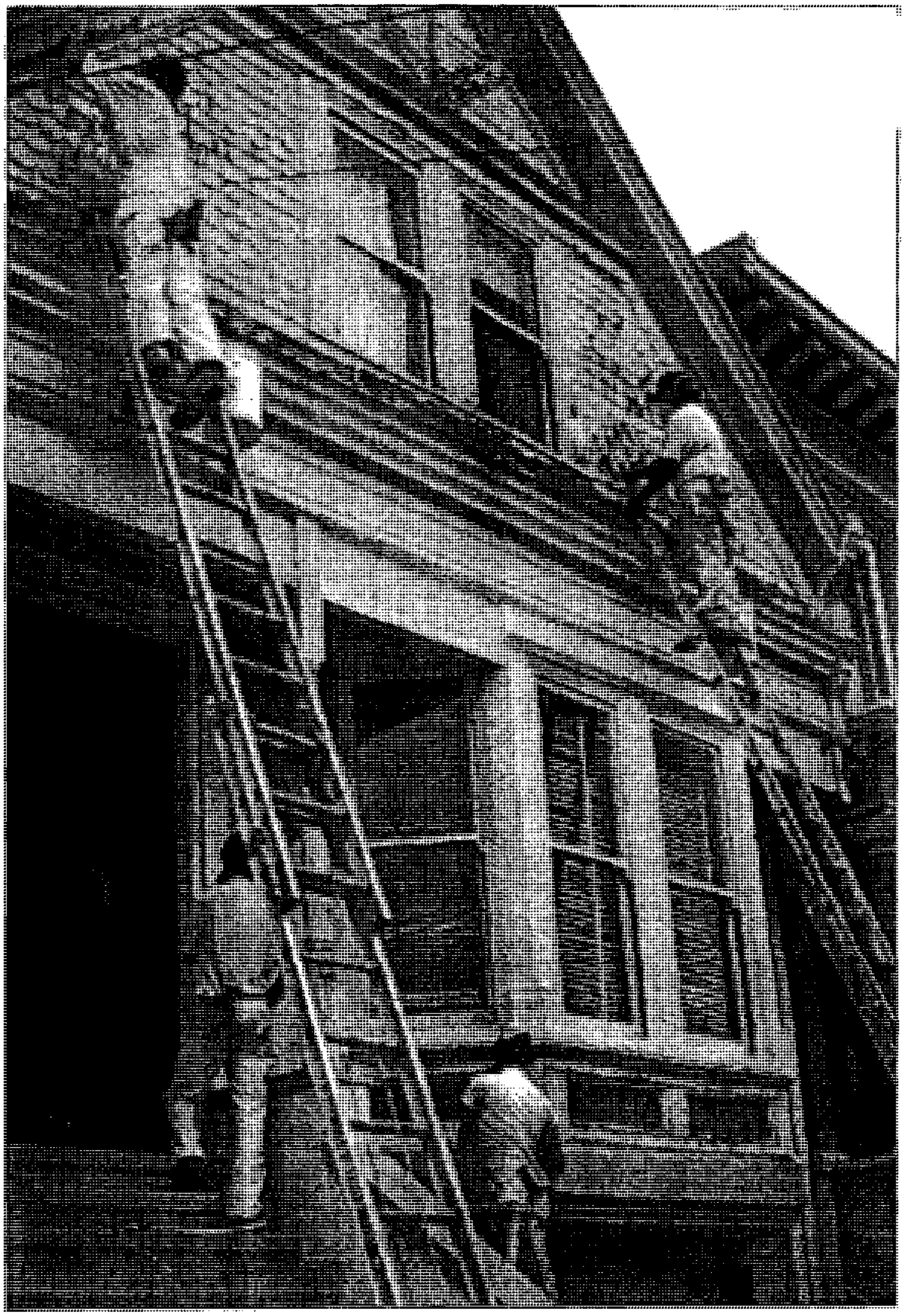
CALIFORNIA PAINTERS PROJECT

Helping Small Business Work Safely with Lead



Occupational Lead Poisoning Prevention Program
California Department of Health Services

FEBRUARY 1998

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EXECUTIVE SUMMARY

The Occupational Lead Poisoning Prevention Program (OLPPP) of the California Department of Health Services (CDHS) provides statewide preventive services aimed at reducing the occurrence of work-related lead poisoning. Its activities include: managing the Occupational Blood Lead Registry; investigating serious cases of lead poisoning in workers; developing educational materials; educating workers, employers, and health professionals; and conducting interventions targeted to specific high risk industries. In October of 1993, OLPPP initiated the California Painters Project (CPP), a two-year effort to design, implement, and evaluate a multi-dimensional intervention research strategy to prevent lead poisoning among a group of lead-exposed painters in the City and County of San Francisco. The CPP was funded by OLPPP and the National Institute for Occupational Safety and Health (NIOSH)/Centers for Disease Control and Prevention.

The purpose of the Project was four-fold: first, to develop and implement a model lead poisoning prevention strategy and evaluate it for its effectiveness with small to medium-sized painting contractors involved in residential and commercial painting activities; second, to develop a step-by-step employer compliance assistance manual; third to generate information on the resources required, problems encountered, and the feasibility and efficacy of the model, and to make recommendations for revisions; fourth, to assess the risk for lead poisoning among a painting workforce engaged in activities that disturb lead-based paint.

BACKGROUND

Residential and commercial painters are at risk of work-related lead poisoning because lead paint is present in the work environment, and their work tasks frequently generate lead dust and fume. Although the U.S. Consumer Product Safety Commission prohibited the addition of lead to paint for use in homes and public buildings in 1978, older buildings are usually coated with at least one, and often more than one, layer of lead-containing paint. These include single family dwellings and apartment buildings, as well as public buildings such as schools, day care centers, offices, and retail and commercial establishments. It is estimated that 3 million homes in California (27% of the housing stock) may have lead-based paint on their exteriors and approximately 1.3 million homes (12% of the housing stock) may have interior lead-based paint (Sutton et al., 1995).

Painters typically spend an extensive amount of time and effort preparing the surface prior to repainting. Surface preparation methods can produce large amounts of fine lead dust or fume. Studies have shown that airborne lead levels in excess of OSHA's Permissible Exposure Limit are generated by power sanding and grinding, dry manual sanding and scraping, heat gun use, and propane torch burning (Booher, 1988; CDHS, 1993; NIOSH, 1992; NIOSH, 1997; OSHA, 1993 [pg. 26612]; Washington State Department of Labor and Industries, 1995; U.S. EPA, 1997; Zedd et al., 1993). Once lead paint dust is released from the surface, workers can inhale it. They can also ingest the lead dust that settles on their hands, clothing, or equipment particularly when they smoke cigarettes, eat, or drink in the work area.

Data on lead poisoning among painters are limited because lead-poisoned workers may not exhibit overt symptoms and blood lead testing is not widespread within the construction industry.

Nevertheless, serious lead poisoning cases (BLLs ranging from 70 to 600 ug/dl) have been documented among house painters who conduct surface preparation without using adequate protective measures (Feldman, 1978; Amitai et al., 1987; Spaedy and Schubert, 1988; Schneitzer et al., 1990).

Surface preparation work by painters not only puts workers at risk, it can also contaminate the building and surrounding property if not done properly. There are numerous case reports and population studies documenting lead poisoning in children attributable to renovation and remodeling work (Marino et al., 1990; Amitai et al., 1987; Rabinowitz et al., 1985; Amitai et al., 1991; Franko et al., 1997). Lead dust brought home by painters on their clothes, shoes, and bodies can contaminate their vehicles and homes and endanger household members. Two recent studies documented lead contamination in the automobiles of abrasive blasters who removed paint at a bridge renovation site and in the automobiles and homes of New Jersey construction workers (Piacitelli et al., 1995; Piacitelli et al., 1997).

Nationwide there are 35,180 painting contractors that employ 160,812 painters (U.S. Department of Labor, 1993). In California, 4,429 painting contractors employ 21,730 painters (U.S. Department of Labor, 1993). These numbers, however, do not represent the entire population of workers at risk. There are many self-employed painters, persons who paint on a temporary, seasonal basis, and others who do painting work for employers who are not painting contractors.

National statistics indicate that the painting trade is dominated by small businesses, with the average painting contractor employing approximately five workers (U.S. Bureau of the Census, 1990). There is often little safety awareness among small business owners, including awareness of applicable OSHA regulations; OSHA does not conduct targeted inspections of businesses with fewer than 10 employees. Lack of resources for health and safety is also an issue for small business owners.

The promulgation of the Cal/OSHA Construction Lead Standard (Title 8 CCR Section 1532.1) only months prior to the start of the Project, heightened awareness of the potential for lead poisoning in the painting trades, and created an environment in which painting contractors, their trade associations, and unions were receptive to participating in the Project. Several other developments influenced the environment in which the Project took place: the enactment in 1992 of the federal Residential Lead-Based Paint Hazard Reduction Act (Title X); the lowering by the CDC of the BLL of concern in children from 25 ug/dl to 10 ug/dl; the passage of the California "Lead-Safe Schools Protection Act" (Chapter 1317, Statutes of 1992); and the passage of California legislation requiring the California Department of Health Services to establish a state program to carry out federal Title X mandates (Chapter 1122, Statutes of 1993). Together, these developments have created a demand for contractors who are knowledgeable about lead-safe painting.

PROJECT DESIGN

The CPP was designed to test the hypothesis that a comprehensive intervention strategy of education, training, and technical assistance, implemented in a step-by-step manner, would be effective in encouraging residential/commercial painting contractors to establish lead safety programs. We also hoped to generate information on the feasibility and efficacy of this strategy in order to make recommendations for replication by others, including state and local health departments.

Several key principles guided the design of the CPP. First, multiple factors which affect health and safety must be addressed simultaneously. Second, both employers and workers must be participants in the intervention in order to bring about significant change at the work site. Third, the Project must either directly provide or facilitate access to the tools and resources necessary for making improvements. Finally, the small business person is most likely to adopt improved health and safety practices when introduced to the material in a stepwise manner and when clear guidance is given concerning the relative importance of specific changes.

RECRUITMENT AND ENROLLMENT OF PARTICIPANTS

Contractors were recruited from the population of licensed residential and commercial painting contractors located in San Francisco. San Francisco was selected as the project site because a large proportion (74%) of the housing stock in San Francisco was built prior to 1978, increasing the likelihood that employee participants would have significant exposure. Eligible companies had to have at least 2 employees who do surface preparation work; work on older buildings likely to contain lead paint; have workers' compensation insurance; and be substantially out of compliance with the Cal/OSHA Construction Lead Standard. OLPPP staff worked with the Painting and Decorating Contractors of America (PDCA) and the International Brotherhood of Painters Union to publicize the Project and recruit participants at local trade association and union meetings, and at the annual PDCA statewide convention.

The final project enrollment was 21 painting contractors, employing 132 surface preparation workers. Participation in the Project was completely voluntary, and contractors and/or workers could drop out of the Project at any time. The State of California Health and Welfare Agency's Committee for the Protection of Human Subjects reviewed and approved the project protocol and procedures for obtaining informed consent, and data collection instruments. Informed consent was obtained from participating contractors and employees.

PROJECT INTERVENTION ACTIVITIES

Project intervention activities took place from June 1994 through November 1994. This time frame was chosen to coincide with the highest seasonal activity period for painters. The Project provided to contractors 32 hours of instruction on how to set up a lead safety program; a nine chapter, step-by-step, lead safety manual developed specifically for participants; and assistance in selecting a medical provider. Participants were also offered industrial hygiene services for conducting airborne exposure monitoring for lead at no cost. Workers received an 8-hour lead training course; a set of easy-to-read fact sheets covering basic lead safety topics; written notification of BLL and ZPP results taken at baseline and post-intervention accompanied by a fact sheet on understanding these tests; and a letter on take-home contamination and specific instructions on how to prevent it. All worker activities, including orientation meetings, structured interviews, training, and written correspondences, were conducted in English, Spanish and Chinese (Cantonese).

An essential part of the CPP was a comprehensive evaluation plan designed to determine whether the Project was implemented as planned (process evaluation), provide feedback from participants during the intervention phase on the quality of activities and materials (formative evaluation), and measure the effect of the intervention on company lead safety programs and worker BLLs (impact evaluation). We set measurable objectives designating the degree of improvement in lead safety practices that we hoped to achieve through our intervention efforts; 27 objectives pertain to employer changes in behavior/work practices and 12 to worker behavior/work practices. Quantitative observations were made over a number of time intervals preceding and following the intervention. These quantitative methods included standardized employer and worker questionnaire interviews on lead safety programs and work practices, and BLL and ZPP testing of lead-exposed workers. We also collected qualitative information in order to arrive at a better understanding of the underlying factors related to the success or failure of intervention activities, and to identify unintended impacts of the Project. Our qualitative methods included focus group discussions with contractors and written and verbal evaluation of employer seminars and worker training sessions.

EXPOSURE RESEARCH

The industrial hygiene monitoring services offered to contractors as a part of the employer intervention activities also provided an opportunity to investigate full-shift and task-specific airborne lead exposures to painters. In the absence, until recently, of a comprehensive Cal/OSHA Construction Lead Standard, few data have been collected on lead exposures to residential and commercial painters. Although limited, these data may be useful to regulatory agencies and others in the future.

RESULTS

Lead Safety

By the end of the Project, participating contractors had made a number of important improvements such as:

- more frequently testing for lead in paint before beginning a job;
- more often selecting the appropriate respirator;
- better containing the spread of lead contamination by sealing windows and doors during exterior work; and
- using safer, more effective clean-up methods.

Workers also made significant improvements in work and personal hygiene practices including:

- more frequently washing before eating, drinking, or smoking;
- less frequently eating, drinking, or smoking in the work area;
- more frequently washing up at the end of the work shift; and
- dry sweeping less frequently.

Data collected one year after the intervention showed that contractors continued to use safer work practices, and in some cases made additional improvements. As could be expected, employers took a longer time to implement practices that required sizable financial investments such as the purchase of HEPA vacuums and HEPA-exhausted power tools.

Contractors were less successful switching from established surface preparation methods to safer methods, maintaining a medical surveillance program and providing new hires with adequate lead safety training.

In addition to changes in work practices, contractors reported changes in their business practices and their relationships with their employees as a result of participating in the CPP. Several contractors have sought work identified as "lead abatement" or have started to advertise their knowledge about lead paint hazards and are receiving referrals for lead-safe work. Contractors reported that employees were more likely to identify where lead paint might be present, consistently take safety precautions, and request the necessary equipment and supplies to complete a job safely.

Airborne Lead Exposure During Surface Preparation

Our air monitoring data show that full-shift airborne lead exposures can exceed the Cal/OSHA Permissible Exposure Limit (PEL) of 50 ug/m^3 during surface preparation work on lead-containing paint. The results of the 25 full-shift samples ranged from 0.8 to 550 micrograms per cubic meter of air (ug/m^3). The average full-shift exposure was 57 ug/m^3. Exposures exceeding the PEL appear to be most likely when dry manual sanding or uncontrolled power sanding are employed. Both of these work methods, but particularly uncontrolled power sanding, were shown to be associated with very high airborne lead exposures. The average short-term (30-minute) sampling result during dry manual sanding was 420 ug/m^3 and 580 ug/m^3 during uncontrolled power sanding. The data also show that HEPA-exhausted power sanding can result in significantly reduced exposures to the worker (90% reduction) when substituted for uncontrolled power sanding.

Blood Lead Levels

BLLs ranged from less than 5 to 38 ug/dl, with a geometric mean of 9 ug/dl at all four times testing was conducted. Two to four percent of painters on all four test dates had a BLL in the 30 to 39 ug/dl range. No participant had a BLL above 40 ug/dl, the level at which Cal/OSHA requires medical evaluation. These BLLs reflect the moderate exposure participants reported in the month prior to testing; on average participants did only a few days (3 to 5) of surface preparation work on buildings likely to contain lead paint in the month prior to blood testing. Although we do not know how the recent lead exposure of our group compares to that of residential/commercial painters as a whole, these results suggest that painters' BLLs are not as high as more continuously exposed worker groups, such as those involved with automotive radiator repair. Still, the average BLL of CPP participants was three times greater than that of the general public.

DISCUSSION

The improvement we saw in many areas indicates that contractors substantially out of compliance with the Cal/OSHA Construction Lead Standard can be successfully encouraged to implement a lead safety program. In general, we were most successful in inducing contractors to make changes that were simple and straightforward, a familiar part of their day-to-day operations, inexpensive or considered reasonably priced. Contractors may have been particularly successful in improving housekeeping and containment practices since these changes can reduce clean-up time and therefore lower long-term labor costs, decrease contractor liability for contamination of the customer's property, and improve customer satisfaction.

Switching from established surface preparation methods to alternative, safer methods proved more difficult for contractors. Contractors may have been reluctant to use alternate surface preparation methods that they believed risked the fundamental quality of their work, thereby threatening customer satisfaction. For example, contractors reported that wet sanding (a safer alternative to dry sanding) was often problematic because it can later lead to problems with underlying moisture.

Contractors were also less successful at maintaining routine blood testing. All of the participating contractors selected an experienced medical provider and 90% sent employees in for scheduled BLL and ZPP testing in August 1994. However, only 57% sent their workers for the next scheduled testing. Still, this achievement is noteworthy, particularly when compared to studies showing that a very low percentage (in one study less than 10%) of employers in lead-using industries conduct routine BLL testing (Rudolph et al., 1990).

Contractors may have made greater improvement in some areas given more feasible work practice alternatives and less costly, more accessible medical services and products. In other areas, contractors may have made greater improvement had we provided more hands-on training to develop comfort with new work practices, or provided training specifically for on-site foremen or supervisors.

REPLICATION OF THE CPP INTERVENTION MODEL

A major goal of the CPP was to develop a lead safety intervention strategy for small to medium-sized residential and commercial painting contractors which could be used by state and local health departments and others. While full implementation of the CPP intervention strategy may not be feasible or appropriate in every situation, the model can be adapted to the needs and resources of local programs. We recommend that state and local health departments and others consider the points below when adapting the model for their use.

The employer seminars appeared to be the most significant project component in achieving desired changes among employers. The use of peer educators, hands-on demonstrations, and participatory training techniques were key to the success of these training efforts. Providing assistance identifying qualified medical surveillance services was instrumental to employers establishing medical surveillance programs. Industrial hygiene consultation and monitoring services, although helpful, could be scaled back if program resources are limited. We recommend that the educational materials developed by the CPP be used rather than developing new materials.

In addition to specific project components, several characteristics of the Project appeared to have a significant impact on the success of the CPP. First, intervening simultaneously with employers and workers led to significant changes at the work site. Approaching employers with an open mind and clearly communicating a willingness to listen and learn, as well as providing opportunities for peer interaction and education, appeared to greatly facilitate the CPP's success. Contractors repeatedly told us that the respectful, non-condescending, open-minded attitude of CPP staff was critical to their efforts, and their employees' efforts, to improve lead safety.

The success of the approach used in the CPP depended on an ability to attract volunteer participants. Local health departments for the most part do not have regulatory authority in the area of occupational health and therefore are in a position to replicate our strategy. The role of the state health department in regulation of the workplace varies from state to state. State health departments which have occupational regulatory responsibilities in addition to their public health responsibilities should consider the effect this may have on their ability to implement a voluntary program. One approach which has been tried by health departments in this situation is to provide limited protection from enforcement action for employers who participate in an intervention program.

Differences in resources and staffing patterns between OLPPP and state and local health departments may also affect the replicability of the CPP in these settings. The CPP was a resource-intensive program and many local health departments may not be able to marshal sufficient resources to implement such a comprehensive model. Throughout the report we have tried to point out areas where activities could be modestly scaled back if necessary.

Another important factor which state and local health departments should consider is their ability to assemble a multi-disciplinary team. Assembling a team of industrial hygienists, health educators, nurses, etc., may be realistic for many state health departments, but most local health departments will find it difficult to compile such a team. Still, local health departments may be able to bring in private consultants or work with other local agencies to bring together the necessary expertise.

CONCLUSION

We conclude based on our initial interviews of painting contractors and their employees that there is likely to be widespread lack of compliance within the industry with the key components of the Cal/OSHA Construction Lead Standard. Our air monitoring data document that airborne lead exposures during surface preparation on lead-containing paint can exceed the Cal/OSHA PEL of 50 ug/m^3; dry manual sanding and uncontrolled power sanding can result in very high exposure levels. While CPP participants' BLLs were lower than those of workers with daily high lead exposure, the average BLL was three times greater than that of the general population.

It is important to note that these BLL results represent a small group of painters who had only moderate exposure to lead paint at the time of our study. Certainly, lead exposure may be higher among painters who concentrate on work in older buildings or painters whose main task is surface preparation. OLPPP and others have found individual residential painters who were seriously lead poisoned following surface preparation without proper controls.

The indication of widespread lack of compliance with the Construction Lead Standard, the evidence of the potential for serious exposure, and the finding that painters' BLLs exceed those of the general population point to the need for education and technical assistance programs/projects for painting contractors and their employees.

Our appraisal of the degree of success of the CPP depends on what *we believe* should have been achieved given our intervention efforts since there are no established performance standards for comprehensive workplace intervention projects or intervention projects which target painters. Unfortunately, there was very little information available to us at the outset on which to base reasonable expectations for improvement. Over the course of the Project it became clear that our expectations were overly optimistic. If we judge the CPP solely on whether we met the objectives we set initially, the CPP was not overwhelmingly successful; employers did not meet 12 of 27 objectives and workers did not meet 9 of 12 objectives. However, such an assessment of the Project masks the extensive improvement that employers and workers made. Looking more closely at the data we find that there was 50% or greater (57% - 84%) improvement in 6 of the 12 areas where employer objectives were not met; of the 9 areas where worker objectives were not met, there was 50% or greater (53% - 82%) improvement in 6 and very close to 50% improvement in the remaining three cases (44%, 48%, 49%). Given that we were attempting to influence a very complex phenomenon, human behavior, our expectations for improvement should have been more modest.

Although we fell short of achieving many of the objectives that we set, we believe that the significant improvement we observed indicates that the CPP intervention strategy of education, training, and technical assistance, implemented in a step-by-step manner, was effective in inducing residential/commercial painting contractors to establish lead safety programs and encouraging workers to use safe work practices. Further, these improvements were sustained.

Our inability to meet employer objectives in the areas of safer surface preparation methods, medical surveillance, and employee training indicates the need for some changes in the intervention approach (e.g., more hands-on training for new work practices) and less costly, more accessible services and products. Approaching employers with an open mind and clearly communicating a willingness to listen and learn from them were critical to the project's success. While effective, full implementation of the CPP intervention strategy may not be feasible for all local and state health departments. For programs choosing to implement a modified version of the CPP strategy, our evaluation provides guidance on where limited resources should be placed and which project components should be emphasized in future intervention projects.

RECOMMENDATIONS

Local and State Health Departments

We recommend that health departments and others interested in replicating or adapting the CPP intervention strategy with painters:

- Adapt this model to fit their target population and the resources available to them keeping in mind that: employer and worker education and training appeared to be the most significant component in achieving improved lead safety; and assistance identifying qualified occupational medical services was essential to employer efforts to establish a medical program.

- Investigate new approaches to addressing the major obstacles to lead safety that we identified through the CPP including: reticence to adopting new work practices and technologies; lack of accessible and affordable medical services; lack of awareness among the public about lead issues; competition from the unlicensed sector and other painters not using lead-safe practices; and variability of enforcement by regulatory agencies.

- Highlight the message that becoming a lead-safe painting company decreases contractors' liability and increases market opportunities.

- Use or adapt educational materials and approaches developed in this Project to raise awareness about lead issues and motivate employers to seek training by accredited training providers.

Occupational Health and Safety Intervention Researchers

We recommend that occupational health and safety intervention researchers and practitioners consider the following points when conducting intervention research.

Our experience in the Project validated much of what has been written regarding effective intervention research efforts:

- Learn as much as possible about the industry prior to beginning the intervention.

- Involve trade associations, unions, and other stakeholders in all phases of the project.

- Base the intervention design on theories in the engineering, sociological, organizational, and behavioral sciences which describe how the project will lead to the desired outcome.

- Use a research design as similar as possible to a true scientific experiment. In most workplace intervention research settings a quasi-experimental design will be necessary.

- Plan to devote significant resources to project evaluation, including follow-up evaluation to determine if changes were sustained or further changes made.

- Develop reasonable performance objectives by which to evaluate the impact of the project.

- Include qualitative evaluation methods to inform and interpret quantitative data.

- Maximize limited occupational health resources by developing intervention projects which can to applied to a larger audience.

Based on our experience, we also propose the following as important to the success of workplace intervention efforts:

- Design comprehensive intervention projects which address the multiple factors which affect workplace health and safety, work simultaneously with employers and workers, provide or facilitate access to tools and resources necessary for making improvements, introduce material in a stepwise manner over an extended period of time, and give clear guidance concerning the relative importance of specific changes.

- Approach employers and workers with respect and an open mind and a willingness to learn from them and adapt the intervention based on their input/feedback.

- Recognize the significance of peer influence and peer support and design projects which include peer education. Use participatory training techniques, including hands-on demonstrations.

- Offer concrete incentives to encourage participation and minimize record keeping tasks and paperwork required for participants.

- For those conducting research in industries where lead exposure is intermittent and highly variable, validate a means for estimating recent lead exposure which minimizes reliance on individual recall and surrogate exposure measures.

Policy Makers

<u>We recommend that policy makers concerned with the prevention of lead poisoning in residential/commercial painting and other industries where small businesses predominate</u>:

- Provide ongoing funding to implement and evaluate new intervention approaches and develop industry-specific educational materials.

- Ensure that free or low-cost education and technical assistance are available to small businesses owners, including painting contractors, to implement lead safety programs in compliance with the OSHA Construction Lead Standard.

- Support stronger enforcement of the OSHA Construction Lead Standard, including targeted inspections.

- Support requirements for state- or EPA-certification of painters (supervisors and/or workers) and/or for painters to use specific lead-safe work practices.

- Promote the development of externally-provided training services for small business owners and their employees that are accessible, affordable, and institutionalized (i.e., available on an on-going basis through educational institutions such as community colleges, union apprenticeship programs, etc.).

- Foster the development of new approaches to the delivery of accessible and affordable, high quality occupational medical services, including lead medical surveillance, to small business owners and their employees.

- Support the development of ongoing financial resources for small business owners for implementation of health and safety improvements.

1. INTRODUCTION

The Occupational Lead Poisoning Prevention Program (OLPPP) of the California Department of Health Services (CDHS) provides statewide preventive services aimed at reducing the occurrence of work-related lead poisoning. Its activities include: managing the Occupational Blood Lead Registry; investigating serious cases of lead poisoning in workers; developing educational materials; educating workers, employers, and health professionals; and conducting interventions targeted to specific high risk industries. In October of 1993, OLPPP initiated the California Painters Project (CPP), a two-year effort to design, implement, and evaluate a multi-dimensional intervention research strategy to prevent lead poisoning among a group of lead-exposed painters in the City and County of San Francisco. The CPP was jointly funded by OLPPP and the National Institute for Occupational Safety and Health (NIOSH)/Centers for Disease Control and Prevention.

The purpose of the Project was four-fold: first, to develop and implement a model lead poisoning prevention strategy and evaluate it for its effectiveness with small to medium-sized painting contractors involved in residential and commercial painting activities; second, to develop a step-by-step employer compliance assistance manual; third, to generate information on the resources required, problems encountered, and the feasibility and efficacy of the model, and to make recommendations for revisions; fourth, to assess the risk for lead poisoning among a painting workforce engaged in activities that disturb lead-based paint.

This report presents a comprehensive record of the design, implementation, evaluation, and results of the Project. In addition, there is a detailed discussion of the results with recommendations as to how the model can be used by state and local health departments and others to prevent lead poisoning in small business environments.

2. BACKGROUND

A. HAZARDS OF SURFACE PREPARATION ON LEAD PAINT

Residential and commercial painters are at risk of work-related lead poisoning because lead paint is present in the work environment, and their work tasks frequently generate lead dust and fume. Older buildings are usually coated with at least one, and often more than one, layer of lead-containing paint. These include single family dwellings and apartment buildings, as well as public buildings such as schools, day care centers, offices, and retail and commercial establishments. Painters typically spend an extensive amount of time and effort preparing the surface prior to repainting. Surface preparation involves sanding, scraping, burning, or otherwise removing old paint that is peeling, flaking, and no longer intact. This ensures that the new primer and paint will form a long-lasting, weather-resistant bond with the surface it is being applied to. The amount of old paint removed during surface preparation depends on its condition. Some areas require total removal of multiple layers of paint, while others may require only light treatment.

Surface preparation methods can produce large amounts of fine lead dust or fume. Studies have shown that airborne lead levels in excess of OSHA's Permissible Exposure Limit are generated by power sanding and grinding, dry manual sanding and scraping, heat gun use, and propane torch burning (Booher, 1988; CDHS, 1993; NIOSH, 1992; NIOSH, 1997; OSHA, 1993 [pg. 26612]; Washington State Department of Labor and Industries, 1995; U.S. EPA, 1997; Zedd et al., 1993). Once lead paint dust is released from the surface, workers can inhale it. They can also ingest the lead dust that settles on their hands, clothing, or equipment, particularly when they smoke cigarettes, eat, or drink in the work area.

Data on lead poisoning among painters are limited because lead-poisoned workers may not exhibit overt symptoms and blood lead testing is not widespread within the construction industry. The Cal/OSHA requirement for blood lead testing in the construction industry did not become effective until 1993 (Title 8 CCR Section 1532.1). Nevertheless, serious lead poisoning cases have been documented among house painters who conduct surface preparation without using adequate protective measures. In a number of studies, sanding, scraping, burning, or sandblasting off lead paint resulted in blood lead levels (BLLs) ranging from 70 to 600 micrograms per deciliter (ug/dl) (Feldman, 1978; Amitai et al., 1987; Spaedy and Schubert, 1988; Schneitzer et al., 1990).

Furthermore, state blood lead registries have identified painters with seriously elevated blood lead levels. A review of data from California's Occupational Blood Lead Registry from 1987 through 1989 showed that applying lead paint or removing it by scraping or sandblasting were the tasks reported to be associated with painters' elevated BLLs (Waller et al., 1992). In Massachusetts, house and bridge painters comprised 36% of construction workers with BLLs exceeding 40 ug/dl, while "deleaders," or residential lead abatement workers who use similar paint removal techniques, accounted for 60% (Rabin et al., 1994).

Building Occupant Exposure

Surface preparation work by painters not only puts workers at risk, it can also contaminate the building and surrounding property if not done properly. This in turn exposes building occupants to lead. The Centers for Disease Control and Prevention have determined that children under age six and pregnant or nursing women are particularly vulnerable to the health effects of lead (CDC, 1991). One report describes four children (BLLs 56 to 87 ug/dl) and two parents (BLLs 33 and 47 ug/dl) who were lead poisoned after paint in their Victorian home was removed with power sanders, heat guns, and torches (Marino et al., 1990). Another case involved four lead poisoned children whose BLLs were further seriously elevated because of paint removal work done by deleaders (Amitai et al., 1987). Two population-based studies showed that repainting or deleading activity in the home was associated with elevated BLLs among children (Rabinowitz et al., 1985; Amitai et al., 1991). A recent New York state study reported 320 children in 1993-1994 with blood lead levels $\geq$20 ug/dl that were attributable to renovation and remodeling work including paint removal; for 42 of the children the work was done by contractors (Franko et al., 1997).

Take-home Exposure

Lead dust brought home by painters on their clothes, shoes, and bodies can contaminate their vehicles and homes and endanger household members. Two recent studies documented lead contamination in the automobiles of abrasive blasters who removed paint at a bridge renovation site and in the automobiles and homes of New Jersey construction workers (Piacitelli et al., 1995; Piacitelli, et al., 1997).

Housing Stock

Lead paint is ubiquitous in older buildings, with the highest lead paint concentrations in structures built before 1950. Typically, lead is found in old paint on interiors and exteriors in areas where it was used to provide long-lasting coverage and corrosion resistance. During the 1960s and 70s, paint companies voluntarily began to reduce lead concentrations in their products. In 1978, the U.S. Consumer Product Safety Commission prohibited the addition of lead to paint for use in homes and public buildings. It is estimated that 3 million homes in California (27% of the housing stock) may have exterior paint with lead levels in excess of 5,000 parts per million (ppm) (Sutton et al., 1995). In addition, approximately 1.3 million homes (12% of the housing stock) may have interior paint with similarly high levels (Sutton et al., 1995). The U.S. Department of Housing and Urban Development defines "lead-based paint" as paint containing at least 5000 ppm of lead by weight (U.S. HUD, 1995). There may also be risks associated with disturbing paint containing lower lead levels.

B. POPULATION OF RESIDENTIAL AND COMMERCIAL PAINTERS AT RISK

Nationwide there are 35,180 painting contractors that employ 160,812 painters (U.S. Department of Labor, 1993). In California, 4,429 painting contractors employ 21,730 painters (U.S. Department of Labor, 1993). In the City and County of San Francisco there are 148 painting contractors (California Employment Development Department, 1993). These numbers, however, do not represent the entire population of workers at risk. There are many self-employed painters, persons who paint on a temporary, seasonal basis, and others who do painting work for employers who are not painting contractors. It is well known that there is a significant "informal" sector of unlicensed persons who paint. In 1990, the Bureau of the Census identified 85,238 people in California who reported "painting" as their occupation, with 2613 residing in San Francisco (U.S. Bureau of the Census, 1990).

In addition to the presence of lead in the work environment and the exposure generated by surface preparation activities, the risk of lead poisoning among painters is exacerbated by the nature of the residential and commercial painting industry. National statistics indicate that the painting trade is dominated by small businesses, with the average painting contractor employing approximately five workers (U.S. Bureau of the Census, 1990). There is often little safety awareness among small business owners, including awareness of applicable OSHA regulations; OSHA does not conduct targeted inspections to businesses with fewer than 10 employees. Lack of resources for health and safety may also be an issue for small business owners. A California study of practices at one residential painting company indicated that simple lead safety measures were not routinely taken by workers. The study found that 82% of painters did not consistently wear respirators while stripping paint, 78% of painters did not consistently wash their hands before lunch, and 79% did not consistently change clothes before leaving work (CDHS, 1993).

C. INTERVENTION MODEL

The CPP was designed to test the hypothesis that a comprehensive intervention strategy of education, training, and technical assistance, implemented in a step-by-step manner, would be effective in encouraging residential/commercial painting contractors to establish lead safety programs and their employees to adopt lead-safe practices. We also hoped to generate information on the feasibility and efficacy of this strategy in order to make recommendations for replication by others. Although it is generally recognized that a holistic approach is more likely to be successful in improving workplace conditions than an intervention that targets a single causal relationship, to date there are few published accounts of workplace interventions attempting to address multiple factors affecting health and safety using a variety of methods.

The CPP intervention model grew out of prior experience conducting an intervention project with small businesses in the radiator repair industry in Los Angeles and San Bernardino counties. It was influenced also by our extensive involvement managing cases of lead poisoning in individual workplaces. The model was also shaped by the ideas and experiences of others conducting workplace interventions, including those published in the literature. Several key principles guided the design of the CPP. First, multiple factors which affect health and safety must be addressed simultaneously. Second, both employers and workers must be participants in the intervention in order to bring about significant change at the worksite. Third, the project must either directly provide or facilitate access to the tools and resources necessary for making improvements. Finally, the small business person is most likely to adopt improved health and safety practices when introduced to the material in a stepwise manner, when clear guidance is given concerning the relative importance of specific changes particularly when there are several possible approaches to choose from to attain the ultimate goal.

The causes of occupational health and safety problems and the barriers to taking action to improve conditions are multiple and complex. Factors which affect health and safety can include ignorance of the hazard; lack of technical knowledge/information about methods for controlling exposures; inaccessible or unaffordable resources and services to address identified problems; competing demands on employers' time and resources; and a lack of motivation to make improvements. There are many more. Addressing a single factor in isolation will be less effective than targeting multiple factors simultaneously, and in some cases this approach may fail completely. For example, educating small business employers about the need for medical surveillance without assisting them in identifying qualified, affordable medical resources will likely be unproductive. Ideally, workplace intervention projects would address all the factors contributing to poor health and safety conditions. In reality, practitioners will be constrained by time and resource limits, and by the technical and economic feasibility of specific improved work and business practices.

Educating workers about the hazards of lead and training them in particular work practices is not sufficient to bring about meaningful change in the workplace. Workers have only limited control over their working conditions. Engineering and work practice controls, appropriate personal protection, medical surveillance programs, etc., must be implemented by the employer. Training workers without addressing these limitations often fails to improve health and safety and frequently leads to worker frustration and cynicism. Intervening with employers and workers simultaneously to improve health and safety offers greater benefits than working with either population alone.

A comprehensive intervention strategy which includes technical assistance in addition to providing information, is more likely to lead to significant changes at the worksite. Providing technical and medical support and other resources is particularly important in the small business environment. Smaller companies rarely have staff dedicated to health and safety. Even when a staff person is assigned to oversee health and safety, this person almost never has had adequate training. Resources for hiring professional consultants to fulfill safety requirements are usually very limited, or nonexistent. Without assistance identifying qualified, affordable, and accessible services, medical providers, and products/equipment, most small businesses will not establish adequate lead safety programs.

Even when technical assistance is provided, establishing a lead safety program can be overwhelming to a small business person. Many small employers do not know where to start when faced with the comprehensive requirements of the Cal/OSHA Lead Standards and may not know where to focus their limited resources for lead safety. In addition, changing established work and business patterns can be disruptive and may be perceived as a threat to the business, particularly if employers feel unsure of the suitability or effectiveness of new methods. To facilitate adoption of new practices, interventions should be designed so that participants can make changes in small steps. New information should be presented in manageable segments over a period of months allowing employers to try out new practices and procedures with as minimal a risk as possible. This step-by-step approach allows the least complex and most easily adopted changes to be introduced first. This early positive experience fosters a willingness to make more complex changes in the future.

Theoretical Basis for Education and Training Methods

The design of individual project components is based on our previous experience and input from Advisory Committee members, but also draws on empowerment and diffusion of innovations theories, and the health belief model of what motivates individuals to take action to prevent disease. Below, we briefly describe these theories and discuss how they are reflected in the project design. The focus of the discussion is the employer seminars and worker training sessions since these specific project components were most influenced by these theories.

Empowerment Theory

Empowerment is an educational philosophy which has as its broad goal enabling students to exercise control over their lives. More specifically, empowerment education seeks to give students the ability to identify and solve problems collectively using their own experience and available resources, rather than teaching students particular behaviors or discrete blocks of information. The goals of empowerment education are accomplished through an approach to teaching and learning which emphasizes student participation, dialogue between trainer and student, problem-solving based on students' real-life experiences, and critical analysis of the organizational causes of problems and obstacles to change. This theory and body of work originated with the work of the Brazilian educator, Paulo Freire (Freire, 1983).

In the field of occupational health and safety, empowerment is most frequently discussed in the context of worker training. However, we incorporated empowerment training methodology into the design and implementation of both the worker and the employer trainings. In the employer seminars, we made a conscious effort to approach contractors with the perspective that they had much to teach us and each other about potential methods of controlling lead hazards, and the feasibility of proposed solutions; contractors were encouraged to share their personal experiences and opinions during scheduled question and discussion periods. Hands-on exercises and demonstrations complemented lectures and slide presentations. Recognizing that empowerment develops over time as individuals gain skills identifying problems and developing solutions, we scheduled employer seminars so that employers could try out new practices and return to discuss their successes, failures, and suggestions for change at the following seminars. Similarly, we included learning exercises such as risk-mapping in worker training to promote critical thinking and problem-solving among the participants. For both groups our approach, on ongoing cycle of listening, dialogue, and action, was to promote the practice of learning through reflection and action.

Diffusion and Adoption of Innovations Theory

The diffusion and adoption of innovations theory describes the process by which new ideas or practices are propagated and gain acceptance by groups of people (Rothman, 1974). The theory delineates certain conditions that will facilitate change among members of a group, organization, or community toward which an innovation is directed.

While many of the principles of diffusion theory may seem obvious to occupational health and safety practitioners, in our experience we and others frequently overlook them when designing and implementing intervention projects. Among the important principles that are reflected in the CPP design are the significance of peer influence and the support of "opinion leaders" in adopting new practices; the importance of creating opportunities for the target population to experience the innovation rather than relying on oral or written transmission of information; the importance of minimizing the risk for the target population by formulating a project so that participants can "try out" an innovation before adopting it completely; and the need to convey a clear, accessible message, at times sacrificing a complete, but complex, explanation of a particular issue, for a simpler one that conveys its essential character.

The employer seminars illustrate how several of these principles were incorporated into the design of the project. Employer seminars took a step-by-step approach, presenting contractors with new information in manageable segments over a period of months and using participatory exercises and hands-on demonstrations instead of lectures, whenever possible. These demonstrations allowed participants to become familiar with new and modified equipment and alternative work practices before trying them on the job. We also took a pragmatic approach when presenting the requirements of the Construction Lead Standard to employers. Recognizing that small businesses usually have limited resources for health and safety, we believed it was important to set priorities with employers, emphasizing some requirements while downplaying others.

Diffusion theory also predicts that individuals are more likely to adopt new practices when they have an opportunity to discuss the innovation with other members of their peer group. We designed the seminars with time for questions and discussion following presentation of new information and allowed sufficient time between seminars for contractors to digest the information and begin to implement new practices. At the following seminar, participants had the opportunity to discuss personal experiences implementing improved work practices and to provide each other with suggestions and advice. We also hired a peer educator, a painting contractor who had implemented many aspects of a lead safety program, to bring direct personal experience to the seminars.

Health Belief Model

The Health Belief Model maintains that in order for individuals to take action to avoid disease they need to believe (1) that they are susceptible to it; (2) that the disease would have at least a moderate negative effect on some part of their lives; and (3) that taking a particular action would in fact be beneficial by lowering susceptibility to, or decreasing severity of, the disease (Rosenstock, 1974).

We were cognizant of these motivating factors while recruiting participants and developing the message conveyed during employer seminars and worker training, and in creating educational materials. For example, our recruitment message focused on convincing potential participants of the need for establishing lead safety programs (increased public awareness of lead hazards; promulgation of the Cal/OSHA Construction Lead Standard) and emphasized the health benefits to employers and workers and the potential for future business opportunities for prepared contractors.

Summary

In summary, the basis of the overall architecture of the CPP intervention model is empirical - i.e., based on our prior experience conducting an intervention project in another industry dominated by small businesses and the experiences of other occupational health practitioners. The design and implementation of the employer and worker education and training activities is largely informed by the theories of empowerment education and diffusion of innovations and by the health belief model of individuals' behavior.

3. PROJECT OVERVIEW

The California Painters Project had four phases:

- project development and recruitment/enrollment of participants
- intervention activities
- evaluation of the conduct and impact of the Project
- dissemination of project results and training materials

This section provides a brief overview of each of these phases, as well as a description of the regulatory context in which the Project took place.

A. BACKGROUND

The promulgation of the Cal/OSHA Construction Lead Standard (Title 8 CCR Section 1532.1) only months prior to the start of the Project, heightened awareness of the potential for lead poisoning in the painting trades, and created an environment in which painting contractors, their trade associations, and employee unions were receptive to participating in the Project. The Standard has comprehensive requirements governing lead use in the workplace, including providing employees with appropriate personal protective equipment and personal hygiene facilities, establishing and maintaining a medical surveillance program, and training employees about lead hazards and safe work practices. The CPP offered contractors direct assistance in establishing a lead safety program and complying with their new responsibilities under the Standard.

Several other developments influenced the environment in which the Project took place: the enactment in 1992 of the federal Residential Lead-Based Paint Hazard Reduction Act (Title X); the lowering by the CDC of the BLL of concern in children from 25 ug/dl to 10 ug/dl; the passage of the California "Lead-Safe Schools Protection Act" (Chapter 1317, Statutes of 1992); and the passage of California legislation requiring the California Department of Health Services to establish a state program to carry out federal Title X mandates (Chapter 1122, Statutes of 1993; also known as Assembly Bill 383).

CDC's lowering of the BLL of concern greatly increases the number of children considered lead poisoned or at risk for lead poisoning and requires expanded efforts to reduce lead hazards in housing. Title X provides federal resources for reducing lead hazards in federally owned/associated housing and low-income private housing. CDHS provides funding to local health departments for investigation of cases of lead poisoning as well as for education and prevention activities.

In order that lead-safe housing be produced without harming residents and workers or increasing environmental lead contamination, Title X directed the U.S. Environmental Protection Agency (EPA) to promulgate regulations on accreditation of training programs and training and certification of individuals and contractors engaging in lead-based paint evaluation and hazard reduction activities. Implementation of accreditation and certification programs was delegated to the states. To comply with federal requirements set forth in Title X, the "Lead Accreditation and Certification Program" was established in CDHS through legislation (Chapter 1122, Statutes of 1993). This law also requires that Cal/OSHA incorporate the CDHS training and certification requirements in the Cal/OSHA Construction Lead Standard.

The Lead-Safe Schools Protection Act mandates that public schools and day care centers use trained and certified contractors and workers when doing any lead-related construction work. It also directs CDHS to conduct a survey of schools and day care centers to identify risk factors that predict lead contamination. The law requires CDHS to work with the State Department of Education to design and implement a plan to minimize hazards in schools and day care centers.

These conditions, the availability of government funding for residential lead paint reduction activities coupled with requirements that contractors and workers be certified to perform lead-related construction work in certain situations, have created a demand for contractors who are knowledgeable about lead-safe painting.

B. PROJECT DEVELOPMENT

Project development began in the summer of 1993. OLPPP sought input from the target population in this process by establishing an Advisory Committee composed of key "stakeholders." Advisory Committee members included representatives from trade associations, employee unions, local health departments, and others (see Appendix 2 for a complete listing of members). Staff carefully considered the technological and economic feasibility of their recommendations when designing employer seminars, developing a lead safety manual, and providing technical assistance to participating contractors. In addition, OLPPP continually sought feedback from contractors, workers, and Committee members during the implementation of the Project. In response to this feedback, project staff modified elements of the Project as needed.

C. RECRUITMENT AND ENROLLMENT OF PARTICIPANTS

Contractors were recruited from the population of licensed residential and commercial painting contractors located in San Francisco who were classified under the Standard Industrial Classification Code (SIC) 1721 (Painting and Paper Hanging) on the California Employment Development Department (EDD) list of companies with employees. The subset of contractors eligible to participate was identified through a screening questionnaire administered by mail. Eligible companies had to have at least 2 employees who do surface preparation work; work on older buildings likely to contain lead paint; have workers' compensation insurance; and be substantially out of compliance with the Cal/OSHA Construction Lead Standard. All eligible companies were invited to a meeting where the purpose and benefits of the Project were described and interested companies enrolled. Twenty-one painting contractors, employing 132 surface preparation workers, were enrolled in the Project. Participation in the Project was completely voluntary, and contractors and/or workers could drop out of the Project at any time.

D. PROJECT INTERVENTION ACTIVITIES

Project intervention activities took place from June 1994 through November 1994. This time frame was chosen to coincide with the highest seasonal activity period for painters. Several different intervention methods were employed: education, training, technical assistance, and provision of educational materials. These intervention activities were designed to:

- increase knowledge of lead hazards among employers and workers;
- increase employer compliance with the Cal/OSHA Construction Lead Standard;
- increase the use of safe work, housekeeping, and personal hygiene practices;
- promote proper respirator selection, fit-testing, fit-checking, and medical clearance;
- promote implementation of a lead medical surveillance program.

Employer Intervention Activities

The Project provided to contractors 32 hours of instruction on how to set up a lead safety program; a nine-chapter, step-by-step, lead safety manual developed specifically for participants; and assistance in selecting a medical provider. Participants were also encouraged to invite the staff industrial hygienist (IH) to visit a job site while surface preparation on lead containing paint was being performed. During the visit, the IH conducted airborne exposure monitoring for lead and made recommendations on lead-safe work practices. These services were provided at no cost to the contractor.

Worker Intervention Activities

Workers received an 8-hour lead training course; a set of easy-to-read fact sheets covering basic lead safety topics; written notification of BLL and ZPP results taken at baseline and post-intervention accompanied by a fact sheet on understanding these tests; and a letter on take-home contamination and specific instructions on how to prevent it. All worker activities, including orientation meetings, structured interviews, training, and written correspondences, were conducted in English, Spanish and Chinese (Cantonese).

E. EXPOSURE RESEARCH

The industrial hygiene monitoring services offered to contractors as a part of the employer intervention activities (see above) also provided us with an opportunity to investigate full-shift and task-specific airborne lead exposures to painters. The research objectives of the exposure monitoring were to collect data on airborne lead exposure associated with specific surface preparation tasks and other relevant conditions, and to document work practices associated with the monitored airborne exposures. In the absence, until recently, of a comprehensive Cal/OSHA Construction Lead Standard, few data have been collected on lead exposures to residential and commercial painters. The CPP provided the opportunity to generate data that, although limited, may be useful to regulatory agencies and others in the future.

F. PROJECT EVALUATION DESIGN AND ACTIVITIES

An essential part of the CPP was a comprehensive evaluation plan designed to determine whether the Project was implemented as planned (process evaluation), provide feedback from participants during the intervention phase on the quality of activities and materials (formative evaluation), and measure the effect of the intervention on company lead safety programs and worker BLLs (impact evaluation). Quantitative observations were made over a number of time intervals preceding and following the intervention. These quantitative methods included standardized employer and worker questionnaires on lead safety programs and work practices, and BLL and ZPP testing of lead-exposed workers. We also collected qualitative information in order to arrive at a better understanding of the underlying factors related to the success or failure of intervention activities, and to identify unintended impacts of the Project. Our qualitative methods included focus group discussions with contractors and written and verbal evaluation of training seminars.

G. DISSEMINATION OF RESULTS AND MATERIALS

The Project's final results and recommendations were communicated both orally and in writing to employer participants in 1998. Written summaries were created in English, Spanish, and Chinese (Cantonese) languages at the appropriate literacy level and mailed to the worker participants at the same time. An executive summary of the final results and recommendations was sent to appropriate federal, state, and local county agencies, industry trade associations and employer organizations, national, state, and local unions and worker health and safety organizations, public health and occupational health care provider organizations, community based organizations, and professional and university based organizations.

The educational materials developed as part of the Project include: the manual, *Painting Contractor's Guide to Lead Safety*; worker tailgate training materials in English, Spanish, Chinese; and a brochure, *Protecting Your Family from Lead Paint Hazards*, for use by trained and certified contractors. The availability of the Project's educational materials has previously been announced to the types of organizations listed above. The primary dissemination of these educational materials has been through an on-going series of OLPPP-sponsored lead safety seminars throughout California for painting and general contractors.

H. TIMELINE

Project activities took place from the fall of 1993 through the summer of 1995 and are briefly described here.

October 1993 - May 1994

- project design, human subjects approval, and early development of educational materials
- outreach, recruitment and enrollment of project participants

June 1994

- collection of employer and employee baseline data through questionnaire and BLLs

June 1994 - November 1994

- employer and employee intervention activities
- mid-project BLLs
- process, formative, and impact evaluation data collected by questionnaire; BLLs

March 1995 - August 1995

- focus group conducted
- administration of one-year follow-up questionnaire; employer-sponsored BLLs collected

September 1995 - Winter 1998

- data analysis, project evaluation, report writing, presentation of results to participants
- dissemination of results, educational materials, etc.

4. IDENTIFICATION, RECRUITMENT, AND ENROLLMENT OF PARTICIPANTS

A. IDENTIFICATION OF PAINTING CONTRACTORS

Contractors were recruited from the population of licensed residential and commercial painting contractors located in San Francisco, California. Contractors were identified from the California Employment Development Department's list of employers classified under Standard Industrial Classification (SIC) Code 1721: Painting and Paper Hanging (First Quarter, 1993). EDD is believed to be the most complete and reliable source for identifying California employers by SIC Code. The EDD list is composed of employers who pay into the state's unemployment insurance system and therefore is unlikely to include unlicensed contractors. Recognizing that unlicensed contractors would be unlikely to participate in a project sponsored by a state agency, we did not attempt the more difficult task of identifying them through another source.

The EDD list identified 148 painting companies in San Francisco. When we compared this number with the number of San Francisco painting companies listed in a commercial marketing database, there was good agreement (148 vs. 155[1]). Thus, we are confident that the universe of potential participants was adequately identified.

B. SELECTION OF THE SUBSET OF ELIGIBLE CONTRACTORS

Due to limited program resources and the pilot nature of the Project, we decided not to invite all 148 contractors to participate, but rather, to select a subset of contractors based on clearly defined eligibility criteria. Our objectives in developing criteria for inclusion in the Project were to select a group of contractors who: 1) were substantially out of compliance with the Cal/OSHA Construction Lead Standard; and, 2) were likely to yield the greatest number of employee participants significantly exposed to lead.

Eligibility Criteria

The criteria for inclusion in the study were:

- residential and/or commercial painting contractor (classified SIC 1721) located in San Francisco
- two or more employees engaged in surface preparation work
- eighty percent or more of the contractor's work in the previous 12 months involved buildings constructed after 1978
- substantial non-compliance with the Cal/OSHA Construction Lead Standard

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[1] Data from D&B MarketPlace, Version 2.0, January - March 1996.

- covered by workers' compensation insurance[2]

San Francisco was selected as the project site because a large proportion (74%) of the housing stock in San Francisco was built prior to 1978, increasing the likelihood that employee participants would have significant lead exposure. In addition, the proximity of San Francisco to the program office made this location cost effective.

We initially excluded companies with fewer than two surface preparation workers in order to maximize the number of employee participants without increasing the number of employers. Program resources limited the number of painting contractors we could accommodate in the Project.

Since the purpose of the Project was to develop a model intervention strategy for assisting small painting contractors in complying with the Standard, companies already in compliance with the Standard were not eligible for participation. A company's self-reported history of employee blood lead level testing and airborne lead exposure monitoring was used as a surrogate indicator of compliance. Companies were excluded from participation if they reported that in the previous 12 months they had done exposure monitoring, and had done BLL testing two or more times.

Development and Administration of Eligibility Screening Questionnaire

On February 22, 1994, a screening questionnaire (see Appendix 3; English and Spanish versions) was mailed to the 148 employers identified by the EDD list. The questionnaire was designed to gather basic information on employer demographics, type of painting work, and history of blood lead testing and air monitoring in order to determine eligibility for inclusion in the Project. The screening questionnaire also gathered information on membership in the Painting and Decorating Contractors of America (the main trade association); company size; and presence or absence of a union. Although this information was not used to determine eligibility, it allowed us to more fully characterize the population of eligible employers.

On March 9, 1994, a second copy of the questionnaire was mailed to all companies that had not responded to the first questionnaire. We made one attempt to contact by telephone companies that did not respond to either mailing.

Summary of Screening Questionnaire Results

The Post Office returned 21 questionnaires because they were undeliverable. After attempting, and failing, to obtain a valid phone number and address from the telephone directory or directory assistance, we categorized these 21 as "unable to locate." Therefore, the total number of "companies located" (2 mailings, one phone contact) was 127.

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[2] Workers' compensation insurance coverage was required because of the potential for identifying a lead poisoned worker requiring medical care through project sponsored BLL testing. No contractors had to be excluded due to lack of insurance coverage.

Of the 127 companies located, 22 (17%) did not respond and 4 (3%) refused to complete the questionnaire. Of the 101 companies completing a screening questionnaire, we judged 37 (30%) ineligible to participate based on information the company supplied: 9 companies were not located in San Francisco, 4 were not painting contractors, 2 were no longer in business, 15 had no, or only one, surface preparation employee, and 7 worked primarily on newer (post-1978) buildings. We did not have to exclude any companies because they lacked workers' compensation insurance or were substantially in compliance with the Cal/OSHA Construction Lead Standard. The remaining 64 companies (50%) were judged eligible to participate in the Project (Table 4.1).

TABLE 4.1

COHORT SELECTION

		Number of Companies	Percent of Total
Potentially Eligible Companies (City & County of SF; SIC 1721, with employees)		148	
Unable to Locate		<21>	
Number of Companies Located		127	100
Non-respondent		<22>	17
Refusals		<4>	3
Number of Respondents		101	
Ineligible Companies		<37>	30
Not Located in SF	9		
Not Painting Contractors	4		
No Longer in Business	2		
No Employees	4		
Only 1 Surface Preparation Employee	11		
Over 80% Work on Post-1978 Buildings	7		
Eligible to Participate		64	50

Overall response rate: 101 questionnaires returned of 127 companies which could be located = 80%

C. RECRUITMENT AND ENROLLMENT OF ELIGIBLE CONTRACTORS

Outreach

OLPPP staff worked with the Painting and Decorating Contractors of America (PDCA) and the International Brotherhood of Painters Union to publicize the Project at local trade association and union meetings, and at the annual PDCA statewide convention. Staff presentations at these meetings encouraged participation by emphasizing the benefits to employers and employees of participating in the Project, as well as the potential for future business opportunities for the prepared contractor as both consumer demand and federal funding for safe lead paint hazard reduction work grows.

Recruitment of Eligible Contractors

On April 28, 1994 we mailed a letter to all 64 eligible companies which described the Project and invited contractors to attend an informational meeting on May 14, 1994 (see Appendix 3). The meeting's purpose was to introduce potential participants to the Project, describe the benefits of participating, and encourage enrollment. Representatives from 22 companies attended the meeting; 8 enrolled in the Project at that time.

Between May 15 and May 30, 1994, we tried to contact by telephone all eligible companies, both those who attended the May 14 meeting and those who did not attend. During this phone conversation, we explained the Project and encouraged enrollment. In addition to the phone contact, we mailed an information packet to all contractors who had not attended the meeting (see Appendix 4). Written information was provided so that a contractor could make an informed decision about participation in the Project. We enrolled an additional fifteen contractors through telephone follow-up.

Final Project Enrollment

Twenty-three companies with 139 surface preparation employees were enrolled in the Project. One contractor was dropped from the Project at the baseline for bringing only a few surface preparation employees to the screening and failing to attend the first Employer Seminar. Another contractor dropped out of the Project a month later after going out of business for economic reasons. The final project enrollment was 21 contractors employing 132 surface preparation workers. Twelve of the 132 surface preparation workers were also owners who do preparation work themselves.

D. HUMAN SUBJECTS APPROVAL AND INFORMED CONSENT

The State of California Health and Welfare Agency's Committee for the Protection of Human Subjects reviewed the project protocol and procedures for obtaining informed consent, and granted approval on December 3, 1993. Approval of data collection instruments was granted at subsequent Committee meetings.

At the baseline screening, employers who had agreed to participate had another opportunity to ask questions about the Project before being asked to give final consent. After answering any remaining questions, project staff asked each contractor to read and sign an informed consent form (see Appendix 5). Each contractor was given a copy of the consent form for their own use.

Informed consent was also obtained from participating surface preparation employees (see Appendix 6). Employees were given an overview of the Project and had an opportunity to have questions answered in a group orientation meeting held at the baseline screening. Employers did not attend this meeting. After the meeting, employees met one-on-one with project staff who explained the consent form and answered any additional questions the employee had. Each employee who consented to participate in the Project and to have blood drawn received a copy of their signed consent form. Employers who did surface preparation work themselves also signed an employee consent form. Only one employee who attended the orientation declined to participate in the Project.

5. EMPLOYER INTERVENTION METHODS

A. INTRODUCTION

Typically, small business owners have an incomplete understanding of lead hazards and how to control them, and have limited or no health and safety resources. CPP employer intervention strategies were aimed at promoting adoption of improved lead safety through education, training, technical assistance and providing other needed health and safety resources. Specifically, the CPP conducted a series of educational seminars for participating contractors, developed a step-by-step employer lead safety manual, provided direct assistance to contractors in locating a competent medical supervisor, and offered on-site industrial hygiene consultations and air monitoring services free of charge. Each of these strategies is discussed in detail below.

B. EDUCATIONAL SEMINARS

Overview

The Project's primary method of improving workplace conditions through changes in employer behavior was a series of four educational seminars attended by all participating painting contractors. The seminars presented all essential information needed to understand why a comprehensive lead safety program is necessary and how to implement one.

Three of the seminars were held for eight hours on Saturdays in June, August, and October 1994. An additional seminar was added and took place for three hours on a weekday evening in October. Contractors were given advance notice of the date and time of each seminar through a written invitation and a follow-up telephone call a few days before each seminar as a reminder. Each participating company was expected to have the same representative attend all four seminars. Contractors were also encouraged to bring any other key personnel, e.g., foremen, co-owners, or estimators. The seminars were held in rented space in a San Francisco community center with adequate room for all activities, including outdoor exercises and demonstrations, and ample parking.

One important incentive for attendance was that contractors who attended the 32 hours of training provided by the Project would be eligible to apply to the Department of Health Services for interim certification as a supervisor of lead-related construction work. Together the four seminars comprised the bulk of the 32 hours of lead safety training; the remaining hours came from individual instruction and consultation during site visits (see below). In two cases we offered scaled back make-up sessions on alternate days for a few contractors who had prior commitments and requested special arrangements to receive training.

Topics Covered

Project staff followed the sequence of chapters in the *Painting Contractor's Guide to Lead Safety* when developing the seminars. Our goal was to teach employers about the most essential pieces of a lead safety program during the first two seminars so that they could immediately begin to implement the new practices and discuss their progress at subsequent seminars. The three full-day seminars were scheduled at approximately eight week intervals to allow sufficient time for employers to implement the suggested action items from each chapter of the manual that was covered. In addition to the material included in the manual, we presented information on a number of other areas that were identified as being important either by OLPPP staff or the contractors. (See Appendix 7 for seminar agendas.)

Educational Methods

OLPPP selected training methods for the employer seminars based on adult education principles regarding which methods are most effective with adult audiences. These included:

- minimizing use of lectures;
- accompanying lectures with graphics and visuals (slides, overheads, handouts);
- allowing ample time for questions, answers, and discussion; and
- maximizing use of hands-on, participatory exercises and demonstrations.

For example, after quick demonstration and presentation, employers were given the opportunity to practice methods of testing lead in paint (colorimetric tests, paint chip sampling), using plastic sheeting for containment, and fit testing respirators using irritant smoke. This ensured that each employer received hands-on training with new techniques and types of equipment, many of which were initially quite unfamiliar. Similarly, we invited vendors to display and demonstrate equipment such as HEPA vacuums, vacuum-exhausted power tools, and protective equipment and clothing. In the final seminar, we had employers work in small groups to develop bids for specific lead jobs that would adequately reflect the costs of completing the job using newly acquired lead-safe practices and equipment.

Personnel

Producing four comprehensive employer seminars required the expertise of individuals from a variety of disciplines. Approximately two-thirds of seminar material was presented or facilitated by project staff, including two health educators, two industrial hygienists, an occupational health nurse practitioner, and an occupational/environmental health specialist.

Certain key areas, including certain "real world" aspects of working as a lead-safe contractor, insurance and liability issues, and environmental issues and regulations, could not be presented effectively by project staff and required the use of outside speakers. The most important of these instructors was a painting contractor who was not a project participant but had previously attended a 40-hour lead abatement training course and was actively using many of the lead-safe practices we wanted to teach to contractor participants. He demonstrated containment methods, discussed how he approaches a job involving lead paint, suggested ways of raising the issue with customers when bidding a job, and described which specific practices he has incorporated into the way he works. His contribution as a "peer educator" was invaluable. Other outside speakers and presenters included vendors of surface preparation and safety equipment who provided information about how their equipment is used by other contractors. To inform contractors about the health and safety services offered by workers' compensation carriers, we invited a speaker from the California Department of Industrial Relations who explained what services insurance companies are required to provide. An industrial hygienist from a state-affiliated insurance carrier that covers a large number of painting companies also presented key information.

There was a high level of interest among project participants about contractor liability. We invited an attorney with extensive experience in this area to address the issue and to present options for minimizing liability and obtaining contractor liability insurance. Similarly, we identified speakers from a number of environmental agencies, including the San Francisco Hazardous Waste Management Program, California Regional Water Quality Control Board, and San Francisco Water Pollution Prevention Program to cover environmental issues.

C. THE PAINTING CONTRACTOR'S GUIDE TO LEAD SAFETY

The development and distribution of a pilot manual entitled "Painting Contractor's Guide to Lead Safety" constituted a major element of the intervention with employers. The content and structure of the manual closely paralleled that of the employer seminars. At the beginning of each of the four employer seminars, the pertinent manual chapters were distributed and then used to reinforce and complement instruction.

The manual's primary focus is on how to institute and maintain an effective lead safety program. The manual consists of nine chapters plus appendices (see Appendix 8 for table of contents). The chapters present information in a step-by-step manner, following a logical sequence in which each chapter builds on material previously presented. The appendices contain reference material such as background material on the history of lead, general resource information for employers on the issue of occupational health and safety, and the full text of the Cal/OSHA Construction Lead Standard.

In the area of worker protection, the manual emphasizes issues that OLPPP believes are most important to prevent lead poisoning: hazard determination, the selection of low exposure work methods, proper respiratory protection, hygiene and housekeeping, medical surveillance and training; and to a lesser extent, airborne exposure monitoring. In the area of contamination control the manual emphasizes: selection of work methods that do not spread contamination, containment, housekeeping and cleanup, proper waste disposal, training; and to a lesser extent, wipe sampling. It does not strictly follow the logic of the Cal/OSHA Construction Lead Standard with its emphasis on airborne exposure monitoring as the trigger for protective measures. However, implementing the recommendations contained in the manual will bring the contractor into compliance with most aspects of the Standard.

Each chapter is followed by a "Resources and Tools" section which contains resources designed to aid the contractor in implementing key aspects of the lead safety program. For example, the Resources and Tools section which follows Chapter 3 on medical issues contains a model medical surveillance contract, forms to aid in tracking employees' BLL and ZPP levels, and forms to use in presenting employees with written notification of their blood testing results.

OLPPP staff wrote and produced the manual collaboratively, with primary authorship of each chapter assigned to a particular member of the OLPPP staff who had professional expertise in that area. After numerous revisions based on staff input, chapter drafts were reviewed by members of the project Advisory Committee, sent to other health and safety professionals and painters for comment, and edited professionally to ensure consistency of style.

D. ASSISTANCE IN ESTABLISHING A MEDICAL SURVEILLANCE PROGRAM

One of the biggest challenges for a small business is successfully locating and contracting with a medical supervisor. To facilitate establishment of a lead medical surveillance program, OLPPP staff contacted local occupational medicine clinics to explain the Project and find out which services were offered. Those willing to serve as medical supervisors for painting contractors were asked to develop a price list for the different services commonly required for lead medical surveillance. Language capabilities were also noted. A list of clinics providing these services was then compiled.

After the first employer seminar, during which the concept of lead medical surveillance was introduced and the need to establish a medical supervisor for the company was discussed, the employers were given the list described above along with the option of choosing a physician not on the list. The employers were also given a copy of a model contract delineating the mutual responsibilities of employer and physician medical supervisor to meet the requirements of the Cal/OSHA Construction Lead Standard and to provide appropriate care for lead-exposed workers.

The Cal/OSHA Construction Lead Standard requires that employers provide BLL and ZPP testing at least every 2 months for the first six months and every six months thereafter. Keeping with this schedule, participating workers were due for testing in August 1994, two months after the baseline testing provided by the Project. We communicated to contractors that we expected them to identify a medical provider by August and to arrange and pay for this mid-project testing.

The first contractor to establish a medical surveillance program chose the University of California at San Francisco/San Francisco General Hospital (UCSF/SFGH) Occupational Medicine Clinic as his company's medical supervisor. He also took the initiative to negotiate group pricing for clinic services and notified the other CPP participants of this opportunity to minimize costs. Subsequently, all CPP contractors chose the UCSF/SFGH Clinic to provide the necessary services. The UCSF/SFGH Clinic offered services either at the workplace or at the clinic.

E. INDUSTRIAL HYGIENE MONITORING AND CONSULTATION SERVICES

All participating contractors were encouraged to invite the staff industrial hygienist to visit a job site where surface preparation on lead-containing paint was being performed. The site visits were offered free of charge to participating contractors and were intended to meet both intervention and research objectives.

Eleven of the 21 contractors in the Project requested and received an on-site visit between August 29, 1994 and October 25, 1994. During the site visit, the industrial hygienist observed the work and made recommendations to the contractor on issues related to on-site lead safety. The industrial hygienist also demonstrated paint chip bulk sampling and air sampling to the contractor. The intent of these on-site intervention activities was to supplement the information being presented in the seminars in a one-on-one context and in a manner that took into account the particular problems associated with a specific painting job.

As part of the research effort, the Project used site visits to conduct airborne exposure monitoring and paint chip bulk sampling. The goals were to collect full-shift airborne lead measurements for comparison to the PEL and task-specific, short-term measurements during a variety of surface preparation activities. The protocol used for air and paint chip bulk sampling is discussed in Chapter 8, Sections B and C.

6. WORKER INTERVENTION METHODS

A. INTRODUCTION

A variety of intervention activities were used to educate worker participants in the Project about lead hazards and to train them in the use of safer work practices. The primary intervention method was an 8-hour lead safety course designed to train workers to identify lead hazards, learn safer work methods, and understand their rights and their employer's responsibilities under the Cal/OSHA Construction Lead Standard. Additional activities included written correspondence regarding prevention of take-home lead exposure, notification of preliminary blood testing results from the baseline and post-intervention screenings, and technical assistance and phone consultation with individual workers as requested. Details of each activity are discussed below.

In designing and developing all aspects of the worker intervention, OLPPP staff gave special consideration to basic principles of adult education as well as literacy concerns. Adults are most motivated to learn when the information presented has some immediate importance for and application to their personal lives or their work. Furthermore, adults bring a wealth of experience and knowledge to the classroom. Recognizing the value of each participant's experience and designing a curriculum that draws upon that experience were key elements of OLPPP's approach to worker training.

In addition, the worker training curriculum and accompanying written educational materials were developed to allow participation and comprehension by workers with varying levels of reading and writing ability. A recent study estimated that almost half of all American adults have difficulty with basic reading, math and reasoning skills (U.S. Department of Education, 1993). OLPPP addressed this challenge by developing and adapting training methods to rely less on workers' reading skills and by making written technical information more readable for all participants.

B. TRAINING

Curriculum Development

OLPPP staff developed an 8-hour lead safety training curriculum for workers. Training methods were selected to maximize participation and to draw on participants' experience as painters and, in some cases, previous lead-related construction experience. The training agenda was designed to meet current Cal/OSHA training requirements for lead-exposed construction workers (see Appendix 9 for training agenda).

A variety of interactive, participatory training methods were used. These included risk mapping, brainstorming, problem-solving exercises, case studies, role plays, small group discussion, and demonstration. In addition, workers were guided in hands-on practice putting on and taking off a respirator, performing positive and negative pressure fit checks, using Tyvek and other protective clothing properly, and handling HEPA vacuums and vacuum-exhausted power tools. The small class size of fewer than 20 participants and the interactive nature of the training methodology created a lively learning environment that allowed for exchange of ideas and experiences.

Training Sessions

Eight full-day worker training sessions were offered in July and August of 1994; 5 were conducted in English, 2 in Spanish, and 1 in Chinese (Cantonese). Workers attended training on work time, and work crews from the same company were encouraged to attend the same session so that they could work together during the exercises and activities. A total of 94 workers attended the training. A number of project participants did not attend the training because they had previously received lead abatement training. Others were unable to attend due to scheduling conflicts. Training sessions were offered on both week days and Saturdays to accommodate busy work schedules during the painting season.

OLPPP staff presented and facilitated all training sessions conducted in English and Spanish. Two consultants were hired to conduct the Chinese (Cantonese) language training. OLPPP staff worked intensively with the two consultants prior to the training in order to develop their knowledge base of occupational lead poisoning and lead in construction and to review and adapt the curriculum for the Chinese worker participants.

Educational Materials

OLPPP staff developed a set of written educational materials to supplement and reinforce information covered in the worker training. Materials were adapted from handouts developed during a previous CDHS lead poisoning prevention intervention project targeting employers and workers in the automotive radiator repair industry in Southern California. Twenty fact sheets covering topics such as basic lead facts, lead paint hazards, routes of entry, health effects, respiratory protection, safer work methods, lead poisoning prevention, and take-home exposure were developed and translated into Spanish and Chinese. Considerable effort was made to create materials that were attractive and easy-to-read. Each training participant received a binder containing a complete set of fact sheets.

C. NOTIFICATION OF BLL AND ZPP RESULTS

In compliance with Human Subjects requirements, timely notification and explanation of individual and group blood lead levels (BLL) and zinc protoporphyrin (ZPP) levels were mailed out to all participants. For individual BLLs, a copy of the handout "Understanding Your Blood Lead Level Test" was used to inform each worker of his own results. This one-page notification letter informs workers about the results of the blood lead test, the difference between BLL and ZPP and what they measure, the health damage lead can cause, and the steps that employers must take as required by the Cal/OSHA Construction Lead Standard. The name and phone number of the doctor in charge of their company's medical program was included as well. All correspondence was translated into Spanish and Chinese (see Appendix 10 for a copy of the letters in English, Spanish and Chinese).

Preliminary group results from the baseline blood testing were also mailed out to all participants in a letter detailing progress of the Project. The letter included a table of the distribution of BLLs among the participants and an update on how their company was progressing toward the goal of setting up a comprehensive lead safety program. (See Appendix 10 for English and Spanish versions of the letter.)

D. CORRESPONDENCE REGARDING PREVENTION OF TAKE-HOME LEAD EXPOSURE

OLPPP's initial contact with worker participants during the baseline questionnaire period in June 1994 revealed many participants who reported that either a pregnant or nursing woman and/or children aged 6 or under lived in his household. Because only a few of the companies reported an adequate work uniform policy or other measures to prevent lead dust from being taken home on dirty work clothes and shoes, there was an identified potential for take-home lead exposure. This was of concern to OLPPP because OLPPP's worker training classes would not be offered to participants until mid- to late-summer. In order to alert participants to the risks associated with wearing work clothes and shoes home, OLPPP mailed out an informative letter to these participants.

The letter explained how take-home contamination occurs and how it can be prevented. In addition, the letter addressed how exposure to lead can put other people in the household at risk for lead poisoning. It strongly recommended that workers have household members tested for lead. Since free blood lead testing is available for most children through the County Child Health and Disability Program (CHDP), a list of local county health departments with their telephone numbers was included in the letter (see Appendix 11 for a copy of the letter in English, Spanish and Chinese).

E. TECHNICAL ASSISTANCE

Throughout the California Painters Project, OLPPP staff were available to provide consultation and technical assistance to all worker participants. During the initial baseline questionnaire period, OLPPP staff encouraged workers to contact the office at any time for assistance. Participants received OLPPP's office telephone number, and bilingual staff in Spanish and Chinese were available when necessary.

Much of our personal contact with workers occurred during the questionnaire periods in June and November 1994 and Summer 1995. OLPPP staff and guest instructors were also available during the worker training classes to answer questions and provide consultation to individual

workers. Finally, OLPPP staff were present during clinic appointments and job site visits to respond to worker concerns.

7. EVALUATION THEORY, DESIGN, AND METHODS

A. INTRODUCTION

The CPP evaluation plan was designed to determine whether the project was implemented as planned (process evaluation), provide feedback from participants and Advisory Committee members during the intervention phase on the quality of activities and materials (formative evaluation), and measure the effect of the intervention on company lead safety programs and worker BLLs (impact evaluation). Further, we wanted to gather information on the underlying factors related to the success or failure of intervention activities and to identify unintended impacts of the project. In this chapter, we briefly describe the theory underlying the design of CPP evaluation plan and continue with a detailed discussion of each evaluation component/activity.

Evaluation Theory

We based the CPP evaluation plan on a combination of evaluation theories and models including: Joseph Wholey's approach to program evaluation which compares actual program performance with some standard of expected performance to determine a program's effectiveness ("goal-based" evaluation) (Wholey, 1986); Patton's approach of gathering qualitative data on how and why a program works or doesn't work in a particular setting (Patton, 1978); Rossi and Freeman's comprehensive approach to program evaluation in which the evaluator examines not only the impact of a program but the "conceptualization" and implementation of a program as well (Rossi and Freeman, 1985); and finally, Rossi and Freeman's complementary concept of tailoring evaluations, which acknowledges that truly comprehensive evaluations are impractical and encourages evaluators to carefully identify the critical questions to be answered at each stage in a program's development and to choose evaluation activities to answer these questions (Rossi and Freeman, 1985).

Consistent with Wholey's goal-based evaluation approach, we set measurable objectives designating the degree of improvement in lead safety practices that we hoped to achieve through our intervention efforts with employers and workers and then measured the degree to which these goals were achieved through standardized questionnaire interviews (Appendices 12 and 13). Although this type of evaluation would yield valuable information on the effectiveness of the CPP, we were aware that it would not tell us *why* the CPP succeeded or failed, and further would not provide information on additional unanticipated program effects, either positive or negative. In order to capture this type of information, we included qualitative evaluation methods. The qualitative evaluation approach does not restrict data gathering to stated goals. The primary aim of qualitative evaluation is to understand *how* a program works in a particular setting, rather than to measure achievement. The primary qualitative evaluation method we used was focus group discussions with employers. The qualitative data we gathered during these discussions was used to help interpret the "objective" quantitative data generated by the goal-based evaluation.

The CPP evaluation plan, which includes process, formative, and impact evaluation components, reflects Rossi and Freeman's thinking that program evaluation should not be limited to assessing program impact, but that other important questions, such as whether a program is operating as designed, must also be addressed. For example, evaluating the impact of CPP, without also evaluating whether it was implemented as intended, could lead to erroneous conclusions about the effectiveness of our intervention model. Finally, Rossi and Freeman's concept of tailoring (i.e., fitting the evaluation to the program based on the stage of program development) was useful/helpful in choosing the most appropriate evaluation activities from a long and diverse list of activities possible under each evaluation component.

Research Design

The conditions of workplace intervention research often force a loosening of what would normally be the preferred approach for testing intervention effects, i.e., a true experimental design. In the classic experimental design, experimental conditions are controlled and participants are randomly assigned to a treatment group (receiving the intervention) or a control group (no intervention) in order to minimize the effect of extraneous factors. Although desirable from a research and evaluation standpoint, a true experimental design was both unethical and unfeasible in our situation. It would have been unethical for us to assign some participants to a control group which received little or no educational intervention since all participants had potential exposure to a hazardous substance. In addition, we had no control over the jobs contractors took during the course of the intervention. As an alternative to the classic experimental design, we chose a quasi-experimental research design in which participants served as their own control group and changes were measured by making repeated observations of participants over time (Campbell and Stanley, 1963). In this approach, observations of employers and workers were made prior to the intervention and over a number of time intervals after intervention. This design can be represented graphically as:

$$O_1 \quad X \quad O_2 \quad O_3 \quad O_4$$

in which:

O_1 = data collected at baseline in June 1994, i.e., prior to intervention activities;
X = six months of intervention activities;
O_2 = data collected immediately post-intervention in November 1994;
O_3 = qualitative data collected at employer focus group discussions in March 1995;
O_4 = data collected at one-year follow-up in Summer 1995;

We collected quantitative data on the same variables at times O_1,O_2, and O_4.

B. EVALUATING IMPLEMENTATION OF THE PROJECT (Process Evaluation)

Process evaluation is done during the implementation phase of a project to determine whether the activities have been conducted in a manner consistent with the project plan. It tracks how well the project is working and looks at both administrative and organizational aspects of project implementation as well as the relationship of different activities to the effectiveness of the overall project. It can also provide tangible evidence of progress, often useful to provide encouragement and reward to participants. The CPP used a variety of process evaluation instruments to ensure satisfactory implementation of the project plan. These included bi-monthly staff meetings, establishing work groups, development of work plans and timelines, and quarterly reports to NIOSH/CDC.

A project coordinator was given responsibility for overall project administration. Project staff were organized into 4 work groups corresponding to the major project components: data, medical, employer and worker. Each work group was assigned a coordinator who was responsible for supervising work activities and materials development in their area and holding work group meetings to accomplish project tasks. Work plans were developed by each work group and integrated into an overall project work plan detailing project methods, activities and a timeline. Bi-monthly project staff meetings were held to plan project activities and to discuss project progress, obstacles and solutions. Due to the limited number of OLPPP staff, most staff served on several different work groups in various capacities.

In addition, quarterly reports were submitted to NIOSH/CDC. These reports detailed project progress and conformity with the stated project design, data collection and analysis, intervention methods and activities, evaluation and timeline. They were prepared by the project coordinator with the assistance of each work group coordinator.

C. EVALUATING THE QUALITY OF INTERVENTION ACTIVITIES AND MATERIALS (Formative Evaluation)

Formative evaluation is any combination of measurements obtained and judgments made before or during the production of materials, and the implementation of methods, activities or programs to control, assure or improve the quality of performance or delivery (Green and Lewis, 1986, p. 362). Formative evaluation activities for the CPP included pretesting the employer manual, evaluations of employer seminars and worker training, open-ended feedback questions in the November 1994 and Summer 1995 questionnaires, Advisory Committee input, progress reports, and conducting focus groups of employer participants. These activities provided short-loop diagnostic feedback which allowed project staff to assess the appropriateness and progress of the Project, its ongoing refinement, and its reception by the participants. This type of evaluation was critical to the ongoing development and improvement of the Project.

Review of the Employer Manual: Painting Contractor's Guide To Lead Safety

Because it was one of the most important intervention resources developed for the Project, all chapters of the *Painting Contractor's Guide To Lead Safety* were reviewed by Advisory Committee members, NIOSH/CDC and an editing consultant for comprehensibility and usefulness prior to its use in the employer seminars. Selected chapters were also reviewed by non-participating painting contractors, lead-related construction consultants, occupational medicine health care providers, county childhood lead programs and California Environmental Protection Agency staff. Reviewers were asked to address issues of factual accuracy, clarity, omissions, readability, and appropriateness of recommendations.

OLPPP also solicited feedback on the manual chapters during employer seminars, specifically which features of the manual participants found useful, whether and how the manual helped them to set up a lead safety program, and suggestions for changes.

Feedback received from a wide range of reviewers helped to ensure that the manual was understandable, relevant, attractive, credible and acceptable to the target audience. Revisions based on reviewer and participant comments were made to the pilot version, and a final version was published for widespread dissemination.

Advisory Committee

Advisory Committee members provided input into the development of all project components. Project staff consulted specific Advisory Committee members on a range of issues based on members' particular areas of expertise and background, i.e., whether they were contractors, union, medical providers, county health department, etc. Full Advisory Committee meetings were infrequent since working with members on a one-to-one basis or in smaller work groups was more effective. A sample of the ways Advisory Committee members were involved included:

- Assisted in outreach and recruitment activities.
- Reviewed employer and employee questionnaires and assisted in setting up opportunities to pilot questionnaires.
- Ensured that minority and women owned painting businesses were in the pool of potentially eligible employers.
- Commented on proposed work plans, training agendas, other educational activities and related logistics.
- Reviewed and commented on all written educational pieces developed as part of the Project.

Written Seminar Evaluations

Written forms were used at the end of each of the four employer seminars to assess participants' evaluation of the seminar content and instructors, and to solicit suggestions for improvement (see Appendix 14 for sample evaluation forms). The evaluations used a modified Likert scale to determine participant satisfaction with the conduct and content of the seminars. Evaluation questions included open-ended questions about the most and least liked aspects of the seminars as well as specific questions asking participants to rate each topic presented on a four point scale from "very understandable and helpful" to "not at all understandable or helpful." After the participants completed the form, OLPPP staff facilitated a short discussion and verbal evaluation of the seminar. Information gathered from both written and verbal evaluation was used to make changes in subsequent seminars to make them more relevant to participants' stated needs.

Progress Reports

Contractors were asked to complete a brief self-administered Progress Report at 2 and 4 months. A final progress report was planned but dropped based on the experience with the first two reports. The purpose of the reports was to provide timely feedback to OLPPP staff on employer progress in establishing a lead safety program during the intervention phase of the Project.

The Progress Reports turned out to be of very limited value. They were not submitted in a timely manner and therefore did not serve their primary purpose which was to provide staff with feedback during the course of the Project. In addition, it took a longer period of time than staff had anticipated for contractors to establish a lead safety program, make changes in their work practices, and purchase necessary safety equipment. Assessing progress at two and four months was simply too early to see change. The failure of the Progress Reports to provide timely feedback to OLPPP staff did not turn out to be a problem. Staff had on-going and frequent contact with contractors during the course of the Project which provided adequate feedback on the status of contractor efforts to establish a lead safety program.

Worker Training Evaluation

Verbal evaluation was conducted at the end of each worker training session to assess the participants' evaluation of the seminar and solicit suggestions for changes or improvements. Due to a wide range of literacy skills among participants, no written evaluation was administered. Worker suggestions for changes or improvements in the curriculum were incorporated into the final version of the curriculum and handouts.

Post-Intervention Evaluation Questions

A series of open-ended evaluation questions were added to the November 1994 post-intervention employer and worker questionnaires. For the employers, these questions were designed to collect qualitative data on their assessment of the Project, its impact on the way their companies conducted their work, its usefulness in helping contractors make improvements in lead safety, perceptions of the benefits and drawbacks to participating in the Project, and any overall suggestions for improving the project model. For the workers, questions focused on what participants liked most and least about the Project, the usefulness of the training sessions in increasing awareness of employer and employee rights and responsibilities, and suggestions for improving the conduct of the Project. Employer and worker answers to these questions formed the basis for the development of employer focus group questions (see below).

Focus Group

Purpose

In Spring 1995, four months post-intervention, all contractors were invited to participate in a group discussion about CPP project activities and their personal experiences establishing a lead safety program. The purpose of this "focus group" discussion was to identify the project components which seemed to be the most significant in achieving desired outcomes, and those that appeared to be less successful, in order to make recommendations for revision of the intervention model. The focus group sessions also sought information on factors outside the Project which influenced the success of intervention activities and ultimately contractors' efforts to improve lead safety. Qualitative data on the project's impact on participants' work and business practices was also collected in these sessions; a discussion of the role of the focus group in evaluating the impact of the Project can be found under "Impact Evaluation - Focus group" and is not considered further here.

The focus group sessions were designed to complement and augment the data gathered by questionnaire in order to arrive at a fuller understanding of participants' experiences establishing a lead safety program and their perspectives on the Project and the business environment in which they work. The focus group interview offered several advantages over individual interviews as a technique for gathering this information. First, the focus group discussions were moderated by outside facilitators to encourage participants to be candid in their comments about the Project. It is reasonable to expect that contractors might be reticent about criticizing project activities in direct interviews with project staff, particularly since many contractors had developed close relationships with individual staff members. Second, the focus group placed contractors in a more natural setting compared to the controlled conditions of a structured interview. Contractors had participated in several group activities prior to the focus group sessions and had experience sharing information in a group discussion setting. Third, the non-directive focus group interview allowed participants to respond without setting boundaries and had a greater potential for uncovering and exploring unanticipated issues.

Question development

Project staff began developing discussion questions by reviewing the information collected in the open-ended questions on the November questionnaire and identifying key areas with missing information. An exhaustive list of all the questions that were of interest was generated in a brainstorming session. This list of questions was reduced to six essential questions in a series of meetings with two outside evaluation consultants. A series of probes was also developed for each question (see Appendix 15 for complete list of questions and probes).

Conducting focus group

All participating contractors were invited to attend a meeting to discuss the Project on the evening of March 21, 1995. Written invitations were mailed four weeks prior to the meeting

date and all contractors were contacted by phone 2 days prior to the meeting to remind them of the session and inquire about their intention to attend. As an incentive to participate, a portion of the meeting was set aside for a presentation by a CDHS staff person on the process of applying for and acquiring CDHS certification for lead-related construction work.
Prior to the meeting, contractors were assigned non-randomly to one of two groups with not more than 11 contractors per group. An attempt was made to create "balanced" groups based on company size, the presence or absence of a union, and the contractors' mix of residential and commercial work. Staff also used their personal knowledge of individual contractors to evenly distribute "talkers" and "non-talkers" between the two groups.

Outside facilitators were selected to moderate the focus group sessions to minimize bias and to create an atmosphere conducive to uninhibited discussion. Neutral individuals without a vested interest in the outcome of the Project were more likely to be objective listeners and less likely to steer the discussion in the direction of preconceived ideas. In addition, use of an outside moderator was intended to encourage more candid responses from participants (discussed earlier).

Data collection methods and analysis

Focus group sessions were recorded in two ways: by audio taping and the written notes of observers. Prior to the start of the discussion, participants were assured of the confidentiality of the recording and written record and told that their names would not appear in the transcripts of the sessions or the final report. The audio tapes were transcribed by a professional transcriber and the transcripts reviewed by a project staff person and the facilitators.

Two non-project staff acted as focus group observers. The purpose of the observations was to capture information that may not have been communicated by audio tape recordings. Prior to the focus group sessions, guidelines were developed to establish which observational data were to be collected. Observational data included body language of participants (e.g., nodding in agreement or disagreement), level of participant attention; emotional reactions of participants; amount of time spent on each question and whether the discussion seemed complete before the facilitator moved on or if it appeared that contractors had more to say. The observers took written notes during the discussion and provided a written summary of their observations the day following the focus group sessions. (See Appendix 16 for Observer Guidelines and observers' notes.)

A final summary report was generated by the evaluation consultants for CPP staff. The consultants developed a coding scheme for the focus group report themes and categories. Codes were continually revised until both consultants reached agreement. The transcription did not allow for identifying any one individual. Thus, the primary limitation of the report is that the analysis is based on the number of comments and not on the number of people making the comments. As a result, they could not conclude that any one theme identified was necessarily represented by the majority of participants.

D. IMPACT EVALUATION

Impact evaluation measures the ultimate effect of the CPP intervention on the establishment of comprehensive lead safety programs by participating painting contractors and the adoption of lead-safe practices by workers. It also seeks to answer the questions: What unintended outcomes (positive and negative) occurred? Can any predictors of success for the Project be identified? Can the impact of the Project be generalized to similar populations in other settings? We used a variety of methods to answer these questions, including data from standardized questionnaires, biological monitoring (BLL and ZPP testing), job logs, site visits, and focus groups.

Development of Measurable Impact Objectives

The overall goals and general objectives of the Project were outlined in the project proposal (see II. Introduction). We were unable, however, to translate these general goals into measurable objectives during the planning phase of the Project since there were no studies on similar populations cited in the literature to provide a basis for setting reasonable performance standards or levels of expected change. Therefore, following baseline data collection and implementation of the intervention activities and prior to any data analysis, OLPPP staff and two evaluation consultants developed measurable impact objectives for changes in employer and worker behavior based on a variety of information sources (see Appendix 17 for objectives). These sources included: employer and worker behavior as reported at baseline, content areas that were emphasized during the intervention, changes considered to be most important in reducing worker exposure to lead, and staff perceptions regarding the technological and economic feasibility of different aspects of establishing a comprehensive lead safety program.

The development of impact objectives allowed for quantitative evaluation of changes in work practices, the establishment of lead safety programs, and compliance with Cal/OSHA requirements as compared to desired or target levels of change. Meeting or surpassing the targeted level of change specified in an objective would indicate areas where the intervention activities were successful in provoking changes in worker or employer work practices. Falling short of the targeted level of change specified in an objective would help identify problems with our intervention approach and/or major barriers or problems that exist outside the boundaries of the intervention itself.

We did not set an objective for a reduction in worker BLLs. BLLs rise rapidly after exposure and fall relatively rapidly once exposure ceases; they generally reflect recent exposure (2-3 weeks). BLL data can be a useful evaluation tool in situations where there is on-going, relatively consistent exposure, such as commonly occurs in general industry. However, in situations where exposure is variable or has been interrupted sometime before monitoring, as is typical of the painters in the Project, it is difficult to distinguish changes in BLL levels that result from an intervention and changes that result from fluctuations in an individual's workload involving disturbance of lead paint.

Collection of Standardized Questionnaire Data

Questionnaire Development

Standardized questionnaires administered by trained interviewers were used at baseline and at two subsequent points in time to collect information about the characteristics and practices of participating painting contractors and employees. The data were collected before implementation of the intervention to establish baseline conditions and following the intervention activities to assess whether conditions had changed. Questionnaires were the primary instrument used to collect data on work practices and company lead safety programs. Existing questionnaires from previous projects and other investigators were first reviewed in order to identify questions that had been previously tested and to obtain comparable data where possible. Since we did not find questionnaires that assessed many of the items we were interested in, particularly those items specific to painting work, the majority of questions were developed by OLPPP staff.

Pre-coded (rather than open-ended) questions were used whenever possible, and questionnaires were designed for accurate and consistent coding and ease of data entry. We pilot tested the draft questionnaires with painters and contractors who were similar to those potentially eligible for our Project but who worked outside the project area. After making revisions based on pilot testing results, the questionnaires were reviewed by Advisory Committee members and NIOSH/CDC. Questionnaires for workers were translated into Spanish by OLPPP staff and reviewed for accuracy by other bilingual professionals. Draft questionnaires were sent to the Committee for the Protection of Human Subjects for approval prior to administering them in the course of the Project.

A total of three questionnaires were developed, with separate versions for workers and employers: the Baseline Questionnaire (administered June 1994), Post-Intervention Questionnaire (November 1994), and One-Year Follow-up Questionnaire (Summer 1995) (see Appendices 12 & 13 for copies of all questionnaires).

The questions on the Employer Baseline Questionnaire were designed to assess the current (pre-intervention) state of the employer's lead safety program, as well as to obtain specific information on work practices and lead jobs during the previous month. The questionnaire contained sections on: company demographics (size, type of work, trade association membership); knowledge of lead hazards; current work practices including surface preparation methods and respirator use during each method while working on potential lead jobs; use of lead paint testing methods; prior air monitoring for lead; existence of a respirator program; hygiene and housekeeping practices; medical surveillance program; and employee training.

The Worker Baseline Questionnaire was designed to obtain specific information from which to estimate possible lead exposure in the month just prior to the blood draw, as well as to assess general lead hazard awareness and work practices. The questionnaire contained sections on: worker demographics including language preference for training; non-occupational risk factors; knowledge of lead hazards; previous blood lead testing or air monitoring; lead jobs during the past month including age of housing, days of surface preparation work; use of specific surface preparation methods and respirators for each work method; respirator program; hygiene and housekeeping practices; and previous training.

The Employer Post-Intervention Questionnaire was designed to assess changes in lead safety programs when compared to pre-intervention (baseline). Therefore, nearly all questions are identical to those in the Baseline Questionnaire. Some new questions were added regarding purchases of health and safety equipment since the Project began. We also asked several open-ended questions where employers could provide feedback on their participation in the Project.

Similarly, the Worker Post-Intervention Questionnaire was almost identical to the Baseline Questionnaire. A section of true/false questions about knowledge of lead hazards was dropped because many workers for whom English was their second language found this type of question confusing. Several open-ended questions about items covered during the worker training were added, as well as an opportunity for workers to provide feedback about their participation in the Project.

A One-Year Follow-up Questionnaire was used in the Summer of 1995 to assess whether the project's intervention methods resulted in substantive and sustainable (at least in the short term) changes in contractors' lead safety programs and employee work practices. OLPPP staff, with input from the project's evaluation consultants, designed the questionnaire to evaluate whether, and to what extent, the Project attained its stated impact objectives. Questions were selected from among the relevant Baseline and Post-Intervention Questionnaire questions. In a few instances, new questions were developed to assess changes in work practices that had not been anticipated and were therefore not asked at baseline.

Questionnaire Administration

Questionnaires were administered by interviewers trained in structured interview techniques including the differences between open and closed ended questions, probing, consistent wording of questions, and proper editing and coding of completed questionnaires (see Appendix 18 for Interviewers Manual). Our study population included painters who spoke Spanish and Cantonese as well as painters who spoke English. Four bilingual interviewers used translated questionnaires to conduct interviews in Spanish. Two Cantonese-speaking consultants were used to provide simultaneous translation of the questionnaires into English (with an English-speaking staff person present to respond to technical questions).

Baseline Questionnaire Administration (June 1994)

Baseline data collection activities were held from June 1 to June 8, 1994. Activities included orienting employees to the Project and providing an opportunity for questions, obtaining informed consent, administering structured interviews to employers and workers, and drawing blood for blood lead and ZPP analysis.

Employer interviews lasted approximately 30 minutes each. Twenty-two employers were interviewed in English, and one was interviewed in Cantonese using a translator. Those employers (n=12) who did surface preparation work themselves (and therefore were assumed to be exposed to lead) were interviewed with both the Worker and Employer Baseline Questionnaires. They also had their blood drawn to determine BLLs and ZPP levels. Information on the methods used for blood sample collection, analysis, and quality control appears in the following section.

Workers were interviewed in English (n=99), Spanish (n=27), or with simultaneous translation into Cantonese (n=13). The worker interviews took from 30 to 45 minutes to complete. Each worker had a blood draw for BLL and ZPP analysis. Twenty-two companies with 132 employees completed the baseline screening activities.

Post-Intervention Questionnaires (November 1994)

Post-Intervention Questionnaires were administered by project interviewers to all 21 employers who completed the intervention and to 118 workers (including 10 employers who do surface preparation work themselves). Interviews were again conducted in English, Spanish, or Cantonese. The 118 persons who completed the Worker Post-Intervention Questionnaire also received blood draws for BLL and ZPP analysis which was provided by the Project.

One-Year Follow-up Questionnaires (Summer 1995)

One-Year Follow-up Questionnaires were administered to contractors and workers in the Summer of 1995, approximately one year after the Project began. One-Year Follow-up Questionnaires were completed for all 21 contractor participants. OLPPP staff conducted the interviews in person (n=16) and by phone (n=5) between June 20, 1995 and August 11, 1995. Ninety-five[1] of the original 132 workers enrolled in the Project were interviewed between June 20, 1995 and August 31, 1995; 52 in person and 43 by phone. Interviews were conducted in English, Spanish, and Cantonese. Of the 37 workers not interviewed, one worker refused the interview, and 3 original employer-workers no longer did surface preparation. The remaining 33 could have changed employment or were still working and could not be reached by telephone for the final interview.

Coding, Data Entry, and Quality Control

Data from the questionnaires were entered into an Epi-Info database. Separate databases were used for each questionnaire, and each worker's and employer's information from all time periods was linked. All questionnaires were coded and checked initially by the trained interviewers, and a second review of coding was done by a research assistant. Questions which required technical review were then checked by an industrial hygienist. An epidemiologist also reviewed all completed questionnaires. Each data file was set up using the

[1] Eighty-nine of these 95 completed questionnaires at all three points in time and were used to examine changes over time.

built-in edit checks available in Epi-Info, including definition of legal values for each field, logical edit-checks, and skip patterns built into the data entry screens. After data entry into the Epi-Info database, each completed and entered questionnaire was visually edit-checked by a research assistant (comparing a printout of each record with the hard copy of the questionnaire). Additional quality control of the data was conducted after creation of the analytical data sets in SAS, when we ran frequencies on all variables to check for outliers, and checked the data for inconsistencies. The final analytical data sets contain a subset of items from each of the questionnaires and have been carefully coded and cleaned.

Data Analysis Methods

To examine changes over time in lead safety programs and practices, we used data from workers (n=89) and employers (n=21) who had completed questionnaires at three points in time: baseline (June 1994), post-intervention (November 1994), and one-year follow-up (Summer 1995). We examined the overall proportion of companies or workers reporting specific work practices at the three points in time. These changes are shown graphically using bar charts.

As described above, we had set 27 quantitative objectives for specific employer improvements and 12 for workers. For assessment of progress toward meeting these objectives we ran a cross tabulation procedure to compare responses in Summer 1995 versus those at baseline. This allowed us first to identify the individuals who could make the desired improvement (e.g., could increase frequency of a safe practice from "never" to "sometimes" or "sometimes" to "often"). The second step was to see how many of this target population made an improvement by Summer 1995. We calculated the proportion of the target population who improved and compared it to the set objective. This procedure formed the basis for our impact evaluation.

Since we were also concerned about how long it took for employers and workers to make changes, we repeated the above procedure, comparing responses in November 1994 versus those at baseline. This determination of percent change in the target population by November 1994 is reported in a summary table in the Discussion of Results (see Table 10.1).

For certain variables where we asked identical or similar questions of both employers and workers, cross tabulations were also used to compare their responses. This served as an assessment of the accuracy of responses we received.

Blood Lead and Zinc Protoporphyrin Testing

We provided project participants with blood lead and zinc protoporphyrin testing at baseline and post-intervention. Employers were strongly encouraged to establish a medical surveillance program and provide BLL and ZPP testing, at their own cost, to employees by mid-project (August 1994). Some employers also sent their workers for BLL and ZPP testing during the Summer of 1995 in compliance with the requirements of the Cal/OSHA Construction Lead Standard. OLPPP staff wrote a protocol for blood sample collection, and on-site phlebotomy services were contracted with a hospital laboratory in San Francisco. Samples were drawn for blood lead and zinc protoporphyrin using lot-tested royal blue top vacutainer tubes for trace minerals with disodium EDTA additive. Sampling for the entire Project was done with same lot blood tubes.

Labeled blood samples were stored in a cool container and delivered on the day of collection to the California Department of Health Services' Environmental Health Laboratory Branch (CDHS/EHLB) for analysis. A log was developed and used to enhance accuracy and efficiency in handling the samples and reporting the results. Blood samples were analyzed for lead by EHLB using the graphite furnace atomic absorption spectroscopy. Free erythrocyte protoporphyrin (FEP) analysis was performed on the whole blood using the microfluorometric method of Chisolm and Brown (1975). The reported values for ZPP were derived from the results of FEP analysis by multiplying the FEP results by a factor of 1.11.

Quality control was performed for BLL and ZPP test results conducted in August 1994 through employer medical programs. Split sampling was done on 18 of 22 painters identified by EHLB from the June 1994 test data as having interesting combinations of BLL and ZPP results. At the mid-project blood draws, two tubes of blood were collected from the same venipuncture and sent for independent analysis to the OSHA approved laboratory used by the medical supervisor and EHLB. In addition, four blind samples from EHLB, known to have elevated BLLs, were submitted to the same outside laboratory for analysis with no identifiable differences in the tubes or request forms. Fictitious names were used and known only to the clinic and CDHS researchers.

The mean differences in analysis by the two laboratories for the 18 painters' samples were BLL $\pm$1.6 ug/dl (range 0.1 to 4.4) and ZPP $\pm$12 ug/dl (range 1.7 to 33.4). Mean differences for the 4 blind samples were BLL $\pm$1.9 ug/dl (range .4 to 3.4) and ZPP $\pm$13.9 ug/dl (range 2.2 to 22). The agreement between the BLL analysis of the two laboratories is well within the confidence interval required by the Cal/OSHA Construction Lead Standard of $\pm$6 ug/dl or $\pm$15%, whichever is greater.

The wider variability for the ZPP analysis between the two laboratories may be due to differences in the value used for analyzer calibration. Also, ZPP values represent larger numbers and have a wider reference range with considerable variability between labs. At the time of the Project, there was no established uniform standard for ZPP measurement or reference value. The National Committee for Clinical Laboratory Standards has recently published new guidelines for ZPP (EP) testing to address this issue (NCCLS, 1996). An action concentration for ZPP is yet to be defined in occupational lead exposure. However, the test is a useful adjunct for interpretation of the BLL in workplace medical surveillance.

<u>Analysis of Blood Lead and Zinc Protoporphyrin Levels</u>

Descriptive statistics were calculated for biological monitoring data (BLLs and ZPPs) collected at four points in time. The laboratory that analyzed the baseline and post-intervention BLLs had a detection limit of 5 ug/dl; values reported "<5" were defined as 3 ug/dl for the purpose of statistical analysis. Geometric means are descriptively reported as the best indicator of central tendency because distributions were skewed to the right (as observed via scatter plots). The 95% confidence intervals for means were calculated using the Z-distribution and log-transformed data, then transformed back to original units. All statistical analyses were done with SAS software (v. 6.10). All reported p-values are two-tailed.

To examine changes in BLLs from baseline (June 1994) to post-intervention (November 1994) and one-year follow-up (Summer 1995), paired-sample t-tests (two-tailed) were used. We calculated the difference in BLL at two points in time (comparing post-intervention to baseline, and one-year follow-up to baseline) and performed statistical tests to determine whether this difference was statistically different from zero. For the post-intervention to baseline comparison, 118 persons were included in the analysis because they had BLLs at both points in time; 52 paired comparisons were available for the comparison of one-year follow-up to baseline. To compare BLLs at two points in the midst of the painting season (during the intervention versus one year later), we also did a paired t-test comparison using the 52 workers who had blood samples taken at both times.

We did not compare differences in ZPP levels over time because the August 1994 and Summer 1995 tests were analyzed by a different laboratory from the other two testing dates. As described above, ZPP analyses have considerable variability among labs, and at the time of this Project there was no established uniform standard for ZPP measurement.

Analysis of Blood Lead Levels versus Other Factors

Our analysis was designed to examine the relationship between workers' blood lead levels and a number of other factors including: exposure-related variables (days of surface preparation in the prior month on older buildings, non-occupational lead exposure, correct respirator worn during high-exposure tasks, smoking or eating in the work area); demographic characteristics (age, race/ethnicity, education level); and other potential covariates (smoking status, company size, union membership, years as a painter). All analyses were conducted using the natural log of the BLL as the outcome variable.

Our data on BLLs, exposure and other factors were from two time periods, baseline (June 1994) and post-intervention (November 1994). We focused initially on analysis of the November 1994 data because we believed that the questionnaire data for some variables, particularly exposure-related ones based on recall, would be more accurate than at baseline. By this time the participants had been questioned repeatedly about work activities related to potential lead exposure. For these analyses we used all available data (i.e., n=118 for most variables).

Blood Lead Levels versus Individual Factors

First, we conducted univariate analyses of the November 1994 data to provide information for selection of variables to include in a multivariate model. We examined the relationship between BLL and each potentially related variable (listed above), using t-tests for categorical variables and tests of significance for correlations for continuous variables. For the latter, both Pearson's r and the non-parametric Spearman's ρ were inspected.

Preliminary Multivariate Model (November 1994 Data)

For the initial model development we included "worker characteristics" (i.e., personal, demographic, and occupational factors which existed apart from the intervention) which were found to be significantly related ($p<0.10$) in the univariate analysis. These significant factors were: race/ethnicity (non-Hispanic white vs. other), smoking status, educational level (high school graduate vs. not graduated), company size, and days of exterior surface preparation work in the prior month on pre-1950 buildings. We also included years as a painter in the preliminary model; although not significantly related in the univariate analysis, this could be an important variable contributing explanatory power (e.g., could be related to work practices, receptivity to training via the intervention, chronic lead exposure). Although union status was significantly related in the univariate analysis, we did not include it here because the unionized companies did not have all of their employees enrolled in the Project. Since employees who participated were more likely to be members of permanent work crews and/or supervisory staff, they may not be representative of all union workers.

We used multiple regression analysis with stepwise selection and a p-value to enter of 0.10 to evaluate the associations of potential predictive factors with blood lead level. For each categorical variable in the model, we constructed indicator variables (e.g., nonsmoker = 0, smoker = 1; white = 0, nonwhite = 1). The procedure results in a model utilizing all variables with a p-value less than 0.10.

Final Multivariate Model (November 1994 Data)

To develop our final model we initially included all "worker characteristics" found to be significant in the preliminary analysis described above. At this point we added variables that we considered could have potentially been affected by the intervention. The two new variables were whether or not participants ate in the work area and had attended the 8-hour worker training provided by the Project. We substituted smoking in the work area for smoking status, since the two are highly correlated and smoking in the work area is more directly related to potential exposure via ingestion. The other variable we considered including is whether the employee wore the Cal/OSHA-required respirator while sanding or scraping paint on older buildings. Unfortunately, only two-thirds of the total employees answered this question; therefore, we did not include the variable in the model. To summarize, the variables initially entered were: educational level, company size, smoking in the work area, days of exterior surface preparation in the prior month on pre-1950 buildings, race/ethnicity, eating in the work area, and attendance at the Project's 8-hour worker training. The final model includes only those variables found to be significant with a p-value less than 0.1.

Multivariate Modeling of BLLs with Baseline (June 1994) Data

To determine whether similar relationships existed at baseline between worker BLLs and various other factors, we repeated essentially the same process as described above, using baseline (June 1994) data. All of the same variables were initially included in a preliminary model with the exception of attending a project-sponsored training class (the classes occurred later in the summer). In addition, days of interior surface preparation on pre-1950 buildings was included, as it was significant in a univariate analysis. For the final model development we entered all significant variables from the preliminary model, plus eating in the work area. We also substituted smoking in the work area for smoking status.

Other Data Collection for Impact Evaluation

Job Logs

We asked contractors to complete a "job log" for every job that involved surface preparation on a pre-1980 building or metal surface during the six-month project period. The job log was a simple one-page form used to collect information on the type, age, and condition of the structure; whether the surface being disturbed had been tested for lead; and the names of the employees who worked on the job, the number of days each did surface preparation, and the methods used. The purpose of the logs was to gather information that could be used to characterize contractors' work during the entire six-month project period and to supplement employee exposure information collected by questionnaire.

OLPPP staff reviewed each log and identified any incomplete or internally inconsistent logs. These logs were completed and corrected by phone interview with the contractor. In the course of these interviews, it became apparent that most logs were completed in retrospect rather than during the job and many were completed weeks or months after a job ended. Contractors often relied on their recollection (or a supervisor's recollection) of past jobs rather than written records. While most contractors were confident about who worked on a particular job, most admitted that the information they provided on the number of surface preparation days for each employee was a rough estimate. Because we could not verify the completeness and accuracy of exposure information reported on the job logs, they could not be used as an additional source of worker exposure data.

Focus Groups

The purpose of the focus groups was to collect qualitative data on the impact of project intervention activities on participants' lead safety program, work practices, and business practices. This was key to understanding and interpreting the results of the Project. Although questionnaires provided a sizable amount of quantitative data on contractors' efforts to establish a lead safety program and the extent to which work practices had changed, questionnaire data did not identify obstacles and barriers contractors may have encountered when establishing a safety program or provide insight into why behavior may or may not have changed. The focus group was intended to provide insight into the successes and failures in reaching objectives as measured by questionnaires. In addition, focus group discussion could suggest strategies for improving future intervention activities.

Question development, conduct of the focus group discussions, data collection, and analysis have been discussed previously (see Section C).

Worker Training Post-Test

A written, multiple choice post-test was administered at the end of 7 out of 8 worker training sessions. It was not administered in one of the Spanish language sessions due to the limited reading and writing abilities of the participants. Questions on the post-test assessed worker knowledge of safer work and clean-up methods, controlling lead dust at the source, preventing take-home lead exposure, medical removal protection requirements of the Cal/OSHA Construction Lead Standard, respirators, and blood lead level testing. After the post-tests were collected, instructors reviewed the answers and clarified any questions or concerns expressed by the participants.

No equivalent pre-test was administered due to the time constraints of an 8-hour session. Therefore, post-test results reflect an overall competency level post-training rather than changes in knowledge from pre- to post-test.

Follow-up Site Visits

In Summer 1995, after the intervention phase of the Project was completed, three contractor work site visits were conducted during surface preparation activities on lead-based paint. The visits were arranged with each of the three contractors in advance. The purpose of these visits was to directly observe the extent of implementation of lead safety practices on these sites. The direct observation was intended as an assessment of the validity of the contractors' reporting on the Employer One-Year Follow-up Questionnaire (Summer 1995).

The three site visits were conducted by project staff and took place August 15, October 4, and December 15, 1995. The site visits took approximately 2 hours each. Contractor implementation of lead safety measures was assessed and documented in 14 areas that fell within the following general categories: identification of lead hazards; employee training; exposure controls; respiratory protection; wash-up facilities, personal hygiene and protective clothing use.

E. SUMMARY OF EVALUATION METHODS

In summary, we used a variety of quantitative and qualitative methods to comprehensively evaluate implementation of the project plan (process evaluation), the quality of the intervention activities (formative evaluation), and the impact of the intervention on participants' lead safety programs (impact evaluation). The principal evaluation methods were:

The specific exposure scenario was characterized with respect to a description of work, protective measures and pertinent environmental conditions on the "CPP Task-specific Exposure Monitoring Form" (see Appendix 21).

Data Analysis

Airborne exposure data were analyzed using Epi Info Version 5.0.

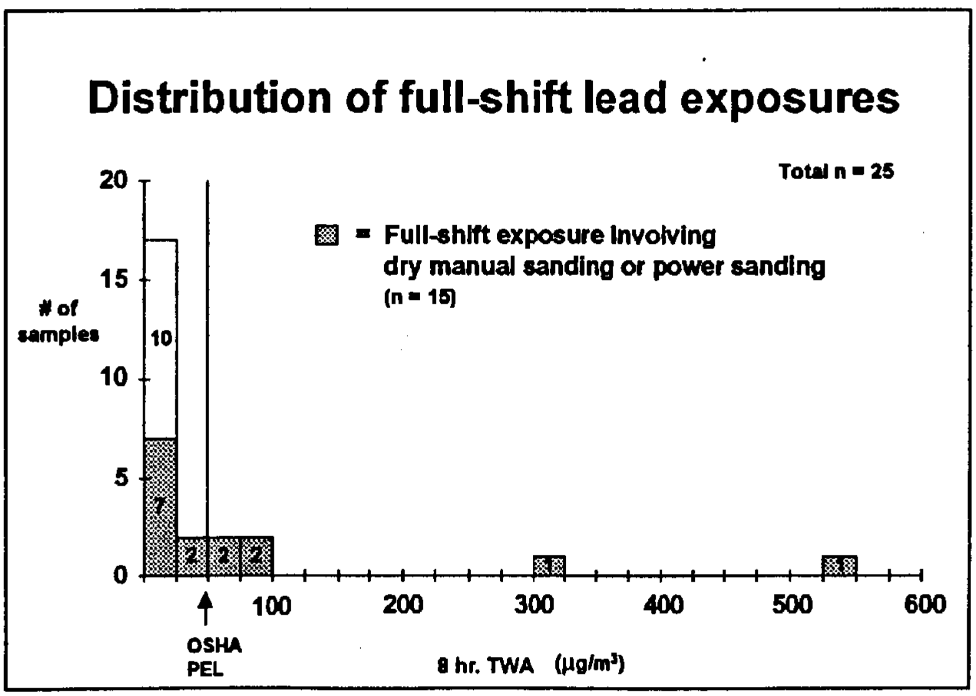
D. RESULTS

Full-Shift Airborne Exposure Monitoring

The results of the 25 full-shift samples, when calculated as eight-hour time-weighted averages (8-hr TWA), ranged from 0.8 to 550 ug/m^3 (GM = 17.74 ug/m^3, GSD = 3.67). The arithmetic mean of the results was 57 ug/m^3, above the Cal/OSHA Permissible Exposure Limit (PEL) of 50 ug/m^3.

Six of the 25 samples (24%) were found to be above the Cal/OSHA PEL. All six of the samples that exceeded the PEL represented work shifts that involved dry manual sanding or uncontrolled power sanding, whereas nine of the 19 sample results below the PEL represented work shifts that involved use of these methods. A histogram showing the distribution of the 25 full-shift sample results is presented in Figure 8.1.

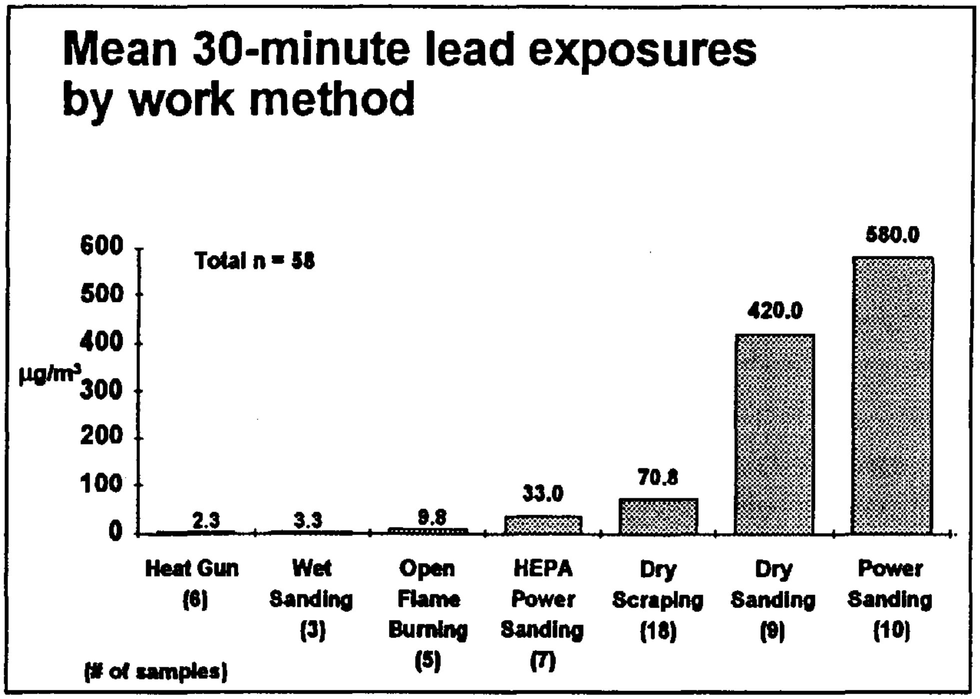
FIGURE 8.1



Short-Term, Task-Specific Exposure Monitoring

In total, fifty-eight 30-minute, task-specific samples were analyzed. The mean results are presented in Figure 8.2 by individual work method.

FIGURE 8.2



The mean results for heat gun, wet sanding and open flame burning were found to be well below 50 ug/m³. The mean result for HEPA-exhausted power sanding was 33 ug/m³; the mean result for dry manual scraping was 70.8 ug/m³. In comparison, the mean results for dry manual sanding (420.0 ug/m³) and uncontrolled power sanding (580 ug/m³) were much higher. The 30-minute lead exposure results by work method are also presented in Table 8.1.

TABLE 8.1

30-MINUTE LEAD EXPOSURES BY WORK METHOD (ug/m^3)

Work Method	n	Range	Median	Arithmetic Mean
Heat Gun	6	<1 (n.d.) - 5	1.5	2.3
Wet Sanding	3	<1 (n.d.) - 7	2.5	3.3
Open Flame Burning	5	<4 (n.d.) - 20	8.0	9.8
HEPA-Exhausted Power Sanding	7	4 - 60	40.0	33.0
Dry Scraping	18	≤4 - 225	50.5	70.8
Dry Sanding	9	29 - 1190	449.0	420.0
Uncontrolled Power Sanding	10	65 - 3400	150.0	580.0

The results presented in Table 8.1 are not the result of a staged side-by-side comparison trial. Therefore, a direct comparison of the work methods is confounded by a number of factors including the different lead paint concentrations on the jobs where these samples were taken. Table 8.2 presents the data for the four methods that generated the highest levels of exposure. Here, task-specific mean lead exposure levels are categorized by the lead content in the paint being disturbed. This allows a better comparison of the lead exposures associated with these four methods.

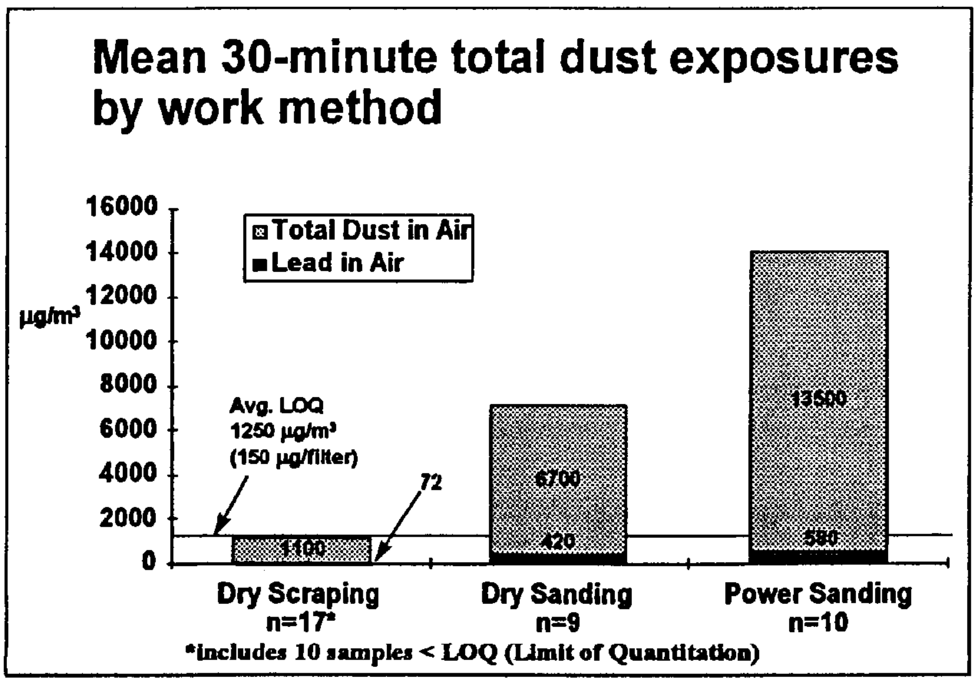
TABLE 8.2

MEAN 30-MINUTE LEAD EXPOSURES,
BY PERCENT LEAD IN PAINT AND WORK METHOD (ug/m^3)

	Bulk Lead Paint Concentration		
Work Method	0 - 9.9% (n)	10 - 19.9% (n)	20 - 45% (n)
Uncontrolled Power Sanding	97.2 (4)	900.0 (6)	--
Dry Manual Sanding	52.7 (3)	600.0 (6)	--
Dry Scraping	25.3 (6)	93.5 (12)	--
HEPA-Exhausted Power Sanding	24.0 (2)	51.5 (2)	26.0 (3)

Of the fifty-eight 30-minute samples taken, 57 samples were analyzed gravimetrically (an MCE filter was inadvertently used for one of the samples and therefore could not be analyzed gravimetrically). Of these, the results of 28 gravimetric analyses were quantifiable above the LOQ of 150 ug/filter. The majority of these (26 of 28) were associated with the three dustiest work methods. The gravimetric results of all 10 samples associated with uncontrolled power sanding were quantifiable; all 9 samples associated with dry manual sanding were quantifiable; and 7 of the 17 gravimetric samples associated with dry manual scraping were quantifiable. The gravimetric results for these three methods are presented in Figure 8.3.

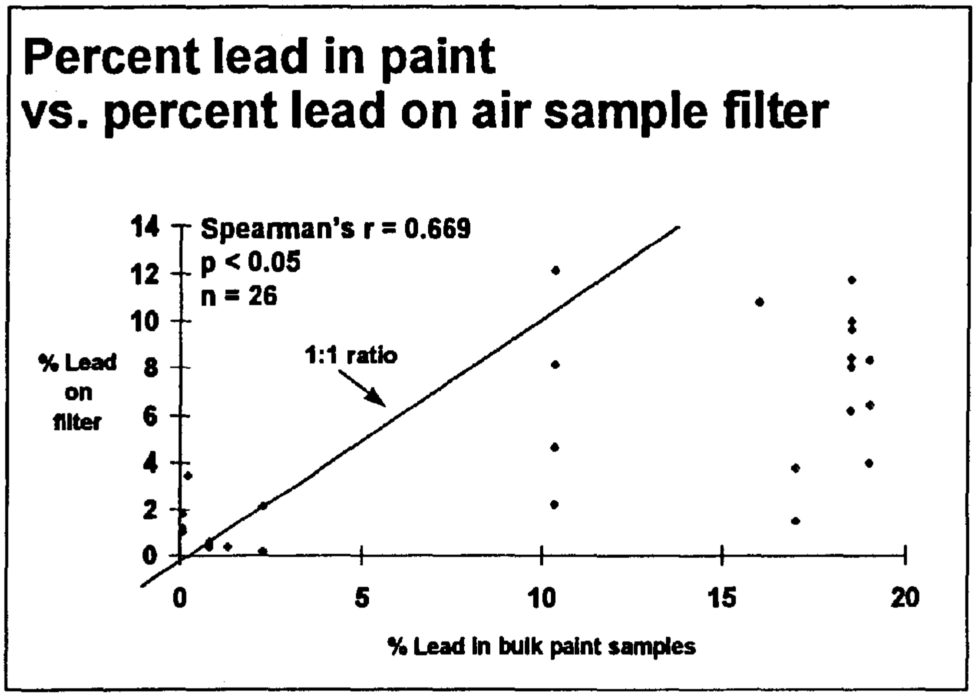
FIGURE 8.3



The light bars represent the mean total dust exposure levels for the three work methods. The superimposed dark bars represent the corresponding mean lead exposure levels calculated from the same samples. Ten of the 17 gravimetric samples associated with dry manual scraping were not quantifiable; for these, values midway between the limit of detection (45 ug/filter) and the limit of quantitation (150 ug/filter) were used in calculating the mean total dust level.

The 26 samples with quantifiable total dust results represented in Figure 8.3 also had quantifiable lead results. For these samples it is possible to calculate the percent lead in the total dust collected on the filter. Figure 8.4 is a scattergram of these 26 samples, plotting the percent lead in the surface paint (x-axis) against the percent lead in the filter dust (y-axis). Data for the three different work methods are combined on this graph. The Spearman's rank correlation coefficient for these 26 points is r = 0.669 ($p < 0.05$). The 1:1 ratio line is superimposed on the scatter plot for illustration purposes.

FIGURE 8.4



E. DISCUSSION OF RESULTS

It is important to note that these results reflect lead exposures which are associated with the exterior surface preparation work of twelve skilled residential and commercial painting contractors operating in the San Francisco Bay Area and that they involve a relatively small number of samples. Still, they suggest a number of conclusions relevant to painters' risks during surface preparation. Further discussion of these results and comparisons to the findings of other researchers appear in Chapter 14.

Full-Shift Exposures

The full-shift exposure data clearly indicate that 8-hour time-weighted average lead exposures to residential and commercial painters can exceed the Cal/OSHA Permissible Exposure Limit (PEL) of 50 ug/m^3 during exterior surface preparation work on lead paint surfaces. Sometimes their exposures can be very high, greatly exceeding the PEL. The data indicate, furthermore, that the higher full-shift exposures are associated with the use of dry manual sanding or uncontrolled power sanding (Figure 8.1).

Dry Manual Sanding and Power Sanding

The analysis of the fifty-eight 30-minute samples (Figure 8.2, Table 8.1) shows that particularly high airborne lead exposures were associated with dry manual sanding and uncontrolled power sanding. In fact, the mean lead exposures of these two methods were an order of magnitude higher than those of the other methods. This finding is supported by the results of the full-shift exposure monitoring.

A comparison of the mean total dust levels in Figure 8.3 indicates that the mean level for power sanding (13,500 ug/m^3) is much higher than for dry manual sanding (6700 ug/m^3). This indicates that the potential for generating airborne lead is significantly higher for uncontrolled power sanding than for dry manual sanding despite the rough equivalence of the mean airborne lead levels shown in Figure 8.2.

HEPA-Exhausted Power Sanding

The airborne exposures associated with uncontrolled power sanding and HEPA-exhausted power sanding are compared in Tables 8.1 and 8.2. The results in Table 8.1 indicate that the mean exposure level associated with HEPA-exhausted power sanding is 6% of the mean level for uncontrolled power sanding. However, it should be noted that this is not a staged side-by-side comparison trial; a direct comparison of the data is confounded by a number of factors including the different paint concentrations on the jobs where these samples were taken. The results in Table 8.2 allow a comparison of exposure levels for the two methods given surface paint concentrations which fall within the same range. Within the two categories that allow such a comparison, the mean exposure levels associated with HEPA-exhausted power sanding are 6% and 25% of the mean levels associated with uncontrolled power sanding.

As discussed above, the intent of simultaneously analyzing the samples for "total dust" exposures was to allow a more direct comparison of the relative potential of the different work methods to result in airborne lead, i.e., a comparison that is independent of differences in surface lead paint concentration. However, only one of the 7 gravimetric results for HEPA-exhausted power sanding was quantifiable at a LOQ of 150 ug/filter or approximately 1250 ug/m^3. Employing the standard conventions in calculating the arithmetic mean where non-quantifiable values are reported, the estimated mean total dust exposure for HEPA-exhausted power sanding is 1590 ug/m^3 or 12% of the level for uncontrolled power sanding (13,500 ug/m^3).

In summary, within the limitations of this small field study the data indicate that worker airborne lead exposures associated with HEPA-exhausted power sanding can be expected to be approximately 10% of the levels associated with uncontrolled power sanding. These data represent the use of a number of different tools by different painters, under a variety of job site conditions. As such, it is likely a reasonable estimate of the amount of exposure control that can be expected from HEPA-exhausted power sanders as employed by painting contractors in the field.

9. RESULTS

A. DESCRIPTION OF PROJECT PARTICIPANTS

Employers

Twenty-one of the 64 eligible employers participated in the Project. Company size ranged from 1 to 54 employees, with an average of 10 and median of 4.5. During slow business periods the average size was 6 employees; during busy periods, 13. The average number of years in business was 17.6, with a range of 2 to 72 years. The majority of companies (62%) did primarily residential work; 19% did primarily commercial work; and 19% did an equal mix of both.

During the year preceding February 1994, employers reported spending an average of 50% of their time working on structures built before 1950, 28% on structures built between 1950 and 1978, and 21% on structures built after 1978. Only 29% of the companies were involved in painting metal structures.

Most companies (85%) reported that none of their employees are union members. Less than half (43%) of the companies were members of the Painting and Decorating Contractors of America (PDCA), the primary trade association for residential and commercial painting contractors. The State Compensation Insurance Fund (SCIF) was the workers' compensation carrier for thirteen (62%) of the companies. SCIF is a public, non-profit agency which provides workers' compensation insurance for the largest number of California employers including many small businesses.

Over half (55%) of the employers said they had employees who would prefer training in Spanish. Similarly, over half (65%) said that they had employees who would prefer written materials in Spanish. As for the employers themselves, 81% said English was their first language, and all but one employer (who was interviewed in Cantonese/Chinese) were interviewed in English.

The characteristics of participating employers are summarized in Table 9.1.

Participating Employers vs. Eligible Non-Participants

Of 64 companies that were eligible to participate in the Project, 21 became participants and 43 did not. The participants were compared to the non-participants for a number of variables obtained from the completed eligibility questionnaires. The two groups were found to be statistically similar in the following areas: number of employees, distribution of residential vs. commercial work, percentage of work on pre-1950 or 1950-1978 buildings, frequency of doing power sanding and torching burning, frequency of conducting personal air monitoring, membership in the trade association, and having employees who are union members.

Statistically significant differences (Chi-square, $p<0.05$) were found in the frequency of abrasive blasting, and employee preference for training in Spanish. Within the participant group a higher percentage of companies reported doing abrasive blasting (31% vs. 8% for non-participants) and

TABLE 9.1

DESCRIPTION OF COMPANIES ENROLLED

Characteristic		Number of Companies	Percent
Type of Work			
Primarily Residential		13	62
Primarily Commercial		4	19
Mix of Commercial & Residential		4	19
		21	100
Age of Structures			
>50% Built Prior to 1950		10	50
<50% Built Prior to 1950		10	50
		20	100
Union Membership			
Yes		3	14
No		18	86
		21	100
Trade Association Membership (PDCA)			
Yes		9	43
No		12	57
		21	100
Workers' Compensation Carrier			
State Compensation Insurance Fund		13	62
Other		8	38
		21	100
Language Preference of Employees			
Any employees prefer written material in Spanish?	- yes	13	65
	- no	7	35
		20	100
Any employees prefer training in Spanish?	-yes	11	55
	-no	9	45
		20	100
Company Size			
Mean: 10 employees		Range: 1-54 employees	
Years in Business			
Mean: 17.6 years		Range: 2 - 72 years	

had employees who would prefer training in Spanish (55% vs. 29% for non-participants). A borderline significant difference (Chi-square, p=0.056) was found in whether or not any employees had been provided with blood lead tests in the year prior to the Project. Five of the participating companies (24%) had conducted blood lead testing at least once, as compared to 7% within the non-participant group.

Workers

The 21 companies enrolled a total of 132 workers into the Project. Although we requested that all surface preparation employees be invited to participate in the Project, some companies did not enroll all of their workers. Generally, most employees of a company did surface preparation. In 12 companies, the employers themselves did surface preparation; these employers were also interviewed as workers.

In order to accurately assess change over time, our analysis is restricted to the subset of 89 workers for whom we have data from all 3 interviews (baseline [June 1994], post-intervention [November 1994], and one-year follow-up [Summer 1995]). From this point on, any discussion of workers will refer to this group unless otherwise noted.

All participants were male with an average age of 36 years (range 21-57 years). Forty-six percent were non-Hispanic white, 31% Hispanic, 18% Asian, and 5% African-American. Forty-five percent of the workers were born in the United States. Other places of birth were China (12%), Mexico (11%), Central America (11%) and Ireland (9%). Most employees (71%) were interviewed in English, with 18% interviewed in Spanish and 10% in Cantonese/Chinese. Three quarters of the employees were high school graduates. Slightly over half of these high school graduates had some college education or were college graduates.

On average, employees had been painters for 11.5 years (range: 6 months to 33 years), and most (80%) were not union members. Twenty-three percent had been employed by the current company for less than one year, 41% for 1 to 5 years, 16% for 6 to 10 years, and 20% for 11 or more years. In the month prior to the beginning of the Project, most of the workers (82%) had done surface preparation tasks for their current employer; 25% of the workers had also done surface preparation for someone other than their current employer. The mean baseline blood lead level was 10.8 ug/dl with a range from less than 5 (laboratory detection limit) to 38.0 ug/dl.

The majority of the workforce did not smoke (72%) or use other tobacco products (96%). In the month prior to the beginning of the Project, only a few employees engaged in activities or hobbies outside of work that could have involved lead. These activities included: using home remedies (n=2); glazing pottery or ceramics (n=2); shooting firearms (n=3); soldering, tinning or brazing (n=4); and using artists' paints (n=6). Twenty percent of the workers (n=18) said they had cooked or served food in imported or handmade ceramic cookware, but most were unsure whether the cookware contained lead.

A summary of worker characteristics appears in Table 9.2.

TABLE 9.2

DEMOGRAPHIC CHARACTERISTICS OF WORKERS WHO COMPLETED THREE INTERVIEWS

Characteristic	Number of Workers	Percent
Gender		
Male	89	100
Race/Ethnicity		
White, Non Hispanic	42	47
Hispanic	27	30
Black (African American)	4	5
Asian	16	18
	89	100
Country of Origin		
U.S.	40	45
China	11	12
Mexico	10	11
Central American	10	11
Ireland	8	9
Other	10	11
	89	100
Language of Interview		
English	64	72
Spanish	16	18
Cantonese	9	10
	89	100
Union Member		
Yes	18	20
No	71	80
	89	100
Smoker		
Yes	25	28
No	64	72
	89	100
Highest Grade Completed		
Grade School	12	14
Some High School	10	11
High School Graduate	30	34
Some College	25	28
College Graduate	12	14
	89	100
Number of Years as Painter		
Mean: 11.5 years	Range: 0.5 - 33 years	
Age:		
Mean: 36 years	Range: 21 - 57 years	

Workers Included In Analysis vs. Workers Excluded

Of the 132 employees who were participants in the Project, questionnaire data at three points in time were available for 89 workers. These workers were included in the analysis, leaving 43 workers for whom data were not analyzed. We did not systematically investigate the reasons why 43 workers were lost to follow-up. One worker refused the last interview, and three worker questionnaires were excluded due to incomplete information. Employers notified us that 3 were no longer doing surface preparation work and one was on disability. The remaining 35 could have changed employment or were still working and could not be reached by telephone for the final interview questionnaire.

No significant differences were found between these two sets of workers except in the area of smoking. Only 28% of the workers included in the analysis were smokers, whereas 72% of those excluded were smokers (Chi-square, p=0.009). Mean baseline blood lead levels for each group were essentially the same (10.8 ug/dl for those included in analysis; 10.5 ug/dl for those excluded).

B. QUESTIONNAIRE DATA

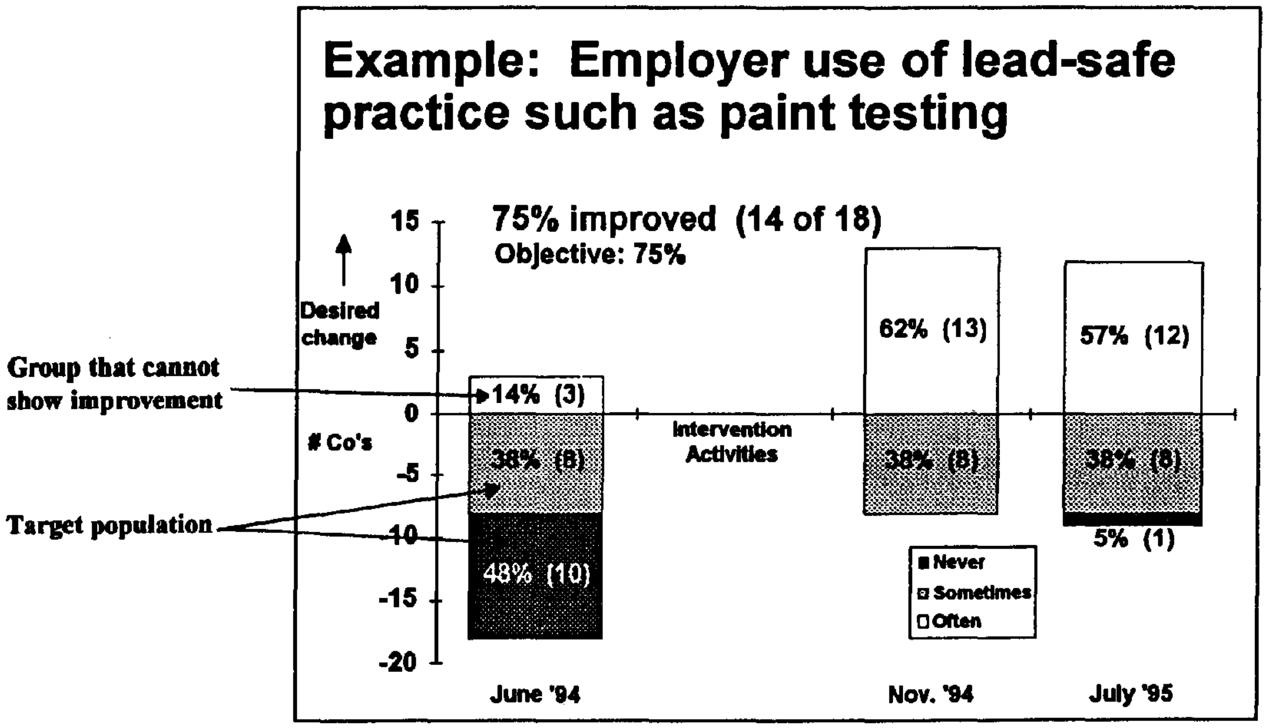
Changes in Lead Safety Practices

We set measurable objectives designating the degree of improvement in lead safety practices that we wanted to achieve by Summer 1995 through our intervention efforts. Twenty-seven objectives pertain to employer changes in behavior/work practices and knowledge, and 12 to worker behavior/work practices. Hereafter, the population of employers or workers who can show improvement with respect to a particular objective is referred to as the "target population." Improvement is expressed as either a) the proportion of the target population that decreased the use of a particular unsafe work practice or, b) the proportion of the target population that increased the use of a particular lead-safe practice. A <u>decrease in the use of an unsafe practice</u> is defined as moving from a questionnaire answer of "often" to "sometimes" or "never," or by moving from "sometimes" to "never." An <u>increase in the use of a particular lead-safe practice</u> is defined as moving from "never" to "sometimes" or "often," or by moving from "sometimes" to "often."

We present employers' and workers' reported safety practices below using bar charts to illustrate the relevant data at three, or in some cases two, points in time (see Figure 9.1 below). The population that can show improvement with respect to the objective--the "target population"--appears in shaded colors in the bar representing baseline (June 1994) conditions. On the other side of the x-axis, the group that cannot improve any further is represented in white. The direction of desired change is indicated with an arrow.

Because individual contractors and workers could improve, regress, or stay the same, it is not possible to distinguish the target population from the others on the bars depicting post-intervention or one-year follow-up data, nor to calculate their percentage improvement directly from the figure. Therefore, at the top of each figure, we present the proportion of the target population that improved from baseline to Summer 1995, compared to the specific objective for that lead safety practice (if an objective was set). For each figure, we present detailed tables showing the direction of change of all individuals from baseline to the two subsequent points in time in Appendix 22.

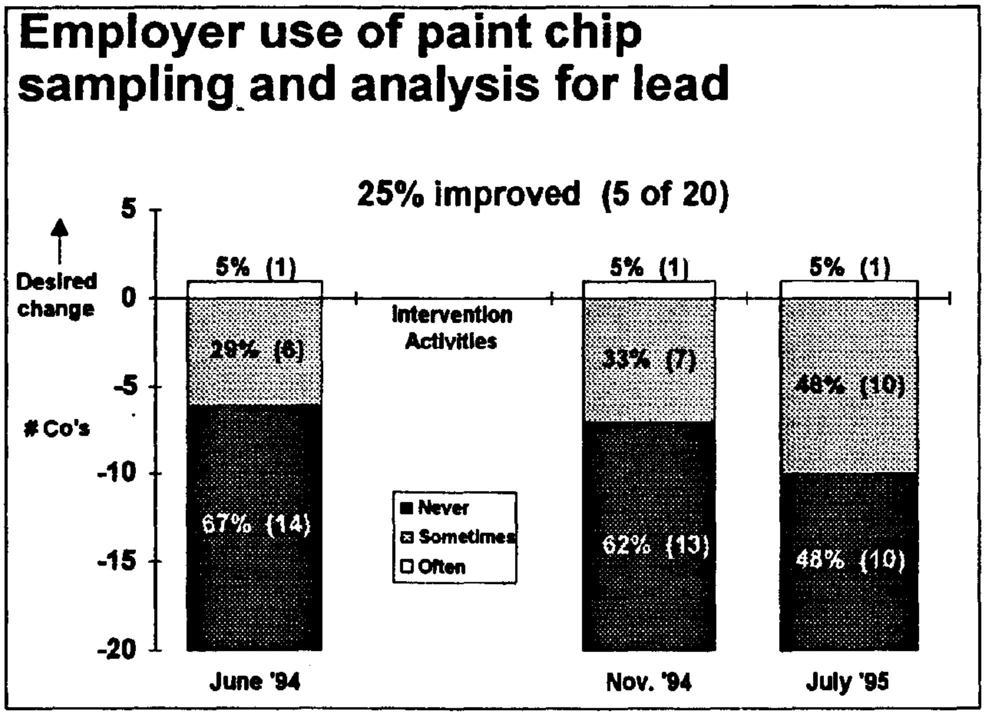
FIGURE 9.1



Lead Paint Hazard Identification

Employers were asked how frequently they used particular methods (color-indicating test, paint chip analysis, XRF) to determine the presence and/or concentration of lead in paint. At baseline, no companies reported any experience with X-ray fluorescence (XRF) analyzers. Before the Project began, the majority of employers (67%) had never used paint chip sampling with analysis by a laboratory (Figure 9.2). Five percent used it often, and 29% sometimes. By Summer 1995, 25% of the employers (5 of 20) who could increase their use of this method had done so.

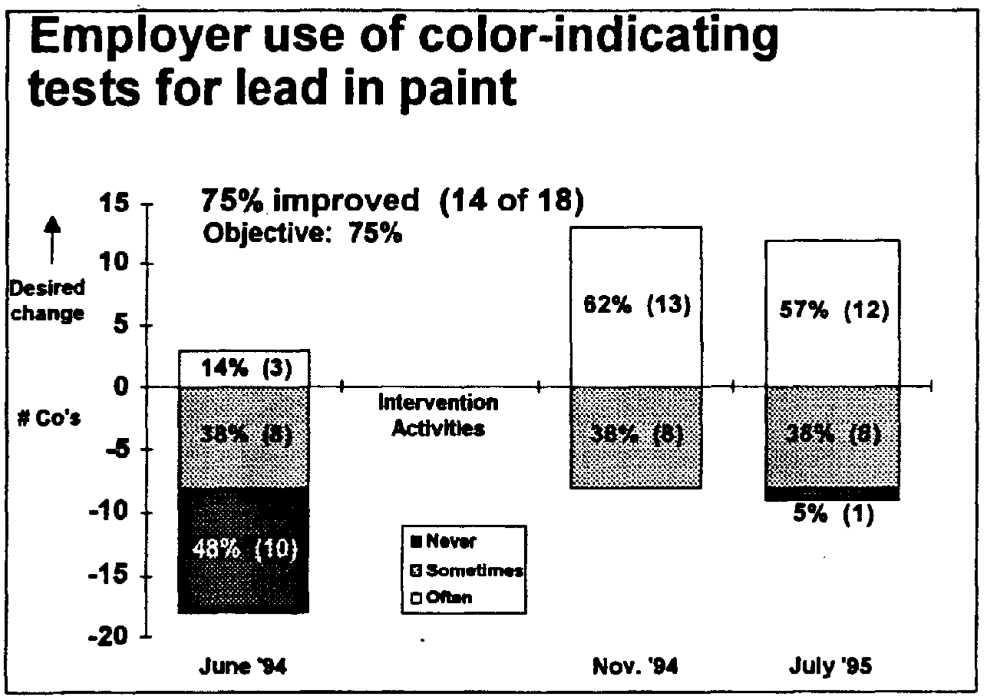
FIGURE 9.2



Objective: 75% of target employers will increase the frequency with which they use color indicating chemical tests for lead in paint.

At baseline, use of color-indicating tests (e.g., "Lead Check") was somewhat more widespread than paint chip sampling (Figure 9.3). We set an objective that 75% of employers (14 of 18) who could increase the frequency of using color indicating tests would do so. This objective was met, as 75% of employers increased their use of this method to identify lead-containing paint. Ninety-five percent of employers (20 of 21) stated in Summer 1995 that they had purchased colorimetric testing supplies since the beginning of the Project. A number of employers negotiated a reduced price with the manufacturer by making a group purchase.

FIGURE 9.3



Surface Preparation Methods

Employers were asked how frequently they used various surface preparation methods for work on pre-1980 buildings or metal surfaces. Contractors' responses at baseline and Summer 1995 are displayed in Table 9.3. The most frequently used surface preparation methods at both points in time were dry manual sanding and scraping, followed by water blasting or power washing.

Employer training addressed the selection of work methods which generate the least amount of lead dust or fume. Employers we [illegible] ect [illegible] Comparing Summer 1995 [illegible] scraping and HEPA-exhausted po [illegible] in the [illegible] ope[illegible] flame burning and power tools without HEPA ventilation.

TABLE 9.3

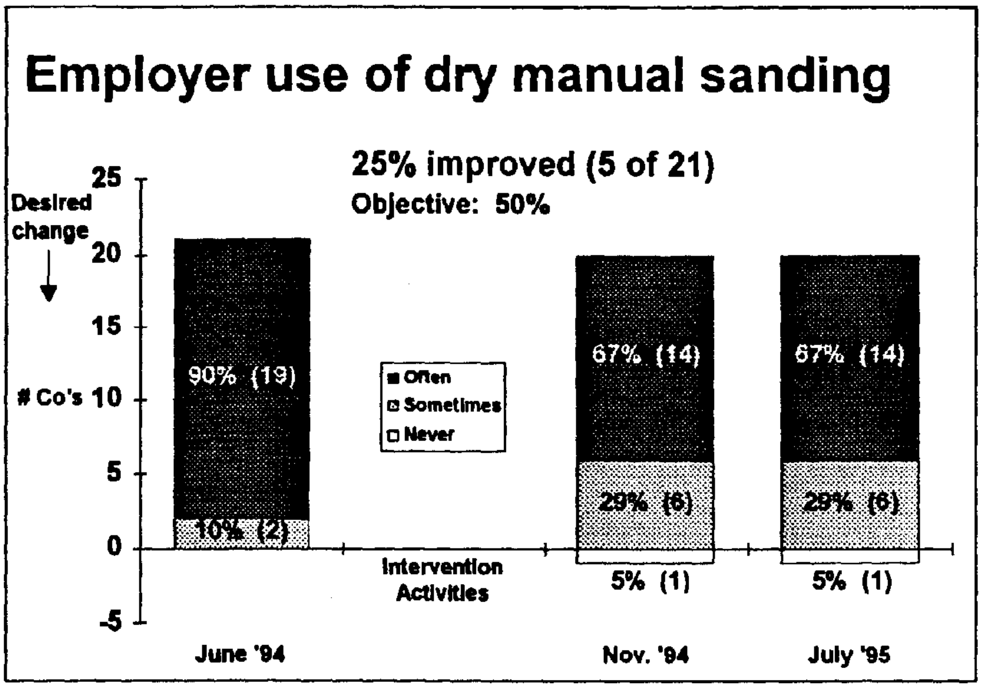
FREQUENCY OF USE OF SURFACE PREPARATION METHODS BY PAINTING CONTRACTORS

Surface Preparation Method	% of Companies Using Method at Baseline			% of Companies Using Method, Summer 1995		
	Often	Sometimes	Never	Often	Sometimes	Never
Dry Manual Sanding	90	10	-	67	29	5
Dry Manual Scraping	86	14	-	71	24	5
Wet Scraping	10	33	57	29	48	24
Uncontrolled Power Sanding	38	48	13	19	38	43
HEPA-exhausted Power Sanding	-	5	-	14	19	67
Water Blasting	38	57	5	52	43	5
Heat Gun	5	43	52	9	43	48
Open Flame Burning	-	57	43	-	19	81
Abrasive Blasting	-	10	90	-	-	100

Objective: 50% of target employers will decrease the frequency of dry manual sanding.

Dry manual sanding of lead paint generates large amounts of lead dust, exposing workers and requiring substantial effort to clean up contamination. We set an objective that 50% of the target employers (10 of 21) would decrease the frequency of dry manual sanding. Since only 25% of the target employers decreased their use of this method, we did not meet this objective (Figure 9.4).

FIGURE 9.4



Objective: 33% of target employers will decrease the frequency of dry manual scraping.

Dry manual scraping of lead paint also generates lead dust and paint chips. In our training, we encouraged painters to substitute dry methods with wet scraping (i.e., misting with water prior to scraping) in an effort to reduce dust exposure. Our objective was that 33% of the target employers (7 of 21) would decrease the frequency of dry manual scraping. This objective was not met (Figure 9.5). Figure 9.6 shows, however, that we did achieve an increase in contractors' frequency of using wet manual scraping as a safer surface preparation method; 53% of employers increased their use of wet manual scraping.

FIGURE 9.5

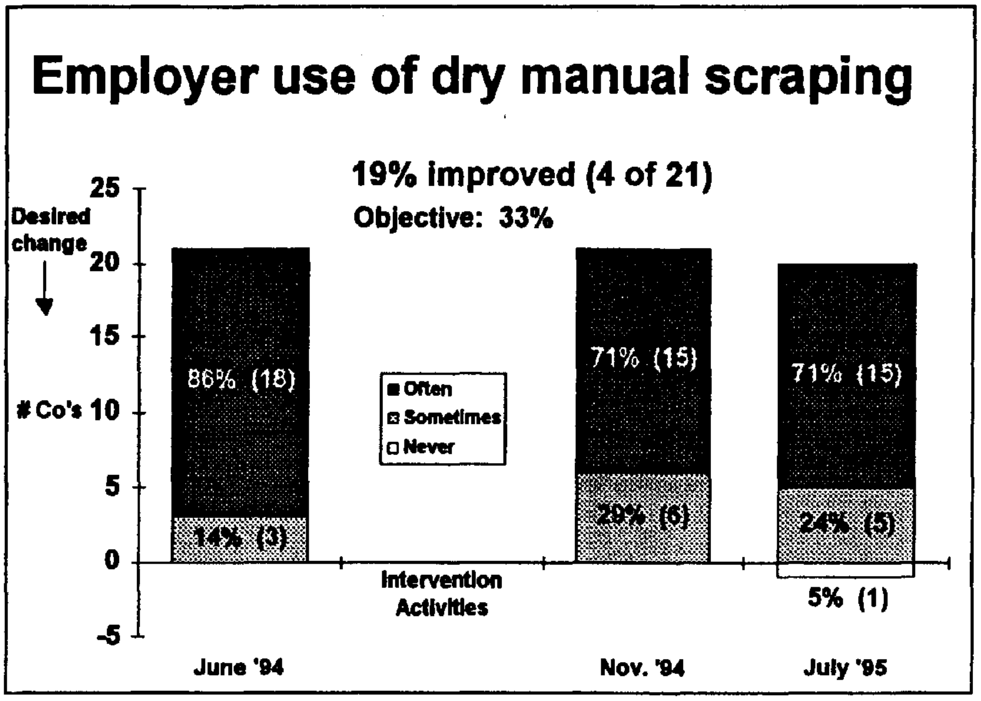
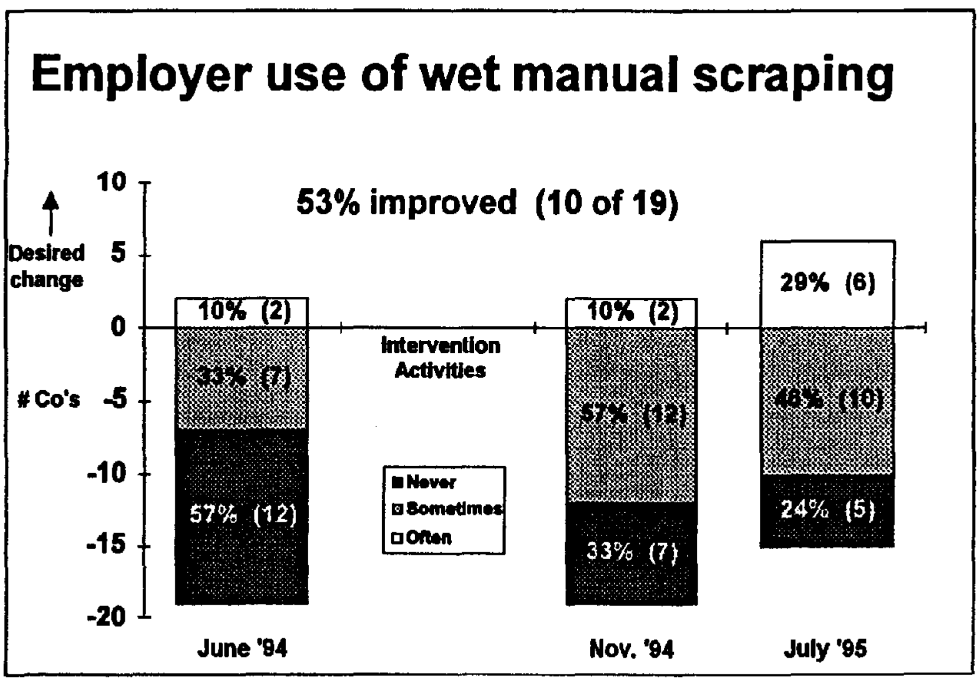


FIGURE 9.6



Objective: 50% of target employers will increase the use of HEPA-exhausted power tools.

Attachments on power sanders or grinders that connect to HEPA vacuums capture lead dust released from the surface before it spreads into the surrounding area thereby decreasing worker exposure and preventing widespread contamination. At baseline, only one employer had experience with this type of equipment (Figure 9.7). Our objective was that 50% of the target employers (10 of 21) would increase their use of HEPA-exhausted power tools. We did not meet this objective. We did, however, note a decrease (56% of employers) in the use of power tools without HEPA exhaust ventilation (Figure 9.8).

FIGURE 9.7

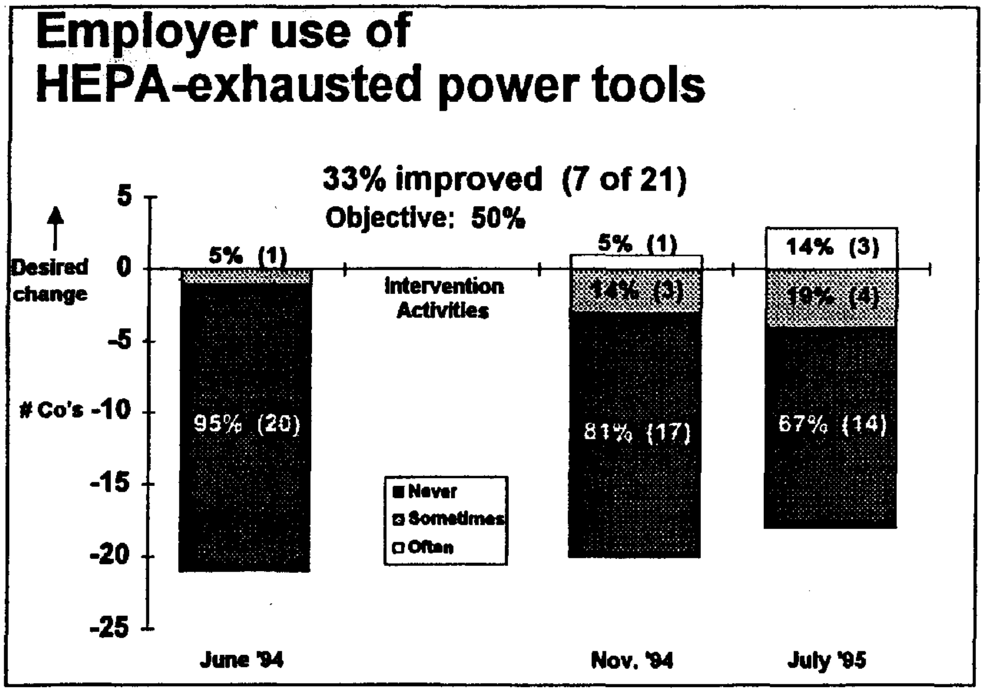
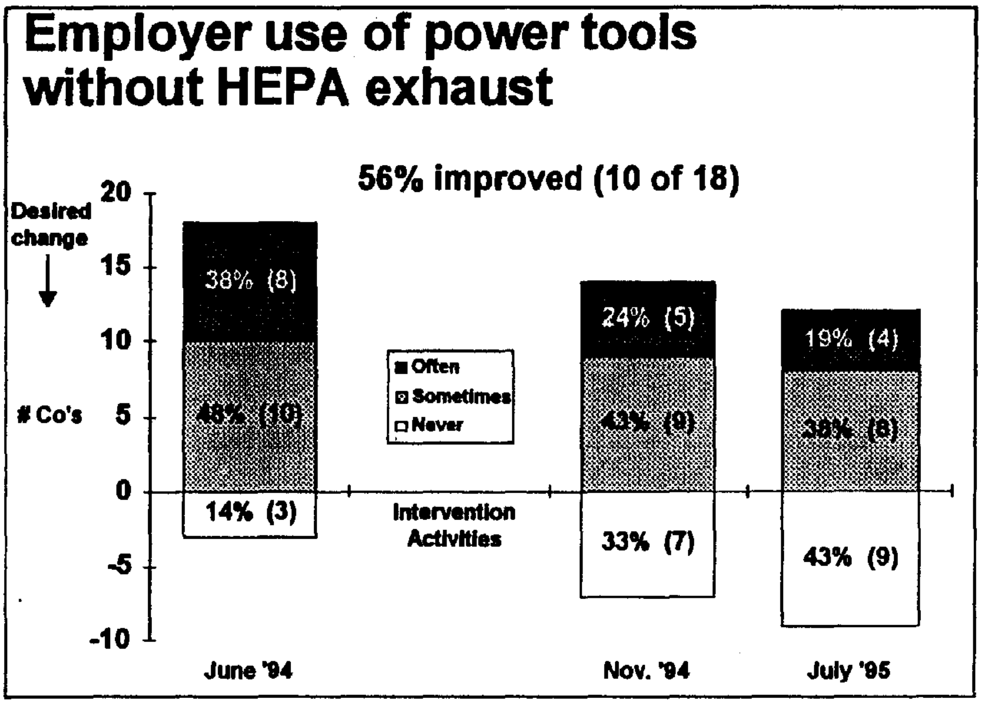


FIGURE 9.8

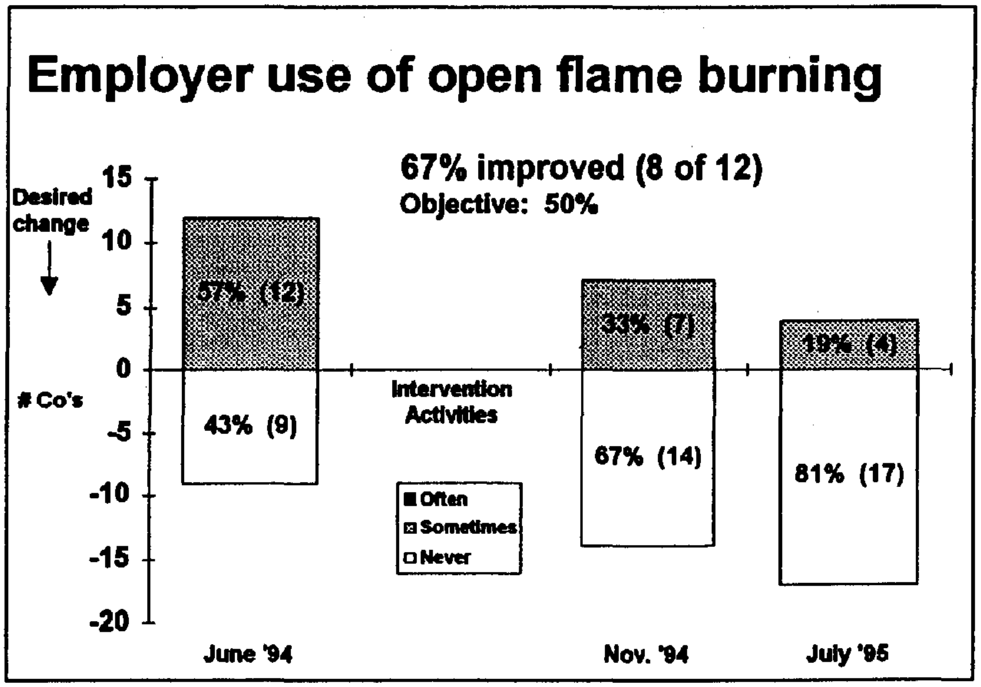


Employer use of power tools without HEPA exhaust
56% improved (10 of 18)
Desired change
Co's
20
15
10
5
0
-5
-10
38% (8)
48% (10)
14% (3)
Often
Sometimes
Never
Intervention Activities
24% (5)
43% (9)
33% (7)
19% (4)
38% (8)
43% (9)
June '94
Nov. '94
July '95

Objective: 50% of target employers will decrease the frequency of open flame burning.

Open flame burning generates lead fume, which can be easily inhaled and absorbed into the bloodstream. We set an objective that 50% of the target employers (6 of 12) would decrease their frequency of open flame burning. Since 67% of employers made the desired change, we met this objective (Figure 9.9).

FIGURE 9.9



Respiratory Protection

Appropriate Respirator Selection

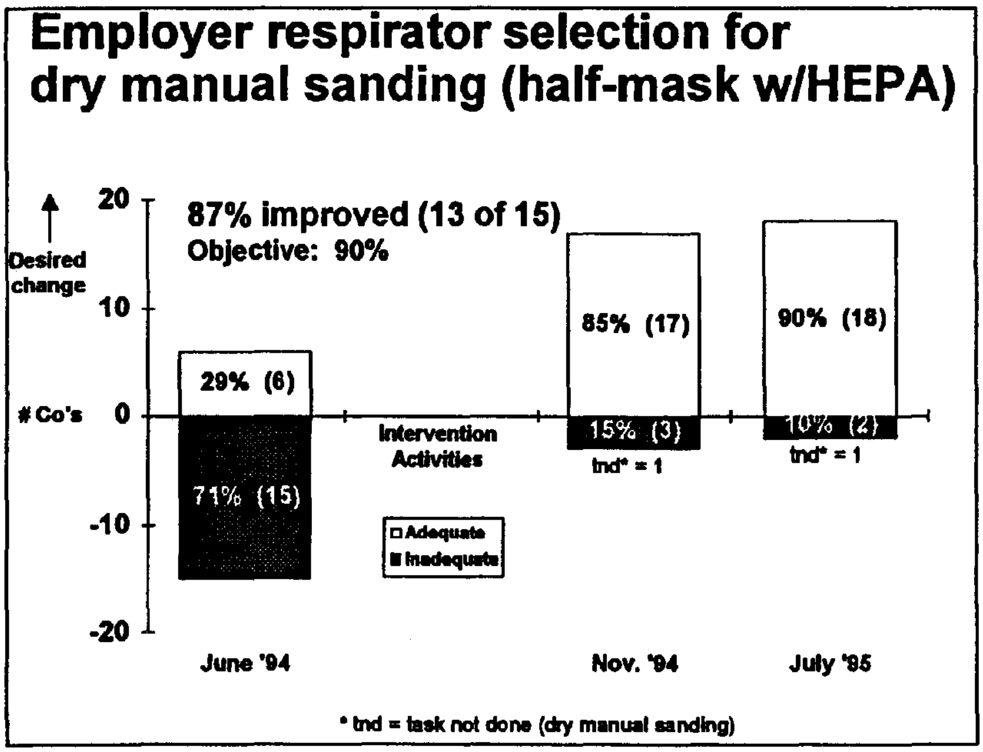
Objective: 90% of target employers who do not provide the respirator required by Cal/OSHA for dry manual sanding will do so.

The Cal/OSHA Construction Lead Standard mandates a minimum level of respiratory protection during certain high risk activities. For example, at least a half-mask respirator with high efficiency ("HEPA") cartridges is required when dry manual sanding or scraping on lead paint. At baseline, only six employers (29%) provided a respirator meeting the Cal/OSHA Standard for employees who were dry manual sanding (Figure 9.10). Of the 15 employers who did not provide adequate respiratory protection at baseline, 11 reported using dust masks and 4 provided half-mask respirators with non-HEPA filters.

Our objective was that 90% of the employers (14 of 15) who did not provide an adequate respirator for dry manual sanding at baseline would do so by Summer 1995. We nearly met this objective, as 87% of employers improved. This was an area where substantial improvement was noted as early as November 1994. In Summer 1995, one employer continued to use dust masks and another used half-mask respirators with non-HEPA cartridges. One employer reported discontinuing the use of dry manual sanding as a surface preparation method.

The results for respirator selection for dry manual scraping, which also requires a half-mask respirator with HEPA filters, were nearly identical. The same respirator is also the minimum required for use with heat guns, a surface preparation method used by approximately half the contractors. Among heat gun users, 85% of those employers who originally did not provide adequate respiratory protection did so in Summer 1995.

FIGURE 9.10

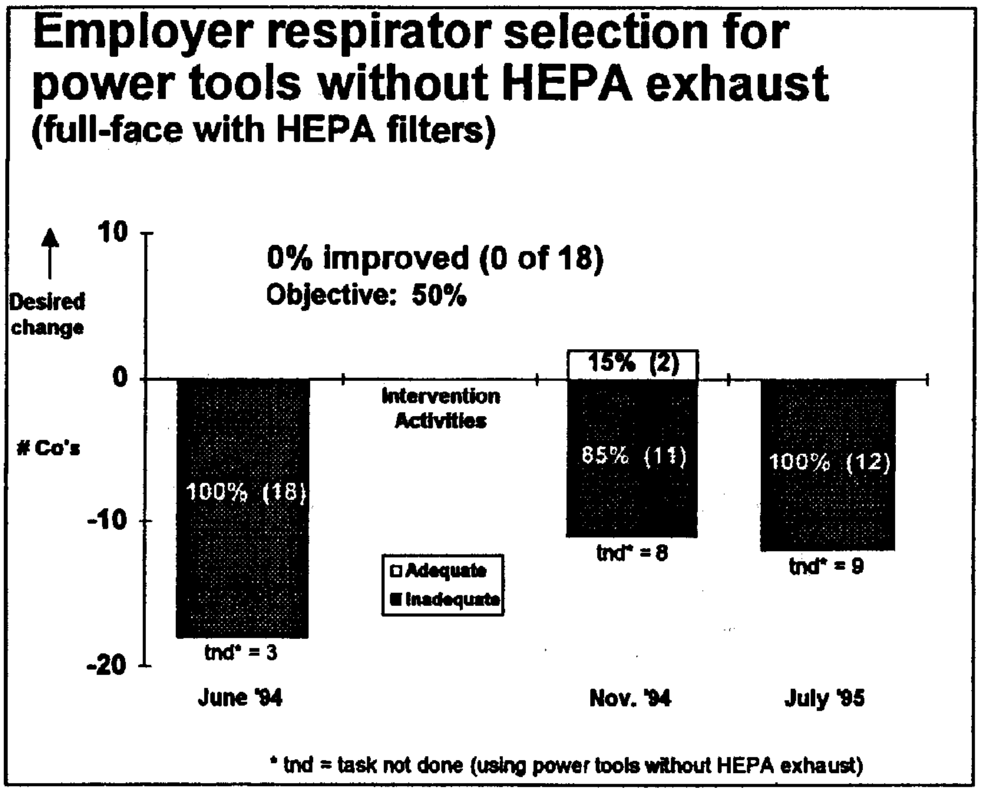


Objective: 50% of target employers who did not provide the respirator required by Cal/OSHA for power tools without HEPA exhaust will do so.

The minimum respiratory protection required by Cal/OSHA for uncontrolled power sanding or grinding on lead paint is a full-face respirator or powered air-purifying respirator with HEPA cartridges. At baseline, none of the 18 employers who used power tools without HEPA exhaust provided the minimum level of respiratory protection required for this task (Figure 9.11).

Our objective was that 50% of target employers (9 of 18) would provide adequate respiratory protection for power sanding/grinding. This objective was not met. In Summer 1995 there were still 12 employers who used this work method, and none provided adequate respiratory protection.

FIGURE 9.11



Medical Clearance

Cal/OSHA requires that employees assigned to use a negative pressure respirator be evaluated by a medical professional to ensure that they can work safely with the respirator without causing too much strain on the heart and lungs. Employees must be reevaluated on an annual basis. At baseline, 96% of employers had not provided initial medical clearance for all respirator users. During the mid-project blood lead testing provided in August 1994 through each company's medical supervisor, 17 companies (81%) scheduled employees to receive medical clearance for respirator use.

Objective: 50% of target employers who provided initial medical clearance for respirators will provide an annual update.

We set an objective that 50% of the employers (9 of 17) who had provided respirator clearance during August 1994 would provide an annual update by August 30, 1995. By this date, only 3 employers (18%) had sent project participants back to their medical provider for an updated medical clearance. Thus, this objective was not met. Two companies did provide respirator clearance after the August anniversary date in September 1995 and December 1995. Four additional employers provided medical clearance to other employees (not project participants) during the period from August 30, 1994 to August 30, 1995.

Objective: 50% of target employers will provide new hires with medical clearance for respirator use.

We established an objective that by Summer 1995, 50% of employers with new hires (since September 1, 1994) would provide them with medical clearance for respirator use. In Summer 1995, 10 companies reported that they had new hires; 5 of these companies had provided medical clearance. Thus, we met this objective.

Fit Testing and Fit Checking

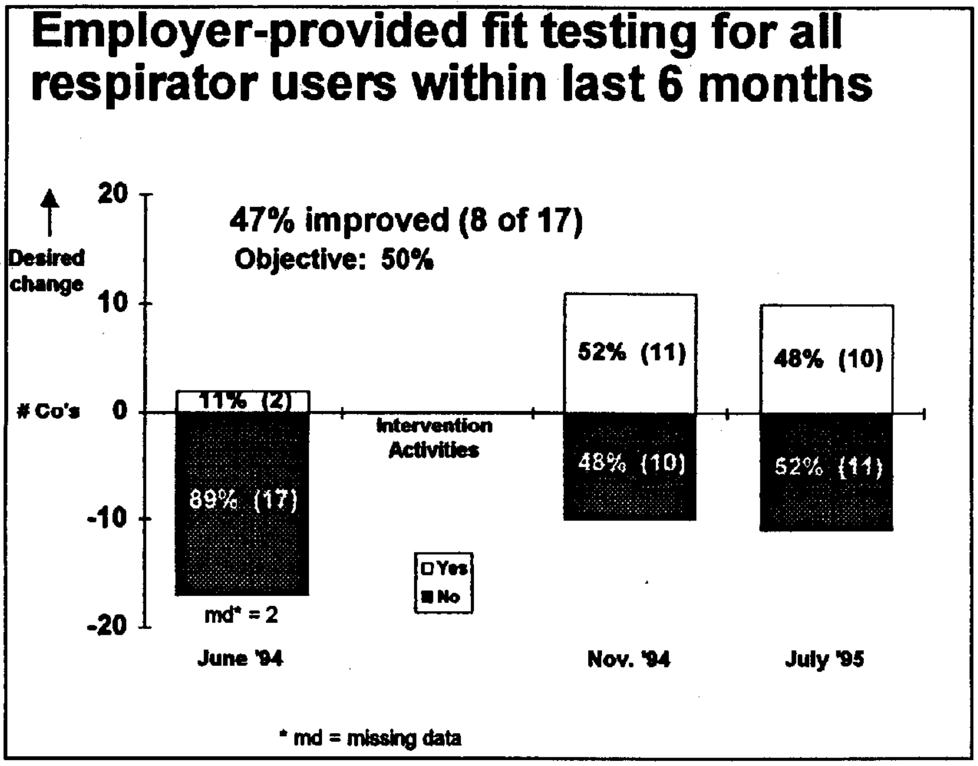
Objective: 50% of target employers who have not provided fit testing in the prior 6 months will do so.

At baseline, we questioned employers about whether all of their employees who used negative pressure respirators had been fit tested in the prior six months as required by Cal/OSHA. Fit testing is necessary to ensure that the face piece seals adequately to the face of the wearer. Seventeen employers (89%) responded negatively, indicating that fit testing had not been done at all, had not been done for all respirator users, or they did not know whether it had been done in the last six months (Figure 9.12). Two employers said that fit testing had been provided to all employees using respirators, and two employers did not respond to the question.

Our objective was that 50% of the employers (9 of 17) who had not provided fit testing to all respirator users in the prior six months would do so and continue to provide it every six months as required. We came close to meeting this objective, since in Summer 1995, 47% of the target employers reported that all respirator users had been fit tested in the prior six months.

Employers who had provided fit testing were asked what method was used. In November 1994, 3 employers reported having used qualitative fit testing, 6 had provided quantitative fit testing, and 2 did not know what method was used. Quantitative fit testing is a service offered by the clinic all companies chose as their medical supervisor. Clinic records showed that 9 employers (43%) arranged for employees to have quantitative fit testing in August 1994, when mid-project blood lead and ZPP testing were done. The most common method of fit testing changed by Summer 1995, when 8 employers reported using qualitative fit testing and 2 had provided quantitative fit testing in the prior six months. In Summer 1995, 6 employers (29%) reported that, since the start of the Project, they had purchased the equipment and supplies needed to perform qualitative fit testing with irritant smoke.

FIGURE 9.12

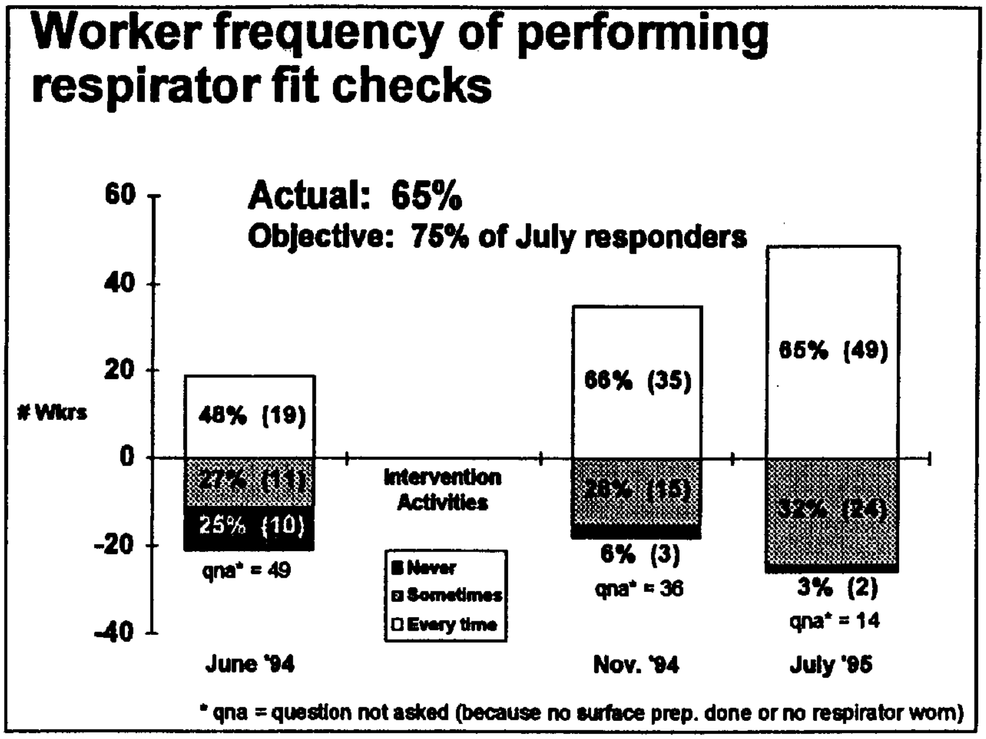


Objective: 75% of all target workers (in Summer 1995) will do a fit check every time they put on a respirator.

Positive- and negative-pressure fit checks should be performed by the wearer of a negative pressure respirator every time it is put on, to check that the face piece is sealing properly to the face. Our original objective was that 75% of workers who could increase the frequency with which they performed fit checks would do so. However, our questionnaire was structured so that the question about fit checks was not asked of workers who either did no surface preparation work in the prior month or did not wear a respirator. At baseline we found that more than half of the workers were not asked about fit checks (indicated on Figure 9.13 as "qna" for "question not asked"), leaving us with incomplete baseline data about the practice of fit checking.

Therefore, we set an objective that 75% of workers (56 of 75) who responded to the fit check question in Summer 1995 would do a fit check every time they put on a respirator. Since only 65% of workers reported doing a fit check every time they put on a respirator, we did not meet this objective (Figure 9.13).

FIGURE 9.13


Worker frequency of performing respirator fit checks
Actual: 65%
Objective: 75% of July responders
60
40
20
0
-20
-40
Wkrs
48% (19)
27% (11)
25% (10)
qna* = 49
Intervention Activities
Never
Sometimes
Every time
66% (35)
28% (15)
6% (3)
qna* = 36
65% (49)
32% (24)
3% (2)
qna* = 14
June '94
Nov. '94
July '95
* qna = question not asked (because no surface prep. done or no respirator worn)

Protective Clothing and Hygiene

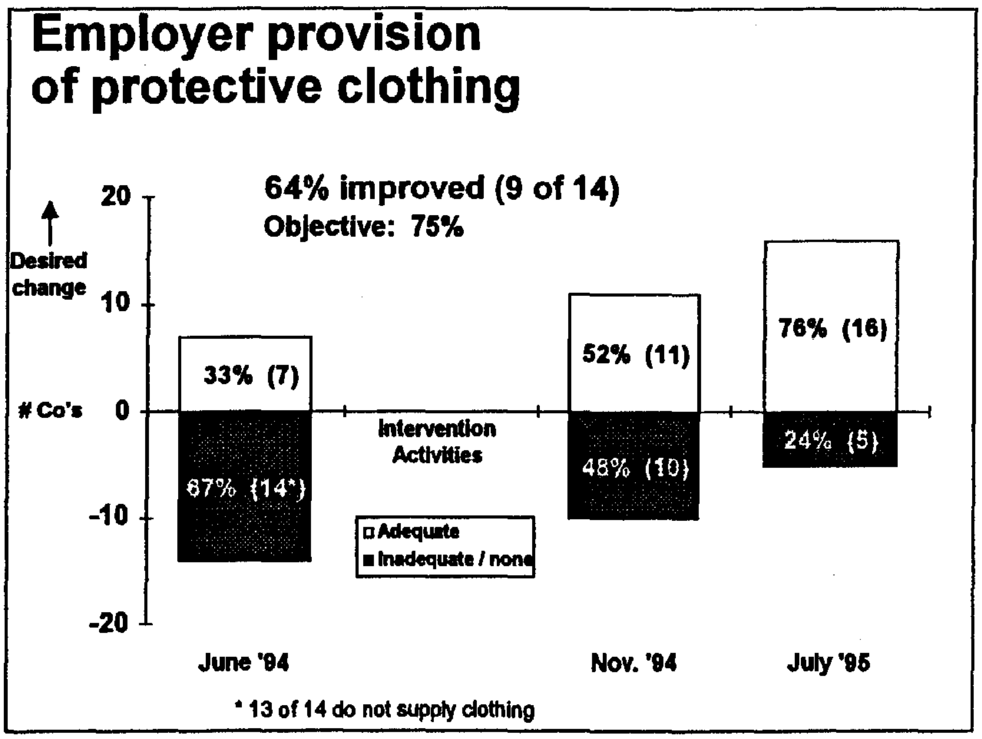
Work Clothing and Shoes

Objective: 75% of target employers who do not provide adequate protective clothing will do so.

At baseline, only seven of the employers (33%) provided their employees with adequate protective work clothing to prevent contamination of street clothes and take-home lead exposure (Figure 9.14). "Adequate" was defined as pants and shirts or full-body coveralls (disposable or non disposable). Thirteen employers did not supply any protective clothing, and one employer supplied clothing that was not adequate.

Our objective was that 75% of target employers (i.e., at least 11 of 14) would provide adequate protective clothing. Only a 64% improvement was achieved by Summer 1995; thus, we did not meet our objective. The use of disposable clothing increased over time, from 2 employers at baseline, to 5 in November 1994, to 9 in Summer 1995.

FIGURE 9.14

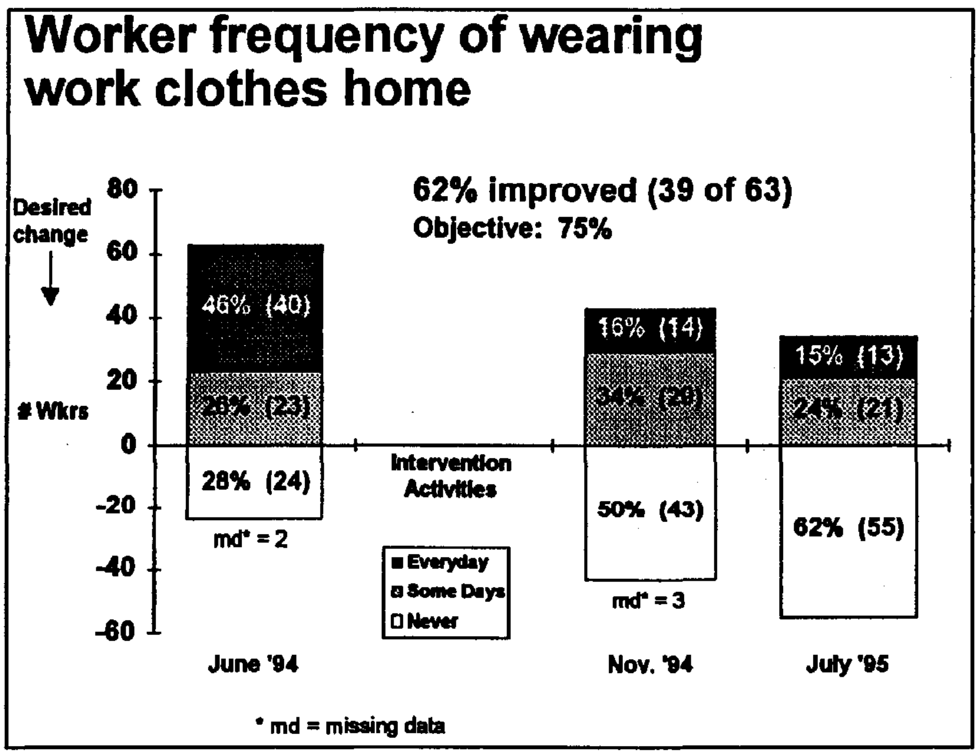


Objective: 75% of target workers will decrease the frequency of wearing work clothes home.

Wearing contaminated work clothes and shoes home creates a potential for exposing household members to lead dust. We questioned workers about how often they wore home the clothes they wore while working. This was a common practice at baseline, with 46% of workers reporting wearing home work clothes every day and 26% on some days (Figure 9.15).

Our objective was that 75% of workers (47 of 63) who wore work clothing home at baseline would decrease the frequency of this unsafe practice. Since only 62% of workers who could improve in this area did, we did not meet our objective. Among the 13 workers who continued to wear home work clothes every day, only 1 had a young child at home. An additional question asked only in Summer 1995 showed that 65% of workers who still wore work clothing home, reported that they changed their clothes before entering the home.

FIGURE 9.15

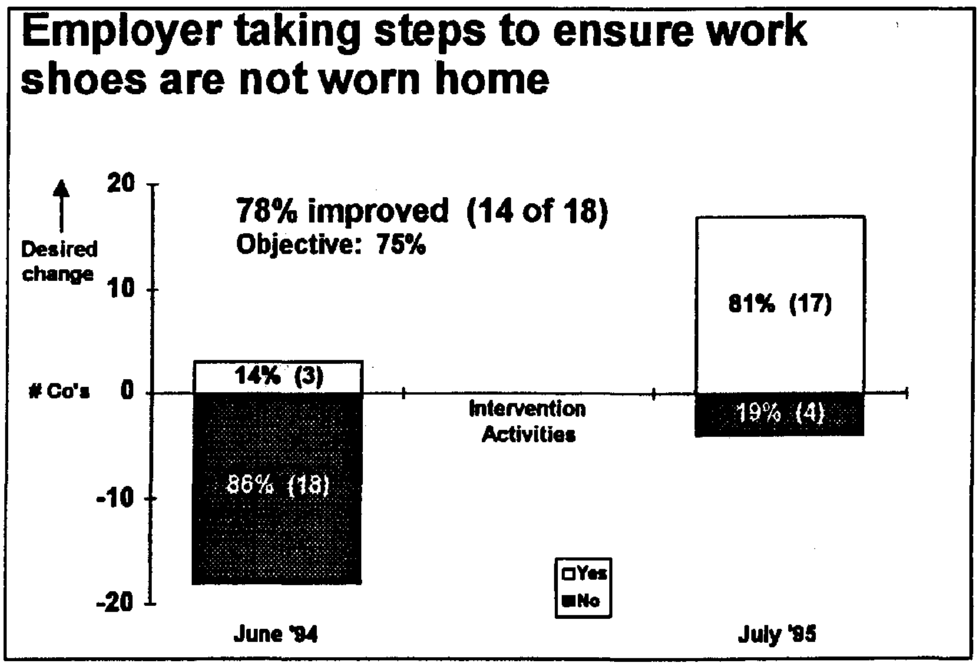


Objective: 75% of target employers who do not take steps to prevent take-home contamination via work shoes will do so.

Employers were asked whether they took any steps to ensure that workers do not wear home the shoes they have worked in, potentially causing household contamination. The majority of companies (86%) said they did not take any steps to prevent take-home contamination via work shoes prior to June 1994 (Figure 9.16).

Our objective was that 75% of the target employers (14 of 18) would improve. This objective was met, as 78% of employers made the recommended improvement. The various measures employers reported included telling workers not to wear home shoes (76% of employers), ensuring that workers have two sets of shoes (18%), and providing shoe covers (6%). None of the employers reported that they provided work shoes to employees.

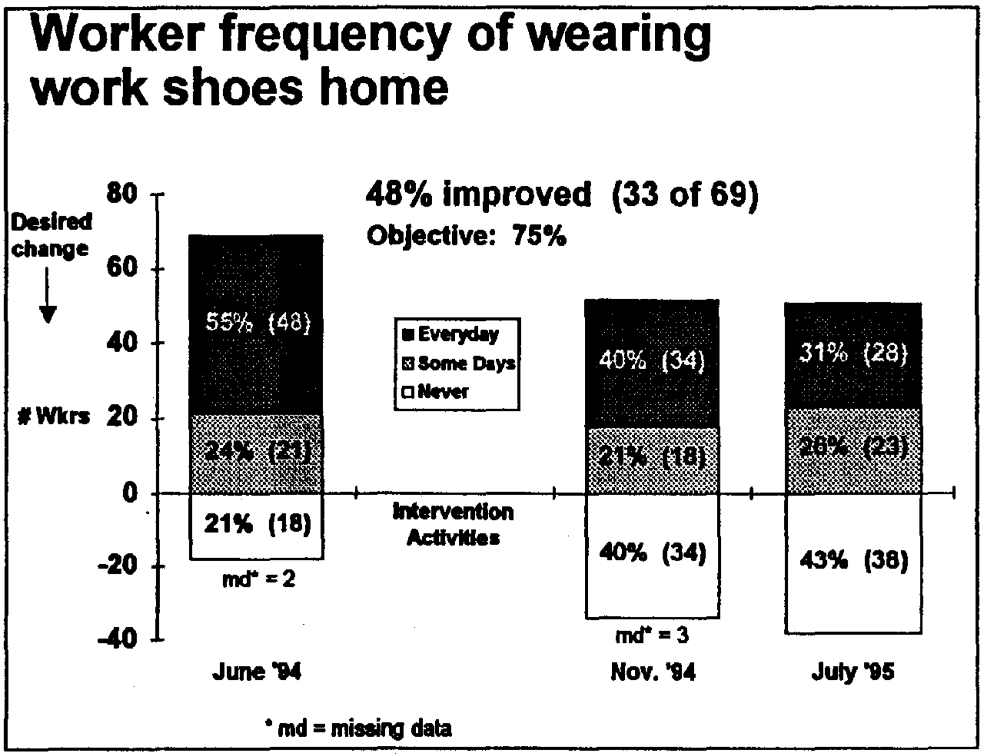
FIGURE 9.16



Objective: 75% of target workers will decrease the frequency of wearing work shoes home.

At baseline, 55% of workers reported wearing home the shoes they wore while working every day, and 24% on some days (Figure 9.17). Our objective was that 75% of workers (52 of 69) who initially wore their work shoes home would decrease the frequency of this practice. This objective was not met, with only 48% of workers who could improve making the change. Among those who continued to wear work shoes home, 68% did not have a young child at home. An additional question asked only in Summer 1995 showed that 67% of workers who still wore work shoes home reported that they changed them before entering the home.

FIGURE 9.17

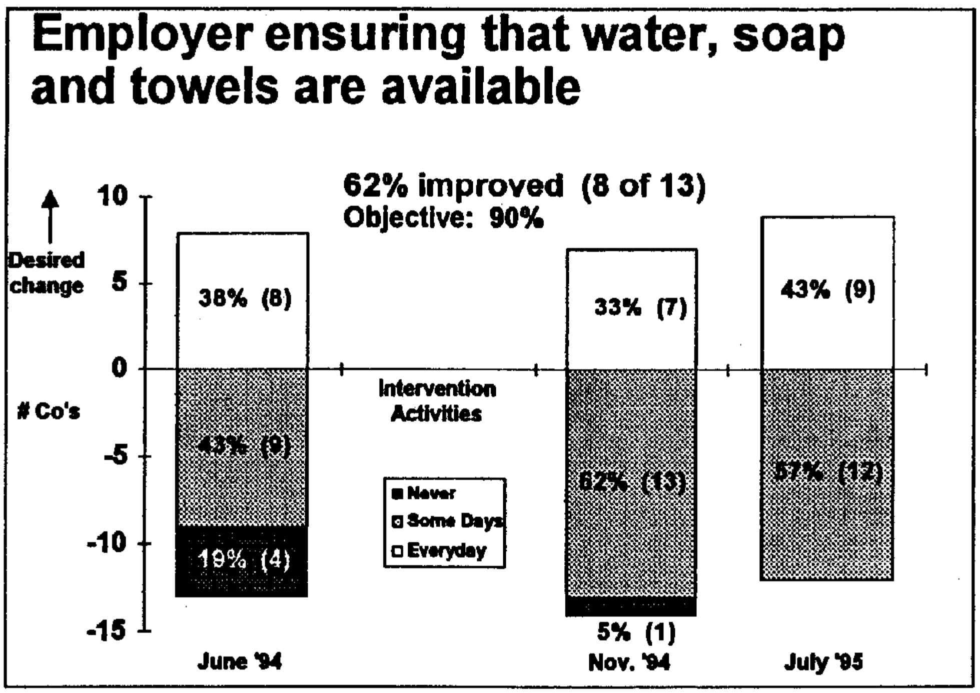


Washing Facilities: Availability and Usage

Objective: 90% of target employers who do not consistently make certain that water, soap, and towels for hand washing are available for workers will do so more frequently.

Employers were asked at baseline whether water, soap, and towels were available at the work site for employee wash-up. For the November 1994 and Summer 1995 questionnaires, this question was reworded slightly to improve clarity, as "How often do you ensure that water, soap, and towels are available for washing?" Our objective was that 90% of the target employers (12 of 13) would more frequently ensure that provisions were made for wash-up. This objective was not met, as only 60% of employers increased the frequency of ensuring that these provisions were made (Figure 9.18).

FIGURE 9.18

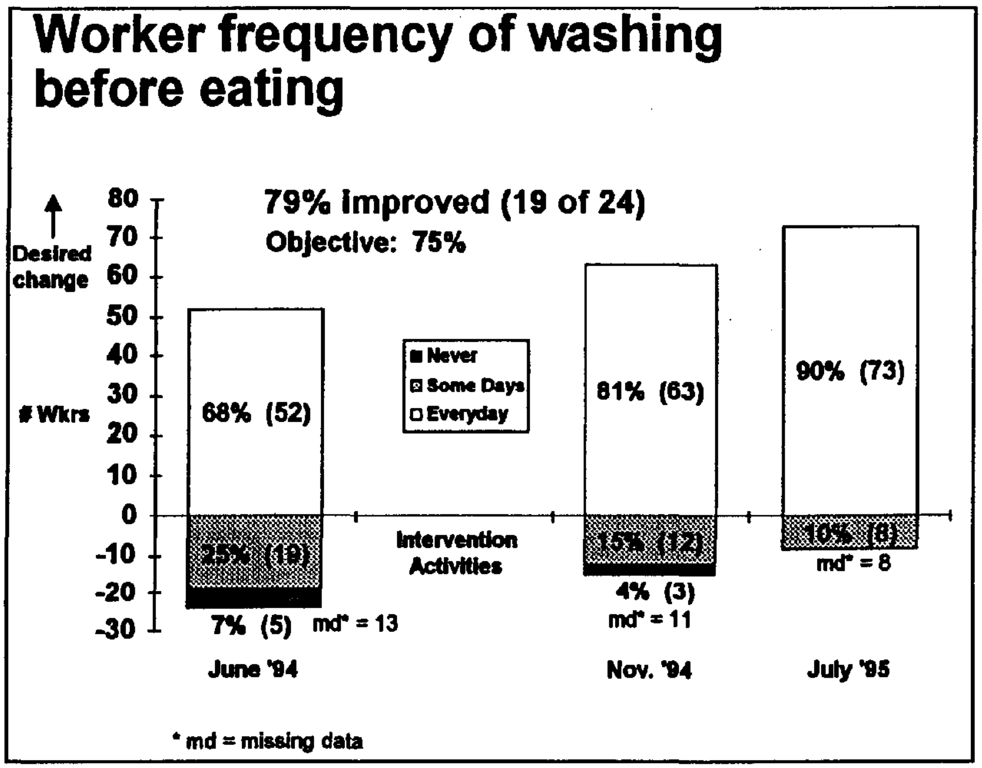


Objective: 75% of target workers who do not consistently wash up before eating will do so more frequently.

Workers' ability to practice good hygiene by washing their faces and hands prior to eating or snacking depends on two factors, the presence of washing equipment and their choice to use it. Workers were asked how often washing equipment was available, and how often they washed their faces and hands prior to eating or snacking. Our objective was that 75% of target workers (18 of 24) would increase the frequency of washing up before eating. Those who reported at baseline that they never had washing equipment available were excluded from the target population for this and the following three objectives which involve washing up.

We met this objective, with 79% of the target group improving (Figure 9.19).

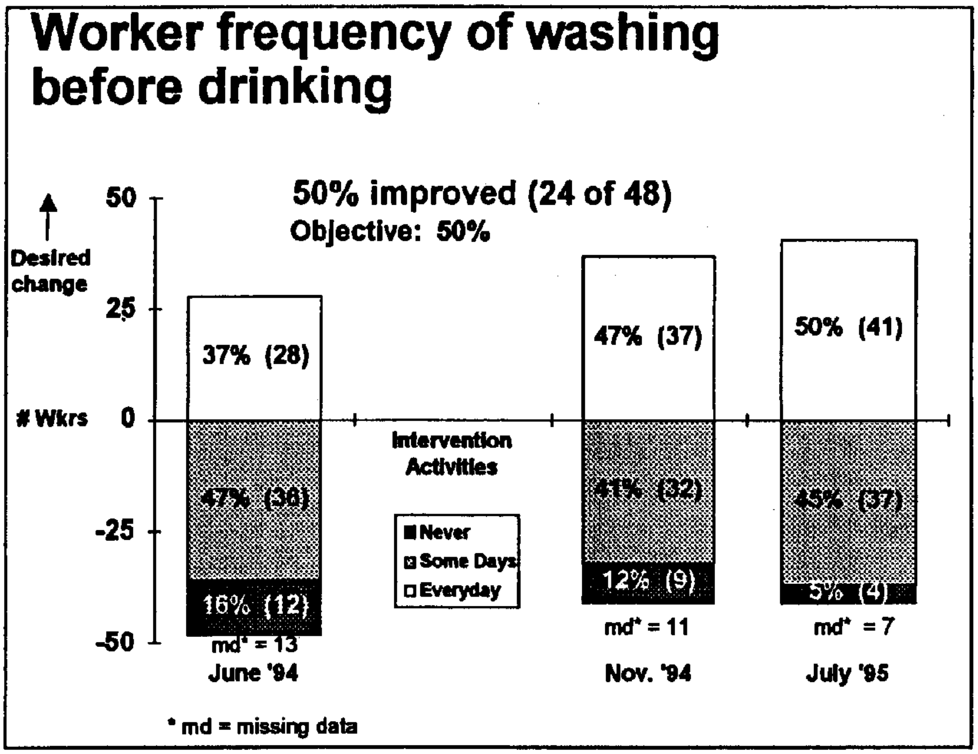
FIGURE 9.19



Objective: 50% of target workers who do not consistently wash up before drinking beverages will do so more frequently.

Similar results were noted for employees washing before drinking beverages (Figure 9.20). Our objective was that 50% of workers who could improve in this area would do so, and this objective was met with a 50% improvement.

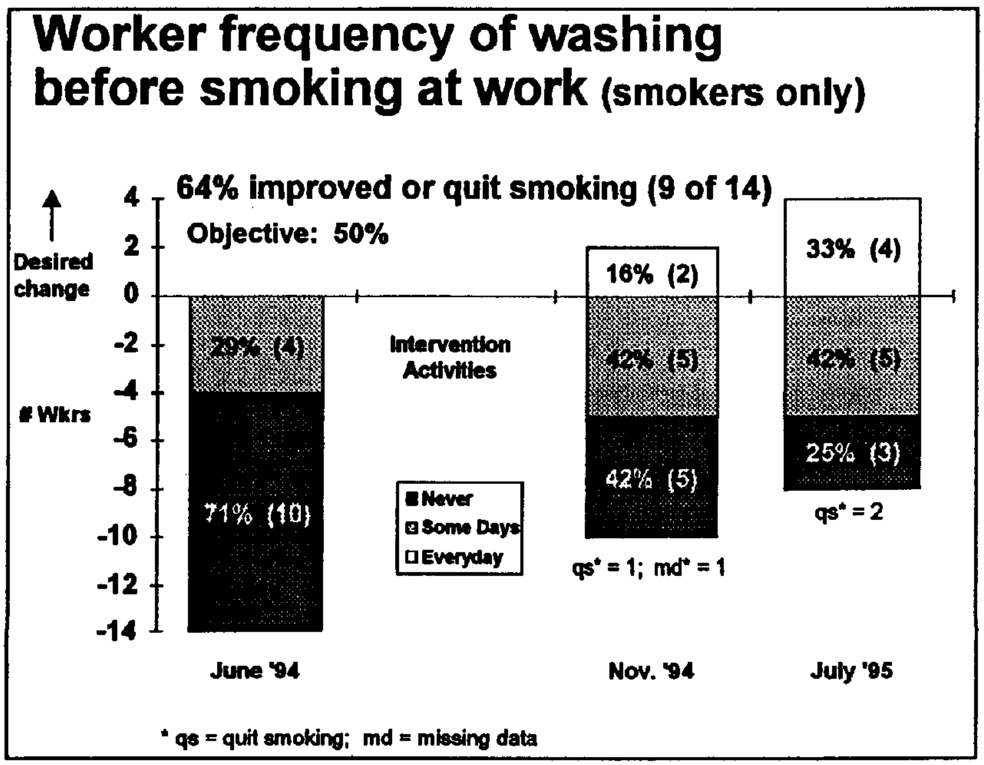
FIGURE 9.20



Objective: 50% of target workers who do not consistently wash up before smoking will do so more frequently.

We questioned the 25 smokers identified at baseline about: 1) whether they smoked in the work area; 2) how often their employer provided washing facilities; and 3) when washing facilities were available, how often they washed their faces and hands before smoking. Of the 14 smokers who reported smoking in the work area and had washing facilities provided at least some days, none reported washing before smoking consistently (i.e., every day) (Figure 9.21). Our objective was that 50% of these target workers (7 of 14) would increase the frequency of washing before smoking. By Summer 1995, 64% of the smokers had increased their frequency of washing before smoking or had quit smoking (2 individuals). Thus, this objective was met.

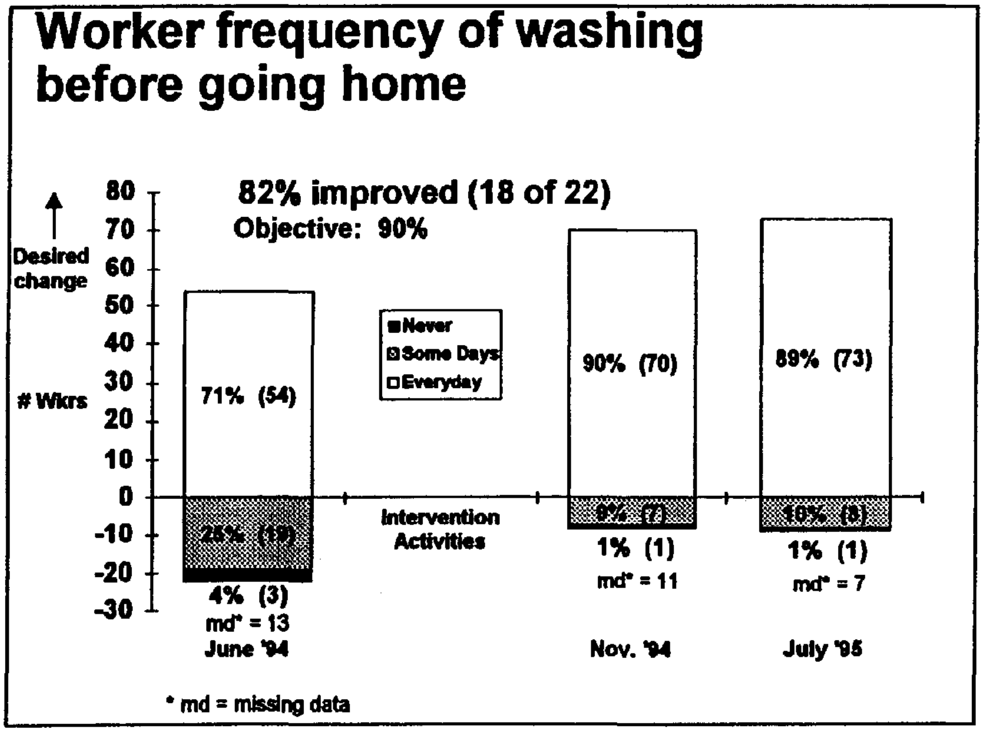
FIGURE 9.21



Objective: 90% of target workers who do not consistently wash up before going home will do so more frequently.

At baseline, a majority of workers reported washing their faces and hands every day before going home at the end of the work shift (Figure 9.22). We set as our objective that 90% of the workers (20 of 22) who could increase their frequency of washing up at the end of the shift would do so. This objective was not met although 82% of workers who could improve did so.

FIGURE 9.22

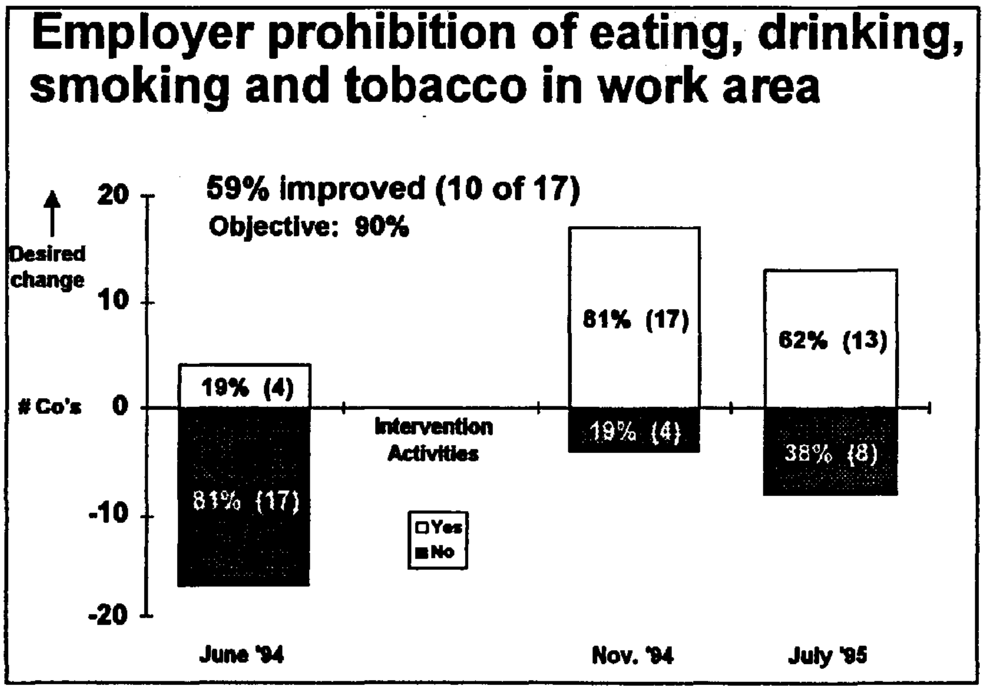


Eating, Drinking, and Smoking in the Work Area

Objective: 90% of target employers who do not prohibit eating, drinking, and smoking in the work area will do so.

Employers were asked whether they prohibited eating, drinking, smoking, and use of other tobacco products in the work area to reduce the risk of exposure to lead through ingestion. At baseline, only 4 employers (19%) prohibited all four activities (Figure 9.23). Our objective was that 90% of the remaining employers (15 of 17) would prohibit these activities. Since only 59% of employers who could improve did so, the objective was not met. Of the four practices we expected employers to prohibit, we had the least success with drinking beverages in the work area; in Summer 1995, 8 employers (38%) reported allowing this. In contrast, only 2 employers allowed eating and smoking in the work area.

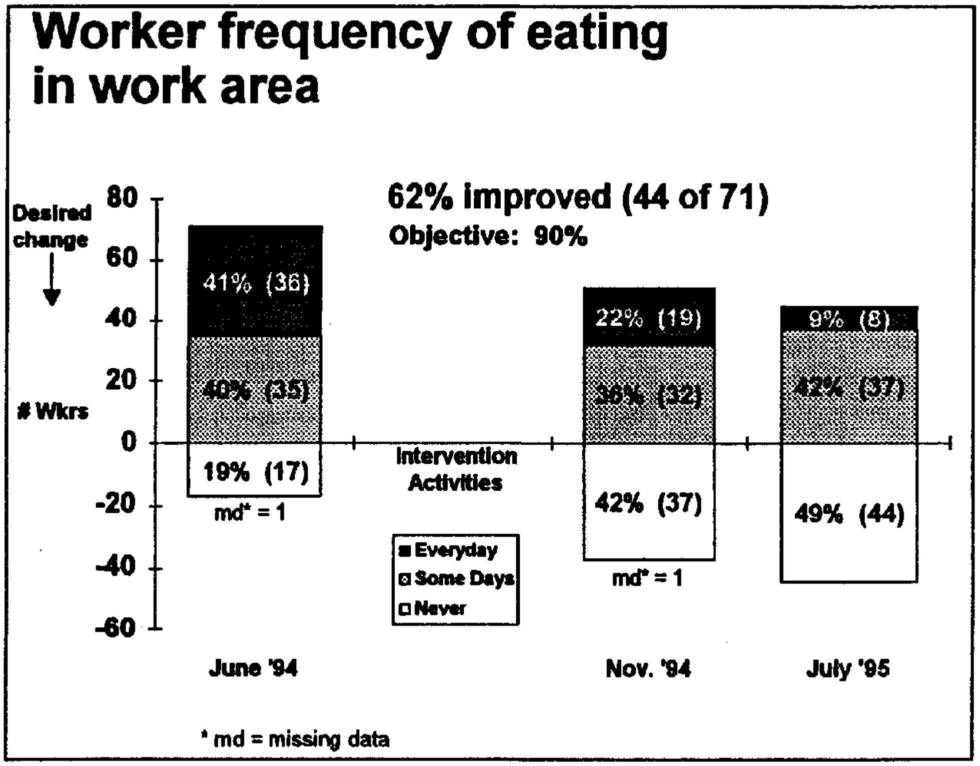
FIGURE 9.23



Objective: 90% of target workers who eat in the work area will do so less frequently.

We asked workers at baseline how often they ate or snacked in the work area and found a fairly high prevalence of this activity (Figure 9.24). Our objective was that 90% of the target workers (64 of 71) would decrease the frequency of eating in the work area. We found that only 62% of the workers originally practicing this unsafe behavior decreased their frequency. Thus, we did not meet our objective.

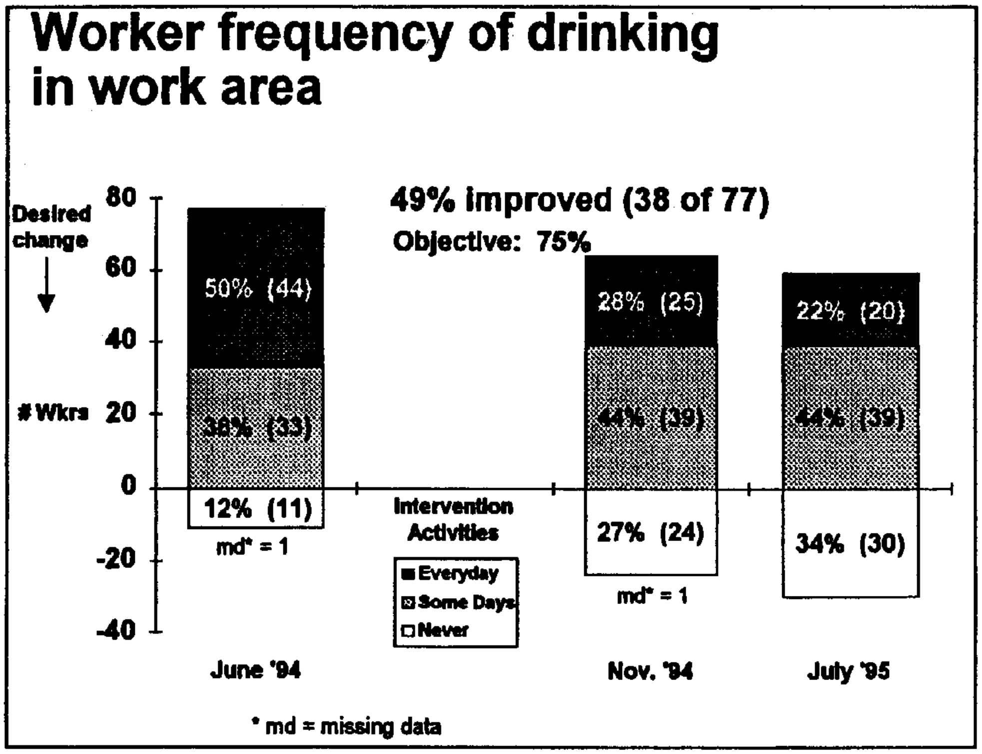
FIGURE 9.24



Objective: 75% of target workers who drink in the work area will do so less frequently.

Drinking beverages in the work area was another unsafe practice reported by a majority of workers at baseline (Figure 9.25). We set an objective that 75% of the workers (58 of 77) who drank in the work area would decrease the frequency of this activity. Although we noted a substantial improvement in this area (49% decreased frequency of drinking in the work area), we did not meet our objective.

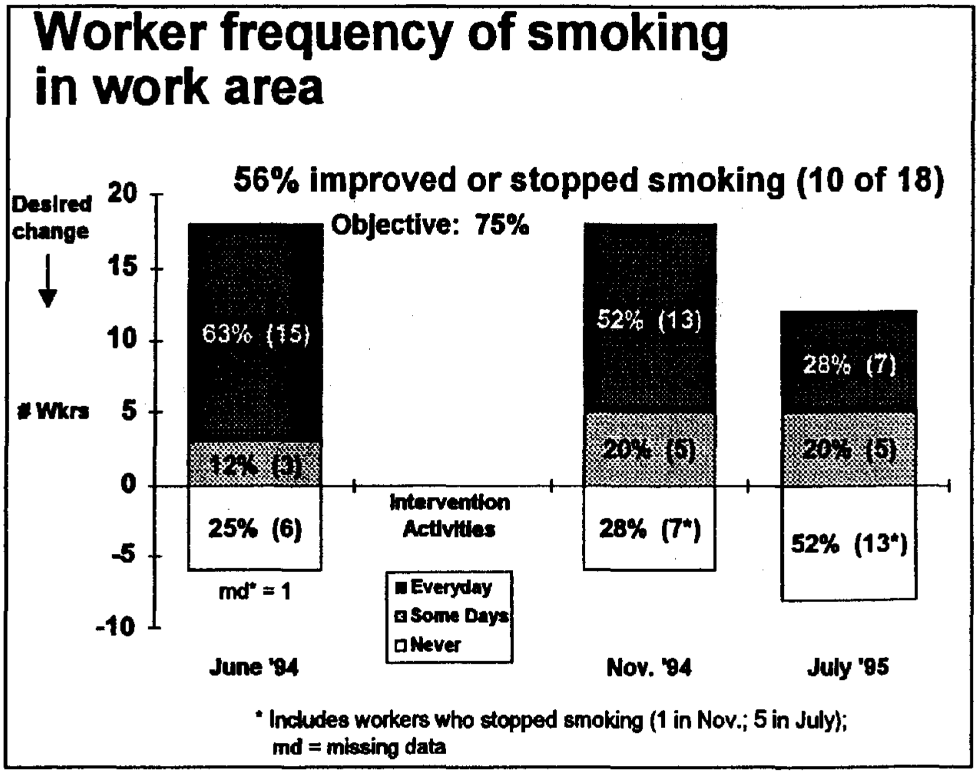
FIGURE 9.25



Objective: 75% of target workers who smoke in the work area will do so less frequently.

Smoking in the work area was also reported at baseline by a majority of smokers (Figure 9.26). Our objective was that 75% of the workers (14 of 18) who smoked in the work area would decrease the frequency of this unsafe activity. Although 56% decreased the frequency of smoking in the work area or stopped smoking, this objective was not met.

FIGURE 9.26



Housekeeping, Containment, and Environmental Control

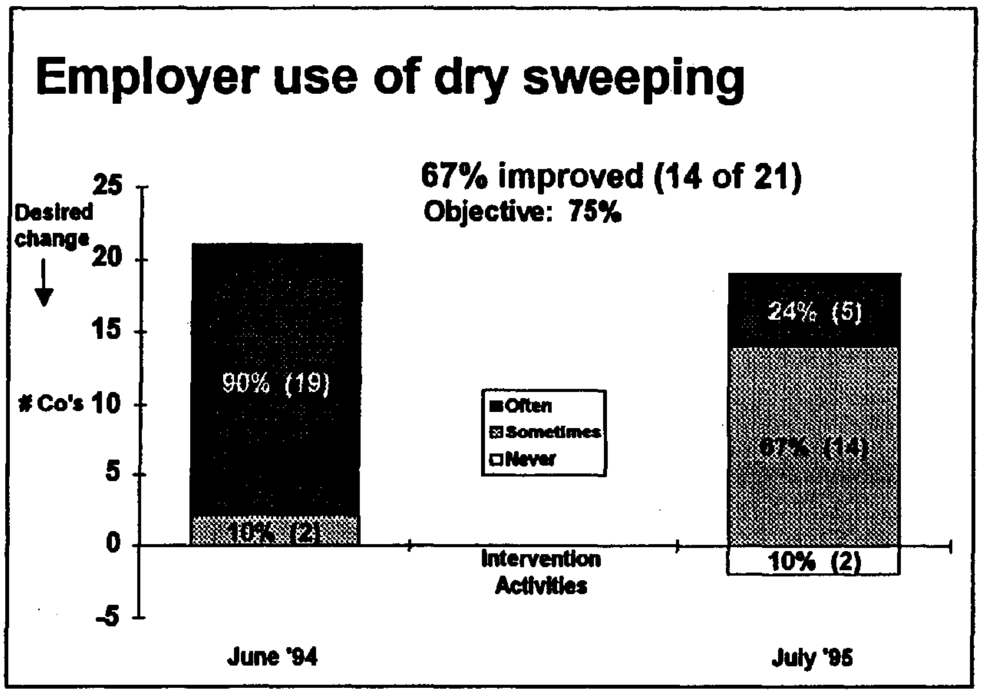
Use of Safe Clean-Up Methods

Control of lead paint dust during cleanup is an important aspect of a lead safety program which protects workers, building occupants, and the environment from lead contamination. We emphasized the use of wet clean-up methods and HEPA vacuuming in our training for employers and workers.

Objective: 75% of target employers will decrease the frequency of dry sweeping.

All employers reported that, before the Project began, they used a broom or brush to sweep up dry paint chips and dust (Figure 9.27). Ninety percent said they used this unsafe practice often. Our objective was that 75% of the target employers (16 of 21) would decrease the frequency of dry sweeping. Although 67% showed improvement, the practice was still widely used. We did not meet this objective.

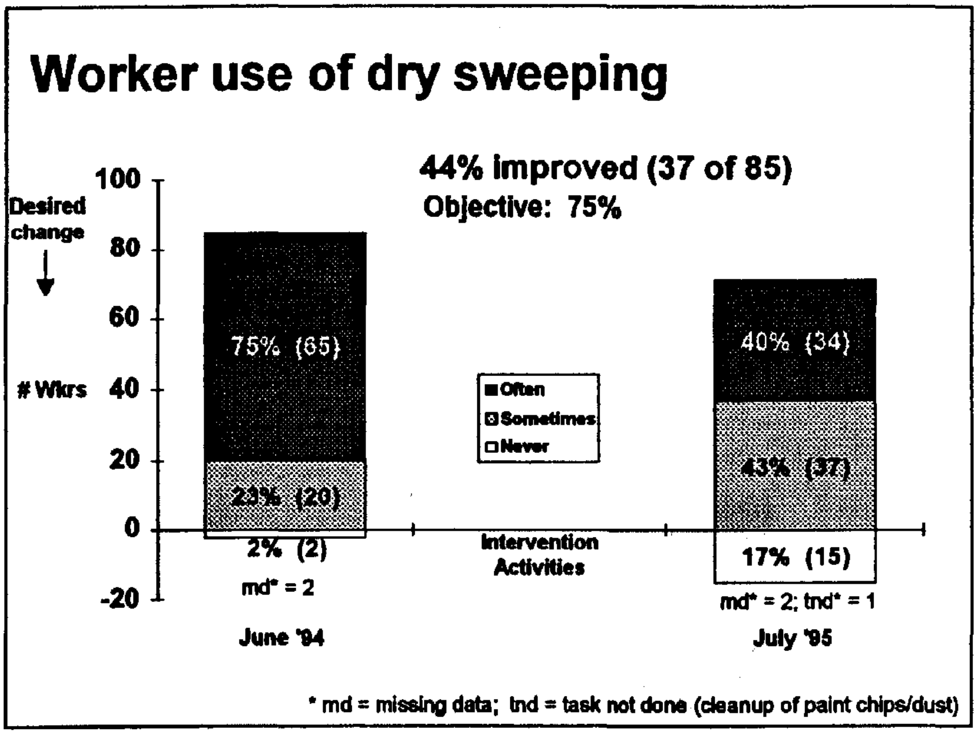
FIGURE 9.27



Objective: 75% of target workers will decrease the frequency of dry sweeping.

We asked workers the same questions regarding dry sweeping. At baseline, nearly all workers reported that they used a broom or brush to sweep up dry paint chips and dust (Figure 9.28). We set the same objective for workers, i.e., 75% of the target workers (64 of 85) would decrease the frequency of dry sweeping. We did not meet this objective, since only 44% decreased their frequency of dry sweeping. Three workers increased use of dry sweeping. Two employers stated in Summer 1995 that dry sweeping was not done, however, 11 of their employees reported using this method often, and 7 said they sometimes did.

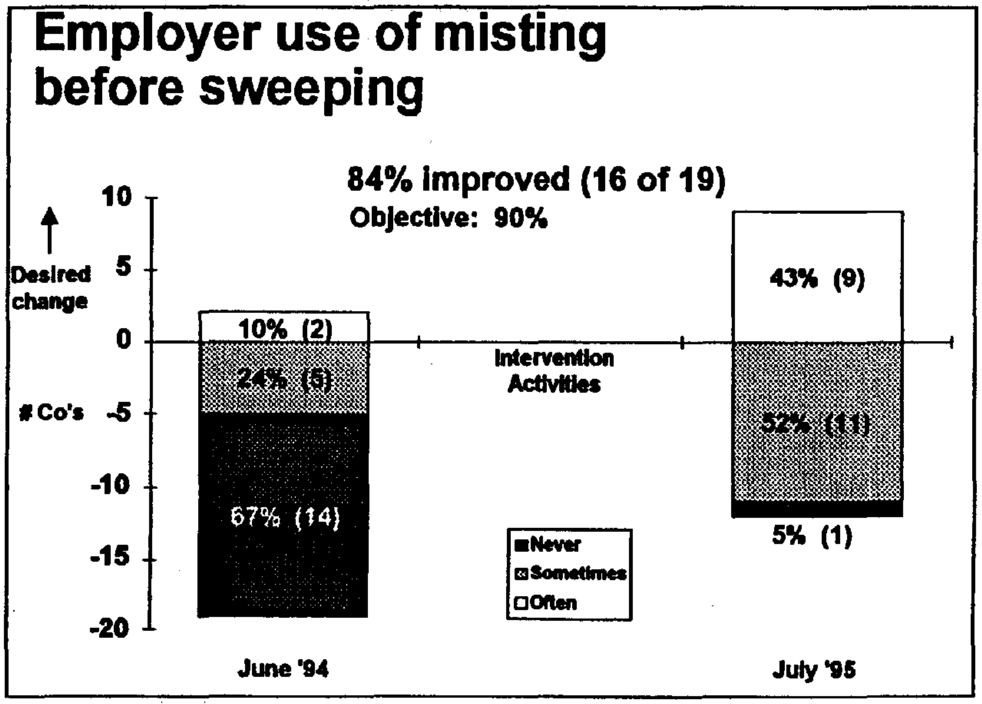
FIGURE 9.28



Objective: 90% of target employers will increase the frequency of misting debris before sweeping or shoveling.

Before the Project began, the practice of misting paint chips and dust before sweeping or shoveling was not widely used (Figure 9.29). Misting greatly reduces the dust generated by this task, reducing worker exposure and making cleanup easier. Our objective was that 90% of the employers (17 of 19) who were not misting before sweeping would do so. The objective was nearly met, with 84% of employers improving in this area. One employer decreased the frequency of misting before sweeping.

FIGURE 9.29

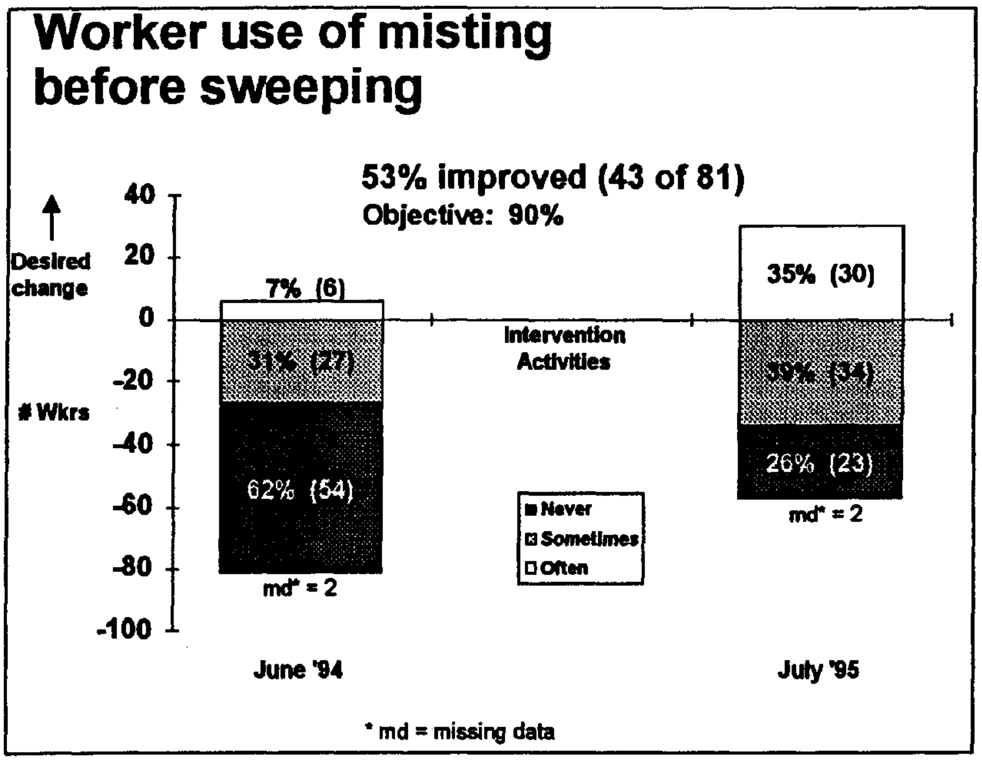


Objective: 90% of target workers will increase the frequency of misting debris before sweeping or shoveling.

As with employers, workers' use of misting before sweeping or shoveling debris was limited prior to the Project (Figure 9.30). Our objective was that 90% of target workers (73 of 81) would increase the frequency of misting before sweeping. With only 53% of these workers increasing their use of wet sweeping, we fell short of meeting this objective. Four workers decreased the frequency of misting before sweeping.

We compared employer versus worker responses regarding misting before sweeping. When speaking about practices before the Project, workers frequently reported misting before sweeping in instances where the employer said this was never done. This discrepancy was noted for at least one employee among each of eight companies that said they never took this precaution. In Summer 1995, however, there was very close agreement between what employers and workers from the same companies reported regarding this practice.

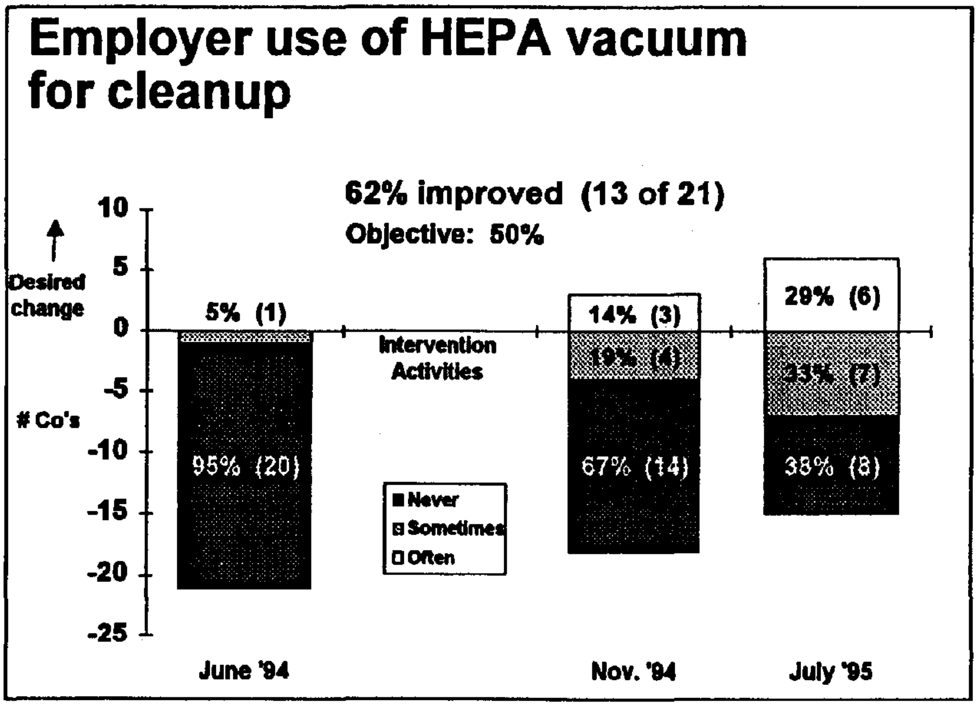
FIGURE 9.30



Objective: 50% of target employers will increase the frequency of using a HEPA vacuum for cleanup.

A HEPA vacuum is an extremely useful piece of equipment for cleaning up lead paint dust and chips safely. At baseline, 95% of companies reported never using a HEPA vacuum for cleanup (Figure 9.31). Our objective was that 50% of target employers (10 of 21) would increase the frequency of using a HEPA vacuum for cleanup. We met this objective, as 62% of employers increased their use of HEPA vacuums. Eleven employers (52%) purchased a HEPA vacuum between the start of the Project and Summer 1995, and others reported borrowing or renting the equipment.

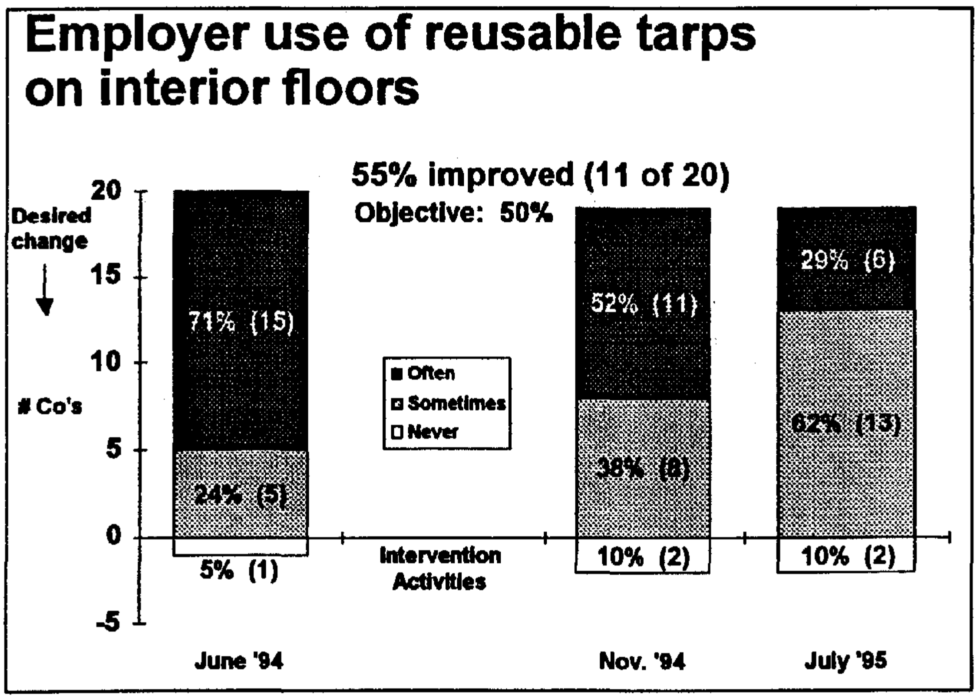
FIGURE 9.31



Objective: 50% of target employers will decrease the frequency of covering floors with reusable tarps during surface preparation.

Reusing a tarp which has been contaminated with lead dust and chips during surface preparation can spread contamination from one job to another. At baseline, a majority of employers reported reusing tarps (Figure 9.32). During the contractor seminars, employers were encouraged to discontinue this unsafe practice. We set an objective that 50% of target employers (10 of 20) would decrease the frequency of covering floors with reusable tarps. This objective was met, as 55% made the desired improvement.

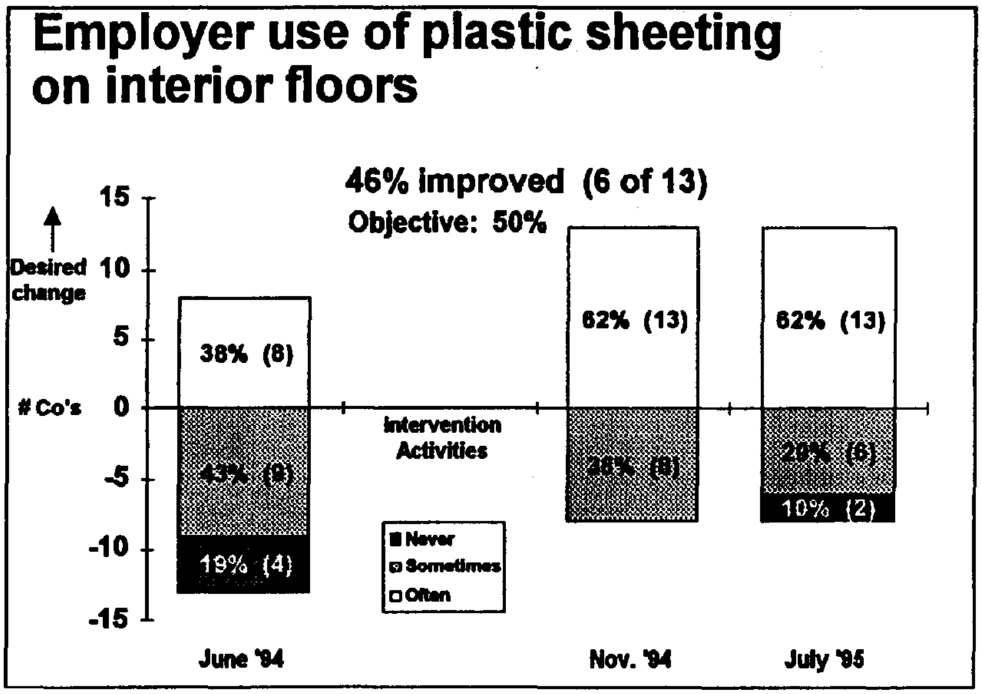
FIGURE 9.32



Objective: 50% of target employers will increase the frequency of covering floors with plastic sheeting during surface preparation.

Plastic sheeting that is disposed of after one use is a preferred method for containing lead paint chips and dust on interior jobs. At baseline, a substantial number of employers were using this method (Figure 9.33). Our objective was that 50% of target employers (6 of 13) would increase the frequency of covering floors with plastic sheeting. Since 46% increased the frequency of using plastic sheeting, we just missed meeting our objective. Two contractors decreased their use of this method.

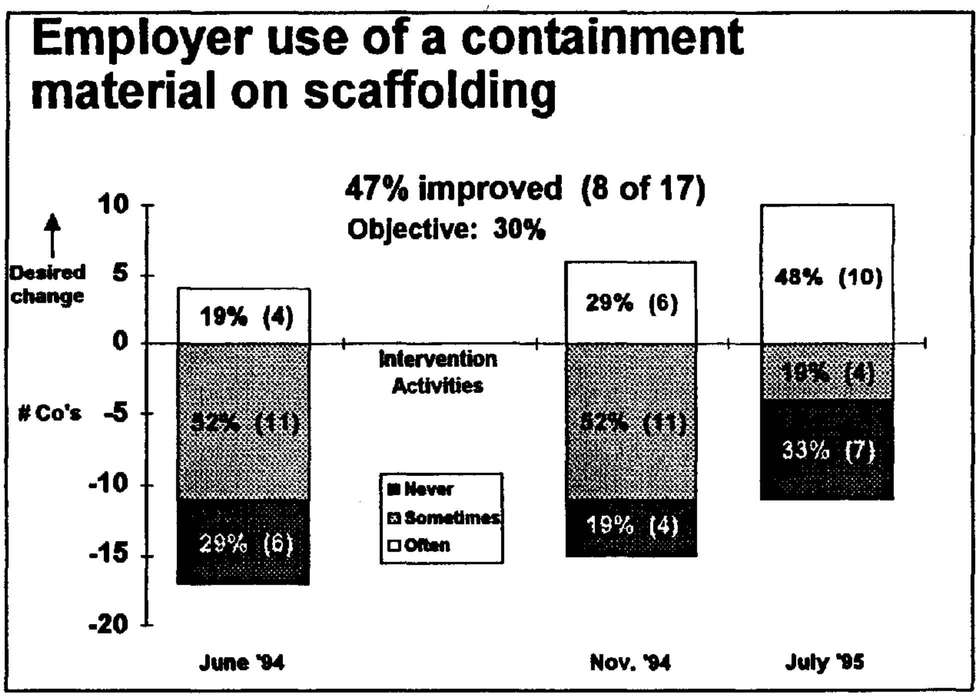
FIGURE 9.33



Objective: 30% of target employers will increase the frequency of using a containment material on scaffolding.

Hanging a netting or shrouding material on scaffolding minimizes the spread of paint dust and chips during surface preparation on exteriors. This technique was used by some contractors at baseline (Figure 9.34). Our objective was that 30% of target employers (5 of 17) would increase the frequency of using a containment material on scaffolding. Since 47% made the desired change, this objective was met.

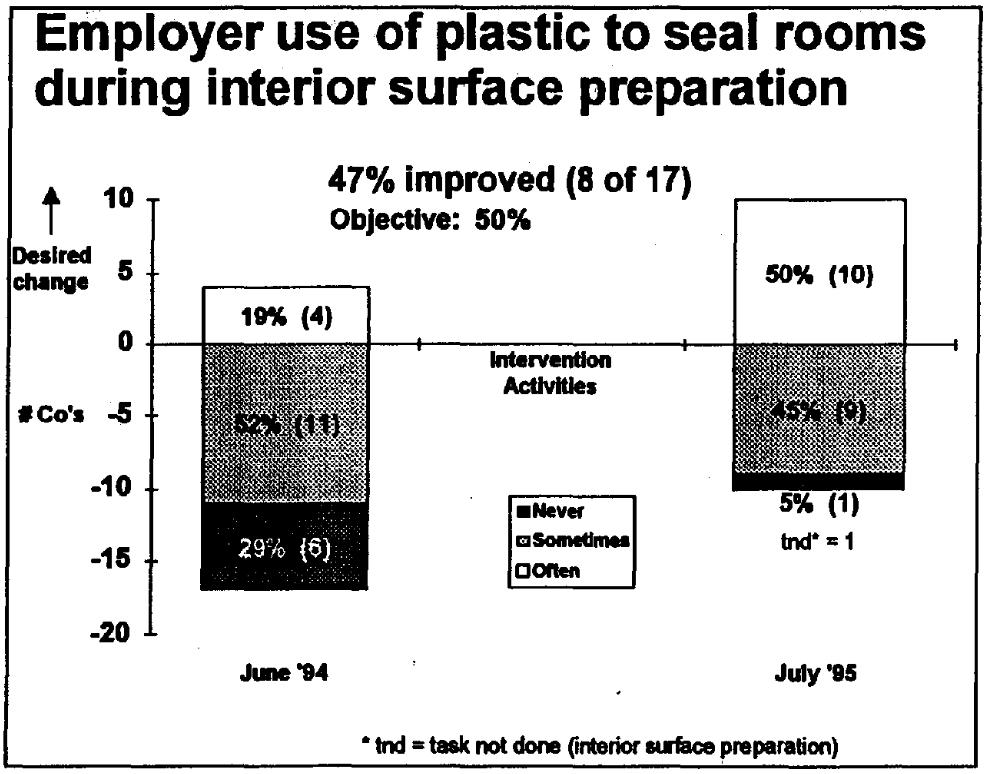
FIGURE 9.34



Objective: 50% of target employers will increase the frequency of using plastic to seal off rooms during interior surface preparation.

Sealing off doorways and windows with new plastic sheeting during interior surface preparation limits the spread of lead contamination outside the work area. Some contractors reported that they used this method prior to the start of the Project (Figure 9.35). Our objective was that 50% of the target employers (9 of 17) would increase the frequency of sealing off rooms. We nearly met this objective, with 47% of these employers increasing their use of this practice.

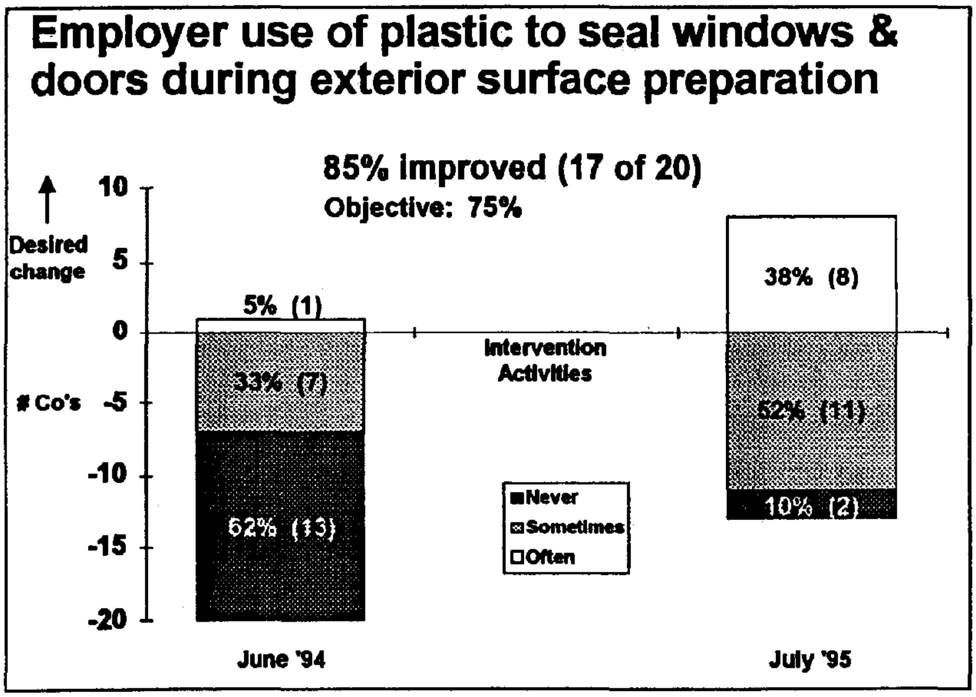
FIGURE 9.35



Objective: 50% of target employers will increase the frequency of using plastic to seal windows and doors during exterior surface preparation.

Prior to the Project, few employers used new plastic sheeting to seal off doors and windows when doing exterior surface preparation (Figure 9.36). Failure to take this precaution can cause significant contamination of the interior of the building with lead dust. Our objective was that 75% of the target employers (15 of 20) would increase the frequency of this practice. With 85% of these employers making the desired change, we met this objective.

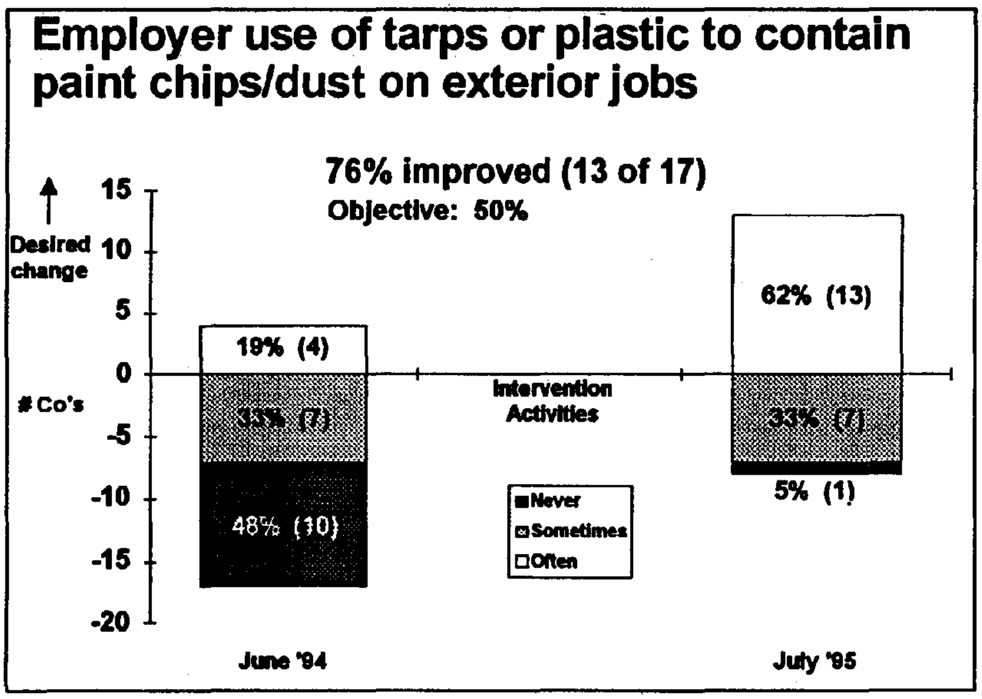
FIGURE 9.36



Objective: 50% of target employers will increase the frequency of using sheeting or tarps to prevent exterior contamination.

Nearly half the employers reported that, prior to the Project, they never used plastic sheeting or tarps on exterior jobs to contain lead dust and paint chips (Figure 9.37). We set an objective that 50% of the target employers (9 of 17) would increase the frequency of using sheeting or tarps on exterior jobs. This objective was met, with 76% of the employers increasing their use of this practice.

FIGURE 9.37

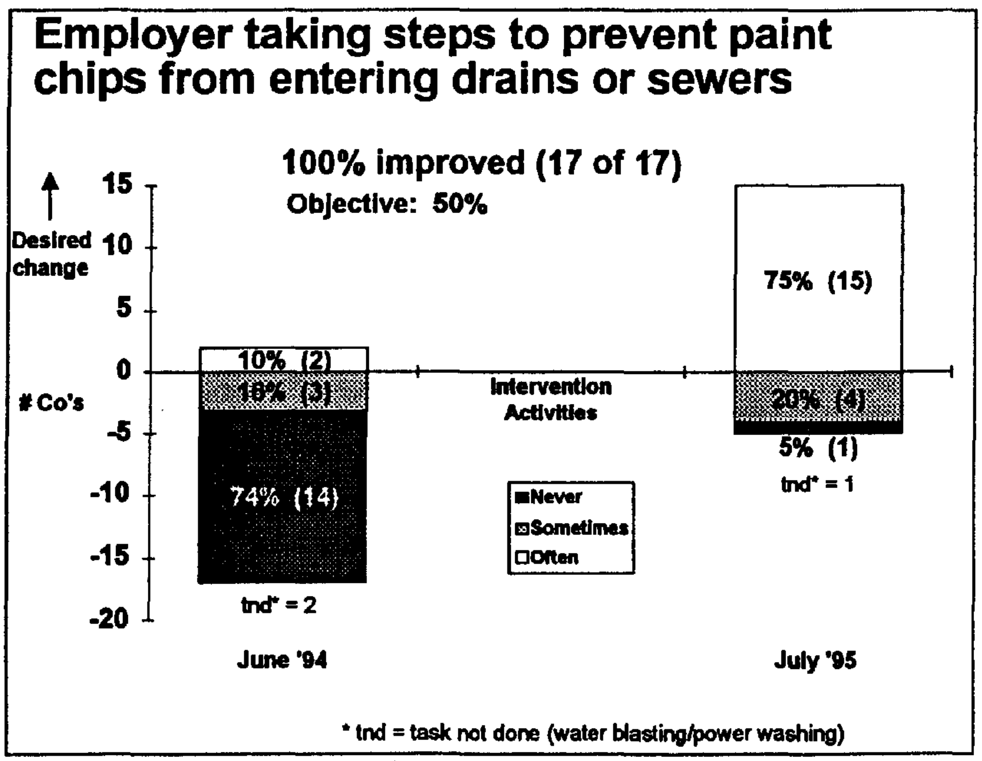


Objective: 50% of target employers will increase the frequency of taking effective steps to prevent paint chips from entering storm drains.

Employers were asked how often, before the Project, they took steps to prevent lead paint chips from entering drains or sewers when water blasting or power washing. Among those who used this common surface preparation method, the majority never took any steps (Figure 9.38). However, three employers reported that they swept up chips, and one placed a screen or filter over the drain.

Our objective was that 50% of the target employers (9 of 17) would increase the frequency of taking steps to prevent paint chips from entering drains or sewers. We met this objective, as 100% of the employers increased the frequency of taking preventive steps. Fifteen employers used screens or filters over the drain, 3 diverted the water from the drain, and 1 stated that chips were swept up following water blasting.

FIGURE 9.38

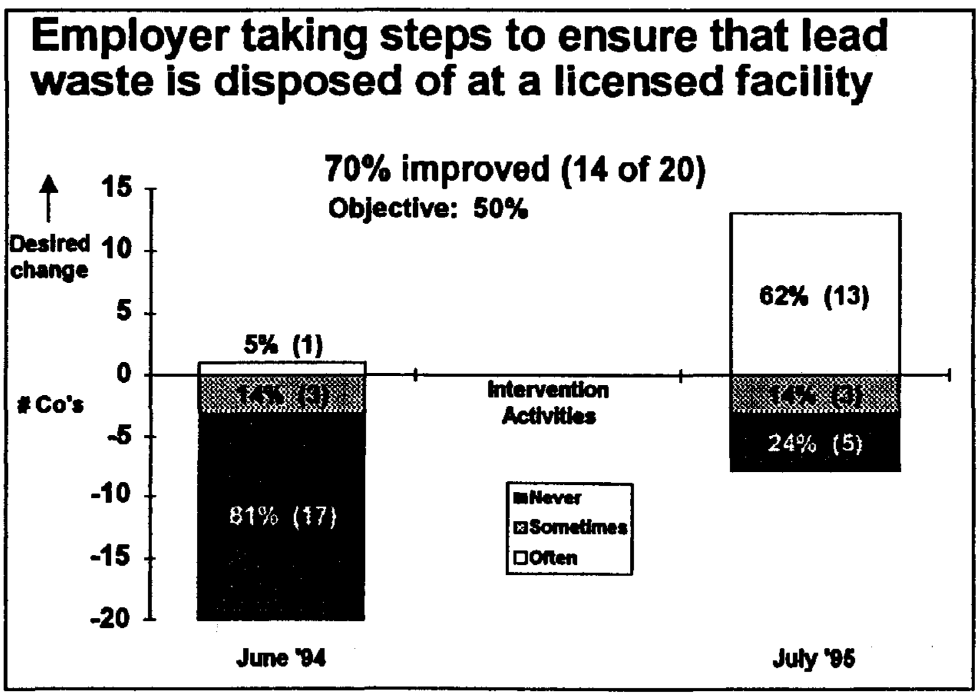


Objective: 50% of target employers will increase the frequency of taking steps to ensure that hazardous waste is disposed of at a licensed facility.

The vast majority of employers stated that, before the Project, they never took any steps to ensure that hazardous lead paint waste was disposed of at a licensed disposal facility (Figure 9.39). Three employers had experience using a hazardous waste hauler, and one participated in a program which accepts waste from small quantity generators.

We set an objective that 70% of the target employers (14 of 20) would increase the frequency of ensuring proper disposal of hazardous lead waste. This objective was met, as 70% of employers increased the frequency of taking preventive measures. The steps that contractors described included: taking the waste to a hazardous waste facility [through a small quantity generator program] (7 employers); leaving the waste with the owner [who has access to a household hazardous waste program] (6); using a hazardous waste hauler (2); and using a combination of methods (1).

FIGURE 9.39



Lead Medical Program

Objective: 90% of target employers will routinely provide BLL and ZPP testing to lead-exposed workers.

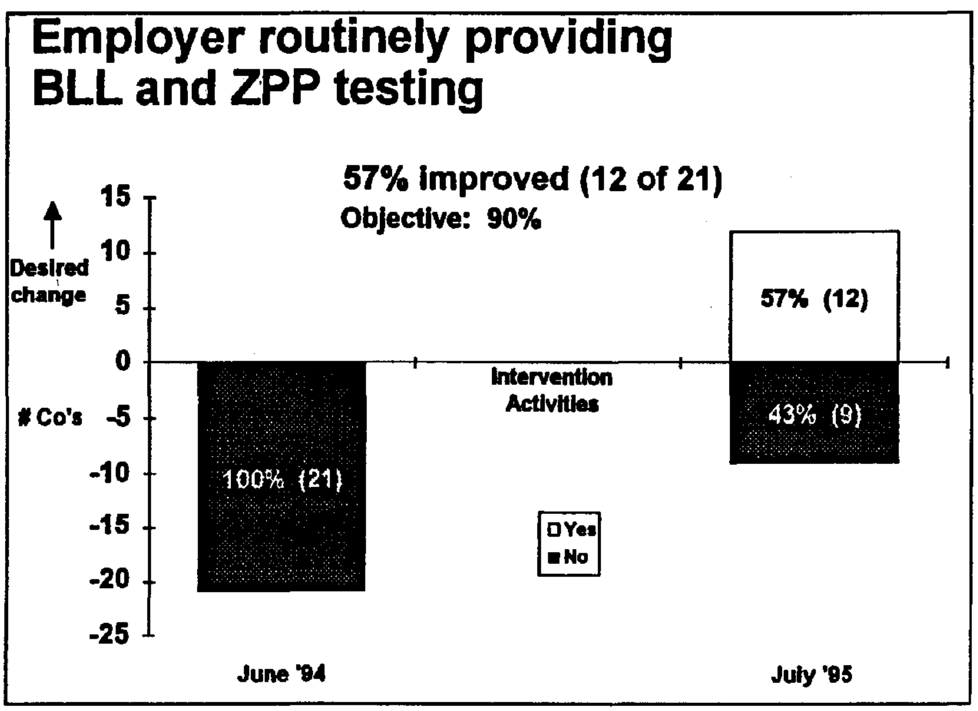
Medical surveillance is a valuable tool for evaluating the effectiveness of a lead safety program and is required by Cal/OSHA for painters performing surface preparation on lead paint. At baseline, only five employers (24%) had ever tested employees' blood lead levels, none had ever done zinc protoporphyrin (ZPP) testing, and none had a routine medical program under the supervision of a physician (Figure 9.40).

We strongly encouraged employers to identify a physician with experience in lead medical surveillance to act as supervisor of the medical program, and to schedule employees for BLL and ZPP testing in August 1994, approximately two months after the baseline testing provided free of charge by the Project. Using pricing schedules for local providers supplied by the Project and joining together to negotiate lower prices, all 21 contractors selected as their provider the University of California at San Francisco/San Francisco General Hospital (UCSF/SFGH) Occupational Medicine Clinic. Nineteen of the contractors (90%) scheduled employees for BLL and ZPP testing in August 1994. The two contractors who did not conduct testing stated that they had very little work at the time.

Our objective was that 90% of target employers (19 of 21) would establish a program for routine testing under the supervision of a physician. A company was considered to have met the objective (i.e., established and maintained a program) if they: 1) selected a physician to act as medical supervisor; and 2) conducted BLL and ZPP testing for at least some employees during the 1995 painting season by August 30, 1995. We considered this date far enough into the busy summer painting season that if employers intended to use BLL and ZPP results to evaluate their lead safety program, they would have scheduled testing for their lead-exposed employees by this time.

In Summer 1995, 57% of employers sent workers in for BLL and ZPP testing. With this level of improvement, we did not meet our objective.

FIGURE 9.40



Other Medical Services

During the course of the Project, some contractors provided other medical services to employees through the UCSF/SFGH Occupational Medicine Clinic. In August 1994, 17 employers scheduled their workers to receive medical clearance for respirator use and 9 provided quantitative fit testing to respirator users. None of the employers provided lead-specific medical examinations (which are not required by the Cal/OSHA Construction Lead Standard unless an employee has a BLL of 40 ug/dl or higher, or reports having lead-related symptoms).

Training about Lead Safety

At baseline, employers were asked whether their company had provided any training to employees about lead hazards during the past year. Sixty-seven percent (14 employers) stated that they had, and 33% had not. When asked what type of training was provided, all 14 said they had provided a "tailgate" or other brief (less than full day) training, and one of these companies had also sent employees to a three to five day lead abatement course from a local training provider. When asked whether they had themselves had any prior training on lead hazards, 29% (6 employers) said they had attended a formal training course, 10% (2 employers) reported "self-training," and 62% (13 employers) had not received any lead training.

During August and September 1994, the Project offered free 8-hour lead safety training classes for employees of the participating contractors. All 21 employers sent one or more workers to the classes on paid work time. A total of 92 workers attended the training, 65 receiving training in English, 15 in Spanish, and 12 in Chinese (Cantonese).

Attending the project's 8-hour training allowed each worker to complete a portion of the 24 hours of lead safety training required (at that time) by CDHS for interim certification in lead-related construction. CPP worked with City College of San Francisco staff to develop a course that would fulfill the remaining 16 hours required for certification. This course was offered in the Fall of 1994. Thirteen project participants from 8 companies took this additional training course, making them eligible for interim certification as a lead-related construction worker.

Objective: 50% of target employers with new hires will provide them with at least 4 hours of lead hazard training.

We set an objective that, by Summer 1995, 50% of the employers (5 of 10) who had new employees who do surface preparation on lead paint would provide them with adequate training in lead hazards. Adequate was defined as at least 4 hours of lead hazard training using training materials provided by the Project or other adequate materials, or a 32-hour training course which is accredited by the California Department of Health Services for lead-related construction. Of the 10 employers with new hires, 40% provided them with adequate training, 50% provided less than adequate training, and 10% did not provide training. Thus, this objective was not met. Of those employers who provided training, 3 conducted training themselves and one paid for training by an outside provider.

Exposure Monitoring

Prior to this Project, only one company had ever done any air monitoring to determine employee exposure to airborne lead during surface preparation work. (This particular company had participated in an earlier California Department of Health Services research project which provided monitoring by state staff.)

We did not set a specific objective related to employer implementation of exposure assessment through personal air monitoring. This was primarily because the project staff intended to conduct free air monitoring in order to obtain research data. Employers were encouraged to participate since the results they would receive would assist them to be in compliance with Cal/OSHA's requirement for initial exposure assessment. Fifty percent of employers (11) availed themselves of the project's offer of free air monitoring on a lead job.

Comparison of Employer Versus Worker Responses

Employer vs. Worker Responses on Identical Questions

Comparing worker and employer responses to identical interview questions provides a means to evaluate the veracity of the information obtained in interviews. There were five questionnaire items for which we could make this direct comparison. We noted less than complete agreement between employers' and workers' responses in the areas of: fit testing of respirators, provision of adequate protective clothing, and provision of training in lead safety prior to the Project. Areas where we found fair or good agreement (see below) include: how often water, soap, and towels were available for washing at the job site, and provision of blood lead level testing prior to baseline.

We asked employers if all employees using respirators had been fit tested in the prior six months. At baseline, two employers stated that all employees had been fit tested; however one or more employee of each company reported that they had not. This discrepancy also occurred in Summer, 1995; for 8 of the 10 employers who reported that all employees had been fit tested in the prior six months, one or more employees said they had not been fit tested. For 5 of these companies, 50% or more of their employees stated they had not been fit tested.

The second area with discordant responses was provision of protective clothing. Employers and workers were asked if clothing was provided and, if yes, what type. The responses were later categorized as "adequate" or "inadequate" clothing. At baseline, of the 7 employers who reported providing adequate work clothing, 3 companies had a majority of employees report they were not provided with adequate clothing. In Summer 1995, 11 of the 16 employers who stated that they provided adequate clothing had 50% or more of their employees respond negatively to this question.

The third area of inconsistency between employers and workers was employer-provided lead safety training. Of the 14 companies who reported at baseline that they had provided lead safety training to employees (usually a short "tailgate" type of training), all had at least one employee who said they had not received any lead safety training in the prior 12 months. For eleven of these employers 50% or more of their workers reported having had no training.

There was fairly good agreement between employer and worker responses to the question regarding how often water, soap, and towels were available at the work site for washing. At baseline, 10 of 89 workers from seven companies reported that washing equipment was never available, while their employer said it was available every day or some days. However, for all but one of the 10 employees there were other employees of the same company who said washing equipment was available. In Summer 1995, only 7 of 89 worker responses regarding availability of washing equipment conflicted with the employer's response as described above. For each of the six companies which employed the 7 workers, there were other employees who said washing equipment was available.

At baseline, five employers stated they had done some employee blood lead testing in the past. One or more workers employed by these companies (and in one case all of the workers) confirmed that they had received a BLL test in the past.

Comparison of Company Policy Versus Employee Practice

In some cases we asked employers a question about company policy, while we asked the workers about their individual work or safety practices. Comparison of these responses gives us a sense of how well the reported company policies are being communicated and actually being followed by employees.

Employers reported to us which respirator the company selected for use with specific surface preparation methods, while employees stated which respirator they actually used for the task. Baseline data show that for 5 of the 6 companies who reported providing a half-mask respirator with HEPA filters for dry sanding, half or more of their workers reported using inadequate or no respiratory protection for this task. It is possible that some of these employers did not train their employees to consistently use this type of respirator when dry sanding on lead paint, or did not supply the correct respirator to all employees. In Summer 1995, the agreement between employer and worker responses was much better. Only 3 companies out of the 18 who reported selecting an adequate respirator had one or more employees who reported using inadequate respiratory protection for dry sanding. At 2 of the 3 companies the majority of employees reported using an adequate respirator.

There was generally close agreement between reported company policy and workers' reported practices for the frequency of using various clean-up methods. These methods include: wet mopping, HEPA vacuuming, dry sweeping, and misting before sweeping or shoveling debris. Some employees reported using a safer clean-up method (e.g., wet mopping or misting before sweeping), while their employer did not report this as the company's usual practice. In Summer 1995, one company reported using a HEPA vacuum often, while all 3 employees stated they never did. Two companies stated that dry sweeping was not done; however, more than half of their employees stated they do it often or sometimes.

In Summer 1995, 17 companies stated that they took steps to ensure that workers did not wear home their contaminated work shoes. Fourteen of the 76 workers employed by these companies (18%) reported that they wore home their work shoes.

We asked employers whether they prohibit eating, drinking, smoking, and use of other tobacco products in the work area, and asked the workers how often they did these activities. At baseline, 4 employers stated that they prohibited all four activities. However, 24 of the 38 employees of these companies (63%) reported that they ate in the work area (sometimes or often), 30 (79%) said they drank in the work area, and 9 reported smoking in the work area. In Summer 1995, 13 employers stated that they prohibited all four activities. For three of these companies, all workers (a total of 5) stated they never ate, drank, or smoked in the work area. For the other 10 companies, 32 of their 58 employees (55%) reported eating in the work area (sometimes or often), 41 (71%) reported drinking in the work area, and 10 reported smoking in the work area.

Changes in Knowledge About Lead

Employers

At three points in time (June 1994, November 1994, and Summer 1995), we asked employers seven true/false questions to assess their knowledge about lead safety. These questions covered the following areas: symptoms, male reproductive effects, take-home lead, routes of entry, presence of lead in relation to age of housing, control measures, and whether an employer can fire a worker with a high BLL. At baseline, 11 of 21 (52%) contractors answered all seven questions correctly. The questions with the most incorrect responses (5 to 6 contractors) were: 1) Lead can make you sick without you knowing it (true); 2) Wearing a respirator is the only way to protect a worker against lead (false); and 3) Breathing in lead dust is the only way lead can enter your body (false).

Of the ten employers who could improve, 100% got a higher score in Summer 1995. Fifteen contractors (71%) answered all seven questions correctly. One contractor who had originally answered all 7 questions correctly, answered one question incorrectly in Summer 1995.

Workers

We also attempted to assess worker knowledge of lead hazards. The true/false question format used at baseline was not understandable to many workers for whom English is their second language, so we did not repeat these questions in subsequent interviews. Therefore, we are not able to assess changes in knowledge as compared to baseline.

Although we could not measure worker knowledge as compared to baseline, we were able to evaluate what workers had learned during the project training and what information they had retained by adding several questions to the November 1994 and Summer 1995 interviews. In November 1994, 75% of the workers (67 of 89) were able to correctly name inhalation and ingestion as the routes of entry in to the body, 21% correctly remembered one route of entry, and

3% did not know. Of the 22 workers who could improve their score, 50% did in the Summer 1995 interview. Sixteen workers (18%) decreased their score.

In November 1994, 94% of workers (84 of 89) correctly named BLL testing as the "best way to find out if you have too much lead in your body." In Summer 1995, three workers who had not answered correctly before knew the answer, and two workers who had previously known the correct answer before could not answer the question.

In November 1994, 92% of workers (82 of 89) were able to name "three ways to protect yourself from lead poisoning." In Summer 1995, scores had improved for 5 of the 7 who had not been able to name three protective measures. One worker's score had decreased.

Two questions were added to the Summer 1995 interview only. Ninety-eight percent of workers (85 of 87) knew that it was possible for lead to "damage your health without you knowing it." Only 40% of workers (35 of 88) correctly responded that a BLL reflects exposure received during the prior two to three weeks (this was a multiple choice question with "6 months" and "1 year" being the other choices).

Reported Company Business Practices

Cooperation with Other Project Participants

In Summer 1995, we asked employers several questions regarding how interactions with other project participants may have assisted contractors. Six employers (29%) reported that, since the Project began, they had either been referred a job or referred a job to another project participant. Two contractors had actually worked together on a job.

The majority of contractors (52%) reported having cooperated with other participants to purchase, loan, or borrow equipment since the beginning of the Project. Some examples of cooperation include joining with others to negotiate a reduced price for HEPA vacuums or colorimetric testing supplies, and borrowing a HEPA vacuum for use on a lead job.

Certification in Lead-Related Construction

Participating contractors received 32 hours of education about lead safety which qualified them for interim certification in lead-related construction through the California Department of Health Services' Accreditation and Certification Unit (with the exception of two contractors who did not attend the full number of hours). An application documenting the applicant's background, the 32 hours of lead education, and a $75 fee are required. As of March 1997, Cal/OSHA requires certification for painting jobs that involve exposures exceeding the Permissible Exposure Limit. However, prior to that time certain work in schools or federally funded housing did require certified contractors and workers. By Summer 1995, six employers (29%) reported that they had applied for certification. Seven employers (33%) stated that, since the Project began, they have had jobs where customers requested lead certification, training, or expertise.

Discussing Lead Safety with Customers

We encouraged contractors to discuss lead safety with their customers, including the preventive measures they planned to take to protect workers and building occupants.

In Summer 1995, we asked the question, "If the customer does not raise the issue of lead safety, how often do you bring it up, often, sometimes, or never?" The majority said they did discuss lead safety often (57% of employers) or sometimes (33%). Only two contractors (10%) said they never did.

Feedback from Workers Regarding Participation in the Project

Workers were asked a series of open-ended questions on the November questionnaire to elicit their feedback about various aspects of the Project. Their responses provided valuable information about workers' attitudes regarding their own participation in project activities as well as their suggestions for improving the Project. The following is a brief summary of their responses.

What Painters Liked Most About the Project

Participants were asked to describe what they liked most about the Project. Becoming more aware of lead hazards was cited as one of the biggest benefits of participating:

- [I liked] "the thoroughness of the information. I've had lead [training] before, but it wasn't presented systematically."

- "I learned about lead poisoning and how to protect myself."

- "This information that we gained and the *way* that they explained the hazards that we are exposed to."

A second positive aspect of the Project was that participants were tested and found out their own blood lead level (BLL). Also noted was the accessibility, competence and dedication of the project staff:

- "I liked the people - we were treated well. We weren't treated badly just because we are Latinos."

- "The staff made an effort to do something about a serious problem for workers, families and others..... an effort to solve a problem."

What Painters Liked Least About the Project

Some workers expressed a general dissatisfaction with regulations and government interference with the way they work. A number stated that all the emphasis on lead safety was "overkill" and just not practical for many companies. The fact that participation in the Project took a significant amount of time was also cited as a drawback.

A number of participants did not like having their blood drawn 3-4 times during the course of the Project for blood lead testing. Finally, the lack of clear communication between staff and workers about the status of their employer's lead safety programs was cited as a weakness in the Project. Workers wanted to know about the quality and progress of their particular employer's program.

Worker Training

Feedback about the worker training was mixed. One hundred percent (100%) of respondents who participated in the training stated that the worker training class was helpful in learning about lead hazards. Many also noted that they were more able to take precautions to protect themselves from lead poisoning than they had been before:

- "Most employers won't tell you about these things [lead hazards and employer responsibilities] because it takes time and costs money."
- "Before, I was scared to ask my boss for certain things. Now I ask for what I need."
- "Before the training, I didn't take care of myself and ate without washing my hands. But with the classes, I've become more aware and my blood lead level dropped."
- "I learned a lot and now I use it [the information]. I clean my respirator every day and don't wear my clothes home."

Nevertheless, some workers mentioned that the 8-hour worker training course was too long and repetitive.

- "The training was way too repetitive. [It] could have been done in one quarter of the time".

Others noted that worker training alone is not sufficient and that employers must commit to making changes in work practices.

- "How do we know that our employers are going to continue to use safe painting practices? Some employers may find it hard to change."

Suggestions for Improvement

Suggestions for improving the Project were limited. Many workers made no suggestions. Of those who did, they focused on two main themes. The first was that there needed to be more pressure on the employers to make changes:

- "I wish there were more government controls on the boss to make him give respirators to workers and teach them how to use them. The boss needs more pressure to follow the rules--sometimes he does and sometimes he doesn't."

This feeling was voiced by a number of participants who weren't hopeful that their employers would significantly change without the threat of enforcement.

A second theme was that many participants felt that the Project should be expanded to all painters and, some felt, to workers in other construction trades.

- "You should reach out to more painters. If it wasn't for our employers, we'd have never known. There are a lot of painters out there who don't realize what they are legally entitled to if their lead levels are high."

Conclusion

Overall, worker participants in the Project responded favorably to project activities and felt that they had been worthwhile. Ninety-five percent stated that they would participate in a similar project in the future if they were given the opportunity.

C. BLOOD LEAD AND ZINC PROTOPORPHYRIN LEVELS

Blood Lead and Zinc Protoporphyrin Levels at Four Points in Time

Blood lead level (BLL) and zinc protoporphyrin (ZPP) tests were conducted at four points in time during the course of the Project: baseline (June 1994); mid-project (August 1994); post-intervention (November 1994); one-year follow-up (Summer 1995). Baseline and post-intervention testing were provided by the Project. Employers were expected to provide mid-project and one-year follow-up testing. Descriptive statistics of the BLLs and the ZPPs appear in Table 9.4 and Table 9.5 respectively. At baseline there were 23 workers with BLLs less than the laboratory's detection limit (i.e., less than 5 ug/dl), and at post-intervention 12 workers had BLLs reported as less than 5 ug/dl. These 35 BLLs were defined as 3 ug/dl for the purpose of statistical analysis.

TABLE 9.4

BLOOD LEAD LEVELS OF RESIDENTIAL/COMMERCIAL PAINTERS (ug/dl)

Time of Testing	n	Minimum	Maximum	Geometric Mean	95% Confidence Interval
Baseline (June 1994)	132	<5	38	8.6	(2.3, 31.6)
Mid-Project (August 1994)	110	1	36	8.7	(2.3, 32.4)
Post-Intervention (Nov. 1994)	118	<5	31	9.5	(3.1, 29.9)
1-Year Follow-up (Summer 1995)	52	4	36	8.6	(3.4, 21.7)

TABLE 9.5

ZINC PROTOPORPHYRIN LEVELS OF RESIDENTIAL/COMMERCIAL PAINTERS (ug/dl)

Time of Testing	n	Minimum	Maximum	Geometric Mean	95% Confidence Interval
Baseline (June 1994)	132	17	71	25.6	(14.7, 44.6)
Mid-Project (August 1994)	106	11	159	25.0	(12.7, 49.1)
Post-Intervention (Nov. 1994)	118	14	71	23.8	(13.9, 40.7)
1-Year Follow-up (Summer 1995)	51	16	45	22.9	(15.2, 34.5)

The distributions of BLLs at baseline, mid-project, post-intervention and one-year follow-up are shown in Table 9.6. In Summer 1995, only 3 of 52 employees (5.7%) had a BLL of 20 ug/dl or higher, as compared to 16 of 132 employees (12.1%) at baseline. The employees with BLLs 20 ug/dl or higher in Summer 1995 were employed by three companies, as compared to the 16 employees at baseline who worked for 9 participating contractors. It should be noted that the number of persons tested changed over time.

TABLE 9.6

BLOOD LEAD LEVEL DISTRIBUTIONS OF RESIDENTIAL/COMMERCIAL PAINTERS AT FOUR POINTS IN TIME

BLL (ug/dl)	Baseline June 1994 n	%	Mid-Project August 1994 n	%	Post-Intervention Nov. 1994 n	%	1-Year Follow-up Summer 1995 n	%
30 - 39	3	2.3	5	4.5	3	2.5	1	1.9
20 - 29	13	9.8	10	9.1	9	7.6	2	3.8
10 - 19	34	25.8	30	27.3	53	44.9	15	28.8
< 10	82	62.1	65	59.1	53	44.9	34	65.4
Total	132	100.0	100	100.0	118	100.0	52	100.0

For ZPP, the percent of values 50 ug/dl and higher were determined, as this level is considered to be elevated (which may be due to lead exposure or certain other medical conditions). At baseline, six workers (4.5% of 132 tested) had a ZPP $\geq$ 50 ug/dl; at mid-project, three did (2.8% of 106 tested); and at post-intervention, 4 of the 118 tested (3.4%) had ZPPs in excess of 50 ug/dl. At one-year follow-up in Summer 1995, none of the 51 workers tested had an elevated ZPP level.

Baseline BLLs were compared to mid-project, post-intervention, and one-year follow-up levels using paired t-tests. A statistically significant result ($p<0.05$) was noted for one of the four comparisons: one-year follow-up (Summer 1995) blood lead levels were lower than at baseline, with a mean difference of -1.9 ug/dl.

To compare BLL results at two points in time when workload, and therefore potential lead exposure, might be most similar, a paired t-test was performed for Summer 1995 versus August 1994. For this comparison, the population included only 52 painters. A slight drop in BLLs was seen from August 1994 to Summer 1995 (the mean difference was -1.1 ug/dl), approaching statistical significance ($p= 0.08$).

Univariate Relationships Between BLL and Other Factors

Blood Lead Levels versus Estimated Exposure to Lead

The questionnaire interviews gathered information on which to estimate employees' recent exposure to lead (i.e., during the past month) in order to look at the possible relationship between estimated exposure and BLLs taken at baseline and post-intervention. The two variables considered of most utility in estimating lead exposure were total days of surface preparation work on exteriors or interiors of pre-1950 buildings in the month prior to testing and, similarly, total days of exterior or interior work on pre-1980 buildings. Descriptive statistics for these exposure variables at baseline and post-intervention appear in Table 9.7.

TABLE 9.7

DAYS OF SURFACE PREPARATION IN THE PRIOR MONTH ON OLDER BUILDINGS, AS REPORTED BY WORKERS

Age of Building	Baseline (June 1994) Mean # of Days	Baseline (June 1994) Maximum # of Days	Baseline (June 1994) % Reporting Zero Days	Post-Intervention (November 1994) Mean # of Days	Post-Intervention (November 1994) Maximum # of Days	Post-Intervention (November 1994) % Reporting Zero Days
Exteriors:						
Pre - 1950	3.2	30	54	3.4	30	48
Pre - 1980	3.6	30	48	4.1	30	38
Interiors:						
Pre - 1950	1.1	18	75	0.8	16	80
Pre - 1980	1.4	18	68	0.9	16	75

Days of interior work on pre-1950 buildings were correlated with log-transformed baseline BLLs (Pearson's $r=0.19$; $p=0.03$), as was interior surface preparation on pre-1980 buildings (Pearson's $r=0.18$; $p=0.05$). A correlation approaching statistical significance was found between days of exterior surface preparation on pre-1950 buildings and BLL using Spearman's non-parametric correlation coefficient (Spearman's $\rho=0.14$; $p=0.10$), but not with Pearson's correlation coefficient (Pearson's $r=0.08$; $p=0.38$). For exterior work on pre-1980 buildings, only the non-parametric correlation was statistically significant (Spearman's $\rho=0.19$; $p=0.03$).

For the post-intervention (November 1994) data, days of interior surface preparation on pre-1950 or pre-1980 buildings were not correlated with BLL ($p=0.50$ and 0.33, respectively, for Pearson's r). A statistically significant relationship was found between days of exterior surface preparation work on pre-1950 buildings and BLL (Pearson's $r=0.21$; $p=0.02$). Similar findings were noted for exterior surface preparation on pre-1980 buildings (Pearson's $r=0.23$; $p=0.01$).

Since total years as a painter may be considered an estimate of long-term, chronic lead exposure, the possible relationships between this variable and BLL at baseline and post-intervention were examined. A statistically significant relationship (i.e., $p<0.05$) was not found at either point in time, using either the Pearson's or Spearman's correlation coefficients.

Blood Lead Levels versus Other Factors

The associations between BLLs and various other personal, demographic, and occupational characteristics of workers were examined using the post-intervention (November 1994) data. The purpose of this effort was to determine possible important covariates to include along with estimates of lead exposure in statistical modeling of BLLs at this point in time (discussed below). The results of all univariate analyses are summarized in Tables 9.8 and 9.9.

Worker BLLs were lower (i.e., $p<0.05$) for: non-Hispanic whites compared to Hispanics, Asians and blacks; high school graduates; non-smokers; and union members. A statistically significant relationship was not found between age and BLL. No difference in BLL was detected for the 16 workers who reported a hobby that possibly could have involved non-occupational lead exposure compared to rest of the group.

Workers who smoked in the work area had significantly higher BLLs than those who did not. However, BLLs of workers who said they ate in the work area did not substantially differ from those of employees who did not (see Table 9.9).

Some results were unexpected. Workers who attended a one-day lead safety training through the Project had higher BLLs than those workers who did not attend a training. Employees who reported wearing the Cal/OSHA required respirator for dry manual scraping (i.e., a half-mask respirator with HEPA filters) had higher BLLs than those employees who used a less protective respirator or did not wear a respirator for this task. This particular comparison was based on a lower number of respondents (76) because employees who did not conduct surface preparation work in the prior month were not asked the question.

Company size was negatively correlated with worker BLL, i.e., larger companies' employees had generally lower BLLs.

TABLE 9.8

UNIVARIATE ANALYSIS: RELATIONSHIP OF BLOOD LEAD LEVEL TO OTHER FACTORS, POST-INTERVENTION (NOVEMBER 1994) DATA

Variable	Total n	Type of Comparison	Pearson's Correlation Coefficient	p-Value	
Race/Ethnicity	118	t - test	-	<0.001	*
Age	118	Correlation	-0.113	0.224	
Education	118	t - test	-	0.005	*
Smoking Status	118	t - test	-	<0.001	*
Smokes in the Work Area	115	t - test	-	<0.001	*
Union Membership	118	t - test	-	0.002	*
Company Size (# employees)	118	Correlation	-0.246	0.007	*
Possible Lead Exposure Off the Job	118	t - test	-	0.820	
Exterior Surface Preparation on Pre-1950 Buildings (# days in prior month)	118	Correlation	0.214	0.020	*
Exterior Surface Preparation on 1950-1979 Buildings (# days)	118	Correlation	0.047	0.612	
Exterior Surface Preparation on Pre-1980 Buildings (# days)	118	Correlation	0.227	0.014	*
Interior Surface Preparation on Pre-1950 Buildings (# days)	118	Correlation	0.063	0.497	
Interior Surface Preparation on 1950-1979 Buildings (# days)	118	Correlation	0.089	0.338	
Interior Surface Preparation on Pre-1980 Buildings (# days)	118	Correlation	0.090	0.333	
Years as a Painter	118	Correlation	-0.066	0.483	
Wears Half-Mask HEPA Respirator While Hand Scraping	76	t - test	-	0.030	*
Eats in Work Area	115	t - test	-	0.782	
Attended Eight-Hour Worker Training	118	t - test	-	0.007	*

*p <0.05

TABLE 9.9

BLOOD LEAD LEVELS OF RESIDENTIAL/COMMERCIAL PAINTERS, POST-INTERVENTION (NOVEMBER 1994): DESCRIPTIVE STATISTICS BY LEVEL OF CATEGORICAL VARIABLE

Variable	Level	n	Geometric Mean BLL (ug/dl)	Geometric Std. Dev.	Minimum BLL (ug/dl)	Maximum BLL (ug/dl)
Race/Ethnicity	Non-Hispanic White	61	8.3	1.6	3	30
	Other	57	11.1	1.9	3	31
Education	Less than High School	30	12.3	1.8	3	31
	Finished High School	88	8.8	1.7	3	30
Smoking Status	Smoker	39	12.4	1.6	3	31
	Non-Smoker	79	8.4	1.8	3	30
Smokes in the Work Area	Yes	29	13.1	1.6	6	31
	No	86	8.7	1.8	3	30
Union Member	Yes	22	6.0	2.1	3	30
	No	96	10.6	1.6	3	31
Possible Lead Exposure Off the Job	Yes	16	9.9	1.8	3	24
	No	102	9.5	1.8	3	31
Eats in the Work Area	Yes	69	9.4	1.9	3	30
	No	46	10.1	1.7	3	31
Wears Half-Mask HEPA Respirator when Dry Scraping	Yes	46	11.3	1.6	5	31
	No	30	8.2	2.0	3	30
Attended Eight-Hour Worker Training Class	Yes	87	10.4	1.7	3	31
	No	31	7.5	1.7	3	18

Multivariate Modeling of Blood Lead Data

Multivariate Model with Baseline Data

Statistical modeling using stepwise multiple linear regression was performed to determine predictors of log-transformed worker BLLs. For the preliminary model using baseline (June 1994) data, variables termed "worker characteristics," i.e., factors unrelated to our intervention, were initially included. These variables were: race/ethnicity (non-Hispanic white vs. other), smoking status, educational level (high school graduate vs. not graduated), company size, years as a painter, days of exterior surface preparation in the prior month on pre-1950 buildings, and days of interior surface preparation on pre-1950 buildings. (A larger list of variables had initially been screened in the univariate analysis for $p<0.10$.) In the resulting preliminary model, after entering each variable stepwise whose p-value was less than 0.10, the significant variables were educational level, company size, smoking status, days of interior surface preparation on pre-1950 buildings, and race/ethnicity. The number of days of exterior surface preparation on pre-1950 buildings was not significantly related to BLL.

To develop the final model, the significant variables from the preliminary model were entered with the exception of substituting smoking in the work area for smoking status. Also added were eating in the work area, a factor addressed in the intervention. The resulting final model, shown in Table 9.10, showed that five factors were predictive of increased BLLs: not having graduated from high school, days of surface preparation on interiors of pre-1950 buildings in the prior month, being non-white, smoking in the work area, and working for a smaller-sized company.

TABLE 9.10

PARAMETER ESTIMATES FOR FINAL MODEL, BASELINE DATA (JUNE 1994)

Variables	Step Entered	Parameter Estimate	Standard Error	Partial R^2	Cumulative Model R^2	p-Value
Intercept	-	1.911	0.108	-	-	<0.001
Education: Less Than High School	1	0.311	0.138	0.087	0.087	<0.001
Days of Interior Surface Preparation on Pre-1950 Buildings	2	0.052	0.019	0.058	0.144	0.004
Race: Other than Non-Hispanic White	3	0.276	0.117	0.032	0.176	0.029
Smoking in Work Area	4	0.290	0.118	0.033	0.209	0.024
Company Size: Number of Employees	5	-0.005	0.003	0.024	0.233	0.050

Table 9.11 shows the predicted increases in BLL associated with specific factors found significant in the final model.

TABLE 9.11

PREDICTED INCREASES IN BLOOD LEAD LEVEL ASSOCIATED WITH SPECIFIC FACTORS, BASED ON BASELINE (JUNE 1994) FINAL MODEL (ug/dl)

Factor	Base Level → Level When Particular Factor is Present
Factors Associated with Increases in BLL:	
Did Not Finish High School	6.8 → 9.2
Does Surface Preparation on Interiors of Pre-1950 Buildings for 10 days in the Prior Month	6.8 → 11.3
Race/Ethnicity Other Than Non-Hispanic White	6.8 → 8.9
Smokes in the Work Area	6.8 → 9.0
Four Above Factors Combined	6.8 → 27.2
Factors Associated with Decreases in BLL:	
Company Size = 10 Employees	6.7* → 6.4
Five Above Factors Combined	6.8 → 25.8

*Shows decrease in BLL for an increase in company size from 1 to 10 employees

Multivariate Model with Post-Intervention Data

For the preliminary model using post-intervention (November 1994) data, the same variables as entered with the baseline data were initially included with the exception of days of interior surface preparation on pre-1950 buildings which was not significant in the univariate analysis. In the resulting preliminary model, the significant variables were smoking status, company size, race/ethnicity, and days of exterior surface preparation work on pre-1950 buildings.

In the next step two variables which related to the intervention were added to the preliminary model developed above. The variables were eating in the work area and attendance at a project-sponsored worker training class. Smoking in the work area was also substituted for smoking status. From this procedure the final model was developed, summarized in Table 9.12. The significant predictors of increased BLL were smoking in the work area, working for a smaller sized company, doing exterior surface preparation on pre-1950 buildings, and being non-white.

TABLE 9.12

PARAMETER ESTIMATES FOR FINAL MODEL, POST-INTERVENTION DATA (NOVEMBER 1994)

Variables	Step Entered	Parameter Estimates	Standard Error	Partial R^2	Cumulative Model R^2	p-Value
Intercept	-	2.138	0.092	-	-	<0.001
Smoking in Work Area	1	0.437	0.111	0.095	0.095	<0.001
Company Size: Number of Employees	2	-0.008	0.002	0.076	0.171	0.002
Days of Exterior Surface Preparation on Pre-1950 Buildings	3	0.020	0.008	0.048	0.219	0.010
Race: Other than Non-Hispanic White	4	0.228	0.097	0.037	0.257	0.020

Table 9.13 shows the predicted increases in BLL associated with specific factors found significant in the final model.

TABLE 9.13

PREDICTED INCREASES IN BLOOD LEAD LEVEL ASSOCIATED WITH SPECIFIC FACTORS, BASED ON POST-INTERVENTION (NOVEMBER 1994) FINAL MODEL (ug/dl)

Factor	Base Level → Level When Particular Factor is Present
Factors Associated with Increases in BLL:	
Smokes in the Work Area	8.5 → 13.1
Does Surface Preparation on Exteriors of Pre-1950 Buildings for 10 days in the Prior Month	8.5 → 10.6
Race/Ethnicity Other Than Non-Hispanic White	8.5 → 10.6
Three Above Factors Combined	8.5 → 20.2
Factors Associated with Decreases in BLL:	
Company Size = 10 Employees	8.4* → 7.8
Four Above Factors Combined	8.5 → 15.5

*Shows decrease in BLL for an increase in company size from 1 to 10 employees

D. FOCUS GROUP RESULTS

On March 21, 1995, two focus groups were simultaneously conducted with painting contractors who participated in the California Painters Project (CPP). The focus groups were conducted in order to gather qualitative data as part of the evaluation component of the Project. Following are the objectives for the focus group discussions, and a summary of the discussion and conclusions derived from the focus group interactions. The comprehensive focus group report with important and interesting comments from the participants can be found at the end of this report in Appendix 23.

Objectives

The primary objectives of the focus groups were to identify:

- Factors that initially influenced the painting contractors to participate in the CPP;
- Motivations for staying involved with the Project;
- Factors that helped the painting contractors make changes to improve lead safety;
- Obstacles encountered by the painting contractors in trying to improve lead safety;
- How project participation affected the painting contractors' approach to carrying out their business; and
- Specific changes that would make the Project more effective.

Summary of Focus Group Results

Factors That Initially Influenced Contractor Participation in the CPP

A number of factors were mentioned by the painting contractors as influential in their decision to participate in the CPP. The factors most commonly cited were previous personal experience with lead and/or asbestos, project recruiting procedure, the free/low cost services offered by the Project, the desire to get educated, the opportunity to interact and learn with peers, and concern about liability.

Previous Personal Experience with Lead and/or Asbestos

A number of statements were made about either a family member or friend who was affected by exposure to lead, and this influenced some contractors to want to get involved with the CPP. The devastating effect of asbestos on one painting contractor's family member influenced his decision to participate in the Project.

Project Recruiting Procedure

Many comments reflected the opinion that the project staff presented themselves in a professional, open-minded manner, which seemed to instill trust in a number of contractors, thus influencing their decision to participate. The fact that the Project solicited feedback from the painting contractors was quite influential for some in the decision to participate. One contractor explained that his interest in the Project stemmed from the fact that it was research-based.

Free/Low Cost Services Offered by the Project

The Project offered a number of services to painting contractors, such as blood lead level testing, air monitoring, and training for employees in a variety of languages, all of which were seen as incentives for participating in the Project. Offering these services at low or no cost was "a big carrot," as one contractor put it, and influenced many to participate.

Desire to Get Educated

One of the recurring themes in response to the question, "What initially influenced you to participate in this Project?" was contractors' desire to learn how to protect themselves and their employees. Many comments focused on the desire to learn more about how lead affects health and safety. A few comments reflected an interest in learning more about procedures, rules and regulations. Still other comments had to do with a general desire to get information about lead safety quickly and relatively easily without having to do a lot of research/investigation on their own.

Opportunity to Interact and Learn with Peers

A few of the contractors mentioned their interest in interacting with their peers as influential in deciding to participate in the Project.

Concern about Liability

A number of comments were made reflecting a concern about liability. Participation in the CPP was seen as an opportunity to learn how to be in compliance with current regulations, thus avoiding lawsuits.

Motivation for Staying Involved in the Project

The reasons given for staying involved with the California Painters Project closely parallel the factors which initially influenced painting contractors to participate in the Project. They include the availability of information and services, the desire to be in compliance with regulations, interaction with peers, and the opportunity to influence policy.

Availability of Information and Services

Many of the same services which contractors mentioned as incentives for joining the Project were also cited as motivations for staying involved with the Project. These services include blood lead level testing, air monitoring, and training on lead health and safety issues. A few statements focused on interest in the project's research findings and materials developed by the Project.

Desire to be in Compliance with Regulations

Some statements reflected an awareness that new regulations were about to take effect, and this motivated a number of painting contractors to stay involved with the Project. Some were motivated to stay involved so as to be able to be in compliance with Cal/OSHA regulations.

Interaction with Peers

The opportunity to network and interact with peers was also cited as a motivation for staying involved with the Project.

Opportunity to Influence Policy

A number of comments reflected a desire to influence policy so that all contractors would be on equal status with each other.

<u>Factors That Helped Painting Contractors Improve Lead Safety</u>

Focus group participants identified several aspects of the Project that helped contractors make changes to improve lead safety. The training seminars, along with specific aspects of the training, were cited repeatedly as an important contributing factor to making changes. Other factors mentioned included specific project components, such as blood level testing, air monitoring, and the manual; and factors not directly related to the Project, such as networking and concerns about liability.

Training

Several comments indicated that as a result of training, business opportunities improved for the contractors. Participation in the training seminars facilitated learning about lead safety for both contractors and their employees, leading to increased awareness and changes in practices. One participant stated an appreciation for the training because it "legitimized" the operation of his business. For another, the training conveyed a cost-effective way to be lead-safe.

Specific Aspects of the Training

The requirement that employees undergo training, and the effectiveness of that training, were important factors to some participants. Some contractors believed that employees were more likely to listen to, and act on, information provided by a trainer from outside of the company.

The communication skills of the training staff played a role in the success of the training. Contractors indicated that instructors communicated well to the employers and did a very good job in the training sessions with the employees as well. They were impressed with worker training being offered in several languages and that neither group's training was done in a condescending fashion.

One contractor indicated that if he had been handed a manual and been told that this is what he had to do, he would have panicked and not done it. Since the material was introduced "bit-by-bit" and each area was discussed it wasn't such a "major thing" for him.

Hands-on demonstrations were cited as particularly helpful because they provided a realistic picture of lead-safe work. It also helped some contractors to realize that a lead-safe job is not that much more expensive than a regular job.

Resources offered by the Project, particularly learning about the hazardous waste disposal program, were considered by one participant to be very important in changing employer practices in the buying and disposal of paint.

Specific Project Components: BLL and ZPP Testing, Air Monitoring, Manual

The blood lead level (BLL) testing program, air monitoring, and the *Painting Contractor's Guide to Lead Safety* manual were specific features of the Project that were useful, according to the comments made by contractors.

BLL measures were seen as particularly important in providing feedback regarding lead exposure, thus serving as a valuable indicator of the extent of lead safety on the job. The availability of quantitative data from air monitoring served to boost this contractor's claims that he operates safely.

Several comments indicated that the manual was too long, but one participant described the manual as essential. He indicated that the manual is a bridge between him and the consumer. The manual helps the contractor to communicate to the consumer what steps a contractor must take to do a lead-safe job. He indicated that if all painting contractors had the manual then it would help to create a "level playing field" in the bidding process.

Networking

The usefulness of talking to and sharing information with other contractors was discussed. Contractors liked hearing feedback from counterparts, discussing ambiguous issues, discovering that they all had the same fears and interests and getting lead-safe job referrals from each other.

Liability Concerns

Concerns about liability prompted some contractors to make changes in work and business practices to improve lead safety. Fear of being sued, and hearing about others being sued, was identified as a motivation for improving lead safety.

<u>Obstacles Encountered by Contractors in Trying to Improve Lead Safety</u>

A number of obstacles encountered while trying to improve lead safety in their own businesses were discussed by the contractors. The obstacles mentioned tended to fall into the categories of meeting the lead standards, cost, the customer, lack of equipment, environmental factors, employee compliance, and record-keeping.

Meeting the Lead Standard

A great deal of concern and uncertainty was expressed both about legal liability and meeting government standards. Many of the contractors' comments reflected fear that they may be found liable for failing to comply with the standards. There were also a number of comments expressing confusion about the standards. They thought that, particularly in the area of hazardous waste, they would inevitably break the law since complying with lead regulations was confusing, difficult and a major burden. Some resentment was expressed about regulations concerning the disposal of hazardous waste. Some contractors viewed the hazardous waste issue as peripheral to their business. They did not consider lead paint chips and dust their "property" and therefore should not bear the financial burden of disposing of them properly. Some contractors voiced the opinion that hazardous waste disposal was simply a money maker for private hazardous waste collectors and is a service that should be provided free to contractors.

Cost

A number of comments focused on cost as an obstacle in trying to improve lead safety. The cost of hazardous waste disposal was particularly mentioned.

Some concern was expressed about correctly estimating the cost of a job so that an accurate bid can be made. Accurately bidding a job requires a lot of forethought since there are so many variables to consider (e.g., whether they do containment given that it may be windy).

One contractor complained about the ongoing costs of blood lead level testing. Insurance was also mentioned as a cost obstacle.

The Customer

Dealing with customers was seen as a real obstacle to improving lead safety. There were many statements made by the painting contractors about the difficulty of communicating with clients, customers, and neighbors around the issue of lead and lead removal. They thought there was overall public ignorance on the issue and thus had difficulty in convincing customers of the problem and the proper way to address it. One contractor stated that he didn't feel comfortable bringing the issue up and tried not to make it a big issue by just informing the customer that he practiced "lead-safe" painting.

Some painting contractors also discussed their perceptions of customer concern with cost, which they see as an obstacle to doing their job in a lead-safe way, and to selling a job. One contractor thought the issue had to be presented to the customer as not costing them a lot more money or else he couldn't sell lead-safe work.

Another concern expressed was that bringing up lead is a red flag to customers because of the customer's fear of regulations or of inspectors showing up and causing them other problems. The conflict described by some contractors was, on the one hand, that they don't want to scare their customers away by discussing 'the lead problem' at great length, but on the other hand, they don't want to be held liable for non-disclosure of a potential problem. Finally, some resentment was expressed, both toward the customer in general, with his or her perceived lack of responsibility in dealing with "the lead problem," and toward regulations which hold the painting contractors solely accountable for handling lead on the job.

Lack of Equipment

A number of comments reflected frustration over the lack of adequate information about equipment, and the unavailability of the equipment itself. One contractor mentioned that it was not so much the expense of the tools as finding out how you get the tools that was the problem.

Environmental Factors

A few comments centered around environmental factors as obstacles to improving lead safety, albeit out of the realm of human control, e.g., doing work on a suspended scaffold on a windy day or having employees wear respirators in the middle of a hot afternoon.

Employee Compliance

The need to keep reminding workers about safety practices on the job was cited as an obstacle to improving lead safety. The need to be vigilant with employees was seen as so important by one contractor that he envisioned it as a full-time job or that he had to have employees he could assign to take this kind of responsibility.

Record Keeping

Record keeping, and the administrative aspects associated with it, was cited as an obstacle to improving lead safety. One contractor mentioned keeping records on employees for 20 years as a problem.

<u>How Project Participation Affected the Contractors' Approach to Carrying out Their Business</u>

Focus group participants indicated several ways that the Project has affected their approach to carrying out their business. Many of the comments revealed that contractors have improved their communication with customers and the way they market their business. Other comments indicate that the Project has helped some contractors to better assess a potential job in terms of lead risks or evaluating the disposition of the customer. There have been changes regarding work approaches for and by employees. One respondent indicated that he now uses the project staff as an ongoing resource.

Improved Communication with Customers

Improved communication with customers included being more proactive and better able to convey information about low-cost procedures and general information about lead safety.

One participant indicated that he is now more knowledgeable about lead and is able to inform other people on the job. When asked if he considered himself working as an educator, he responded, "Yes, very much."

Improved Marketing Practices

Many of the comments seem to indicate that contractors have improved their marketing practices or skills by participating in the Project. This is especially true for marketing to commercial establishments. One contractor stated that while he doesn't advertise that he is willing to do the work, he does network and gets a lot of referrals.

Increased Ability to Assess Potential Jobs

Several comments suggested that contractors felt that, as a result of participating in the Project, they are better able to assess whether or not they wish to take on a particular job in light of the magnitude of the lead hazard associated with that job.

Change in Practices for and by Employees

Several comments indicated that the Project has helped change workplace procedures for and by employees; for example, employees can now tell their employer where they think there might be lead contamination. One respondent has been able to formalize his medical program and respirator fit testing program for employees. Another contractor stated that he is now more selective in who he hires as he doesn't want to hire someone who's a potential workers' compensation claim. One contractor voiced the opinion that talking to his employees about lead safety was very important because, regardless of whether an employee stays with his company or moves on, at least they have become aware of the hazard.

Access to Additional Resources

One respondent indicated that as a result of the Project he now has access to additional resources such as the Occupational Lead Poisoning Prevention Program.

<u>Specific Changes That Would Make the Project More Effective</u>

Focus group participants suggested several modifications to the Project. Most of the comments recommended ways to change the format of the training sessions, including the order of instruction, the methods used, and how discussions were facilitated. Additions and changes to the curriculum and manual were also suggested. Time considerations were discussed along with employee training. Several of the comments suggested that the Project provide training to the public and other types of contractors.

Suggestions for Changing Training Sessions

Several of the comments made by participants indicated a preference for more hands-on presentations. Contractors wanted to see and handle more equipment. There was also a preference by some to have the more practical and hands-on aspects of the training presented prior to describing the lead problem and legal framework. One participant, however, cited an advantage to having information on the lead problem and legal framework presented at the beginning of the series of employer seminars to get the participants to listen to the rest.

There was also a request that more time be allotted for participants to ask questions. Contractors believed that the training seminars were well-organized and planned, but the agendas were so full that there was not sufficient time to answer questions.

Suggestions on how to handle the liability/insurance issues included a suggestion that this section be covered earlier on rather than toward the end of the seminar series. The workers' compensation portion of the presentation was considered confusing and disorganized, while the liability and insurance presentation was well-received.

Suggestions for training methods included more "on-the-job" instruction to minimize the number of hours of classroom instruction, more "peer education," less technical information, and more presentations of case studies.

One participant was concerned about the need for the group to stay on track. He suggested that contractors be allowed to "unload" at the beginning of the training, but then get the group back on track.

Suggestions for Revising the Manual

Suggestions for changing the manual included adding contractors as authors, reducing the number of pages, using a "how to" format, and accompanying the manual with a CD ROM or with a videotape. One contractor stated he wanted a painting contractor manual for dummies. Another reflected that without the instruction to go along with the manual one would be lost.

Instructional Aides

Several instructional aides were suggested as additions to the training, including a video showing on-site procedures, posters, and informational brochures.

Time Considerations

Comments varied concerning the length of time for the training seminars. Some preferred a condensed version of the program, while others liked a program that spanned a period of time. Those who preferred the training over a period of time cited the difficulty in taking a week long course while running a business and found that more was absorbed and learned this way. For employee training there were benefits to just getting it done in a short period of time.

Other Issues Concerning Employee Training

There were several other opinions offered about employee training, particularly related to its cost and the high employee turnover rate in the painting industry. One contractor thought that employers should not have the burden of training their employees. Others thought employees should pay for some or all of the training and certification costs and should be reimbursed completely or in part only if they stayed with the company.

Providing Education to the Public and Other Contractors

The need to educate the public and general contractors about lead paint hazards and the steps that must be taken to do a repaint job safely was discussed. Contractors found convincing a customer of the importance of lead safety, or that total paint removal was unnecessary, particularly challenging. The need to focus more on customer education (e.g., the brochure, "Protecting Your Family from Lead Paint Hazards" developed by the Project) was cited as important.

Conclusions

From the focus group discussions, a number of recurring themes were identified:

- Contractors valued the fact that the CPP was research-based, and as such, presented itself as independent from other organizations.

- Contractors appreciated being asked for their input and feedback by the Project and were influenced to participate in the CPP by the opportunity to potentially have an impact on lead-related policies.

- The free or low-cost services provided by the Project (e.g., blood lead level testing, air monitoring, training for employees and certification) were big incentives for continued participation in the Project.

- Overall, contractors were drawn to the Project because of the opportunity to become educated about lead safety. There was a real interest expressed in wanting to learn about the hazards of lead.

- Overall, there was concern about the liability incurred by taking on lead jobs. Although there seemed to be agreement that liability will never be eliminated, there was recognition that it can be minimized through compliance with regulatory codes. Many felt the need for universal compliance among all contractors and supported certification to level the playing field.

- Cost was identified as a barrier to conducting business in a lead-safe way. The additional cost of including lead-safe procedures when quoting bids for customers was of great concern. The Project has contributed to easing some of the contractors' concerns by offering ways to communicate the need for lead safety to customers.

- Networking was seen as a real benefit to project participation, as it provided opportunities for contractors to share information with and learn from their peers.

- Overall, the Project was perceived to be effective in helping contractors and their employees to create a safer work environment. Several of the proposed changes to the Project included:

    - Reducing the size of the manual and making it more user friendly;
    - Consolidating regulatory information into one document;
    - Creating visuals, including videos, posters, and CD ROM software as instructional aides;
    - More peer education and hands-on instruction

- Overall, a positive and appreciative tone was conveyed by the painting contractors throughout the focus group discussions toward the California Painters Project and its staff.

E. WORKER TRAINING POST-TEST RESULTS

A written, multiple choice post-test was administered to workers at the end of the 8-hour training session. The average score was 89%; 76% of participants achieved a score of 90% or higher. Ninety percent of participants achieved a score of 80% or higher.

F. FOLLOW-UP EVALUATION SITE VISITS

In Summer 1995, three contractor work site visits were conducted during surface preparation activities on lead-containing paint. Observations in each of the 14 areas we assessed during these follow-up site visits were matched with the employers' answers to questions that addressed the same areas in the Employer Summer 1995 Questionnaire (one-year follow-up). The results in each area of observation (n=42) were then categorized as follows: 1. inadequate to allow a comparison with questionnaire reporting; 2. in general agreement with questionnaire reporting; 3. in disagreement with questionnaire reporting.

In total, of the 42 areas of observation, 14 (33%) were inadequate to allow a comparison with employer questionnaire reporting, 26 (62%) were in general agreement with questionnaire reporting, and 2 (5%) were in disagreement with the employer's questionnaire reporting.

10. DISCUSSION OF RESULTS

A. CHANGES IN LEAD SAFETY

The California Painters Project was designed to test the hypothesis that an intervention strategy of education, training, and technical assistance, provided in a step-by-step approach, would be effective in increasing lead-safe work and business practices and decreasing unsafe practices among contractors and their employees. Questionnaire data collected immediately following our intervention and one year post-intervention (referred to as "one-year follow-up") allow us to measure improvements made toward implementation of specific lead safety practices. Qualitative data from the contractors' focus group provide insight into why contractors were successful in making improvements in some areas and not in others.

The lead safety practices we examined fall into seven broad categories: tests for lead in paint; surface preparation methods; respiratory protection; protective clothing; housekeeping, containment and environmental control; medical surveillance; and employee training. Here we assess the progress made in each of these areas with respect to the intensity of our intervention effort (e.g., emphasis in training, resources provided by the Project), incentives and disincentives to change, enabling factors, and barriers encountered. We also note whether we met, almost met,[1] or failed to meet, the measurable objectives we had set for specific lead safety practices (see Chapter 7, Section D for a full discussion of the measurable impact objectives). Table 10.1 summarizes the employer and worker lead safety objectives; for each objective, we present the percent improvement in the target population immediately after the intervention (November 1994) and at one-year follow-up (Summer 1995) in comparison to baseline.

Lead Tests

In the employer seminars, we stressed the importance of determining whether lead paint is present before bidding a job and demonstrated several lead testing methods. We set an objective that 75% of target employers would increase use of color-indicating tests for lead in paint. Contractors responded quickly and positively to this message; by November 1994, 83% of the target contractors had increased use of color-indicating tests for lead in paint; this increase was in large part maintained through Summer 1995. Participants voiced a preference for color-indicating tests over other methods because color-indicating tests are inexpensive and results are available immediately. Contractors got a discount on the already low cost of these tests when one of the project participants negotiated a group purchase at a reduced price (approximately $1/test).

Although no objective was set for increasing paint chip analysis, it was discussed during employer seminars. We saw only a small increase (25%) in the use of paint chip analysis by the end of the intervention. Employers appeared reluctant to use this method because of cost;

[1] Within five percentage points of the objective.

the average cost per test at the time of the Project was $20-30/sample. Although the added cost could be included in the bid, many contractors were uncomfortable with asking the customer to pay for the analysis.

TABLE 10.1
CHANGES IN LEAD SAFETY PRACTICES:
OBJECTIVES AND PERCENT CHANGE AMONG TARGET POPULATION

Practice	Objectiver % Change*	% Change by Nov. 1994*	% Change by Summer 1995*	Objective Met by Summer 1995?
Identification of Lead Paint				
Employers Use Color-Indicating Tests	+75	+83	+75	Yes
Surface Preparation Methods				
Use of Dry Manual Sanding	-50	-29	-25	No
Use of Dry Manual Scraping	-33	-19	-19	No
Use of HEPA-Exhausted Power Tools	+50	+14	+33	No
Use of Open Flame Burning	-50	-42	-67	Yes
Respiratory Protection				
Appropriate Respirator for Manual Sanding	+90	+80	+87	Almost**
Appropriate Respirator for Non-HEPA Power Tools	+50	+11	0	No
Employers Provide Updated Medical Clearance for Respirator Users	50	N/A	18	No
Employers Provide Medical Clearance for New Hires	50	N/A	50	Yes
Employers Provide Fit Testing in Past 6 Months	+50	+47	+47	Almost**
Workers Perform Fit Checks	75	N/A	65	No

* As Compared to Baseline
** Almost = Change was within 5% of objective

TABLE 10.1 (Cont'd)
CHANGES IN LEAD SAFETY PRACTICES:
OBJECTIVES AND PERCENT CHANGE AMONG TARGET POPULATION

Practice	Objective: % Change*	% Change by Nov. 1994*	% Change by Summer 1995*	Objective Met by Summer 1995?
Protective Clothing and Hygiene				
Employers Provide Protective Clothing	+75	+43	+65	No
Employees Wear Work Clothes Home	-75	-59	-62	No
Employers Take Steps to Ensure Work Shoes Not Worn Home	+75	N/A	+75	Yes
Employees Wear Work Shoes Home	-75	-38	-48	No
Employers Ensure Washing Equipment Available	+90	+54	+60	No
Employees Wash Before Eating	+75	+58	+79	Yes
Employees Wash Before Drinking	+50	+44	+50	Yes
Employees Wash Before Smoking	+50	+50	+64	Yes
Employees Wash Before Going Home	+90	+82	+82	No
Employers Prohibit Eating, Drinking, Use of Tobacco Products in Work Area	+90	+76	+60	No
Employees Eat in Work Area	-90	-49	-62	No
Employees Drink in Work Area	-75	-47	-49	No
Employees Smoke in Work Area	-75	-17	-56	No

* As Compared to Baseline
** Almost = Change was within 5% of Objective

TABLE 10.1 (Cont'd)
CHANGES IN LEAD SAFETY PRACTICES:
OBJECTIVES AND PERCENT CHANGE AMONG TARGET POPULATION

Practice	Objective: % Change*	% Change by Nov. 1994*	% Change by Summer 1995*	Objective Met by Summer 1995?
Housekeeping, Containment, and Environmental Control				
Employers Use Dry Sweeping	-75	N/A	-67	No
Workers Use Dry Sweeping	-75	N/A	-44	No
Employers Mist Before Sweeping	+90	N/A	+84	No
Workers Mist Before Sweeping	+90	N/A	+53	No
Employers Clean with HEPA Vacuum	+50	+33	+62	Yes
Employers Use Tarps on Interior Floors	-50	-35	-55	Yes
Employers Use Plastic Sheeting on Interior Floors	+50	+62	+46	Almost**
Employers Use Containment on Scaffolding	+30	+47	+47	Yes
Employers Seal Rooms on Interior Surface Preparation	+50	N/A	+47	Almost**
Employers Seal Windows, Doors on Exterior Preparation	+75	N/A	+85	Yes
Employers Use Tarp or Plastic on Exterior Preparation	+50	N/A	+76	Yes
Employers Protect Drains and Sewers from Chips	+50	N/A	+100	Yes
Employers Take Steps to Ensure Proper Waste Disposal	+50	N/A	+70	Yes

* As Compared to Baseline
** Almost = Change was within 5% of objective

TABLE 10.1 (Cont'd)
CHANGES IN LEAD SAFETY PRACTICES:
OBJECTIVES AND PERCENT CHANGE AMONG TARGET POPULATION

Practice	Objective: % Change*	% Change by Nov. 1994*	% Change by Summer 1995*	Objective Met by Summer 1995?
<u>Medical Program</u>				
Employers Provide Routine BLL and ZPP Testing	+90	N/A	+57	No
<u>Employee Training</u>				
Employers Provide Training to New Hires	50	N/A	40	No

* As Compared to Baseline
** Almost = Change was within 5% of objective

Surface Preparation Methods

Only one of the four objectives for changing surface preparation methods was met--decreasing the use of open flame burning (67% of target contractors decreased use). During the employer seminars we discussed this method as a "medium" risk task and presented reasonable alternatives such as chemical stripping and less than total paint removal. However, we can not attribute the observed decrease solely to the Project since there were additional influences discouraging open flame burning, most notably increased recognition of the fire risks associated with this method on the part of both contractors and insurers. This was often cited by project participants as the reason for an industry-wide decrease in the use of burning.

We had moderate success in increasing contractors' use of HEPA-exhausted power tools. Despite the significant cost associated with purchase of a HEPA vacuum ($400 - $1200) and appropriate tools (approximately $250/"dustless" power tool), 33% of target employers increased use of these methods. Some employers seemed less willing than others to experiment with this new method for surface preparation. Cost was voiced as a barrier by employers who did not switch to HEPA-exhausted tools. Additionally, although vendors displayed HEPA-exhausted tools at one seminar and retrofitting existing tools was discussed at the following seminar, some contractors said that a lack of information and the unavailability of these tools were obstacles to making a change. Several contractors also stated that it was too soon to purchase these tools because the technology was not yet adequately developed.

Even though two thirds of the target contractors did not increase use of HEPA-exhausted power tools, other data suggest that many understood that use of uncontrolled tools was associated with high airborne lead exposures and surface contamination. Fifty-six percent (56%) of target contractors decreased use of uncontrolled power tools. Some contractors who reported decreased use of uncontrolled tools may have switched to other safer methods, or reduced the amount of paint removed during their surface preparation, rather than switching to exhausted tools.

We were less successful in decreasing the practice of dry manual scraping. Only four of the 21 target employers (19%) reported dry scraping less frequently, falling short of our objective of a 33% decrease. Some contractors told us that decreasing use of this method was difficult since the main alternative, wet scraping, was frequently not acceptable because of raising the wood grain and problems with underlying moisture upon repainting. Even so, by Summer 1995, 10 of 19 target employers had increased use of wet scraping, indicating that they were willing to try this method when possible.

Dry manual sanding is a significant source of contamination and high worker exposure. During the employer seminars, we emphasized the need to shift to a safer method(s). Still, the majority of target employers (75%) did not decrease dry manual sanding. We had hoped to induce half of them to use this method less frequently. Contractors reported that the alternative we promoted, wet sanding, is often problematic because it can result in underlying moisture and can raise the grain of exposed wood. In retrospect, we may have been more successful at decreasing dry manual sanding if we had also emphasized the use of HEPA-exhausted power sanders (including trim sanders) as a safer alternative.

Respiratory Protection

Employers were receptive to our instruction about selection and use of respirators. We met, or nearly met, our objectives for employer improvement in the areas of appropriate respirator selection for manual sanding, provision of medical clearance to new hires assigned to wear a respirator, and periodic fit testing of respirator users.

Employers addressed respirator selection quickly; by November 1994, 80% of the target employers were selecting a half-mask respirator with HEPA filters for dry manual sanding. By Summer 1995, the percentage increased to 87, falling just short of our objective of 90%. We may have been successful, in part, because employers were already familiar with the use of respirators to protect workers, and because they considered the cost of this respirator reasonable ($40/respirator).

Although employers were willing to invest in half-mask respirators, we were not successful in persuading them to purchase full-face respirators with HEPA cartridges for uncontrolled power sanding.[2] The cost of a full-face respirator (~ $200/respirator), and the difficulty of

[2] This is the minimal level of respiratory protection required by Cal/OSHA in the absence of air monitoring data on which to base respirator selection.

maintaining more than one set of employee respirators, may have been a deterrent. Contractors who did uncontrolled power sanding infrequently, or intended to purchase HEPA-exhausted power tools in the future, may have been reluctant to invest in costly respirators. We put more emphasis in employer seminars on the use of HEPA-exhausted tools and safer surface preparation methods than use of full-face respirators to control exposures because eliminating high exposure work methods, such as power sanding, is the most effective way to reduce exposures. We did note a decrease in open power sanding, although 12 employers continued to use it at least occasionally.

Half of the target employers began providing an *initial* medical clearance for *new* respirator users. The relationship contractors had established with a medical provider for blood testing likely assisted compliance with medical clearance, since employers now had a provider who could deliver this additional service. However, only 18% of target employers provided *annual* medical clearance for *ongoing* respirator users, as required by Cal/OSHA. We suspect that cost, and a perception that periodic medical clearance is less important than an employee's initial clearance, may have dissuaded employers from maintaining this service.

Slightly less than half of the target employers (47%) provided six-month fit testing. Of those who did, 6 purchased supplies to perform qualitative fit testing themselves; the remainder sent employees to their medical supervisor for quantitative fit testing. Although we nearly met our objective of a 50% increase, we may have done better in this area had we helped employers become more comfortable with performing qualitative fit testing. We demonstrated the technique during the seminar but did not allow sufficient time for contractors to practice by fit testing each other.

Most employees were provided with a half-face respirator with HEPA filters during the Project and trained to perform daily fit checks in order to ensure that their respirator was providing meaningful protection on an ongoing basis. We set our objective for fit checking high (75%) since it is a practice workers can take to protect themselves and it is easily incorporated into the process of putting on a respirator. By Summer 1995, 65% of the target workers who wore a respirator while doing surface preparation reported conducting a fit check every time they put on a respirator. Although this falls somewhat short of our objective, it is an important positive change. We may have achieved a higher degree of improvement in this area if every worker had had the opportunity to practice fit checks during the worker training, rather than simply watching a fit check demonstration.

Protective Clothing and Hygiene

Protective Clothing

By Summer 1995, 65% of targeted employers were supplying work clothing for employees. This is short of our objective of 75% but is still meaningful improvement. Cost and the logistic difficulty of issuing and collecting work clothing from employees who report directly to the job site may have been obstacles for some employers. Disposable work clothing may address some of the logistical problems; use of disposable clothing did increase. Some employers, however, expressed concern about the lack of comfort and potential for heat stress associated with disposable clothing. Additionally, some contractors believed that these suits would scare their customers.

Three quarters (75%) of target employers reported taking steps to ensure that workers did not wear shoes home from the job site. This change took minimal effort, however, as most employers merely told employees not to wear shoes home and took no other steps.

Nearly two-thirds of target workers reported wearing their work clothes home less frequently. Although we fell short of our objective of 75%, this increase shows important progress toward prevention of take-home lead exposure. The hazard of taking lead home was stressed in worker training, and workers seemed very concerned about protecting their families. Of those who still wore clothes home in Summer 1995, two-thirds stated that they changed their clothes before entering the home. Additionally, because of the way in which the question was worded, it is possible that some workers who responded that they wear home the clothes they work in may have worn disposable clothing on top of their work clothing and removed it before going home. Only one of the workers who reported having a child in the home continued to wear his work clothes home.

Almost half (48%) of target workers reported wearing work shoes home less often, falling short of our objective of 75%. Realizing that employers would be unlikely to provide separate work shoes, we encouraged workers to bring an extra pair of shoes to the job site and to leave them there, changing back into their street shoes at the end of the day. Although we were not completely successful in getting employees to follow this recommendation, it is notable that two-thirds of the workers who continued to wear their work shoes home said they changed shoes *before* entering the home. This does not eliminate the possibility of exposing family and household members, however, since a worker's personal vehicle will be contaminated whenever work clothes or shoes are worn offsite.

<u>Hygiene</u>

Because ingestion of lead dust can be a significant route of exposure for painters, employer seminars emphasized providing washing facilities for workers and establishing and enforcing policies prohibiting eating, drinking, smoking, etc., in work areas. Our aim was to bring 90% of the target contractors into compliance with the Standard in these areas. We set high objectives in this area because complying with these requirements is simple, inexpensive, and can be accomplished almost immediately.

In contrast to the general concern about worker hygiene expressed by many contractors during focus group discussion, 40% of the target employers did not follow through on those concerns by consistently providing workers with adequate washing facilities and establishing a clear company policy on eating, drinking, etc. in work areas. We cannot provide a satisfying explanation for this failure. Given that implementing these changes is inexpensive and easy to manage and that employers clearly understood what was required, it is surprising that we did not meet our objective. We may have been more successful had we directed our recommendations to job site supervisors and made it clear that they have an important role in ensuring that hand washing equipment is consistently available and that workers practice good hygiene.

The necessity of practicing good hygiene to prevent ingestion and take home exposure was also a focus of worker training. We set lower (50 - 75%) objectives for workers in these areas than for employers (90%) because changing behavior can be difficult and occurs slowly. The exceptions were the objectives for eating in the work area and washing before going home, which we set at 90%.

By Summer 1995, more than half of target workers washed before drinking and smoking when facilities were available and more than three quarters washed before eating. One worker specifically stated that after the training he began to wash before eating and his BLL decreased. The largest improvement was in the percentage of workers who washed before going home (82% improvement) clearly indicating that workers grasped the message about take-home exposure and acted on it.

We were moderately successful in getting target workers not to eat, drink, or smoke in work areas--more than half reported that they decreased eating and smoking in work areas and nearly half reported a decrease in drinking in work areas. We had expected greater improvement in this area since workers have substantial, if incomplete, control over hygiene and eating, drinking, and smoking practices. The failure of 40% of the target employers to establish a clear policy prohibiting eating, drinking, and smoking in work areas likely contributed to poorer than expected worker performance in this area. Lack of a clear company policy in this area sends a message to employees that these practices are unimportant in controlling lead exposure.

Housekeeping, Containment, and Environmental Control

Housekeeping

Fourteen of the 21 target employers (67%) reported decreasing dry sweeping. However, employees of two of the 14 reported that they continued to dry sweep, indicating that company policy is not always put into practice. Eighty-four percent (84%) of target employers reported increasing the practice of misting debris before sweeping or shoveling, short of our objective of 90%. One contractor stated that wet cleanup is not effective because wet debris turns into sludge which is more difficult to clean up.

At one-year follow-up (Summer 1995), 62% of the targeted contractors reported using HEPA vacuums for cleanup. This improvement is especially noteworthy given the substantial cost of the equipment ($400 - $1200). Our success may be the result of the emphasis we placed on HEPA vacuum cleanup in employer seminars; vendors demonstrated HEPA vacuums and contractors had an opportunity to share their own experiences with HEPA vacuums during the seminars. Contractors' familiarity with shop vacuum cleaners and the time they save during cleanup probably contributed to our success as well. Finally, group purchasing may have brought the cost of a HEPA vacuum within the reach of some contractors.

The increase in target employers reporting use of HEPA vacuums nearly doubled between November 1994 and Summer 1995 (+33% compared to +62%) demonstrating that changes in work practices that require purchase of expensive equipment take time for small business owners to make.

Containment

We met or nearly met our six objectives regarding containment practices. Employers decreased use of tarps and increased the use of plastic on floors; they increased sealing off work areas during interior surface preparation and sealing off doors and windows during exterior surface preparation; and they increased use of containment on perimeter ground areas and on scaffolding. Containment on scaffolding is technically difficult to implement and we did not demonstrate this during the seminars. Still, almost half of the targeted contractors reported increased use of scaffold containment.

Employers received training from a painting contractor in how to set up containment, and the consequences of not containing paint dust and chips were discussed in a session on liability. The factors that likely motivated improved containment were: concern for occupant health and the opportunity to concretely demonstrate this concern to the customer, the ability to reduce clean-up time, and liability concerns. One contractor stated that as a result of the training he realized that, "up until now we were leaving a lot of contamination behind."

Environmental Control

Although not a primary focus of our Project, water pollution control and proper waste disposal were covered in one seminar where speakers from environmental agencies presented feasible solutions for the painting contractor. Contractors seemed sensitive to environmental concerns, and we exceeded our objectives in both areas. By Summer 1995, 100% of target employers reported implementing the recommendation to reduce water pollution by covering storm drains and sewer openings with filter material to collect paint chips[3] and 70% reported taking steps to ensure that lead waste was disposed of at a licensed facility.

We believe that the increased number of contractors taking steps to properly dispose of hazardous waste is partly attributable to increased awareness of the availability of a local small generator hazardous waste disposal program. Furthermore, feedback from contractors indicates that a better local program would have resulted in even broader adoption of good disposal practices. As it was, contractors expressed some frustration with the limitations of the local resources available to them.

[3] We should note that the recommended water pollution prevention method may only be appropriate for certain locations; San Francisco's unique water system, which treats all runoff, is not the norm throughout California.

A number of contractors reported taking steps towards proper disposal by leaving sealed waste containers with residential customers with the understanding that the waste would be taken to a household hazardous waste facility. Clearly, leaving waste with the homeowner does not ensure proper waste disposal. However, in light of the limited options available to residential contractors, we presented this practice as an acceptable means of dealing with small amounts of hazardous waste--given good communication with the customer. And we considered the adoption of this practice by some contractors to constitute a step toward proper disposal.

Medical Program

During the employer seminars we stressed the medical surveillance requirements of the Cal/OSHA Construction Lead Standard and the utility of biological monitoring for evaluating the efficacy of a company's lead safety program. We also provided extensive assistance to employers in setting up a lead medical program.

We were successful in getting all employers to select a medical provider with experience in occupational health and an understanding of the Cal/OSHA requirements for medical surveillance, biological monitoring and respirator clearance. One contractor spoke highly of the project's assistance in identifying a provider: "I had no idea where to go to get my men blood tested, and now I can call up any time and make a next-day appointment." This initial success was facilitated by a participating contractor who organized a group contract for project participants with a university-based occupational medicine clinic located in San Francisco. All project participants took advantage of this opportunity.

We were not successful, however, in meeting our objective that 90% of target employers would provide routine BLL and ZPP testing under the supervision of a physician. Most employers sent workers for mid-project blood testing (August 1994); however, this took repeated reminders from the clinic and was facilitated by the offer of one contractor to schedule a series of testing dates for all interested contractors at his shop. In the summer of 1995 only 12 of 20 employers (57%) sent their workers for scheduled blood testing. Although well short of our goal of 90%, this improvement is noteworthy, particularly when compared to studies showing that a small percentage of employers in lead industries conduct routine testing (Rudolph, et al., 1990; Papanek et al., 1992).

Focus group discussion suggests that employers were not resistant to the concept of medical surveillance. Employers expressed a great deal of interest in the results of blood testing provided by the Project, and remarked that they liked the feedback that testing provided on implementation of lead safety measures. Contractors also believed that BLL results motivated employees to improve their personal hygiene. Nevertheless, only slightly more than half of the employers had their employees tested as required.

Employers' failure to maintain a routine BLL and ZPP testing program may be due to the relatively high cost of periodic testing for a small business.[4] Small businesses are not accustomed to providing and paying for medical services for employees; few contractors provide personal health insurance to employees. One contractor stated, "the only part that bothers me a lot is having to test my employees every six months and running into the doctor's...It's just going to be an added expense that can go on forever." Additionally, all baseline BLLs were below 40 ug/dl, perhaps leading some employers to conclude that there was not a serious problem and repeat testing was not a priority. Contractors may also choose to invest scarce resources in efforts to reduce exposure, such as purchase of HEPA vacuums and HEPA-exhausted tools, rather than medical surveillance, although we have no concrete evidence of this. The disruption of work and the difficulty of scheduling employee clinic visits during work hours may also have contributed to lack of compliance with scheduled testing.

Employee Training

Less than half the target employers provided four hours or more of lead safety training to new hires in the year following the intervention. Although we did not specifically train employers in how to deliver safety training to their employees, we did provide employers with written materials they could use for training their employees. They also had the option of sending employees to commercial training providers.

Employers may have failed to provide training because they lacked the confidence to deliver comprehensive lead safety training or felt the cost of outside training was prohibitive. During focus group discussion, some contractors mentioned cost (approximately $200 - 400 for 32 hours of training with an accredited trainer plus paid work time) as a deterrent. Contractors were reluctant to invest in training since employees may not remain with the company. In retrospect, it was perhaps unrealistic to expect four hours of lead safety training to be provided by employers. We did not devote time in the employer seminars to developing contractors' training skills. We believe that outside training would be most effective, and contractors in the focus group supported this idea. However, our experience indicates that if contractors are to use outside training providers their services need to be more affordable and more accessible.

Time Required for Change / Sustainment of Changes

In order to meaningfully evaluate the effectiveness of an intervention that attempts to change employer and employee work practices and behavior, a sufficient length of time must pass between the end of the intervention and the follow-up measurement. Relying on one measurement immediately following the intervention can be misleading; changes that take longer to implement will be missed, and the failure to sustain earlier changes will be

[4] Approximately $160 per employee in the first year and $80 per employee in subsequent years based on an average cost of $40 per BLL and ZPP and a schedule of a test every two months for the first six months and every six months thereafter.

misclassified. In order to avoid this pitfall, we collected questionnaire data immediately after the intervention and again one year later.

We found that employers continued to improve in a number of areas in the year after the intervention. The increased use of HEPA vacuums for cleanup, and the increased use of HEPA-exhausted power tools both required significant purchases of new equipment, and economic factors may have delayed implementation.

We also found continued improvement in the area of safer surface preparation. We found a continued increase in wet manual scraping, and a continued decrease in open flame burning and use of uncontrolled power tools. In the area of surface preparation, it may be that an innate conservatism delayed implementation of alternative methods. The quality of surface preparation work is crucial to the quality of a repaint job. It is reasonable that a contractor would be slow to relinquish proven work methods and to adopt new, untried alternatives.

We also found continued improvement in the provision of protective clothing and the decreased use of tarps on interior floors.

The only areas in which employers performed more poorly when surveyed again one year after the intervention were in the prohibition of eating, drinking, and smoking in the work area and use of plastic sheeting on interior floors. In November 1994, 76% of the target employers reported establishing a company policy prohibiting eating, drinking, and smoking in the work area; by Summer 1995, this figure had dropped to 60%. Target contractors reporting use of plastic sheeting dropped from 62% to 47% in the same time period. In all other areas where we collected data one year later, changes made by employers during the intervention period (by November 1994) were sustained at essentially the same level through Summer 1995.

While it is not unusual to see changes in employee work practices that are not sustained over time as employees return to former practices, we did not see this pattern in our data. In several key areas, target workers reported a higher level of lead safety practice in Summer 1995 than in November 1994. These practices include: washing before eating, drinking, or smoking; eating, drinking, or smoking outside the work area; and changing out of work clothes at the job site or before entering the home. There are no areas in which workers made an initial improvement in lead safety practice which then dropped off over the following year.

Reliability of Questionnaire Data

To measure the magnitude and sustainment of changes in lead safety achieved through this intervention we relied heavily on information obtained from employers and workers through questionnaire interviews. One concern with this evaluation method is that participants learn the "right" answers through participating in a project and simply tell the investigator want she or he wants to hear (the "testing effect"). For a number of reasons, we do not believe this to be the case with CPP participants.

First, employers and employees were candid about their failure to implement or practice a number specific lead safety measures that we had promoted in our seminars and training. For example, by Summer 1995, only 40% of the targeted employers reported that they routinely provided washing facilities for their employees, despite their expressions of concern about personal hygiene and the evident ease of compliance. This suggests that participants were being truthful and accurate overall in their responses since there is no reason to believe they would exaggerate their progress in one area more than another.

Secondly, in a number of areas, we had a second, independent source of information about employer and employee practices. In the case of medical services, confirming information was supplied by the contractors' medical supervisor. In other areas, we compared employer and employee responses to the same question. Since there is no incentive for workers to misrepresent their employers' performance, their responses can be used to verify the information provided by employers. We found few areas of disagreement between what the workers and their respective employers reported. Analyzing the data by company, we also saw generally good agreement between what the employer reported as company policy and what the company's employees reported as their own practice. This supports the idea that we were getting accurate information from both employers and workers, and that our measured changes were indeed valid.

Finally, three on-site visits in the summer following the intervention provided additional evidence which supported information obtained through employer questionnaires. The utility of these data as a validation of contractors' questionnaire reporting is constrained by the small number and short duration of the site visits conducted, and by the fact that the visits were conducted with the contractors' advance knowledge. However, with these limitations in mind, the data generated indicated general agreement between the site visit observations and the contractors' reporting in the Employer Summer 1995 Questionnaire.

Summary of Changes in Lead Safety

The improvement we saw in many areas indicates that contractors substantially out of compliance with the Cal/OSHA Construction Lead Standard can be successfully encouraged to implement a lead safety program. In general, we were most successful in inducing contractors to make changes that were simple and straightforward, a familiar part of their day-to-day operations, inexpensive or considered reasonably priced. Accordingly, we saw large improvements in colorimetric testing for lead in paint, proper use of half-mask respirators with HEPA filters, containment, and safe clean-up methods. We may have been particularly successful in improving housekeeping and containment practices since these changes could reduce clean-up time and therefore lower labor costs, decrease contractor liability for contamination of the customer's property, and improve customer satisfaction.

Data collected one year after the intervention show that contractors were able to maintain improved work practices, and in some cases make additional improvement, in the absence of any additional effort on our part. As could be expected, employers took a longer time to implement practices that required sizable financial investments such as the purchase of HEPA vacuums and HEPA-exhausted power tools.

One area where we were not as successful at inducing change was continued medical surveillance. This may have been because, as opposed to the one-time purchase of equipment, contractors found it hard to reconcile themselves to on-going costs that were not perceived as a direct investment in the operation and success of the business. Our attempts to improve contractor provision of on-going medical surveillance, and employee safety training, may also have run up against the fact that contractors are unfamiliar with these areas, and do not see them as a usual part of running a painting business.

We were also less successful at inducing change where contractors perceived the safer alternative, such as wet manual sanding or scraping, as infeasible or impractical. Additionally, contractors may have been reluctant to use alternate surface preparation methods that they believed risked the fundamental quality of their work, thereby threatening customer satisfaction.

In some areas it is unlikely that changing our intervention strategy would have achieved greater results in the absence of more feasible alternatives and less costly, more accessible, services and products. This is probably true for some surface preparation methods, medical surveillance, and hazardous waste disposal. In other areas, improving the intervention may have led to greater success, e.g., fit checking respirators by workers; fit testing workers by employers. We may also have had greater success in getting workers to adopt safer work practices if we had directed our recommendations to supervisors who are at the job site each day and are immediately responsible for worker practices.

B. CHANGES IN KNOWLEDGE

An increase in specific knowledge about an occupational health hazard is usually a prerequisite to improving safety practices. Our limited assessment of employers' knowledge of lead safety demonstrated an increase in correct responses to a series of true/false questions post-intervention, and a sustained level of knowledge one year later. This finding suggests that we were successful in getting across basic points about lead hazards and employer requirements under the Cal/OSHA Construction Lead Standard. During focus group discussion, several contractors mentioned that learning about the hazards of lead paint and how to protect their workers were reasons they chose to participate in the Project.

Since our method of assessing employee knowledge at baseline was problematic (i.e., the true/false format was not understandable to a significant number of employees), we cannot measure the change in worker knowledge of lead hazards. Worker training post-test results indicated that the majority of workers were knowledgeable about issues such as routes of entry, health effects, medical surveillance and lead poisoning prevention at the end of the training. The lack of an identical pre-test, however, prevents us from concluding that these results represent a change in knowledge that is due to the intervention. Using a reformatted questionnaire, we were able to establish that workers had a high level of knowledge about important lead safety issues immediately following the intervention period and generally retained that knowledge through the following year's painting season.

C. CHANGES IN BUSINESS PRACTICES

Contractors reported that their participation in the Project resulted in material changes in their business operations. For example, after completing the CPP employer seminars, some contractors specifically sought work identified as "lead abatement," and were selected because of their experience. Several contractors mentioned that they have started to advertise their knowledge about lead paint hazards and are receiving more referrals for lead work. Contractors also reported that increasingly customers are aware of lead paint hazards and are looking for a contractor with lead certification, training, or expertise. Still, at our one-year follow-up, a majority of contractors had not applied for state certification in lead-related construction. We believe this is due to the current lack of regulations requiring certification except under limited circumstances (such as in schools, which are generally not enforcing the current requirement), and very low public awareness about the certification program and lead paint hazards.[5]

Discussing lead paint hazards with prospective customers and explaining the added costs associated with doing the job safely were new practices for many of the contractors. After the Project, most contractors stated that they raised the issue of lead safety with customers often or at least sometimes. During focus group discussions, they reported that they were more comfortable communicating with customers about lead safety, and had learned enough to provide some education themselves; one contractor added that it was easier to discuss lead safety with the commercial customer than with residential customers. Nevertheless, several cited the general lack of public awareness of lead paint hazards, and customers' frequent unwillingness to pay the additional costs of lead safety, as on-going problems. In response to participants' requests for assistance in educating customers, CPP staff developed a brochure for residential customers that discusses lead safety and contractor selection (see Chapter 16, Section D).

Contractors reported that their relationships with their employees had also changed as a consequence of the CPP worker training about lead paint hazards; contractors believed that seeing their employer make safety improvements encouraged many employees to improve their own work practices. One contractor quoted one of his employees as saying, "We have people looking out for our health and our welfare. They're testing our blood and looking at the results and they're acting proactively." Contractors reported that employees were more likely to identify where lead paint might be present, consistently take safety precautions, and request

[5] Note: A revised Cal/OSHA Construction Lead Standard has been adopted since the Project was conducted (March 7, 1997). The revised standard requires certification of workers and supervisors for construction work in residential and public buildings which involves lead exposure above the Permissible Exposure Limit (PEL).

the necessary equipment and supplies to complete a job safely. One contractor mentioned that training employees changed the company culture permanently and that new employees were encouraged by incumbents to conform to company safety practices.

Contractors reported that they valued the opportunity to develop relationships with other contractors. Networking enabled contractors to make group purchases for HEPA vacuums, colorimetric testing supplies, and medical services. Contractors also called each other between training sessions to discuss what had been presented, shared information and equipment, and worked together to schedule medical testing sessions for multiple employers. In some cases, contractors referred jobs to each other. The opportunity for interaction with peers was cited as an important motivation for participating in the Project and is an important factor to consider in future work, particularly with small business owners.

D. BLOOD LEAD AND ZINC PROTOPORPHYRIN LEVELS

One objective of this Project was to gather information about the risk of lead poisoning among residential and commercial painters through biological monitoring. We also anticipated that, if baseline BLLs and ZPPs were substantially elevated, we might demonstrate the impact of the Project by observing a drop in these levels post-intervention while controlling for variations in exposure via work assignments involving lead paint disturbance. In addition, we wanted to look at the relationships between BLLs and other factors, to determine whether any individual factors were predictive of BLL.

Painters' Risk of Lead Poisoning

Through blood lead testing at four points in time over approximately one year, we found that geometric mean BLLs for the group remained near 9 ug/dl, a level that is slightly more than three times that of the general U.S. adult population (CDC, 1997). The BLL ranges were quite similar over time (i.e., less than 5 ug/dl to the 30's), and the proportion of painters with BLLs above 30 ug/dl was 2 - 4%. No worker was ever found to have a BLL at or exceeding 40 ug/dl, for which Cal/OSHA requires a medical evaluation. ZPP levels were similarly moderate, with a geometric mean of 23 - 26 ug/dl and only 3 - 4 % of workers with a ZPP 50 ug/dl or higher on the first three test dates; no ZPPs were elevated in Summer 1995 testing.

In determining how these monitoring results relate to the risk of lead poisoning to all residential/commercial painters, it is essential to consider the participants' recent exposure to lead via disturbance of lead paint in older buildings. We did not have the resources to perform exposure assessments for each contractor's employees on jobs prior to blood testing, and efforts to get contractors to maintain detailed records for each job were not successful. Thus, we had to rely on self-reported information collected by interview at the time of each blood draw, with some ability to confirm employee responses by comparison to information provided by the employer. Our surrogate measures for potential lead exposure were developed from each individual's listing of the jobs he worked on in the month prior to testing, the number of days of surface preparation work on interiors and/or exteriors, and the estimated age of the building. Since asking individual questions about the work methods and protections used on each job would have been too time-consuming, we do not have information on which to estimate exposures quantitatively.

Through this crude manner of exposure assessment, we know that at baseline (June 1994) and post-intervention (November 1994), the mean number of days of surface preparation on buildings likely to contain lead paint in the month prior to testing was 3 - 4 days on exteriors and one day on interiors. A substantial proportion of the population (approximately half) reported no surface preparation on exteriors of pre-1950 buildings. From this information we conclude that these painters generally had intermittent exposure to work involving lead paint disturbance, and a significant number of them probably had minimal work on jobs involving lead exposure. A similar assessment of a group of painters from another study is discussed in Chapter 14, Section B.

Having only limited information about the lead exposures of our participants and lacking similar information about the extent of exposure among the general population of residential/commercial painters, it is difficult to draw conclusions about the risk of lead poisoning among this type of worker. Clearly, the BLLs of our group show that it is possible for painters who work intermittently on lead jobs to receive enough exposure to have BLLs that exceed those of the general population and, in a few cases, approach a level that calls for medical evaluation. This was true both at the beginning of the Project, when contractors were largely out of compliance with the Cal/OSHA Construction Lead Standard, and post-intervention, when more controls such as proper respirator selection and use were in place. For painters who have more consistent work involving paint disturbance on older buildings, we would expect the risk to be higher, particularly if the more hazardous surface preparation methods are used and/or protections are not adequate. Additional discussion of our BLL results in comparison to other studies appears in Chapter 14, Section B.

Change in Blood Lead Levels Over Time

Workers' BLLs were not significantly different post-intervention (November 1994) compared to baseline, and our questionnaire data showed that their surface preparation time on older buildings was similar. One-year follow-up BLLs (Summer 1995) were found to be lower than those at baseline using a paired t-test ($p < 0.05$); however, we had fewer numbers ($n = 52$) and were unable to obtain complete exposure data at follow-up. The mean difference in BLL was -1.9 ug/dl, which is small in terms of biological significance and within the range of laboratory error on BLL tests as specified in the Cal/OSHA Construction Lead Standard.

Given the low to moderate BLLs of the group at all points in time and the crude exposure assessment variables, BLLs did not prove to be a useful method for assessing the impact of the intervention. BLLs can be a useful evaluation tool in situations where there is ongoing, relatively consistent exposure, such as commonly occurs in general industry. However, in situations where exposure is variable, or has been interrupted sometime before monitoring, as is typical of the painters in the Project, it is difficult to distinguish changes in BLLs that result from an intervention and changes that result from fluctuations in an individual's workload involving disturbance of lead paint.

Relationship of BLLs to Other Factors

Having BLL data on approximately 120 workers, we were able to examine the univariate associations between BLL and various personal or work-related characteristics and to use that information to develop multivariate regression models. We followed similar procedures using two separate data sets, BLLs at baseline and post-intervention.

In our univariate analysis of November 1994 BLLs, conducted as an initial screening for significant variables to include in regression models, a total of 10 out of 18 variables were significantly correlated with BLL ($p < 0.05$), including the exposure estimates, days of exterior surface preparation on exteriors of pre-1950 or pre-1980 buildings (Tables 9.8 and 9.9). Days of interior surface preparation on older buildings were not correlated with BLL. (Curiously, when we used the baseline BLL data, this pattern involving exposure variables was reversed, with interior surface preparation being correlated with BLL and exterior work not correlated. We do not have an explanation for this finding.)

One unexpected result was that those workers who attended the project's 8-hour lead safety training class had significantly higher post-intervention BLLs than those who did not. One possible explanation for this finding is that workers with less surface preparation work may have been less likely to attend the training.

There was no association found between BLL and either age or years as a painter. Thus, there was no evidence of an association with elevated BLLs from chronic, high-level exposure in the past.

The variables found to be significantly related to BLL were included in the development of statistical models, with a few notable exceptions. Despite finding that union members had lower BLLs compared to their non-union counterparts, we felt that it was inappropriate to use this variable in the multivariate modeling because of the lack of representativeness of these particular individuals; the employees of the two large unionized companies did not all participate in the Project, and those who did were more likely to be foremen and/or long term employees.

The other variable correlated with BLL which we did not include in modeling was wearing a half-mask HEPA respirator while hand scraping. Unexpectedly, wearing the proper level of respiratory protection resulted in a higher BLL (11.3 vs. 8.2 ug/dl). This finding could possibly result if those who wore HEPA respirators were more likely to work on jobs with significant levels of lead in the paint and either did not use the respirators properly (e.g., did not do frequent fit checks) or ingested more lead when not wearing the respirator. The reason that we did not include this variable in modeling was that only a subset of workers had done surface preparation in the prior month and therefore answered the question; including this variable would have restricted the multivariate analysis to only 76 of the 118 workers and substantially reduced the power to detect significant associations.

The regression model developed using the baseline (June 1994) BLL data had five significant predictors of an elevated BLL, listed in decreasing order of significance: education less than high school, days of surface preparation in the prior month on *interiors* of pre-1950 buildings, race/ethnicity other than non-Hispanic white, smoking in the work area, and working for a smaller-sized company. In comparison, when modeling the post-intervention (November 1994) data, the significant variables were: smoking in the work area, company size, days of *exterior* surface preparation work on pre-1950 buildings, and race/ethnicity, in decreasing order of significance.

Given that pre-1950 buildings and exteriors are known to have the highest lead paint concentrations and that surface preparation work disturbs the paint, we expected to see an association between this surrogate measure of potential lead exposure (i.e., days of exterior surface preparation on pre-1950 buildings) and BLL. The magnitude of the effect, however, was small, i.e., an increase in BLL of approximately 2 ug/dl predicted for 10 days of this type of work in the prior month. This association was found in the post-intervention data only; possibly, this was because workers were more likely to accurately recall age of housing and days of surface preparation work after having received training in recognition of lead paint hazards. It is strange that, at baseline, doing interior surface preparation on pre-1950 buildings was predictive of elevated BLLs, considering that the population had fairly minimal exposure to this type of work (75% had done none); perhaps this finding was heavily influenced by a small number of workers who received significant exposure on such a job.

Three factors were significant in models using data from both points in time: smoking in the work area, race/ethnicity, and company size. Since smoking in the work area clearly presents the opportunity to ingest lead, this association was to be expected; it emphasizes the need for consistent enforcement of a no-smoking policy and worker training programs that address this hazard.

Being non-white is recognized as a risk factor for poor health outcomes throughout the general public health literature as well as in other studies of worker populations. Various reasons have been suggested for this finding, e.g., that minority workers are more likely to be assigned to the "dirtier," and thus more hazardous jobs. Possibly there are language issues for immigrant workers (whose first language is Spanish or an Asian language) that preclude them from benefiting equally from on-the-job training provided primarily in English. With racial/ethnic differences there are often socioeconomic differences, which we did not measure in this Project. Minority workers may be more likely to live in older housing with deteriorated lead paint, or to take on more outside work on their own time where protections are not available (we asked questions about the latter but perhaps did not get truthful responses since many employers prohibit outside employment). There may be other differences in terms of workplace exposures that we did not quantify.

Working for a smaller company may put workers at higher risk of lead exposure because resources are not as available for purchase of necessary protective equipment. Workers at very small companies may also work more on their own, on smaller jobs, rather than in a crew with a foreman who can provide supervision and enforcement of good safety practices.

Interestingly, educational level was the most significant variable in the modeling of baseline data and was not significant at all with the post-intervention data. Workers with more education may have been more likely to be foremen and therefore may have had less lead exposure, since their work involves more supervision and less surface preparation; in retrospect, we should have ascertained which of our worker population had supervisory roles. The lack of an association between BLL and education post-intervention may be due to participation in the Project having decreased the differences between high school graduates and other workers; however, the variable "attended the project's 8-hour worker training" was not significant in the post-intervention model. It also should be noted that the two models were developed using data from slightly different populations: there were 132 workers with BLLs at baseline compared to 118 at post-intervention.

Overall, the variables in the final regression models explained approximately 25% of the variation in BLLs among the workers (i.e., the cumulative model R^2 was 0.257 for the post-intervention data, corresponding to a multiple correlation coefficient of approximately 0.5; the cumulative model R^2 for baseline data was similar, at 0.233). This effort to identify significant predictors of BLL was therefore fairly successful, although there remain many other unquantified factors which might account for the remaining 75% of the variability.

Further discussion of the project's multivariate regression models in comparison to a similar study involving painters appears in Chapter 14, Section B.

11. EVALUATION OF THE INTERVENTION STRATEGY

A. INTRODUCTION

In addition to the benefit to individual participating contractors and workers, the intent of the CPP was to evaluate the efficacy of a model workplace health and safety intervention strategy for the small business environment, and to make recommendations for improving the intervention design for replication by state and local health departments. The evaluation methods we used (qualitative and quantitative) are described in detail elsewhere and are not discussed here (see Chapter 4; Chapter 12).

Briefly restating our previous discussion, the CPP intervention model was based on the hypothesis that an intervention strategy of education, training, and technical assistance, provided in a step-by-step approach, would be effective in increasing lead-safe work and business practices, and decreasing unsafe practices, among contractors and their employees. Further, this strategy would be most effective if multiple intervention components were integrated and simultaneous, rather than sequential; the intervention was conducted over an extended period rather than at one point in time; both employers and workers received education and training; and project participants had the opportunity to be involved in the implementation of the Project.

We begin our discussion by examining each intervention component separately. In considering each component, we asked ourselves, "Was it effective?" "How much effort did it require?" "Would we do it again or suggest that others use it?" "How could it be improved?" We continue with a discussion of the intervention strategy as a whole that addresses the questions "Which intervention components and project characteristics (e.g., voluntary participation) seem to be most significant in achieving the desired changes and which are less effective?" "How might intervention components have worked together/synergistically to bring about the desired changes?" "Can we identify any indicators or predictors of success for the intervention strategy/project?" "How can we improve the program?" We finish with an assessment of the effectiveness of the CPP model and make recommendations for its replication.

B. SPECIFIC INTERVENTION COMPONENTS

The CPP was designed so that multiple intervention methods were integrated and simultaneous, rather than sequential. One disadvantage of this approach is that it is difficult to determine with certainty the relative impact of each intervention method or tease out synergistic effects. Clearly, quantitative questionnaire data demonstrate that the Project had a positive impact on participants. However, these data measure the impact of the Project as a whole on employer lead safety programs but do not measure the influence of discrete components. Our assessment of the relative effectiveness of each method relies on formal and informal feedback from contractors on which parts of the Project they found most useful and which they would change, and our own observations and perceptions of various intervention components. While the project design, and subjective nature of the data we collected, limit our ability to draw definitive conclusions, we believe that careful consideration of the available information provides insight into the effectiveness and merit of each program component. However, it is important to remember that each intervention component was carried out within the framework of a larger, comprehensive strategy and is influenced by, and has an impact on, other project components.

Employer Intervention Activities

Employer Seminars

During focus group discussion, contractors reported that they knew more about lead hazards and had made changes in their work and business practices *as a result of the seminars*. They were very receptive to our educational approach which promoted dialogue between contractors and project staff and valued contractors' experience and knowledge. Responses to open-ended questions asking contractors to identify specific aspects of the seminars they believed helpful included, "...the (CPP staff) were not narrow-minded bureaucrats who were just going to lay down a bunch of regulations and we were going to conform to them. It was much more open discussion..." "...it was not done in a condescending fashion, the communication was good..." "...the (CPP staff) were interested in our feedback and creating something that was feasible rather than just laying down the law."

The CPP's step-by-step approach to establishing a lead safety program and the emphasis on communicating a clear, accessible, message seemed to work well for contractors. In the words of one contractor, "In the training you are shown very specific methods. Part of my fear was that is was going to be so complicated that I wouldn't be able to get this thing going. And they have slowly polished things so that it is not so complicated. If someone had just given me this manual and said this is what you have to do, I would have panicked and not done it. But we were introduced bit-by-bit and discussed each of these particular things so that it wasn't such a major thing."

Comments varied concerning the scheduling of seminars. Some contractors favored a condensed version of the program, while others preferred the CPP format of conducting a series of seminars over a period of several months. Among the reasons contractors preferred an extended program, the opportunity to interact with peers and discuss personal experiences implementing improved work practices were frequently mentioned. In addition, many contractors identified peer interaction as a primary motivating factor for participating in the Project. Quoting one contractor, "I liked the interchange. I've sat at a lot of regulatory meetings and a lot of time there are no contractors there. So whenever I get the chance to talk like this, with other contractors providing different perceptions, it makes it more realistic. Everyone has something new to say."

We got a strong, positive response to the hands-on demonstrations and the peer educator. Discussing the training seminars several months later, contractors made numerous comments about the usefulness of demonstrations for becoming familiar with new and modified equipment and alternative work practices. Quoting several of the contractors, "(The demonstrations were) excellent." "I was impressed with ...demonstration of equipment and stuff." Contractors also voiced a preference for more training and education by their peers: "Having more of our peers come in and do some of the teaching" "Most of the presentations were done by the health services people and not contractors...(would have preferred more contractors as instructors.)"

In general, contractors would have opted for covering the more practical and hands-on aspects of the training first, followed by what they described as "theoretical" information. Typical comments we heard were, "I wanted them to start with what I can do today to help my people...and I didn't get that." We covered medical surveillance in the first seminar because we believed it was important to get contractors started on selecting a medical supervisor and establishing a surveillance program. Some contractors reported feeling overwhelmed by the prospect of medical surveillance, perhaps because it is an unfamiliar concept to them.

In retrospect, we should have started with topics that were more familiar to contractors and changes in work and business practices that were easy to implement (e.g., selection of appropriate respirators, containment, personal hygiene). Had we conducted a comprehensive needs assessment prior to developing the educational seminars, rather than relying on our initial eligibility survey, we may have had a better understanding of the initial needs of our target audience. However, even a comprehensive assessment may have failed to uncover this issue. Contractors' needs were not always evident to them, or to us, at the start of the Project. Since few intervention projects have been conducted with small business owners, and none that we know of with painting contractors, there was little information available at the start of the Project to guide the development of the seminars. This was truly a learning experience for both the participants and the CPP project staff.

Resources Required/Lessons Learned

We found that the employer seminars were an effective method for communicating information about lead hazards and inducing contractors to improve working conditions. This success can be attributed, at least in part, to our training methodology which integrated principles of empowerment education and diffusion of innovations theory. We received consistently favorable responses to hands-on demonstrations, participatory exercises, peer education, dialogue between students and teachers, and the opportunity to try out new methods followed by peer discussion. In fact, participants felt that the seminars would be more effective if there were greater focus on these training methods. Typical comments included, "It was well-organized and planned except for allowing enough time for input and questions from the group." "Have instructors on the job, instead of coming and sitting down for eight hours." "(the demonstrations were) excellent. I would like to suggest that they have more of that. More practical, less theory."

Based on feedback from participants, in the future we would reorganize training topics so that familiar and easy to make improvements would be covered first, and devote more time to hands-on and participatory exercises and peer education. It may not be possible to incorporate as much of this approach as we or the participants would like because of the tension between the need to cover certain material in each seminar and the time needed for participatory exercises and addressing every question or concern that arises during peer discussion.

The employer seminars were a major component of our intervention and it was critical that they be planned and implemented well. This, of course, required a major commitment of resources. A multi-disciplinary team of six staff members spent approximately 800 hours planning, developing, and conducting the four employer seminars. The team included health educators, industrial hygienists, an environmental health specialist, and a nurse practitioner. We also hired outside consultants and peer educators at a cost of $900. Guest speakers from other public agencies were not paid. We spent approximately $1,300 for room rentals, audiovisual and health and safety equipment, reproduction of materials and teaching aids. This labor and time intensive approach may limit strict replication of this model by other agencies.

We believe that the employer seminars were a worthwhile effort. In addition to being an effective method for conveying information and encouraging improvement in lead safety, the employer seminars provided an opportunity to assist the Childhood Lead Poisoning Prevention Branch, CDHS, in the development of regulatory standards for accreditation of contractor training courses. We are also extending the impact of these seminars by using them as the basis for a series of a half-day seminars we are presenting to contractors throughout the state. (See Chapter 15, Section C.)

Employer Manual (*Painting Contractor's Guide to Lead Safety*)

Of the major CPP components (employer seminars, manual, technical assistance, worker training), the manual probably had the least impact on employer lead safety programs. During focus group discussion, contractors did not identify the manual as a significant aid to their efforts to improve lead safety. When prompted, the most consistent feedback we got from participants was that the manual was too long. Quoting several contractors, "...the book (referring to manual) could probably be condensed in terms of a "how-to" format...it could probably be 15-20 pages." "I would ask them to write a briefer manual." In contrast to employer feedback that the seminars made difficult, complex information accessible and understandable to participants, several comments about the manual suggest that it may have been less effective in this regard--"I must say that the manual is so thick and involved that one would be lost without instruction." "I want a painting manual for dummies."

This is not to say that the response to the manual was universally negative. Contractors told us that the manual was well-organized and attractive. One contractor reported that he found the manual helpful when "selling" a lead-safe bid because he could *show* the customer what was required to do a job safely. Additionally, while contractors expressed a strong preference for verbal and audiovisual communication over written materials they did not suggest that we eliminate the manual, but rather offered suggestions for making it more accessible to contractors. Suggestions for improvement included developing a videotape presentation to accompany the manual, developing a CD-ROM version of the manual, and producing a manual with "tear-out" sections that could be laminated and posted at the job site as an on-going reminder of, in the words of one contractor, "the way we *should* be doing it."

In interpreting contractors' responses, we must keep in mind that the manual was one component of a comprehensive intervention strategy that included hands-on learning and direct technical assistance. Contractors may have been less inclined to use the manual because the same information was covered in detail in the employer seminars and because participants had direct, immediate access to CPP technical staff. This preference for interactive methods of gathering information is consistent with empowerment education theory which holds that people learn best when they are actively involved in the process and, conversely, education is less effective when people receive information passively, such as through a lecture or written materials. (See discussion Chapter 2, Section C.) We do not know to what extent contractors may have used the manual as a reference after the Project ended and alternate information sources (seminars, direct technical assistance) were no longer available.

As discussed earlier in this chapter, it is difficult to measure the impact of a discrete project component or to predict its effectiveness outside of the context of a comprehensive intervention program. Still, our follow-up activities provide some information on the value of the employer manual in a different setting. After the intervention, we disseminated the manual to a broad group of health and safety professionals, unions, trade associations, and national, state, and local health agencies. We are also distributing the manual to painting and general contractors through a series of half-day lead awareness seminars being held around the state. Informal feedback from health and safety consultants, public agency staff, and large contractors has been positive.

Resources Required/Lessons Learned

The *Painting Contractor's Guide to Lead Safety* received high marks for its thoroughness, organization, and technical accuracy. The quality of the manual reflects the effort that went into writing, reviewing, revising, and producing the manual. Five CPP staff members spent a total of 1750 hours developing and revising the manual and approximately $14,000 was spent on consultant and copying costs.[1] Still, the manual seemed to have the smallest relative impact on participants' lead safety programs. This result has led us to reconsider the utility of producing a comprehensive health and safety manual for the small business owner.
We continue to believe that it is important for employers to have educational materials to consult after formal training is completed. Feedback from painting contractors indicates that written materials must be brief and uncomplicated or small business owners will not be inclined to use them. This presents a problem: How are we to accommodate the target audience's preference for an abbreviated version of a lead safety manual and at the same time convey all the needed technical information? It may be that we have gone as far as it is possible to go simplifying and condensing written information on developing a lead safety program given the complexity of the Cal/OSHA Construction Lead Standard and the volume of technical information on work practices and exposure control that must be communicated.

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[1] Includes costs of graphic designer, photographer, copy editor, production and copying costs.

In the future, before developing a similar manual, we would look more closely at how small business owners acquire new information and how they incorporate information resources into their day-to-day operations. We would also carefully consider whether other technical resource materials/media might be more appropriate for small business owners. Visual media, such as videotapes, slide shows, or interactive computer-based training might be more effective, although we are cognizant that resource limitations may ultimately prevent using these alternate methods. We conclude that a comprehensive lead safety manual similar to the *Painting Contractor's Guide to Lead Safety* is more appropriate for health and safety professionals and large contractors who employ, or have easy access to, health and safety staff; a shorter version is needed for the small contractor, and in certain circumstances a completely different approach may be needed. If the manual is used with small contractors, we recommend that it be integrated into a training course.

Industrial Hygiene Monitoring and Consultation Services

We have no direct evidence that industrial hygiene monitoring and consultation services provided by the Project had an impact on contractors' lead safety practices. However, feedback from contractors suggests that providing industrial hygiene services played a role in contractors' decisions to participate, and in their continued commitment to, the Project. In the words of one contractor, ..."So if I have something like this (air monitoring) and Cal/OSHA comes along and asks if I have a safety program, I can say 'Yes, I've got this, and I've had air monitoring done and I'm not exposing my workers to a lead level that you say is dangerous to them.' So to me that was a big motivational factor." That seventy percent (15/21) of the contractors took advantage of the CPP staff IH's services is a further indication that contractors believed these services would be useful to them.[2]

In addition to providing employers free exposure monitoring which partially fulfilled their obligations under the Cal/OSHA Construction Lead Standard, IH consultation services supplemented and reinforced the information being presented in the seminars. One-on-one discussion between the IH and contractor at the job site appeared to be beneficial for several reasons. First, the industrial hygienist could directly observe surface preparation work, identify specific problems, and make specific recommendations to the contractor to improve lead safety measures. Second, the IH reported that it appeared that some contractors felt free to discuss issues with him that they might not have wanted to air before other project participants. In addition, one contractor admitted that he did not like to speak up during the employer seminars because he felt his spoken English would not be understood. Third, certain sampling techniques that were presented in the employer seminars, and discussed in the manual, could be demonstrated firsthand. Finally, supplementing the seminars with direct observation enabled the IH to check contractors' grasp and interpretation of the information presented in the seminars.

[2] Note: Twelve received on-site consultation visits that included air monitoring and three received consultation visits that did not take place at a lead job site and did not involve air monitoring or observation of work practices.

Providing industrial hygiene services also had several unanticipated results. On-site interviews with contractors provided valuable feedback on the practicality and effectiveness of recommendations made during the employer seminars. For example, we received significant feedback on the issue of feasible and effective containment. As a result of this feedback, we made changes in the material presented at subsequent employer seminars and in the revised version of the manual. The IH also reported that he felt more confident during employer seminars as a result of the on-site experience. Last, but not least, we believe that these interactions increased the legitimacy of the project staff by demonstrating our willingness to listen, that is to visit them on their own turf and to modify our recommendations based on real life conditions.

Resources Required/Lessons Learned

We did not specifically ask contractors if they made changes in their work or business practices as a result of IH consultation, nor did we evaluate how contractors used the air monitoring results we provided them. Still, we believe that providing industrial hygiene monitoring and consultation services was a valuable intervention tool. The incentive of free exposure monitoring motivated some contractors to participate in the Project and likely was an important factor in gaining access to the job site. On-site observation and one-on-one discussion gave us feedback on the feasibility of our work practice recommendations and contractors' interpretation of information presented to them during employer seminars. Our perception is that on-site visits increased both the practicality and the legitimacy of our recommendations and, therefore, contractors were more likely to implement them. Focus group discussion supports this perception.

Industrial hygiene monitoring and consultation services required a modest amount of CPP staff time and funds, given the value of the exposure data obtained through air monitoring. CPP staff person-hours for these services totaled 50 hours. The air and bulk paint chip sampling was conducted by two industrial hygiene consulting firms under the direction of the CPP industrial hygienist. The total costs for collection of air and bulk paint samples was $6638. The total costs for the laboratory analysis of samples was $5012. In the future, if insufficient funds were available for these services, air sampling and bulk sampling activities could be eliminated while still maintaining on-site observation and consultation services.

We have no information on the likelihood of contractors doing air monitoring in the absence of the free services we provided. Our perception is that most contractors would be unlikely to incur this expense.

Medical Surveillance Services

Contractors seemed especially appreciative of the assistance we provided identifying competent, and reasonably priced, medical supervisors. Providing medical services to workers is a foreign idea to contractors and trying to identify a provider can be overwhelming. Contractors may not know what to look for, or how to go about finding a provider. Quoting one contractor, "I had no idea where to go to get my men blood tested, and now I can call up any time and make a next-day appointment." Another contractor commented, "I think it was the information with regard to blood lead testing and on-site programs...The ease of, and availability of stuff like that, rather than having to find a forensic pathologist to do lead tests...That to me was very good. It motivated me to stay."

These and other comments from contractors have convinced us that direct assistance from the Project in identifying a provider was critical to inducing participants to establish medical surveillance programs and conduct initial blood tests and respirator clearance. Still, only 57% sent employees in for scheduled blood testing and 50% sent new employees for respirator medical clearance indicating that other factors are important in continued compliance with medical surveillance. Although we do not know for sure, we suspect that cost and the difficulty of scheduling appointments when work hours and demands are highly variable were inhibiting factors, particularly the ongoing costs of medical surveillance. In the future, it would be important to evaluate why some employers did not continue medical surveillance after establishing a relationship with a specific provider. Less expensive, more convenient testing may be needed if small employers are to comply with the medical surveillance requirements of the Cal/OSHA Construction Lead Standard.

Worker Intervention Activities

Worker Training

Workers' response to the CPP training was positive. Participation and interest in risk mapping, brainstorming, and case study activities were high. The atmosphere in the classroom was lively; workers asked a lot of questions and discussed a great deal among themselves and with the training staff. In addition to our observations during training, nearly all of the workers reported in the post-intervention questionnaire that they found the training helpful in learning about lead hazards. Post-test scores indicated that participants had a basic understanding of lead hazards at the end of the training session, although the project design does not allow us to conclude unequivocally that this knowledge was gained during the training.

We believe that integrating adult education principles and participatory training methods with more traditional approaches to training was central to our success. Although our project design did not allow us to measure the effectiveness of these methods directly, workers' enthusiastic participation in training activities speaks for itself. Also, during a discussion period at the end of each training session, workers told us that they found the training engaging and preferred the participatory methods we used to lectures.

A number of factors in addition to our training methods contributed to the success of the training sessions. We conducted training on work time which ensured good attendance. Only small groups of workers (10-20) were trained at each session to enhance participation. Also, whenever possible, we trained work crews together. Training crews together facilitated participation in group activities since workers already knew each other and were used to working as a group. Finally, we endeavored to create an atmosphere that was non-threatening to participants, particularly those with low literacy skills, by letting them know at the beginning of the training that most of the activities would be conducted in small groups with their co-workers, that trainers would not be calling on individuals to answer questions, and that we wouldn't be asking individuals to read aloud.

While the training was well-received, direct feedback from workers, and our own observations, suggest a number of areas for improvement or change. Some workers expressed the opinion that the training was repetitive. On the whole, participatory and small group exercises went well. However, trainers were frustrated by the difficulty of getting workers to take part in the "role play" activity. Some workers even told the trainers that they thought the role play was condescending. We suspect that workers may have been too self-conscious to participate, or may have feared making fools of themselves in front of their co-workers and the trainers. In contrast to other workers, Latino workers were enthusiastic participants and had fun performing the role play they had developed.

Designing the worker training curriculum presented a number of challenges, particularly the need to develop a curriculum for a target audience with a wide range of formal education and literacy skills. In some sessions, workers' formal education levels ranged from third grade to graduate school. To address this issue, we designed our training activities to rely on written materials as little as possible. When activities required use of written materials, we arranged small group activities so that each group had at least one member who could read. Although the majority of written materials we used were not created de novo for the CPP, they were adapted from existing OLPPP materials which had been field-tested with workers for readability and understandability.

Another challenge we faced was addressing the training needs of the Spanish and Cantonese speaking workers. We chose to develop complete curricula and to deliver training in Spanish and Cantonese, rather than use interpreters. While this required substantial additional effort, we felt that the use of an interpreter would interfere with our training approach by inhibiting dialogue between trainers and workers. We were also concerned that interpretation would be tedious, making it difficult to keep workers' interest. Our approach seemed to work well as workers' participation and interest in the Spanish and Cantonese language training sessions were similar to that of workers who attended the English language training sessions.

Worker feedback and post-test results indicate that we met our immediate educational goals for worker training. The average score on the written worker training post-test was 89%; 76% of participants achieved a score of 90% or higher. Ninety percent of participants achieved a score of 80% or higher. More importantly, questionnaire data show that workers made a number of significant improvements between baseline and post-intervention in their personal hygiene and work practices. Although we can not conclude with certainty that these changes were causally linked to worker training, at least some workers credited CPP training for their increased use of safer practices; employers also reported that workers had made changes in work and hygiene practices as a result of CPP training.

CPP worker training appears to have been successful in inducing workers to change their personal/individual hygiene and work practices. We do not know, however, whether workers took steps to get *their employer to make specific improvements* in response to problems the worker(s) had identified. Some workers reported that they were more willing to ask their employer for specific protections after learning in CPP training what precautions were necessary, their right to a safe and healthy workplace, and their employers' responsibilities under the Cal/OSHA Construction Lead Standard. One contractor did report during focus group discussion that his workers had begun alerting him to hazards and asking for needed protective measures. While we do not claim that this is evidence that CPP training has enabled workers to exercise control over their working conditions, it is indicative of a small gain in workers' level of empowerment.

Workers can gain the skills and confidence to take action only through a process of working together to identify steps to make changes, trying them out in the real world, returning to the group to discuss successes and failures, revising the strategy, and trying again. This evolution cannot take place within a one-day training format. We would have preferred a worker training schedule similar to that of employers; i.e., several sessions spread over time. Unfortunately, we were limited to one 8-hour training by project resources and the difficulty of persuading employers to release workers for training on multiple occasions.

Employer response to the worker training provided by the CPP was positive. Employee training, particularly Spanish and Cantonese language training, was one of the services provided by the CPP that employers identified as a significant influence in their decisions to participate in the Project. Quoting one contractor, "I was frustrated because I couldn't get any [employees] trained in Spanish. And this would also be a great opportunity to get training in Spanish for my employees. Very difficult to come by, otherwise." Many employers felt that training conducted by outside providers was more credible to their employees and therefore was more likely to be effective. In the words of one contractor, "The most crucial change for us has been that my painters got the message...once they were educated and trained by someone else, they listened and changed their ways a lot more easily...getting trained outside of the company seemed to carry more weight with them." Incidentally, many employers voiced the opinion that the cost of outside training should be borne by the employee, not the employer. They felt that in an industry where workers come and go, it is "unfair" that the employer incurs the cost of training an employee who is unlikely to remain with the company for a long period of time.

Resources Required/Lessons Learned

We found that worker training that incorporates participatory methods, dialogue between student and trainer, and workers' real life experiences was an effective way of educating painters about the health hazards of lead and safe work and hygiene practices. We also have found that creating a safe learning environment (particularly for those with limited literacy), training work crews together, and keeping the number of individuals at each training session small, are critical to the success of this approach to worker training.

Although workers responded positively to the CPP training at the time it was given and reported measurable improvements in work and hygiene practices, we did not measure participants' gain in the confidence and skills needed to effect change in their working conditions. Workers reported that they were more willing to speak up about job hazards after CPP training signifying a small gain in their level of empowerment. Still, they were doubtful that their employers would ever make significant and sustained changes without the real threat of Cal/OSHA enforcement action.

Achieving the social action objectives of worker training requires specific training on strategy and tactics for addressing problems in participants' particular workplaces, and the opportunity for workers to try out specific actions at their workplaces and return to the group to revise their strategy and try again. Unfortunately, we were unable to fully implement this approach because we anticipated employer reticence to releasing workers for more than one 8-hour training session. This points up the difficulty of incorporating empowerment education philosophy and techniques into an intervention project that is voluntary for employers and which relies on employers for access to workers. In order to maintain employer participation and cooperation with the CPP, we had to carefully balance the concerns of participating contractors with our responsibilities to workers. During training, we fully informed workers of their rights and their employers' responsibilities under the Cal/OSHA Construction Lead Standard and acknowledged that employers do not always fulfill their obligations. We endeavored to convey this message honestly but avoided "employer bashing."

A great deal of time, effort, and resources were devoted to conducting 8 worker training sessions. CPP staff invested approximately 500 person-hours developing the training curriculum, attending to logistics, and conducting the worker training sessions. Bilingual English-Spanish CPP staff developed and delivered training to the Spanish-speaking workers. We did not have English-Cantonese bilingual staff and hired three outside consultants to translate the worker handouts and training curriculum into Cantonese and conduct the worker training at a cost of $1,570. We also incurred expenses totaling approximately $1,300 for room and audiovisual equipment rental, health and safety equipment and reproduction of training materials.

C. OTHER CRITICAL ELEMENTS OF THE PROJECT

In addition to specific project components, there are several characteristics of the CPP project design that had a significant impact on its success including an industry-specific focus, voluntary participation, and our strategy for recruiting participants. These are discussed below.

Industry-Specific Focus

The credibility of project staff, as well as the legitimacy and practicality of our recommendations, were critical to moving contractors to change business and work practices. Focusing on a specific industry, rather than multiple industries, allowed us to gather detailed information on lead exposures, and develop and recommend specific engineering and work practice controls to participating employers. A comprehensive intervention project targeting businesses based on geographic area would have been impractical given the incredibly diverse mix of lead-using small businesses in the San Francisco Bay Area.

Voluntary Participation

We chose to make participation in the CPP voluntary, rather than mandatory, for several reasons. First, the Cal/OSHA Construction Lead Standard was promulgated only a few months prior to the start of the CPP and painters were, for the most part, unaware of the new Standard and the risk of lead poisoning in their industry. Second, we needed access to workers to monitor exposure during surface preparation activities and believed that employers would be more likely to give us entry to job sites if our approach was non adversarial and cooperative. Finally, we believed that a cooperative approach would further our goal of developing long-term, cooperative relationships with the industry trade association, unions, the local county health department and others to facilitate future education, training, etc., efforts in the construction trades.

Although it required more aggressive recruitment efforts (discussed below), we believe that voluntary participation worked. Contractors told us that the cooperative, non adversarial approach of the CPP was instrumental in their efforts to make changes in business and work practices. Contractors allowed us onto their job sites to conduct air monitoring, and the trade associations, unions, and others supported the painting contractor seminars we offered throughout the State subsequent to the CPP. The primary drawback of our voluntary approach was that the CPP population was not necessarily representative of the larger universe of painting contractors.

Outreach and Recruitment Strategy

Our decision to make participation in the CPP voluntary made the effectiveness of our outreach and recruitment strategy critical to the success of the Project. We elicited support from the local chapters of the Painting and Decorating Contractors of America (PDCA) and the International Brotherhood of Painters and Allied Trades local union and labor/management committee. The support of these organizations was critical in getting access to contractors and painters through PDCA chapter and local union meetings and provided legitimacy to the Project.

Since many contractors were not members of the PDCA, and/or signatories to a union contract, we also conducted outreach efforts beyond these organizations. Contractors identified as eligible to participate through our initial mail survey were invited to an informational meeting where they could learn more about the Project and have their questions and concerns addressed. These meetings also provided contractors with an opportunity to talk with each other about the value of participating in the CPP.

While these meetings were helpful in introducing the Project to potential participants, only half of the final number of participants were enrolled during these meetings. Follow-up phone calls to contractors who had indicated at least some interest during the meetings, or to contractors who did not attend a meeting, were essential in our recruitment efforts. For conducting these phone calls it was important to have staff who could enthusiastically "sell" the Project to contractors and obtain their commitment to participate. It was also necessary to develop clear, brief informational materials for faxing or mailing which described the Project and the services and benefits contractors and their employees would receive through participating.

Since we were asking contractors and their employees to make a significant commitment of time, resources, and money, we had to convince potential participants of the need for establishing lead safety programs (increasing public awareness of lead paint hazards; liability for lead contamination; promulgation of the Cal/OSHA Construction Lead Standard), the health benefits to employers and workers, and the potential for future business opportunities for prepared contractors. Other important parts of our recruitment message were our perspective that the Project was a learning process for both parties and that the data we generated would be used to inform regulatory policy affecting painting contractors.

Based on earlier informal meetings with stakeholders/Advisory Committee members, we had obtained some insight into the questions the trade association and union were interested in having answered through a research study. During recruitment we made an effort to highlight the research aspects of the Project that were most relevant to potential participants.

Offering contractors incentives to participate also turned out to be crucial. Focus group data indicated that free blood lead testing, air monitoring, and training for employers and employees (particularly Spanish and Chinese languages) were major influences on contractors' decisions to enroll and participate until project completion.

Although we did not systematically survey eligible non participants, discussion with contractors during informational meetings and phone conversations gives us insight into why some contractors chose not to participate. The reasons most frequently given for not participating were economic in nature. Some contractors believed that the Project would take away too much time from day-to-day business operations. They also expressed concern that raising the "lead paint" issue would scare customers away or that the increased cost of doing a lead-safe job would make competition more difficult in an already tight market.

D. CPP MODEL INTERVENTION STRATEGY

Our hypothesis that a comprehensive intervention strategy of education, training, and technical assistance, implemented in a step-by-step manner, would be effective in inducing residential painting contractors to establish lead safety programs and encouraging workers to use safer work practices was borne out. Quantitative questionnaire data document an increase in lead-safe work and business practices, and a decrease in unsafe practices, among CPP contractors and their employees.

Feedback from contractors, as well as our own observations, indicate that within the context of the CPP's comprehensive intervention strategy, the employer seminars were the most significant project component in achieving desired changes among employers, followed by industrial hygiene consultation and monitoring services and assistance establishing a medical surveillance program. The employer training manual appeared to have the least impact on employers' efforts to improve lead safety. We cannot conclude, however, that these project components would be similarly effective in isolation. Eliminating technical assistance to employers and expecting results similar to the CPP's from employer education and training alone, would be a mistake. For example, CPP participants told us that without direct assistance identifying a qualified, affordable medical provider it is unlikely that they would have acted on the information we provided in the seminars on the medical surveillance requirements of the Cal/OSHA Standard.

The CPP experience also supports our hypothesis that intervening simultaneously with employers and workers can lead to significant changes at the worksite. We had hoped that this approach would create an atmosphere between employers and employees that would support changes in business and work practices. Several comments from contractors indicated that the Project helped change how contractors and workers communicate and deal with lead safety issues. Contractors mentioned that employees can now identify and notify them of lead contamination problems so that changes can be made. Some contractors also reported that their workers will now ask them for specific personal protective gear and equipment when needed. Quoting one contractor,"...my guys have a stake, not only in their own health, but they have a stake in my organization and they are looking to protect themselves as well as me, and even the clients."

As predicted by empowerment and diffusions of innovations theories on which our project design was partially based, approaching employers with an open mind and clearly communicating a willingness to listen and learn, as well as providing opportunities for peer interaction and education, appeared to greatly facilitate the CPP's success. Contractors repeatedly told us that the respectful, non-condescending, open-minded attitude of CPP staff was critical to their efforts, and their employees' efforts, to improve lead safety. They also reported that the opportunity the CPP provided for peer discussion and support contributed to their success implementing changes in business and work practices.

In summary, the CPP intervention strategy lead to meaningful change in working conditions for painters and contractors. We cannot overestimate the importance of approaching employers with an open mind and clearly communicating a willingness to listen and learn from them and the profound influence of formal and informal peer education and interaction. We also believe that the CPP's pragmatic and flexible approach to compliance with the Cal/OSHA Construction Lead Standard ultimately resulted in greater improvement in working conditions than a rigid, dogmatic approach. The CPP experience demonstrates that employers can be induced to implement feasible recommendations. However, in the absence of a serious threat of enforcement action, employers are unlikely to make changes that they consider infeasible, regardless of the statutory requirements of the Standard. While effective, full implementation of the CPP intervention strategy will not be feasible for many occupational health programs because it requires significant time and resources and the input of a multi-disciplinary staff. Still, for programs choosing to implement a modified version of the CPP strategy, our evaluation can inform where limited resources should be placed and which project components should be emphasized in future intervention projects.

12. DISCUSSION OF THE IMPACT EVALUATION METHODS

A. INTRODUCTION

The importance of evaluating the effectiveness of workplace intervention efforts is generally recognized, but comprehensive impact evaluation is frequently left undone by health and safety practitioners. Part of our reluctance likely springs from the difficulty of meaningfully evaluating the impact of education and training efforts on working conditions. We are usually forced to limit our assessment to an evaluation of the process and the immediate impact of our efforts, such as measuring gains in knowledge or intentions to make changes in the future. We seldom have access to participants after the end of an intervention project, or adequate resources, making it very difficult, if not impossible, to determine whether new information leads to sustained change back at the worksite.

In contrast to this usual state of affairs, we had access to project participants at the end of the intervention and at one-year follow-up, allowing us to evaluate the long term impact of the CPP on working conditions through a variety of methods including standardized questionnaires, focus group discussion, site visits, and biological monitoring. A comprehensive evaluation protocol, including process, formative, and impact evaluation, was particularly important in this case because one of the primary goals of the CPP was to generate information on the feasibility and effectiveness of a specific intervention model. In this chapter, we assess whether our evaluation strategy and methods yielded the information we wanted, identify areas for improvement, and make recommendations for replication.

B. SPECIFIC EVALUATION METHODS

Little information was available on effective and appropriate evaluation models for this particular type of intervention and this target population at the start of the CPP. Consequently, we kept our evaluation plan "fluid" so that we could adapt and tailor our strategy, methods, and tools as we learned more about the industry. We included qualitative methods in addition to more "traditional" quantitative evaluation methods to help identify underlying factors related to changes in business and work practices.

Questionnaire Data Collection

Questionnaire interviews yielded a wealth of information on the changes employers and workers made in a large number of work, business, and personal practices. In some cases, independent sources of information were available which corroborated these self-reported changes. As discussed in more detail in Chapter 10, we are confident that the information we collected by questionnaire about improvement in lead safety is generally reliable. Questionnaires did not prove, however, to be an effective method of gathering individual exposure data or information on what participants liked or disliked about the Project and what they would recommend for improving the Project in the future.

Although the questionnaires were an effective evaluation tool and produced reliable data on improvements in lead safety, they were too long. We had spent a considerable amount of time discussing which questions would elicit the information we were seeking and reviewed existing questionnaires. Still, we found that some of our questions were ambiguous or confusing to participants and, in some cases, yielded data that we could not use. In part, this was unavoidable. At the start of the CPP, we were ignorant of many specific characteristics of the working environments of residential painters, and existing questionnaires were not appropriate for this target population. In the future, we would consider convening a focus group of non-participant workers and employers and conducting key informant interviews to learn as much as possible about the industry work environment prior to developing a questionnaire. Once developed, we would pilot test the questionnaire more extensively before using it with project participants. A pilot test could also help identify those areas where the reliability of questionnaire data is weak and where a method other than a structured questionnaire should be used.

We had hoped to grossly characterize participants' potential lead exposure in the 30 days prior to interview by including a series of questions on jobs involving surface preparation. Our intent was to link this data with BLL data from blood samples drawn at the same time. Unfortunately, the questionnaire interviews were not a reliable method of estimating workers' exposure. First, employers and workers had difficulty recalling detailed information about each job they worked on in the 30-day interval in question. Recall of such critical information as the number of days spent preparing surfaces and the age of buildings was poor. Also, many young workers had trouble judging the age of housing. Second, the age of the structure did not turn out to be a good surrogate for potential lead exposure. Although the age of a structure is generally a reliable predictor of the *presence* of lead paint, our air monitoring and bulk chip paint sampling results showed that individual lead exposure was highly dependent on the *concentration of lead in the paint layer being disturbed.*

We also did not obtain useful information on what participants thought of the CPP, or the problems they encountered in attempting to establish a lead safety program, by asking open-ended questions in one-on-one interviews. Participants may simply have been too tired to respond; the open-ended questions were asked at the end of the lengthy interview process. Additionally, the interviews were conducted by project staff, and participants may not have been comfortable critiquing the Project directly. Because the CPP evaluation plan was flexible we were able to further develop these questions and include them in the employer focus group discussion.

The true/false question format we used at baseline to assess workers' knowledge of lead safety was not comprehensible to many workers, particularly workers whose first language was not English. Workers found it difficult to determine whether a negative statement, such as "Wearing work clothes and shoes home is not a problem," was true or false. We deleted the true/false questions from subsequent interviews and replaced them with a series of open-ended knowledge questions.

A weakness of the questionnaire interviews was the inconsistency in our data collection methods. We conducted all of the baseline and post-intervention questionnaire interviews in person at the time of the blood draws. In contrast, we conducted some one-year follow-up interviews in person and others by phone. This inconsistency results from our decision to use the third data collection activity as an opportunity to assess whether employers would be responsive to the request from the UCSF/SFGH Occupational Medicine Clinic (their medical supervisor) to send employees in for routine blood testing and other medical services as required by the Cal/OSHA Construction Lead Standard. Rather than hold a separate, CPP-sponsored, BLL test and interview session, we coordinated our interviews of workers with the Clinic's scheduling of their BLL and other tests. Our ability, therefore, to conduct face-to-face interviews of workers and get BLL data was dependent on their employer's response to the Clinic's notification that workers were due.

Unfortunately, many employers did not respond to the Clinic's request, or did not send all of their workers in for testing. Consequently, we had to quickly locate all the "missing" workers and interview them by phone. Although we were able to contact most of the workers, we do not have BLL and ZPP data for them and are less confident of the information we collected in phone interviews. The result is that we do not have complete, comparable data for three points in time. In retrospect, we should have sponsored the third questionnaire and BLL data collection session to avoid this problem. We could have evaluated the employer's responsiveness to the Clinic's request to send employees in for testing at a later date, without being dependent on employer response for collecting other important data.

The questionnaire interview process itself went well. Project participants were patient and cooperative throughout the lengthy interviews and tolerated with good humor being asked the same questions on three separate occasions. We believe that one reason participants cooperated so willingly is that they understood and valued the research purpose of the CPP. One of the reasons contractors gave for participating in the CPP was the opportunity to provide government regulators with a "real world" perspective on lead hazards in their industry. Not only did contractors see a personal benefit to the opportunity to influence regulatory policy, they also felt that they had a responsibility to the larger contractor community to advance the understanding of lead paint hazards and feasible safe work practices.

Resources Required/Lessons Learned

The most significant disadvantage of collecting data via questionnaire interviews was the enormous amount of time, effort, and resources required to develop and test the interview instrument and to train the interviewers and administer the questionnaires. CPP staff spent approximately 1,100 hours designing the questionnaires and conducting the interviews. Outside consultant interviewers (2 Chinese language interviewers, three English language interviewers and one bilingual Spanish interviewer) cost the Project $3,555. We also spent approximately $2,200 on room rental, audiovisual equipment rental, and reproduction of materials and supplies. Once data were collected, a significant amount of staff time was spent on data management and analysis. In addition, we spent $5,212 on statistical consultation. Although labor and resource intensive, the alternative method of collecting the same information, through direct observation of participants, was completely impractical on a large scale.

We conclude that in-depth, standardized questionnaire interviews were an effective evaluation tool and yielded accurate, reliable data on changes in business, work, and personal practices. Questionnaires were not an effective tool for estimating individual lead exposure, nor for gathering qualitative information about the obstacles employers face implementing lead safety and their opinions of the Project. Although developing and conducting in-depth interviews is resource and labor intensive, the alternative method, direct observation, is infeasible and unaffordable. In the future, we would try to design a shorter, more concise interview. We would gather basic information about an industry and field test questions by doing "key informant" interviews and convening focus groups of non-participating employers and workers during the very early stages of questionnaire development. We would eliminate the true/false question format and open-ended questions. We would gather qualitative data through focus group discussion and expand focus group activities to include workers.

Follow-Up Site Visits

As discussed previously (see Chapter 9, Section E), three site visits were conducted one year after the intervention phase of the Project (in Summer 1995) to assess by direct observation the validity of information employers provided by questionnaire. The small number and short duration of these visits, and employers' advance knowledge of the site visit, preclude definitive conclusions. Still, our direct observations were in general agreement with questionnaire data and we feel confident that employers' self-reported practices are not grossly discrepant from their actual practices.

In theory, we could have improved the value of site visits for assessing the validity of employers self-reported information by making unannounced visits. In reality, conducting a site visit without advance notice was impossible since our only source of information on job location was the contractor. We also could have conducted additional site visits, however, at the time we were not convinced that, given the inherent limitations of this assessment method, the additional expenditure of staff time was warranted.

<u>Resources Required/Lessons Learned</u>

Follow-up site visits required only a small time and resource investment; the staff IH spent approximately 15 hours conducting and analyzing the three site visits. We believe that these direct observations provided valuable, if limited, information. In the future, we would consider conducting additional site visits if project resources were available.

Focus Group Discussions

The employer focus group discussions were highly successful and provided us with a great deal of qualitative data not available through the questionnaires, particularly information on the obstacles and barriers participants encountered when establishing a lead safety program and insight into why contractors made certain changes and not others. All but one of the contractors attended the discussion sessions and the evaluation consultants, as well as two outside observers, reported that the discussions were lively. Unfortunately, we did not have the resources to hold worker focus group discussions and, consequently, missed the opportunity to collect rich qualitative data on workers' experience.

We believe that the discussions were successful for a number of reasons. First, contractors appreciated the opportunity to provide feedback on the Project itself and on their own personal experiences participating in the Project and their efforts to make changes. As the contractors themselves said during the discussions, the CPP staff's interest and willingness to listen to what they had to say was an important incentive for participating in and completing the Project. Contractors knew in advance that the discussions would be facilitated by outside consultants rather than project staff which would allow them to be candid in their responses. Second, CPP staff and the evaluation consultants spent a great deal of time developing questions and probes that would elicit the information that we wanted and arranged the focus group discussions at a time and in a location to be most convenient for participants.

We also provided several incentives to encourage attendance at the focus group discussions. Discussion sessions were held in the evening, and we provided attendees with food and refreshments. Although we do not believe that contractors attended for the food, providing food removed one disincentive to attending. Contractors also received their "letter of training completion," which made them eligible to apply for the California Department of Health Services' lead-related construction certification. As an additional "draw," we included a presentation on how to become a certified contractor by a representative of the Accreditation and Certification Unit of the Childhood Lead Poisoning Prevention Branch. We do not know what effect this may have had on contractors' decisions to attend.

Resources Required/Lessons Learned

The focus group discussions were very successful. We were able to collect a great deal of qualitative data not available from the questionnaire interviews. The more natural setting of the group discussion, in which contractors could expand on and respond to each other's comments, yielded richer qualitative data than the structured interviews. We believe that hiring outside consultants to help plan and facilitate the focus group discussions was critical to their success. Outside facilitation created an environment that was more conducive to uninhibited discussion. In addition, because the outside facilitators did not have a vested interest in the outcome of the Project they were less likely to "steer the discussion in the direction of preconceived ideas," providing us with more authentic information.

Planning and conducting the focus group discussions, and summarizing and analyzing the findings, required significant staff and consultant time. CPP staff spent approximately 80 hours developing the questions and attending to the logistics of conducting the discussion groups. Transcribing the tape recorded sessions took a professional transcriptionist 50 hours. The evaluation consultants spent 40 hours analyzing the data and producing a final written report. The cost of the consulting services was $5,175; the cost of room and equipment rental was $200. Still, we are convinced that the insight provided by the focus groups on the CPP, and the obstacles small business owners face when implementing lead safety programs, far outweighs the time and resources we invested. We strongly encourage others conducting similar projects to incorporate focus group discussions into their project evaluation plans.

Job Logs and Progress Reports

As discussed in detail earlier in this report (see Chapter 7, Section C and D), neither the job logs nor the progress reports were useful evaluation tools. We could not verify the accuracy or completeness of the information provided on the job logs and consequently could not use them to assess worker exposure. Similarly, the progress reports did not provide us with the timely feedback we sought on employer progress in establishing lead safety programs. The amount of staff time expended on these activities (approximately 120 hours, mostly spent trying to get employers to complete these reports) was way out of proportion with the information they yielded. We would not use either of these tools in the future.

Blood Testing

The purpose of the blood lead and zinc protoporphyrin testing was threefold: first, to assess the potential risk for lead exposure among painters; second, to explore the relationship between BLLs and other variables, such as days working on lead jobs, demographic factors, or hygiene practices; finally, to measure the impact of the CPP. Only the use of blood testing as an impact evaluation tool is discussed here.

We were successful in getting workers to consent to have their blood drawn; only one worker declined to participate in this part of the Project. We attribute this high participation rate to several factors. First, we were careful to completely inform workers of the purpose of the study and the specific purposes for which the BLL data would be used, how the confidentiality of the test results would be guaranteed, and their right to refuse participation without retribution. Also, we believe that creating a social atmosphere for the blood draws encouraged participation. Rather than conduct the blood draws in a clinical setting, we arranged testing so that painters from different companies saw each other participating and had the opportunity to socialize over food and refreshments.

We did encounter some reluctance among Chinese painters to participating in BLL testing. The consultant who conducted the orientation session for the Chinese workers explained that their reluctance stemmed from a belief that lost blood was not replaced and, therefore, repeated blood draws would eventually weaken them. She carefully explained that blood loss is not permanent and that the small amount of blood removed would be quickly replaced by the body. Although all the Chinese workers ultimately participated, the consultant voiced some concern that a few workers may not have been convinced of the safety of the blood draw and had agreed to participate out of concerns for their job security despite the assurance that they would not be penalized. Neither the consultant nor any of the CPP staff, however, has evidence that this actually occurred. This points, however, to the need for researchers to be sensitive to the cultural beliefs of participants and to be prepared to address them.

Resources Required/Lessons Learned

In general industry, monitoring BLL and ZPP levels over time is a common tool for evaluating the effectiveness of an employer's lead safety program. In our initial project plan, we proposed analysis of BLL and ZPP trends from baseline to post-intervention and one-year follow-up as one way we would evaluate the effectiveness of the CPP intervention model. At first glance the reasoning seems obvious: improved work practices would result in lower airborne and ingestion lead exposures which would be reflected in participants' BLL and ZPP levels. Examining changes in BLL and ZPP levels over time, therefore, would give us objective data on the impact of our efforts to induce employers and workers to change business and work practices. Very early on in the CPP, however, we began to question the utility of this method for evaluating the effectiveness of an intervention project within the construction industry.

In individuals without significant lead body burdens, BLLs rise rapidly after exposure and fall relatively rapidly once exposure ceases; they generally reflect recent exposure (2-3 weeks). BLL data can be a useful evaluation tool in situations where there is on-going, relatively consistent exposure, such as commonly occurs in general industry. However, in situations where exposure is variable or has been interrupted sometime before monitoring, such as is typical of the painters in the Project, it is difficult to distinguish changes in BLL levels that result from an intervention and changes that result from fluctuations in an individual's workload involving disturbance of lead paint. Without good data on participants' surface preparation work in the month prior to the blood draw, therefore, the BLL data were not useful for impact evaluation purposes. As discussed previously, the data we had in this area were poor.

We chose to hire an outside consultant phlebotomist so that we would not have to worry about ensuring compliance with the Cal/OSHA bloodborne pathogen standard and related medical waste handling and medical malpractice coverage issues. Hiring a consultant also allowed CPP staff to focus their efforts on accurate record keeping and keeping a smooth flow of participants through the blood draw and interview stations. The costs for the phlebotomist's services and related supplies was $1,125. Food and refreshments for the blood draws totaled $1,600. Since the CPP blood drawing activities were held at the same time as the questionnaire interviews, we did not incur additional expenses for room rental. The Environmental Health Laboratory Branch (EHLB) at the California Department of Health Services provided BLL and ZPP analysis and quality control on the proficiency of other laboratories. The costs for the mid-project (August 1994) and one-year follow-up (Summer

1995) blood draws and laboratory analysis by the UCSF/SFGH Occupational Medicine Clinic were borne by the employers.

We do not recommend BLL and ZPP tests for evaluating the impact of an intervention project in situations where exposures are inconsistent and unpredictable, such as in the construction trades, without a reliable means of exposure assessment. However, BLL and ZPP tests do provide extremely useful information to individual workers and employers about lead exposures on a particular job, and the effectiveness of efforts to control exposure. In addition, these tests are required by the Cal/OSHA Construction Lead Standard.

C. ASSESSMENT OF THE IMPACT EVALUATION STRATEGY

The CPP impact evaluation strategy, which included a variety of qualitative and quantitative methods, provided us with valuable information on the impact of the CPP intervention on working conditions for painters and contractors. In-depth questionnaire interviews and employer focus group discussion yielded the most useful/complete information. In the future, we would conduct similar focus group discussions with worker participants. BLL and ZPP testing, while providing useful feedback to individual workers and their employers, was not an effective impact evaluation tool. The job logs and progress reports did not provide useful information and we would not recommend their use in the future.

The greatest strength of our evaluation strategy was the decision to collect data on actual changes in work and business practices rather than limit our assessment to gains in knowledge, intentions to make changes, or BLL and ZPP data. Another strength of the strategy was assessing change at the end of the intervention phase and again one year later. Without this information, we would not have known if immediate changes were sustained over time, nor would we have had any information on changes that took longer to implement. Finally, without the qualitative data gathered through focus group discussion, we would have had to guess at the underlying reasons why contractors made some changes and not others. In addition, we would know little about what participants liked and disliked about the Project and how they would improve it. The qualitative data collected during focus group discussion added depth, detail, and meaning to our quantitative findings. We strongly recommend that qualitative data collection methods be integrated into all intervention research efforts.

13. LIMITATIONS OF THE PROJECT DESIGN

Before concluding that the California Painters Project was a success and advocating that others undertake similar projects, we must examine whether the improvements in work and business practices that we observed among participants are attributable to the intervention (internally valid) and whether our findings would apply to painters outside our study population (externally valid).

The "ideal" intervention research study would be conducted under controlled conditions and participants would be randomly assigned to a treatment group (receiving the intervention) or a control group (no intervention) in order to minimize the effect of extraneous factors and to be able to generalize to other painters (Campbell and Stanley, 1963). However, for practical as well as ethical reasons we could not use a purely experimental design. Instead, we employed a quasi-experimental design in which participants served as their own control group and changes were measured by making repeated observations of participants over time (Campbell and Stanley, 1963). (See Chapter 7 for a full discussion of the project design.) This design addresses some, but not all, of the biases that could lead us to misinterpret our findings. In this chapter, we discuss potential biases in the study and the plausibility and relevance of alternative explanations for our findings (sometimes called "threats to validity"). We also discuss our assessment of the conditions under which the CPP model can be generalized to other populations of painters.

A. INTERNAL VALIDITY

Undoubtedly, there are multiple "causal components" that moved contractors and workers from poor health and safety practices to improved lead safety. Rarely, if ever, is there a single cause for observed phenomena, particularly such complex phenomena as human behavior. Thus, the changes we measured are a result of our intervention efforts and the influence of other processes occurring at the same time or already underway at the start of the CPP. Additionally, the outcome measures will reflect any bias introduced by the project design itself. What we provide to the reader here is our assessment of the effect of our intervention efforts in the context of other conceivable alternative or contributing causes.

History

Events in the community or society that occur during the course of an intervention can influence participants in a project and may affect the outcomes being measured. This phenomenon has been referred to as "history." In evaluating the effectiveness of the CPP we must consider the extent to which "outside" events and processes influenced contractors and workers and to what extent these non-program influences may account for the observed changes.

Unfortunately, our project design does not allow us to rigorously evaluate the potential impact of non-program influences on CPP participants. A study design that includes multiple points of observation both prior to an intervention and after can help identify "secular trends" (Posavac and Carey, 1992). With only one pre-intervention observation point, we do not have sufficient data to identify the presence of a secular trend.

Still, we are aware of two factors ["events"] which could have influenced the outcomes that we measured: passage of the Cal/OSHA Construction Lead Standard in November 1993 and media attention to lead paint hazards. We do not believe that Cal/OSHA enforcement of the new standard had a significant influence on contractors' lead safety practices. Most contractors were unaware of the Standard and, at the time of the CPP, there was no focused enforcement action by Cal/OSHA.

There was increased media attention to the hazards of lead paint, particularly the risk to young children, prior to and during the CPP. The San Francisco and Alameda County Health Departments were conducting programs to educate the public about lead paint hazards, and Bay Area newspapers published articles on the subject. While this increased publicity may have increased contractors' awareness of lead paint hazards, we do not believe that this alone can account for the significant improvements we observed in lead safety. Increased publicity raised awareness but did not provide the detailed information, resources, and tools necessary for making the specific changes in business and work practices that we observed.

Mortality

Significant participant attrition ("dropping out") can lead to misleading interpretations of program results. For example, if those participants most motivated to make changes stay with a program, the results will overestimate the effect of the intervention.

Since all the contractors who started the Project completed it, attrition does not threaten the validity of the employer results. We did have attrition among workers; 44 of the original 132 workers who started the CPP were lost to follow-up, i.e., we were unable to contact them for the final questionnaire interview. When we compared workers who completed the Project with those who did not, we found that there was a higher incidence of smoking among those who were lost to follow-up; 72% of the workers lost to follow-up were smokers whereas only 28% of the workers who completed the CPP were smokers. There were no other demographic differences between the two groups.

The discrepancy in smoking status between those who completed the study and those who did not could conceivably have affected our results concerning washing before smoking and smoking in the work area (although the direction of the effect is not clear). Because we have no information that would lead us to believe that smokers and non-smokers differ in other work and hygiene practices, we do not believe that worker attrition significantly affected other results of the study.

Testing

The act of requesting information from individuals or observing their behavior can influence the behavior being studied. Also, the results of a repeatedly administered test or survey may differ simply because the respondent becomes familiar with the tool itself. This phenomenon is often called the "testing effect."

Since we were not testing ability, it seems unlikely that increased familiarity with the survey questions affected contractors' responses; i.e., contractors "performed" better on the second and third administrations of the questionnaire since they had heard the questions before. It is possible that contractors' understanding of the questions changed over time. Because the survey questions were simple, it seems unlikely that contractors' understanding of the question changed with repeated administrations. For example, it seems unlikely that the question "How often do you dry sweep?" meant something different to contractors at the end of the Project than it did at baseline. On the other hand, a contractor's, or a worker's, personal definition of the terms "often" "sometimes" "never" could have changed over the course of the Project. If this occurred, our results could under or over estimate the actual change.

An additional consideration is that participants may have learned the "right" answers through participating in the Project and simply told us what they thought we wanted to hear. As discussed in detail in Chapter 10, Section A, we do not believe this occurred. Information from independent sources was consistent with self-reported behavior (site visits, employee reports of employer practices, records of the medical supervisor). Also, employer and employees' candid admissions of their failure to implement a number of specific, easy to implement, lead safety measures that we had promoted suggests that participants were being truthful and accurate overall since there is no reason to believe they would exaggerate their progress in one area more than another.

It is possible that contractors were more motivated to make improvements since they knew that we would be measuring changes in their work and business practices over the course of the CPP. We do not know whether contractors would have achieved the same level of progress had we not been evaluating them. If we view the evaluation as part of the intervention effort itself, it is not essential to answer this question. However, since developing and conducting the standardized questionnaires were labor and resource intensive, it would be useful to know what influence the evaluation had on contractors' behavior. If it had little impact, someone replicating the Project with limited resources could eliminate or scale back this activity.

Other Biases

Two other potential biases bear brief mention: selection and maturation. Contractors self-selected to participate in the CPP, and it is reasonable to think that they may have been the "better" employers, i.e., already using safer work and business practices. Measuring their lead safety programs and the practices of their workers only at the end of the intervention might reveal a high level of performance in the area of lead safety but it would tell us nothing about the effectiveness of the CPP if these contractors and their workers were in good shape to start with. By administering the standardized questionnaire at baseline as well as post-intervention, we were able to "subtract out" their pre-project achievements and arrive at an estimate of their improvement during the CPP.

Maturation, a natural process of development or change over time, is not a plausible threat to the validity of the findings in this Project. We did not measure variables that can be expected to change merely with the passage of time. Aging over the course of a one-year project will not reasonably have an effect on attitudes concerning work practices. Had the contractors all been new business owners at the start of the Project, maturation might have been a confounding factor. It is plausible that as a new business "matures" it goes through a predictable process of establishing business and work practices including practices related to safety. In that instance, we would have had to consider the extent to which the changes that we observed could have been attributable to that natural progression. However, since most of the participating contractors had been in business for some time, this was not a problem.

B. EXTERNAL VALIDITY

Confidence that an intervention program can be instituted elsewhere with similar results can be developed by evaluating the program in a number of different settings and with different target populations. That approach to testing the external validity of the CPP, however, was impractical and economically infeasible for us. Instead, throughout this report we have provided our observations and judgments concerning what it is about the CPP, the participants, OLPPP, and the setting that permitted the program to be successful. In this section, we recap some important points so that the reader considering using the CPP intervention model can decide whether their proposed target population and setting are similar to those of the CPP and that, therefore, the CPP intervention model is likely to work.

A major objective of the CPP was to develop a lead safety intervention strategy for small to medium-sized commercial and residential painting contractors and to make recommendations for revisions to the model for replication by state and local health departments and others. To what extent is the CPP model applicable to other health departments, and to other populations of painting contractors?

Project Initiators

The success of the approach used in the CPP depended on an ability to attract volunteer participants. CPP participants identified the cooperative, non-adversarial, approach of the Project as a major factor in their making improvements in lead safety. The Occupational Lead Poisoning Prevention Program is part of a non-regulatory government agency with a policy of working cooperatively with employers who demonstrate a willingness to improve lead safety. Local health departments for the most part do not have regulatory authority in the area of occupational health and therefore are in a position to replicate our strategy. The role of the state health department in regulation of the workplace varies from state to state. State health departments which have occupational regulatory responsibilities in addition to their public health responsibilities should consider the effect this may have on their ability to implement a voluntarily a program. One approach which has been tried by health departments in this situation is to provide limited protection from enforcement action for employers who participate in an intervention program.

Differences in resources and staffing patterns between OLPPP and state and local health departments may also affect the replicability of the CPP in these settings. The CPP was a resource-intensive program and many local health departments may not be able to marshal sufficient resources to implement such a comprehensive model. Throughout the report we have tried to point out areas where activities could be modestly scaled back if necessary. However, the CPP model is comprehensive and we do not believe that similar success could be expected if the program were significantly cut.

Another important factor which state and local health departments should consider is their ability to assemble a multi-disciplinary team. Assembling a team of industrial hygienists, health educators, nurses, etc., may be realistic for many state health departments, but most local health departments will find it difficult to compile such a team. Still, local health departments may be able to bring in private consultants or work with other local agencies to bring together the necessary expertise.

Target Population

The contractors who participated in the CPP are likely to be similar to licensed painting contractors in other locales in that they have few resources for health and safety and do not have dedicated health and safety staff. Frequently, the owner is directly responsible for most aspects of the business. We expect that local and state health departments would find painting contractors in their areas also receptive to a program which provides free education, training, technical assistance and services to comply with workplace regulations. On the other hand, CPP participants likely differ from other populations of painting contractors in important ways which must be taken into account by anyone considering replicating the CPP.

The hazard of lead paint in housing is a high profile issue in the San Francisco Bay Area. This greater public awareness likely influenced our ability to recruit project participants and participants' willingness to make changes in business and work practices. Even given this level of awareness, recruiting participants was difficult. We succeeded in persuading only 21 of the 64 eligible contractors to participate. Health departments operating in areas where public awareness is low, may have to work much harder at recruiting participants into a voluntary program. Additionally, if the public is unaware of the lead paint hazard there will be little market for lead-safe paint jobs. Contractors are unlikely to incur the cost of using safer work practices if they cannot sell the "lead-safe" job to the customer and perceive no liability. State and local health departments may want to consider working with their childhood lead poisoning prevention programs so that efforts to promote lead safety among painting contractors are coupled with public education efforts.

The economic health of the local community will also likely affect the market for lead-safe paint jobs and consequently contractors' interest in lead safety. The San Francisco contractors who participated in the CPP generally provided services to middle- to upper-income customers. State and local health departments in economically disadvantaged areas may find it difficult to recruit and retain participants.

Finally, the CPP was conducted in San Francisco where a large percentage of the residences and other buildings were constructed prior to 1980, indeed prior to 1950, and therefore likely contain lead paint. In other geographic areas this may not be the case. In settings where contractors do less work on lead paint, contractors would probably be less likely to participate in a similar project and, even if they did, would be less likely to invest time, effort, and money into instituting lead-safe practices.

Anyone considering replicating the CPP should also keep in mind that the CPP participants were licensed contractors. We do not believe that the CPP model would be effective with the population of unlicensed contractors since it is unlikely that they would choose to participate in a project conducted by a government agency, or that compliance with health and safety would be a priority for this group.

C. CONCLUSION

We cannot provide definitive answers to our questions regarding the external validity of our results. However, we hope that considering the points raised here will help the reader determine whether the CPP intervention model is relevant to their proposed target population and setting. We also hope that other researchers will implement and evaluate the CPP intervention model with different target populations in different settings. In this way, we can refine our intervention strategies.

14. COMPARISON TO OTHER RESEARCH

A. COMPARISON TO OTHER INTERVENTION RESEARCH

Two educational/behavioral intervention studies were identified from the occupational health literature for comparison to the California Painters Project on a number of key methodological issues. The comparison is intended to be instructive to others who plan intervention research projects, as the three projects differed somewhat in their designs and approaches, but all reported positive impacts on workplace health and safety.

The first study, called the "Respiratory Health in Swine Confinement Project," aimed to improve knowledge, attitudes, and behaviors related to preventing respiratory illness among workers in swine confinement buildings (Ferguson et al., 1989; Gjerde et al., 1991). When high densities of livestock are maintained in enclosed buildings, hazardous levels of dust, carbon monoxide, ammonia, and hydrogen sulfide may be present. The goals of the intervention were to improve knowledge about recommended gas and dust levels and the benefits of wearing proper respiratory protection; change attitudes about wearing respirators, taking safety precautions, and inspecting ventilation systems; and affect behaviors such as regular inspection of buildings and wearing appropriate respirators.

The second study (Porru et al., 1993) involved carrying out and evaluating a health education program delivered to lead-exposed workers in several small lead factories producing brass or bronze, lead shot, or lead-painted pylons. The Project was designed to improve knowledge about lead toxicity and the hygienic behaviors and work practices (e.g., respirator use) which reduce exposure. The goal was to reduce blood lead levels by motivating workers to adopt lead-safe behaviors.

These studies are compared below with the California Painters Project on the following six methodological issues to be concerned with when undertaking intervention research (Goldenhar and Schulte, 1994): theoretical basis; intervention duration, intensity, and frequency; study design; subject selection; instrument reliability and validity; and analytical techniques. The comparisons are summarized in Table 14.1.

TABLE 14.1

COMPARISON OF THREE OCCUPATIONAL HEALTH INTERVENTIONS

Study	Theory	Intervention Characteristics	Study Design	Subject Selection	Measurement Instruments	Analysis
California Painters Project	Mix of experience with health education, behavior, IH theory	Multidimensional; 32 hours training for employers (4 seminars over 5 months) and 8 hours for employees; educational materials; IH consultation and air monitoring offered; high duration, intensity, frequency	One group, internal controls; knowledge, behaviors, BLL and ZPP at baseline and 2 times post-intervention	21 painting contractors and their 132 employees; voluntary	Questionnaires to assess knowledge, behaviors; BLL and ZPP testing; few IH site visits; focus groups for qualitative data	Compared proportions to target objectives for specific behaviors; paired t-tests and multivariate regression for BLLs; qualitative methods
Swine Confinement Project (Ferguson et al., 1989; Gjerde et al., 1991)	Health Belief Model; health education, IH theory	Multidimensional; six self-study units mailed at 2-week intervals plus 1 group meeting; IH consultation and air monitoring; medium duration, intensity frequency	Intervention and control groups; KAB* at baseline and one year later	172 swine confinement unit operators; voluntary	Questionnaires to assess KAB*	ANCOVA to compare KAB* scores of 2 groups; Wald statistic for individual items
Health Education in Small Lead Industries (Porru et al., 1993)	No stated theory; health education	One-dimensional; 60-minute training and educational booklet; low duration, intensity, frequency	One group, internal controls; knowledge, behaviors and BLLs assessed at baseline, 4 and 12 months post-intervention	50 lead-exposed workers in 7 small factories; appears to be voluntary	Questionnaires to assess knowledge and behavior; BLL testing	2-way ANOVA for BLLs and questionnaire scores; multivariate regression for BLLs

*KAB = Knowledge, attitudes, and behaviors

Theoretical Basis for the Studies

In the Swine Confinement Project the researchers used the Health Belief Model as the framework by which they developed and delivered their intervention. Under this theory, knowledge is considered a necessary, but not sufficient, condition for adoption of a health-promoting behavior, and an individual's attitudes about the risks and benefits of a particular behavior are also important. Thus, the Project aimed to improve attitudes by addressing the potential benefits of certain practices relative to their inconvenience and by having workers who had made behavior changes serve as role models in group discussions. Although a specific educational theory is not stated, the intervention used participatory learning approaches such as group problem solving. The researchers also utilized the theoretical principles of industrial hygiene and engineering through training on the detection of gases and use of respirators and other controls, as well as industrial hygiene consultation visits to provide individualized recommendations for each participating farm. The authors did not discuss their findings in relation to the underlying theory on which the work was based.

The Porru study does not state a specific theory on which the intervention is based, other than the utility of health education as a tool to prevent occupational illness. Apparently the intent was to increase knowledge about the risks of lead toxicity and the appropriate behaviors to reduce inhalation and ingestion of lead, with the hope that increased knowledge would translate into improved behaviors and ultimately reduce BLLs. As the intervention consisted of an informational meeting provided by an occupational physician plus an educational booklet, participatory learning approaches were not used other than discussion after the meeting.

As discussed earlier (see Chapter 2, Section C), the CPP's intervention was not based on a single theory but a combination of theories as well as the program's acquired experience and knowledge; the Project tested the resulting model intervention strategy. In the setting in which the CPP was conducted, i.e., a public health program rather than academia, we believe it is more appropriate to test the practice of a multidimensional prevention model rather than a specific educational or behavioral theory. Through our project findings and evaluation of the approach we have developed recommendations regarding the replication and/or adaptation of this model by other public health practitioners (Chapter 16).

Intervention Characteristics: Duration, Intensity, and Frequency

Both the Swine Confinement Project and the California Painters Project were interventions of considerable duration, intensity, and frequency, aiming to change behaviors in multiple areas but also recognizing that knowledge and attitude changes are important. Over a one-year period, participants in the Swine Confinement Project received: six educational home-study modules with reference materials; an educational poster; periodic project newsletters; a sign for outdoor posting identifying them as participants; and an invitation to an evening session in which respirators and gas measurement were demonstrated and participants engaged in group problem-solving discussions. In both projects the intervention was delivered over a several month period involving multiple contacts with the participants. The CPP had a higher intensity in terms of the total number of training hours (32 hours for employers and 8 hours for employees), as well as more frequent group meetings (4 seminars for employers compared to one group meeting in the Swine Confinement Project). This higher intensity was probably necessary, because the CPP targeted a greater number of specific behaviors for change.

Both projects used baseline surveys as needs assessments to ensure that educational sessions and materials were appropriate to the target audience. In both cases on-site industrial hygiene consultation, including air monitoring, was available for individualized technical assistance in improving use of safety practices and engineering controls. The CPP targeted separate and combined activities to employers and their employees, but it is unclear whether the participants in the Swine Confinement Project included owners, workers, and/or owner-operators. In both projects the intensive interventions resulted in substantial improvements in knowledge and a number of behaviors/work practices. Since multiple behaviors, many of them requiring specific technical knowledge, were being addressed, it is likely that extended duration, high intensity, and frequent contact were needed to effect the level of change measured.

In contrast, the Porru intervention was of short duration and low intensity--a 60-minute informational meeting plus educational booklet. The focus was solely on changing workers' knowledge and personal hygiene and lifestyle behaviors. The participants were intentionally selected from workplaces where no changes in airborne lead levels were expected due to further use of engineering controls. Despite the low duration, intensity, and one-time frequency of the intervention, the researchers found a statistically significant improvement in knowledge and reduction in BLLs four months later. A continued improvement among the workers remaining at one-year follow-up was also noted. However, since data regarding the intended behavior changes were either not collected or not analyzed separately, it is possible that the reduction in BLLs may have been due to other workplace changes unrelated to the intervention.

These comparisons suggest that an intervention of short duration and low intensity may result in occupational health improvements if specifically focused on things workers can easily do to reduce their risk, especially when the existing situation is quite poor (e.g., in the Porru study, 75% of BLLs were 30 ug/dl or higher). When trying to improve multiple behaviors, especially in unfamiliar areas where specific technical knowledge is lacking (e.g., selection of the correct respirator, measurement of contaminant levels, assessment of ventilation functioning), an intervention with higher duration, intensity, and frequency may be required.

Study Designs

The CPP, Swine Confinement, and Porru studies were similar in their use of a quasi-experimental, rather than a truly experimental, study design. They differed, however, in several important details of their designs.

The Swine Confinement project had separate control and intervention groups selected from geographically separated counties (southeastern vs. northeastern Iowa). The strength of this design is that it gives the researcher a greater ability to determine whether change detected among intervention participants is due to the intervention or to external factors. Many researchers, however, will find themselves in situations where this design is unethical and/or impractical. The design of the CPP and Porru studies, in which the intervention group members serve as their own controls and changes are measured by making repeated observations of participants over time, is a more typical situation for those doing workplace intervention research.

The findings of the Swine Confinement study would have been further strengthened if the researchers had followed up with participants after a significant amount of time had passed post-intervention. The lack of further follow-up by the researchers precludes drawing any conclusions about the sustainability of the observed changes.

Both the CPP and Porru studies administered questionnaires and assessed BLLs at three points in time: pre-intervention (baseline), shortly after post-intervention, and again at a later time. The CPP analysis differed from the Porru study in that we measured changes in specific behavior/work practices, while the Porru study analyzed changes in total questionnaire scores and changes in BLLs.

The Porru study's reliance on BLLs for impact evaluation is based on their belief that biological monitoring, in this case BLLs, would provide a more reliable assessment of project impact than self-reported behavior. BLLs do provide a reliable measure of worker exposure when lead exposure is consistent and ongoing, as it was at the Porru study sites. However, this study's use of BLL data to evaluate the impact of their intervention without also assessing specific behavior changes raises the concern that the observed declines in BLLs may have been due to unidentified changes in the workplace or work processes which were unrelated to the intervention. Porru et al. attempted to address this problem by selecting workplaces with relatively constant BLLs in the several years prior to the intervention and no plans for further engineering controls. They also conducted worksite inspections each time questionnaire and BLL data were collected to document that no significant changes in workplace conditions had occurred. Still, the conclusion/assessment that the decline in BLLs was attributable to the intervention would have been stronger if Porru et al. had also documented changes in specific in behavior and work practices known to be associated with lower exposures.

Although we also gathered BLL data, these data did not turn out to be a useful impact evaluation tool because the lead exposures of CPP participants were intermittent and highly variable. Our impact evaluation, therefore, relied heavily on self-reported changes in behavior. As we discussed in detail in Chapter 10, Section A, we addressed this issue by corroborating self-reported change with independent sources of information and by comparing employer and employee responses to similar questions. We concluded that the information provided by contractors and their employees during questionnaire interviews was highly reliable.

The Swine Confinement Project and the Porru study used statistical tests applied to their results to judge their programs' effectiveness. The authors imply that, because a statistically significant degree of change was noted, they consider their projects "successful" and their methods worth replicating in other settings. Although tests for statistical significance may tell us that observed differences are real and not due to chance alone, they do not provide guidance on the efficacy of a program, i.e., whether the degree of improvement achieved is commensurate with the amount of effort expended. In contrast, we set objectives for the degree of change we expected to achieve by our intervention efforts (i.e., a performance standard) and compared the actual degree of improvement to this standard. As we learned by experience, this method of determining "success" also has limitations, particularly when there is very little information available to researchers at the outset on reasonable expectations for improvement. In retrospect, we believe that we set unreasonably high target objectives in many cases (e.g., expecting that 90% of the target population would change a specific work practice).

A final comment on study design, the CPP research design included gathering qualitative as well as quantitative data. The primary qualitative evaluation component of the CPP, the employer focus group discussions, provided us with information on how the CPP worked, as well as insight into why the CPP succeeded in some areas and not in others. Neither the Swine Confinement Project nor the Porru study included qualitative evaluation methods.

Subject Selection and Number

In all three studies, the researchers identified employers/workplaces that fit pre-defined criteria, and then sought subjects to participate. The criteria for the CPP have been described (see Chapter 4, Section B); the Swine Confinement Project selected pork producers that used swine confinement and had an adequate level of worker exposure time, and the Porru study chose factories with stable BLLs and processes and no plans for engineering improvements. Both the CPP and Swine Confinement Project conducted a preliminary survey of the initial population (or in the case of the Swine Confinement Project a randomly selected sample) and recruited employers who completed the survey, met the eligibility criteria, and were interested in participating in the Project. It is not completely clear whether participants in the Porru study were volunteers. Due to voluntary participation and the resultant potential for selection bias, all three studies suffer from a potential lack of representativeness that affects the interpretation and generalizability of the findings.

Since participation in the CPP and Swine Confinement Project involved multiple intervention activities over an extended period of time, and the CPP and Porru study included data collection at three points in time, it is interesting to consider the various encouragement the projects offered for participation. None of the projects directly paid participants, however they all offered services with a monetary value in addition to the training/information and educational materials provided. The Porru study provided BLL testing on three occasions, as did the CPP at two points in time. Both the Swine Confinement Project and the CPP offered on-site industrial hygiene consultation including air monitoring. Both projects also describe exhaustive efforts to recruit a target number of employers and participants.

All three studies obtained sufficient sample size to detect statistically significant post-intervention differences. For the Swine Confinement Project, the total study group included 108 farms (56 intervention and 52 nonintervention) and 198 participants (97 intervention and 101 nonintervention); the final analysis utilized appropriate data obtained from 49 persons in the intervention group and 79 controls. The Porru study recruited 50 workers from 7 factories, and obtained baseline and post-intervention questionnaire data and BLLs from all 50; one year after baseline the researchers obtained follow-up data on 34 participants.

Measurement Instruments

All three studies used subjective measures, i.e., questionnaires, to evaluate the effectiveness of the interventions. The questionnaires assessed knowledge, attitude, and behavior/work practices for the Swine Confinement Project and, for the CPP and Porru studies, knowledge and behavior/work practices. The CPP used qualitative evaluation methods to supplement the quantitative data. The obvious limitations of self-reported data can be addressed by using additional objective measures. Both the CPP and Porru study collected BLLs at three points in time; however, these data were less useful for evaluation of the CPP due to the intermittency of lead exposures over time. The CPP also used lead medical surveillance records and a few one-year follow-up evaluation site visits as objective measures to verify self-reported data. The Swine Confinement Project did not report using any additional data to verify self-reported changes in behavior/work practices.

The CPP pilot tested questionnaires among non participants for validation; questionnaire validation was not discussed in the articles describing the other two studies. In all cases, consistently using the same questionnaires provided a measure of reliability.

Analytical Techniques

Because of differing designs and types of data, each of the three studies utilized fairly different analytical methods.

In the Swine Confinement Project a knowledge score, attitude score, and behavior score were obtained from the percent of correct responses to items within each type. Analysis of covariance was performed to compare the two groups on each of the three scores at post-intervention, using the corresponding score at baseline as a covariate. Where there were significantly different scores, a more detailed analysis was done of individual items using a least-squares approach (reporting a Wald statistic) to detect a different pattern of change over time for each group. The analysis demonstrated significant differences among the intervention group in overall scores, as well as in 14 of 23 knowledge items, 4 of 13 attitude items, and 4 of 13 behaviors.

In contrast, the bulk of the CPP data pertained to 39 specific behaviors/work practices of employers and/or employees within the major areas of lead safety. We did not consider it useful to combine these responses into an overall score and instead compared the proportion of participants reporting each specific practice at post-intervention and one-year follow-up to the stated measurable objective. These comparisons provided our measure of the project's "success," rather than applying a test of statistical significance. We did perform paired t-tests to detect statistically significant changes in BLL over time, as did the Porru study. In addition, we used multivariate regression techniques to look at the relationship of various factors to BLLs at baseline and post-intervention; the Porru study did this as well. Since the CPP also collected qualitative data via focus groups, we utilized qualitative data analysis methods to analyze these results.

The Porru study analyzed BLLs and total questionnaire scores at three points in time, without examining responses to individual questionnaire items. Paired t-tests were used to compare baseline BLLs and questionnaire scores to post-intervention (4 months later), indicating statistically significant improvements for both. They also noted that BLL distributions had improved, with no post-intervention BLLs greater than 60 ug/dl, and a larger proportion below 30 ug/dl. With the post-intervention data they identified two subgroups of subjects, the "improved" and "not improved" with respect to baseline questionnaire scores, and compared them on a number of factors. They found that the improved group had been employed for a shorter period of time (and thus were possibly more receptive to the information provided). Multiple regression analyses were performed using data from baseline and from post-intervention to evaluate the predictive value of different variables on questionnaire scores and BLLs. For the 34 subjects who completed all three phases of data collection, a two-way analysis of variance was used to demonstrate a time trend of significant improvement in both BLLs and questionnaire scores.

B. STUDIES OF PAINTERS' RISK

Although there have been numerous case reports of lead poisoning in residential and commercial painters, few population-based studies have been conducted to characterize the risk of lead poisoning to painters. Little information is available on such indicators of risk as airborne lead levels, work practices and use of protective measures, and blood lead or zinc protoporphyrin levels.

The studies we identified for comparison to the CPP are: 1) a trade association-sponsored study of 127 house painters in North Carolina (Ennever et al., 1995); 2) the U.S. Environmental Protection Agency-sponsored study of remodeling and renovation workers which included BLLs and questionnaires from 34 painters and air monitoring during paint removal (U.S. EPA, 1997); 3) a report from the Washington State Department of Labor and Industries of five visits to painting jobs at pre-1950 homes, including air monitoring, blood testing and observations of nine painters (Washington State, 1995); and 4) an unpublished study by the California Department of Health Services of 28 painters who restored Victorian houses in San Francisco (CDHS, 1993). Additional sources of information about painters' risk come from previously cited case studies, state blood lead registry data, and other published air monitoring data.

Airborne Lead Concentrations During Surface Preparation

The air monitoring results from this Project are in agreement with those from other studies which document that airborne lead concentrations during surface preparation on lead-containing paint frequently exceed Federal OSHA and Cal/OSHA's Permissible Exposure Levels (PELs) of 50 ug/m^3. Airborne lead concentrations exceeding 50 ug/m^3 have been observed for both task-specific time-weighted averages (i.e., monitoring conducted as long as employee conducts a high exposure task) as well as full-shift, 8-hour time-weighted averages (TWAs).

In the CPP, the surface preparation method associated with the highest airborne lead exposures was uncontrolled power sanding, with a mean task-specific TWA of 580 ug/m^3 (n=10). In EPA's study, 3 personal samples involving power sanding had a geometric mean of 571 ug/m^3 and an estimated 95th percentile of 3170 ug/m^3. In Washington State, 3 painters doing power sanding had TWA exposures of 400, 1035, and 2270 ug/m^3. The highest TWA exposure in the San Francisco Victorian study, 1700 ug/m^3, was measured during power sanding. In the exposure assessment data assembled by Federal OSHA in support of the Final Interim Construction Lead Standard, 65 samples taken during non-abatement power tool use ranged from 1 to 20,600 ug/m^3, with a mean of 735 ug/m^3 and an estimated 95th percentile of 1,314 ug/m^3 (OSHA, 1993). These data support the Standard's requirement for initial assignment of a respirator that is at least protective up to 2500 ug/m^3 when an employee is assigned to do power sanding.

Uncontrolled power sanding was frequently used by surveyed painters. In EPA's study, 52% of painters reported doing power sanding in the 30 days preceding the survey. In the Washington State telephone survey of painters, 38% reported using power tools occasionally and 13% did frequently. At baseline in this project, 48% of contractors used uncontrolled power tools sometimes and 38% power sanded often.

Our results are similar to those from other studies which found airborne lead exposures exceeding 50 ug/m^3 for painters doing dry manual scraping or sanding. Our data show a mean TWA of 71 ug/m^3 for dry manual scraping (n=18) and 420 ug/m^3 (n=9) for dry manual sanding. The Washington State study measured TWAs of 43 and 164 ug/m^3 for two painters who were hand scraping on paint with a lead concentration as low as 1.2 - 3.3%. In the EPA study 6 samples taken during hand scraping and sanding had a geometric mean TWA of 254 ug/m^3 and an estimated 95th percentile of 1410 ug/m^3. EPA's study also included a meta-analysis of data from six unpublished sources involving surface preparation primarily by dry hand sanding and scraping. Based on 31 samples from interior work, the geometric mean exposure was 58 ug/m^3, with an estimated 95th percentile of 6350 ug/m^3; 38 samples from similar exterior work showed a geometric mean of 4.3 ug/m^3 and an estimated 95th percentile of 114 ug/m^3. There was no apparent explanation for the much lower exterior exposure given that paint lead concentrations were generally similar. Federal OSHA's exposure assessment identified 6 samples for hand scraping, ranging from 6 to 167 ug/m^3 with a mean of 45 ug/m^3 and an estimated 95th percentile of 96 ug/m^3.

Dry manual sanding and scraping are consistently reported to be very widely used among painters. EPA's study found that 87% of painters did dry hand sanding and 74% did dry hand scraping in the 30 days prior to the survey. Among the contractors in our Project, 100% of participants did dry manual sanding and scraping often or sometimes, and this combined percentage dropped only to 95% in the following painting season.

Air monitoring data associated with other surface preparation methods are extremely limited and in some cases come from groups other than painters. Our mean TWA results for heat gun use, wet sanding, and open flame burning were all found to be well below 50 ug/m^3 (2.3 ug/m^3 for heat gun, n=6; 3.3 ug/m^3 for wet sanding, n=3; 9.8 ug/m^3 for open flame burning, n=5). NIOSH personnel monitoring exposures to abatement workers using heat guns for exterior paint removal also found very low airborne lead levels, ranging from none detected to 3.3 ug/m^3 (n=3) (NIOSH, 1992). However, 10 interior breathing-zone samples ranges from none detected to 286 ug/m^3, with six samples (60%) exceeding 50 ug/m^3. NIOSH researchers concluded that workers are potentially overexposed to lead when using the heat gun method.

EPA's study described some data from both interior and exterior surface preparation work using wet methods. Nineteen samples from exterior work were all generally low; 12 samples were below the limit of detection and 7 samples had a geometric mean of 6.75 ug/m^3. Fifteen samples from wet interior work had a geometric mean of 22.0 ug/m^3; however, a different job yielded 17 samples with a geometric mean of 164 ug/m^3, higher than one might expect to see (possibly due to incomplete wetting). The San Francisco Victorian study, which primarily involved monitoring during open flame burning, reported a median air lead concentration of 75 ug/m^3, higher than the level we found with our small number of samples (mean=9.8 ug/m^3).

Our results, and those of other studies, indicate that high airborne lead levels are determined by the type of surface preparation method used and the lead concentration in the paint being disturbed (which is related to the age of the building). A number of other factors, some of which are difficult to quantify, may also be involved, including how much paint is disturbed, the location of the lead-containing layers of paint, individual work practices, and environmental factors. Given the widespread prevalence of lead paint in older buildings (see Chapter 2, Section A), it is clear that a large number of California's painters will be exposed to lead and potentially at risk of lead poisoning if adequate precautions are not taken.

Use of Exposure Controls

Overall, our baseline results show that most components of a lead safety program to protect workers and building occupants were not in place at participating companies prior to our intervention. The baseline survey showed that the majority of the 21 employers:

- did not test for lead in paint,
- frequently used high exposure surface preparation methods (e.g., dry sanding and scraping, uncontrolled power sanding),
- did not use safer alternate methods (e.g., wet scraping, HEPA-exhausted power tools),
- did not provide adequate respiratory protection,
- did not provide fit testing or medical clearance for respirator users,
- did not provide routine blood testing under the supervision of a physician,
- did not provide protective work clothing or shoes,
- did not provide employee training more extensive than brief tailgate sessions,
- did not prohibit eating, drinking and smoking in the work area,
- did cleanup by dry sweeping,
- did not use HEPA vacuums for cleanup,
- did not consistently use containment methods to reduce lead contamination, and
- did not properly dispose of lead paint waste.

We are not aware of any similar surveys of owners of painting companies with which we can compare these findings. Still, since our group likely reflects employers who are more highly motivated in the area of health and safety, as evidenced by their participation in the Project, the lack of controls we observed among participants is likely to be common among residential and commercial painting contractors across the country. Lack of employer compliance with requirements of the Cal/OSHA Lead Standards such as medical surveillance and air monitoring has been found to be widespread in studies primarily of general industry (Rudolph et al., 1990; Papanek et al., 1992; Nunez et al., 1993; Burnham and Rossignol, 1996). The painting industry, its trade associations, and unions have recently begun to address the issue of lead safety through written materials, educational sessions, and participation in lead-related construction training courses. However, we believe these efforts have yet to make a significant impact on thousands of painting contractors and their employees in California and elsewhere.

The several small surveys of painters that are currently available (cited above) also document that painters are not adequately protected from exposure to lead in paint. The EPA study surveyed 34 painters from Philadelphia and St. Louis who volunteered to complete a questionnaire and have a BLL test for $50 compensation. Survey responses show that these painters were very similar to our participants at baseline in certain respects, including inadequate use of respiratory protection, use of dry sweeping, smoking at work or in the work area, and use of specific surface preparation methods (power sanding, dry manual sanding, and dry or wet scraping). The use of HEPA-exhausted power tools, however, was higher among EPA's painters than our group at baseline; 23% of respondents in the EPA study reported using HEPA-exhausted power tools in the prior 30 days, while 95% of our employers at baseline had never used this control measure. The EPA group had received more formal training in lead hazards compared to the CPP population at baseline, possibly because lead abatement has been emphasized for a longer period of time in the eastern U.S. and has had some influence on the painting industry. Twenty-one percent of EPA's respondents had formal training in lead safety (only one employer in our group (7%) had sent any employees for formal training), and 18% had received educational materials.

The Washington State study included observations of 9 painters working at 5 jobsites. The industrial hygienist observed workers smoking and eating without washing up, wearing no, or inadequate, respiratory protection (only one wore the appropriate respirator for his job task), and wearing work clothes home. In our baseline survey, 76% of smokers reported never washing up before smoking, although the majority of workers said they washed up before eating. Most of our workers at baseline did not use adequate respiratory protection. We found that at baseline 46% of our participating employees wore their work clothes home every day, and 55% wore their work shoes home every day. None of the workers in the Washington State study had received any training in lead hazards, except that one had heard about lead paint while in the military.

The San Francisco Victorian study included questionnaire surveys of workers which similarly identified that wearing work clothes home and not washing up before eating were problems. Regarding use of respiratory protection, 71% reported using a dust mask when removing paint.

Blood Testing

Blood Lead Levels

We have argued that lead paint is present in a large proportion of buildings across the country, that painters frequently disturb lead paint while preparing surfaces and create high airborne lead levels, and that many painters are not using lead hazard control measures that are well known to occupational health professionals. This would lead us to expect, then, that painters are at risk for lead poisoning. Case studies of painters with highly elevated BLLs are reported in the literature (Feldman, 1978; Schneitzer et al., 1990; Spaeder and Schubert, 1988). State occupational blood lead registries have also reported elevated BLLs among painters (Baser and Marion, 1990; Maizlish and Rudolph, 1993; Rabin et al., 1994; Tepper, 1992; Waller et al., 1992).

The population studies cited above report BLLs on a combined group of just 329 painters (note: this includes our baseline data from 132 painters). Only 36 of these painters[1] had a blood sample collected at the work site on a day when lead paint was being disturbed by

[1] painters from the San Francisco Victorian and Washington state studies

surface preparation work. For the vast majority of the painters (293[2]), blood collection was scheduled for the convenience of the researchers and did not necessarily coincide with recent work on a lead paint job. Because we do not how the recent lead exposure of this small group of painters compares to that of the universe of painters, we have little assurance that their BLLs are representative of painters as a group.

The CPP painters tested at baseline reported that they did exterior surface preparation on pre-1980 buildings an average of 3.6 days in the month prior to testing, and exterior surface preparation on pre-1950 buildings 3.2 days in the month prior to testing. In November 1994 (post-intervention), our participants reported doing exterior surface preparation on pre-1980 buildings a mean of 4.1 days in the prior month, and 3.4 days on pre-1950 buildings. Employees averaged only 1 day of interior surface preparation on pre-1950 buildings at both baseline and post-intervention. Since the EPA group of painters reported doing paint removal on pre-1950 housing an average of 11 days in the prior month, they may have had more recent exposure to lead than our participants. However, other factors (e.g., surface preparation method, amount and location of lead paint, protections used) that are much more difficult to measure or estimate for a large group, might be important for a more accurate estimate of recent exposure.

The geometric mean BLL and range were 7.2 ug/dl (1 to 36) for the painters in the EPA study (after adjusting for covariates the geometric mean was 5.9 ug/dl), 6.8 ug/dl (3 to 29) in the North Carolina study, and 8.6 (3 to 38) for our participants at baseline. In our study, the geometric mean BLLs and ranges were similar at four points in time, including early, in the middle of, and late in the busy exterior painting season (i.e., summer through fall). The highest geometric mean was 9.5 ug/dl, in November 1994. For comparison, the 1991-94 NHANES study reported a geometric mean BLL of 2.1 ug/dl for adults aged 20 - 49, and 3.1 for adults aged 50 - 69 (CDC, 1997).

The eight BLLs in the Washington State study ranged from 2 to 18 ug/dl. BLLs were found to be somewhat higher in the San Francisco Victorian study, ranging from 11 to 45 ug/dl with an arithmetic mean of 24 ug/dl. It is possible these higher levels, which represent a more homogenous group of painters specifically involved in Victorian restoration and were collected during a job with confirmed presence of lead paint, are more typical for this specific sector of the painting workforce.

In all of the studies, painters were found to have BLLs exceeding those of the general adult U.S. population. In the North Carolina study, 2.4% of painters had a BLL greater than 20 ug/dl. The EPA study found that 21% of painters had BLLs greater than 10 ug/dl. In our Project, during testing while in the midst of the busy painting season (August 1994), 41% of 110 painters had a BLL greater than or equal to 10 ug/dl, 14% were at or higher than 20 ug/dl, and 4.5% were in the 30 - 39 ug/dl range. Distributions varied somewhat among the four testing dates, as did numbers tested, but there was always at least 35% of the group at or above 10 ug/dl. For comparison, the NHANES study of the general

[2] painters from CPP, the North Carolina study, and the EPA study

population estimated that for U.S. residents aged 20 to 49, the proportion with BLLs at or exceeding 10 ug/dl would be 1.5 %. For those aged 50 to 69, the proportion at or above 10 ug/dl would be 2.9 %.

In reviewing the distributions of BLLs in these studies, we note that the prevalence of BLLs at or above 40 ug/dl, the level at which Cal/OSHA requires medical evaluation, is very low. Only the San Francisco Victorian study identified employees with BLLs in this range, with five painters (18%) having a BLL between 40 and 45 ug/dl in at least one test over a period of several months.

Painters' BLLs in the available studies are lower than those reported for workers in other industries where the exposures are high and continuous. For example, a study of 246 radiator repair workers in California found that 6% of the group had BLLs at or above 60 ug/dl, a level high enough that the worker had to be removed from lead exposure (Bellows and Rudolph, 1993). Twenty-two percent were at or above 40 ug/dl, and 60% above 25 ug/dl. In another study of radiator repair workers in New York City, 26% had BLLs at or above 40 ug/dl, and 56% had BLLs 25 ug/dl or greater (Nunez et al., 1993).

Painters' exposures to lead are likely to be intermittent unless they work exclusively on very old buildings (e.g., historic restorations). Painters usually alternate surface preparation with application of non-lead paint. They may also work for periods of time on newer construction where lead paint is not present. This pattern of intermittent exposure is likely to be a key reason why BLLs among groups of painters are lower relative to other lead occupations with more continuous high exposures. It is important to keep in mind, however, that individual cases of severe lead poisoning have been documented among painters. BLLs can rise quickly with just a few days of exposure at very high levels, which may occur often for unprotected workers disturbing lead-containing paint using common surface preparation methods. Painters who do not receive routine blood testing, or whose tests are poorly timed in relation to recent exposure, may remain unaware of their personal risk of excessive lead exposure.

Relationship of Blood Lead Levels to Other Factors

As in the EPA study (U.S. EPA, 1997), we had BLL data on a sufficient number of workers to examine relationships between BLL and other factors and to develop statistical models identifying significant predictors of BLL.

Looking first at univariate relationships, both our Project and the EPA study found statistically lower BLLs for non-Hispanic whites, non-smokers, smokers who do not smoke at work/in the work area, and high school graduates. Neither study found an association between BLL and non-occupational/hobby exposure or between BLL and eating in the work area. In contrast to the EPA's finding, we did not find a relationship between age and BLL. Our data show lower BLLs for union members and employees of larger companies; these variables are not reported in the EPA study. Both studies found that respirator use was associated with higher BLLs, an unexpected finding. We believe that a possible explanation is that workers reporting wearing respirators are more likely to be exposed to lead paint.

Days of paint removal work on pre-1950 buildings in the month prior to testing was related to BLL in the EPA study. For our baseline data, days of interior surface preparation on pre-1950 buildings was associated with BLL, and days of exterior work on pre-1950 buildings approached significance. In November 1994, our data show that exterior surface preparation on pre-1950 buildings was related to BLL but interior work was not. The EPA study found that years of paint removal on pre-1950 buildings was related to BLL, but in our data years employed as a painter was not significantly associated with BLLs.

EPA's final linear regression model shows the effect of specific factors on BLL while simultaneously adjusting for the effects of all other factors. Higher BLLs were found to be associated with working as a painter (as compared to other types of renovation or remodeling work), as well as being African-American, not having finished high school, smoking while working, living in a pre-1950 home, and using a respirator or dust mask. In addition, BLLs were increased by having conducted more days of renovation/remodeling work in pre-1950 buildings in the prior month, in the last year, or over one's career.

Our statistical models differed somewhat according to when the BLL data were collected (i.e., baseline or post-intervention [November 1994]). Both of our models were similar to the EPA study in that they identified being non-white and smoking in the work area as factors associated with higher BLLs. Also, exposure estimated by days of surface preparation on pre-1950 buildings was significant in both models; however, at baseline the significant association with exposure was with interior work and in November 1994 it was with exterior work. As in the EPA model, educational level was significant in our model developed from baseline data. One other factor found to be significant in both of our models was company size, with larger companies having lower employee BLLs; this variable was not investigated by the EPA study.

15. BROADER IMPACT OF THE CPP

The California Painters Project has had a positive impact beyond the 21 painting contractors and their workers immediately involved in the Project. The Occupational Lead Poisoning Prevention Program has gained knowledge and experience from the CPP that we can carry forward to our subsequent intervention work with painting contractors as well as small businesses in other industries. Additionally, since the end of the Project, OLPPP has undertaken several activities whose goal is to provide information and education concerning lead paint hazards to a larger audience including other contractors, workers, the public, and regulatory agencies. In this chapter we discuss the benefits of the CPP to OLPPP as well as the activities that OLPPP has undertaken since the end of the Project.

A. BENEFITS TO OLPPP

Through the CPP, the OLPPP staff acquired technical information and expertise about the rapidly changing technology available to address lead safety in the painting trades. We also learned more about which work and business practices are technically and economically feasible for painting contractors, leading to better recommendations regarding lead safety measures. OLPPP's expertise is now recognized by the industry, and this facilitates our on-going educational efforts with contractors (discussed below). We also gained invaluable experience working with small businesses in the construction industry. We now have a better grasp of the nature of construction work and the culture within the construction industry. Previously, our small business experience was limited to general industry.

Our intervention research skills also improved significantly. Specifically, we feel more confident in our ability to gain access to a target population and recruit project participants, develop effective data collection instruments, and conduct qualitative as well as quantitative evaluation. We also have a deeper understanding of the complexity of full-scale multi-faceted intervention research and when it is appropriate to conduct more modest efforts.

Finally, as a result of the CPP, we have developed long-term relationships with the stakeholders in the painting industry. Recognition of OLPPP has increased and our reputation in the trades has been enhanced facilitating our future education efforts with this target population. Further, this recognition allows us to provide input into development of local, state and national standards and regulations and lead poisoning prevention policy.

B. REVISION AND DISSEMINATION OF PROJECT MATERIALS

Following the conclusion of the intervention, we revised the *Painting Contractor's Guide to Lead Safety* manual and the "Lead Safety for Painters" tailgate training handouts in response to feedback received during the employer seminars and the focus group. The revisions were also informed by our increased understanding of a number of issues gained during the course of the intervention stage of the Project. A final version of the manual was produced in March 1996. Final versions of the tailgate training materials in English, Spanish and Chinese were also put together at the same time. We are not broadly disseminating the worker training curriculum at this time because we believe it is not realistic to expect untrained contractors to use the curriculum to train their employees.

In April of 1996, a flyer advertising the availability of these materials was mailed to a list of individuals who had expressed interest in the past, appropriate federal, state, and county agencies, industry trade associations and employer organizations, national, state, and local unions, and worker health and safety organizations, public health and occupational health care provider organizations, community-based organizations, and professional and university-based organizations. In response to these mailings, we have received a number of requests for the materials and have distributed copies through the mail. In addition, the manual and the tailgate training materials were handed out to all attendees at the half-day regional contractor lead safety seminars that OLPPP has conducted throughout the state (see below).

C. REGIONAL SEMINARS FOR PAINTING AND REMODELING CONTRACTORS

To begin to address lead safety statewide among painters and other construction workers who disturb lead paint, OLPPP planned a series of up to 20 regional seminars for painting and remodeling contractors. We were in an excellent position to plan these seminars using the experience we gained in conducting this Project and the relationships we developed with participants and Advisory Committee members. Our message was refined to a clear "You contractors can do this--you can protect your employees and the public from lead paint hazards and increase your market opportunities at the same time."

The goal of the 4-hour seminars was to raise awareness about lead safety and to motivate contractors to seek additional formal training from a state-accredited training provider and become state-certified. The seminars were co-sponsored by State Compensation Insurance Fund, the state's largest workers' compensation carrier, and OLPPP and CLPPB of the California Department of Health Services (CDHS). Two trade associations for painters and remodelers, the Painting and Decorating Contractors of America and the Builders Exchange, endorsed this effort and assisted with publicity. Cal/OSHA Consultation Service and the local health department childhood lead programs were also invited to endorse and participate in the seminars. Local health departments also assisted with outreach efforts.

The seminars were designed for groups of 30 - 60 contractors and were provided free of charge. Speakers included a painting contractor with a good lead safety program, an attorney who addressed liability issues (videotaped), OLPPP staff, and staff from CDHS' Accreditation and Certification Unit who discussed why and how to get certified in lead-related construction. A sample seminar announcement and agenda appear in Appendix 24. Attendees received a copy of the *Painting Contractor's Guide to Lead Safety*, worker tailgate training materials, and other resources. The response from contractors who attended the seminars was very positive.

D. CUSTOMER EDUCATION

During the course of our intervention, contractors expressed the concern that they would lose jobs to lower bidders who did not take steps to control worker and occupant exposure unless customers appreciated the hazard of disturbing lead paint. In the focus group discussion, contractors identified public ignorance as a significant obstacle to improving lead safety. In response to their requests for an independent publication to assist them in selling the "lead-safe" bid, we developed an educational brochure entitled "Protecting Your Family from Lead Paint Hazards: What you should know before repainting, remodeling, or renovating a home or apartment." The brochure was designed to assist the trained and certified contractor in educating a potential customer about the hazards of lead paint and to help the consumer in selecting a "lead-safe" contractor. We made the brochure available to all CPP participants who completed the 32-hour training course, the Painting and Decorating Contractors of America (PDCA), and other trade associations. We also made the brochure available to the CDHS Accreditation and Certification Unit for distribution to contractors at the time of their certification and to local health department childhood lead poisoning prevention programs.

E. PARTICIPATION IN LEAD IN CONSTRUCTION REGULATORY EFFORTS

During the course of this Project and afterward, there have been several regulatory efforts at the federal, state, and local level related to protecting the public and/or workers from lead paint hazards. These efforts include: U.S. EPA regulations resulting from implementation of Title X; California Department of Health Services regulations to address training, accreditation, and certification of workers and supervisors, and protection of the public in lead abatement and construction work; revisions to the Cal/OSHA Construction Lead Standard to require state-accredited training and CDHS certification of workers and supervisors for construction work involving significant lead exposure; and San Francisco city ordinances covering lead paint in housing.

Several of the participating contractors, who became aware of these efforts through the Project, became active in representing the views of experienced, licensed contractors toward the development of feasible and effective regulations. They have been involved in advisory committees, public meetings, and other means of providing input to the regulatory process, including assisting the organizations of which they are members (trade association, union) take positions on key issues. Project staff, who gained expertise in construction and working with small contractors, have similarly participated and provided input, particularly into the development of state regulations.

F. CHINESE CONSTRUCTION WORKER TRAINING

In June 1995, staff from OLPPP, the San Francisco County Childhood Lead Prevention Program (SFCLPP), Health Center #4 of the San Francisco Department of Public Health, and

City College of San Francisco met to discuss a cluster of cases of children seen at Health Center #4 who had elevated blood lead levels. A majority of the cases involved a parent who was either a painter or had done renovation and remodeling in his own home. Because these were Chinese families, OLPPP and SFCLPP decided to conduct a small-scale outreach and training project targeting painters and do-it-yourself remodelers in San Francisco's Chinatown, using training and education materials originally developed for the Project.

In early October 1995, SFCLPP's outreach worker conducted four lead awareness classes for 175 ESL[1] students at the Chinatown campus of City College of San Francisco. These classes were designed to raise basic awareness of lead hazards, including take-home exposure, and to recruit painters and remodelers for a half-day training course. Outreach to painters was also conducted by going to local cafes where Chinese day laborers meet for breakfast and wait for job offers. On October 14, 1995, SFCLPP's outreach worker and OLPPP's health educator and Cantonese-speaking contract trainer conducted a half-day training session for 18 participants. The training curriculum utilized CPP worker training activities and written handouts, emphasizing workplace exposure to lead and residential contamination, health effects of lead exposure, blood lead testing, respirators and hygiene, prevention of take-home exposure, and workers' rights.

[1] English as a second language.

16. CONCLUSIONS AND RECOMMENDATIONS

As we stated at the outset, the purpose of the CPP was four-fold: to develop and implement a model lead poisoning prevention strategy for residential and commercial painting contractors and evaluate its effectiveness; to develop a step-by-step employer compliance assistance manual; to generate information on the feasibility and efficacy of the model and make recommendations to state and local health departments for replication; and to assess the risk of lead poisoning among painters. Below we summarize our findings in each area and make recommendations to state and local health departments and others considering similar interventions. We finish with our recommendations to policy makers for preventing lead poisoning among painters and other small business trades.

CONCLUSIONS

Risk of Lead Poisoning Among Painters

Our screening questionnaire and baseline interviews indicate that there is likely to be widespread lack of compliance with the Cal/OSHA Construction Lead Standard among painting contractors. None of the 127 companies we contacted for potential participation in the CPP had to be excluded because they were substantially in compliance with the Lead Standard. Our baseline interviews of contractors and their workers show that contractors had very little knowledge of lead hazards and how to control them, and did not have adequate lead safety programs in place. For example, no employers provided periodic BLL testing as required by the Lead Standard and almost three quarters of employers were not consistently selecting the appropriate respirator for dry manual sanding.

The BLLs of CPP participants reflect the moderate exposure they reported in the month prior to testing. On average participants did only a few days of surface preparation work on buildings likely to contain lead paint in the month prior to blood testing. BLLs ranged from less than 5 to 38 ug/dl, with a geometric mean of 9 ug/dl. Although we do not know how the recent lead exposure of our group compares to that of residential/commercial painters as a whole, these results suggest that painters' BLLs are not as high as more continuously exposed worker groups, such as those involved with automotive radiator repair. Still, the average BLL of CPP participants was three times greater than that of the general public. Because research shows there are subtle health effects associated with lead exposure at increasingly lower levels, our goal should be to keep worker BLLs as close as possible to the average BLL of adults in the United States (approximately 2-3 ug/dl).

It is important also to remember that very few painters have been tested in population studies to date and OLPPP and others have found individual residential painters who were seriously lead poisoned following surface preparation without proper controls. The CPP BLL results represent a small group of painters who had only moderate exposure to lead paint at the time of our study. Certainly, lead exposure may be higher among painters who concentrate on work in older buildings or painters whose main task is surface preparation.

Our air monitoring data confirm that painters can be exposed to very high airborne lead concentrations when using common surface preparation methods on exterior surfaces. Nearly one quarter of full-shift exposures exceeded Cal/OSHA's Permissible Exposure Limit of 50 ug/m^3. The specific methods with the highest exposures were uncontrolled power sanding and dry manual sanding. The use of HEPA exhaust ventilation on power sanders was found to reduce airborne lead exposures by approximately 90%. Use of a properly fitted, half-mask respirator with HEPA filters would be expected in most instances to provide adequate control of full-shift exposures during surface preparation.

The indication of widespread lack of compliance with the Cal/OSHA Construction Lead Standard, the evidence of high airborne lead exposure during certain surface preparation tasks, and the finding that painters' BLLs exceed those of the general population, together indicate that residential and commercial painters are at significant risk of harm to their health from lead exposure.

Effectiveness of CPP Intervention Strategy

There are no established performance standards for comprehensive workplace intervention projects or interventions targeting painters. Our appraisal of the degree of success of the CPP depends on what *we believe* should have been achieved given our intervention efforts. Our task is made more difficult because our impression at the outset of what was reasonably achievable was quite different from our perception at the end; over the course of the Project it became clear that our expectations were overly optimistic. If we judge the CPP solely on whether we met the objectives we set initially, the CPP was not overwhelmingly successful; employers did not meet 12 of 27 objectives and workers did not meet 9 of 12 objectives. However, such an assessment of the Project masks the extensive improvement that employers and workers made. Looking more closely at the data we find that there was 50% or greater (57% - 84%) improvement in 6 of the 12 areas where employer objectives were not met; of the 9 areas where worker objectives were not met, there was 50% or greater (53% - 82%) improvement in 6 and very close to 50% improvement in the remaining three cases (44%, 48%, 49%).

Establishing specific performance objectives at the beginning of a project requires some notion of what is reasonably achievable given certain efforts. Unfortunately, there was very little information available to us at the outset on which to base reasonable expectations for improvement. In retrospect, we believe that we set unreasonably high target objectives in many cases (e.g., expecting that 90% of the target population would change a specific work practice). Given that we were attempting to influence a very complex phenomenon, human behavior, our expectations for improvement should have been more modest.

Although we felt short of achieving many of the objectives that we set, we believe that the significant improvement we observed indicates that the CPP intervention strategy of education, training, and technical assistance, implemented in a step-by-step manner was effective in inducing residential/commercial painting contractors to establish lead safety programs and encouraging workers to use safe work practices. Further, these improvements were sustained.

We were most successful in inducing contractors to make changes that were simple and straightforward, a familiar part of their day-to-day operations, inexpensive or considered reasonably priced. As could be expected, employers took a longer time to implement practices that required sizable financial investments. Despite the intensity of our intervention activities, there were several areas where the participants had difficulty meeting our objectives. Contractors identified cost and a lack of public awareness of lead paint hazards, resulting in customers' unwillingness to pay the additional costs of lead-safe painting, as two of the obstacles they faced to making changes in lead safety.

The combined costs for a comprehensive lead safety program--including equipment and supplies, medical services, increased hours devoted to set-up, cleanup, or slower work methods, employee training, employee time away from the job, and increased record keeping--were substantial for these small business owners. In some areas, such as medical surveillance, improvement will require increased availability of lower cost services and products. Cost was not a barrier to change, however, in all areas where we failed to meet our objectives. In these areas, we may have been more successful if we had provided more hands-on training to develop comfort with new work practices, or had provided training specifically for on-site foremen or supervisors. The role of the on-site supervisor in daily attention to lead safety and related work practices needs to be further explored.

Workers also made important changes to reduce their risk for lead poisoning, particularly in the areas of hygiene and preventing take-home exposure. Contractors and workers felt that having an outside agency provide worker training contributed to the success of their efforts to improve work and hygiene practices. Offering training in Spanish and Chinese was also critical to the success of the worker training. Unfortunately, we did not collect information on why workers met some of the objectives we had established and not others.

Adaptation of the CPP Intervention Strategy

A major objective of the CPP was to develop a lead safety intervention strategy for small to medium-sized residential and commercial painting contractors and to make recommendations for revisions to the model for replication by state and local health departments and others. While full implementation of the CPP intervention strategy may not be feasible or appropriate in every situation, the model can be adapted to the needs and resources of local programs. We recommend that state and local health departments and others consider the points below when adapting the model for their use.

The employer seminars appeared to be the most significant project component in achieving desired changes among employers. The use of peer educators, hands-on demonstrations, and participatory training techniques were key to the success of these training efforts. Providing assistance identifying qualified medical surveillance services was instrumental to employers establishing medical surveillance programs. Industrial hygiene consultation and monitoring services, although helpful, could be scaled back if program resources are limited. We recommend that the educational materials developed by the CPP be used rather than developing new materials.

Our evaluation revealed that in addition to specific project components certain aspects of the intervention played a critical role in contractors' and workers' decisions to participate and their efforts to improve lead safety. We believe concrete incentives such as BLL testing, air monitoring, and worker training must be offered to obtain the participation of small business owners and their workers over a several-month period (and beyond for additional follow-up). Intervening simultaneously with employers and workers appeared to be critical/instrumental in making improvements. Contractors believed that seeing their employer make safety improvements encouraged many employees to improve their own work practices and to identify and notify the employer of lead contamination problems so that changes could be made. Approaching employers with an open mind and clearly communicating a willingness to listen and learn, as well as providing opportunities for peer interaction and education, appeared to greatly facilitate the CPP's success. We also believe that the CPP's pragmatic and flexible approach to compliance with the Cal/OSHA Construction Lead Standard ultimately resulted in greater improvement in working conditions than a rigid, dogmatic approach.

The success of the approach used in the CPP depended on an ability to attract volunteer participants. Local health departments for the most part do not have regulatory authority in the area of occupational health and therefore are in a position to replicate our strategy. The role of the state health department in regulation of the workplace varies from state to state. State health departments which have occupational regulatory responsibilities in addition to their public health responsibilities should consider the effect this may have on their ability to implement a voluntary program. One approach which has been tried by health departments in this situation is to provide limited protection from enforcement action for employers who participate in an intervention program.

Differences in resources and staffing patterns between OLPPP and state and local health departments may also affect the replicability of the CPP in these settings. The CPP was a resource-intensive program and many local health departments may not be able to marshal sufficient resources to implement such a comprehensive model. Throughout the report we have tried to point out areas where activities could be modestly scaled back if necessary.

Another important factor which state and local health departments should consider is their ability to assemble a multi-disciplinary team. Assembling a team of industrial hygienists, health educators, nurses, etc., may be realistic for many state health departments, but most local health departments will find it difficult to compile such a team. Still, local health departments may be able to bring in private consultants or work with other local agencies to bring together the necessary expertise.

The contractors who participated in the CPP are likely to be similar to licensed painting contractors in other locales in that they have few resources for health and safety and do not have dedicated health and safety staff. We expect that local and state health departments would find painting contractors in their areas also receptive to a program which provides free education, training, technical assistance and services to comply with workplace regulations. However, CPP participants and the setting of the CPP may differ from other populations of painting contractors and settings in important ways. The CPP was conducted in the San Francisco Bay Area where public awareness of lead paint hazards is high and local childhood lead poisoning prevention programs are active. In areas where public awareness is low health departments may have to work harder to recruit participants into a voluntary program and to develop a market for lead-safe paint jobs. State and local health departments may want to consider working with their childhood lead poisoning prevention programs so that efforts to promote lead safety among painting contractors are coupled with public education efforts.

Health departments and others considering replicating the CPP should also remember that in contrast to other geographic areas a large percentage of the residences and other buildings in San Francisco likely contain lead paint. In settings where contractors do less work on lead paint, contractors would probably be less likely to participate in a similar project and, even if they did, would be less likely to invest time, effort, and money into instituting lead-safe practices. Finally, CPP participants were licensed contractors. We do not believe that the CPP model would be effective with the population of unlicensed contractors since it is unlikely that they would choose to participate in a project conducted by a government agency, or that compliance with health and safety would be a priority for this group.

RECOMMENDATIONS

Local and State Health Departments

<u>We recommend that health departments and others interested in replicating or adapting the CPP intervention strategy with painters</u>:

- Adapt this model to fit their target population and the financial and staff resources available to them keeping in mind that: employer and worker education and training appeared to be the most significant component in achieving improved lead safety; and assistance identifying qualified occupational medical services was essential to employer efforts to establish a medical program.

- Investigate new approaches to addressing the major obstacles to lead safety that we identified through the CPP including: reticence to adopting new work practices and technologies; lack of accessible and affordable medical services; lack of awareness among the public about lead issues; competition from the unlicensed sector and other painters not using lead-safe practices; and variability of enforcement by regulatory agencies.

- Highlight the message that becoming a lead-safe painting company decreases contractors' liability and increases market opportunities. As the public becomes more aware of lead paint hazards and the need to use contractors who are trained in lead-safe procedures, painting companies with this expertise have a business advantage. Federal lead paint disclosure requirements and other regulatory efforts may drive this effort forward.

- Use or adapt educational materials and approaches developed in this Project to raise awareness about lead issues and motivate employers to seek training by accredited training providers available in many states since the passage of Title X.

Occupational Health and Safety Intervention Researchers

We recommend that occupational health and safety intervention researchers and practitioners consider the following points when conducting intervention research.

Our experience in the Project validated much of what has been written regarding effective intervention research efforts:

- Learn as much as possible about the industry prior to beginning the intervention. This should include some form of needs assessment.

- Involve trade associations, unions, and other stakeholders in the planning, recruitment, implementation, and evaluation of the intervention.

- Base the intervention design on theories in the engineering, sociological, organizational, and behavioral sciences which describe how the project will lead to the desired outcome.

- Use a research design as similar as possible to a true scientific experiment. In most workplace intervention research settings a quasi-experimental design will be necessary.

- Plan to devote significant resources to project evaluation, including follow-up evaluation to determine if changes were sustained or further changes made.

- Develop reasonable performance objectives by which to evaluate the impact of the project.

- Include qualitative evaluation methods to inform and interpret quantitative data.

- Maximize limited occupational health resources by developing intervention projects which can be applied to a larger audience.

Based on our experience, we also propose the following as important to the success of workplace intervention efforts:

- Design comprehensive intervention projects which address the multiple factors which affect workplace health and safety, work simultaneously with employers and workers, provide or facilitate access to tools and resources necessary for making improvements, introduce material in a stepwise manner over an extended period of time, and give clear guidance concerning the relative importance of specific changes.

- Approach employers and workers with respect and an open mind and a willingness to learn from them and adapt the intervention based on their input/feedback.

- Recognize the significance of peer influence and peer support and design projects which include peer education. Use participatory training techniques, including hands-on demonstrations.

- Offer concrete incentives to encourage participation and minimize record keeping tasks and paperwork required for participants.

- For those conducting research in industries where lead exposure is intermittent and highly variable, validate a means for estimating recent lead exposure which minimizes reliance on individual recall and surrogate exposure measures.

Policy Makers

<u>We recommend that policy makers concerned with the prevention of lead poisoning in residential/commercial painting and other industries where small businesses predominate</u>:

- Provide ongoing funding to implement and evaluate new intervention approaches and develop industry-specific educational materials.

- Ensure that free or low-cost education and technical assistance are available to small businesses owners, including painting contractors, to implement lead safety programs in compliance with the OSHA Construction Lead Standard.

- Support stronger enforcement of the OSHA Construction Lead Standard, including targeted inspections.

- Support requirements for state- or EPA-certification of painters (supervisors and/or workers) and/or for painters to use specific lead-safe work practices.

- Promote the development of externally-provided training services for small business owners and their employees that are accessible, affordable, and institutionalized (i.e., available on an on-going basis through educational institutions such as community colleges, union apprenticeship programs, etc.).

- Foster the development of new approaches to the delivery of accessible and affordable, high quality occupational medical services, including lead medical surveillance, to small business owners and their employees.

- Support the development of ongoing financial resources for small business owners for implementation of health and safety improvements (e.g., loans, grants).

APPENDIX 1

References

APPENDIX 1 - REFERENCES

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APPENDIX 2

Advisory Committee Member List

CALIFORNIA PAINTERS PROJECT ADVISORY COMMITTEE

Tom Lewis; Painting and Decorating Contractors of America

Peter Tiernan; International Brotherhood of Painters and Allied Trades

Karen Cohn; Childhood Lead Prevention Program, San Francisco Department of Public Health

Michael Kosnett, MD; University of California at San Francisco

Peter Flessel, PhD; Environmental Health Laboratory Branch, California Department of Health Services

Bob Nakamura; California Division of Occupational Safety and Health (Cal/OSHA)

Heather Borman; State Compensation Insurance Fund

Bob Schlag; Childhood Lead Poisoning Prevention Branch, California Department of Health Services

William Walker, MD; Environment Subcommittee, California Conference of Local Health Officers

Bob Downey; Associated General Contractors of California

APPENDIX 3

Eligibility Screening Questionnaire and Invitation to Participate

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY

PETE WILSON, Governor

DEPARTMENT OF HEALTH SERVICES
CALIFORNIA OCCUPATIONAL HEALTH PROGRAM (COHP)
2151 BERKELEY WAY, ANNEX II
BERKELEY, CA 94704
(510) 540-2115

February 22, 1994

Dear Painting Contractor:

The California Department of Health Services is conducting a project to reduce lead paint poisoning among painters working in San Francisco and we invite you to participate. The project will determine the likelihood of lead poisoning among painters disturbing lead paint. The project will then assist contractors in setting up a lead safety program and meeting the new lead poisoning prevention regulations. As part of this effort we will provide substantial resources to selected contractors at no cost.

As a first step, we are asking <u>every</u> contractor to answer the enclosed questionnaire. Please take fifteen minutes to fill out the questionnaire. Your answers will be kept confidential. The information you provide will be used to determine if you are eligible to participate in the project. Your answers will also help us to develop educational materials for you and your employees.

You may not be aware of the new lead poisoning prevention laws and regulations which will <u>now</u> affect how you do business. (These are new regulations just now being enforced.) However, not having a lead safety program *could* mean fines from Cal/OSHA, increased workers' compensation costs and lawsuits from property dwellers or owners. The Department of Health Services does not enforce these regulations. We try to make compliance less difficult by providing resources specifically for small businesses like yours.

This project has the enthusiastic support of the Painting and Decorating Contractors of California, the International Brotherhood of Painters Union, the San Francisco Department of Public Health and others. These organizations are working closely with us in conducting this project.

Please return the completed questionnaire in the postage-paid envelope no later than Monday, March 7, 1994. If you would rather answer these questions over the phone or have any questions about this questionnaire, please call me collect at (510) 540-2788. If you are selected to participate in the project, we will contact you soon. If you are not selected, we will send you a packet of lead health and safety educational materials. Thank you for your cooperation.

Sincerely,

David Harrington

David Harrington
Coordinator, California Painters Project

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY PETE WILSON, Governor

DEPARTMENT OF HEALTH SERVICES
CALIFORNIA OCCUPATIONAL HEALTH PROGRAM (COHP)
2151 BERKELEY WAY, ANNEX II
BERKELEY, CA 94704
(510) 540-2115

Febrero 22, 1994

Estimado Contratista de Pintura:

El Departamento de Servicios de Salud del Estado de California está llevando acabo un proyecto para reducir el envenenamiento de pintura con base de plomo entre aquellos pintores que trabajan en San Francisco y les enviamos una invitación para participar en el proyecto. El proyecto determinará la probabilidad del envenenamiento con plomo entre los pintores cuando remueven pintura a base de plomo. El proyecto entonces asistirá a los contratistas en organizar un programa de seguridad con plomo y en cumplir con las nuevas regulaciones de prevención al envenenamiento con plomo. Como parte de nuestro esfuerzo, disponeremos recursos substanciales para contratistas seleccionados sin costo para ellos.

Como primer paso, quisieramos que <u>cada</u> contratista respondiera al cuestionario adjunto a la presente. Por favor, tome 15 minutos para completar el cuestionario. Sus respuestas serán guardadas bajo confianza. La información que Ud. disponga será usada para determinar su elegibilidad de participar en el proyecto. Sus respuestas también nos ayudarán a desarrollar materiales educativos para Ud. y sus trabajadores.

Tal vez, no está enterado de las nuevas leyes y regulaciones de prevención al envenenamiento con plomo las cuales <u>ahora</u> afectan la manera que uno hace negocios. (Ahora mismo se exigen estas nuevas leyes.) De qualquier modo, el no tener un programa de seguridad con plomo <u>puede</u> resultar en multas otorgadas por Cal/OSHA, aumentos a los gastos de la compensación de trabajadores ó denuncias por los habitantes de las propiedades ó los dueños. El departamento de Servicios de Salud no impone estas regulaciones. Tratamos de hacer que el proceso de implementar las regulaciones sea menos dificil para disponer recursos específicamente para aquellos pequeños negocios como la suya.

Este proyecto tiene el apoyo entusiasta de los Contratistas de Pintura y Decoración de California (Painting and Decorating Contractors of Calif.), la Congregación Internacional de la Union de Pintores (International Brotherhood of Painters Union), el Departamento de Salud Pública de San Francisco (S.F. Dept. of Public Health), y otros. Para realizar este proyecto, estamos trabajando juntos con estas organizaciones.

Por favor, devuelva el cuestionario completo en el sobre con sello de correo antes de Marzo 7, 1994. Si prefiere responder estas preguntas por teléfono ó si tiene preguntas acerca el cuestionario, por favor, llámeme por cobrar al (510) 540-2788. Si fue seleccionado como participante en este proyecto, nos comunicaremos con Ud. muy pronto. Si no fue seleccionado, le enviaremos un paquete de materiales educativos acerca de la salud y seguridad con plomo. Gracias por su participación.

Sinceramente,

David Harrington

David Harrington,
Coordinador del Proyecto de Pintores
del Estado de California

EMPLOYER ELIGIBILITY QUESTIONNAIRE
California Painters Project

Occupational Health Branch
Occupational Lead Poisoning Prevention Program
California Department of Health Services

Company Name: ______________________________

Address: ______________________________

City: ____________________ State: ________ ZIP: ____________

Your Name: ______________________________

Your Title: ______________________________

Telephone Number: (   ) ____________ Best time to reach you: ____________

Today's Date: ____________________

1. During the past 12 months, how many (painting) employees did your company have:

   During your SLOWEST period? ______ employees

2. During the past 12 months, how many (painting) employees did your company have:

   During your BUSIEST period? ______ employees

   How many of these painting employees did surface preparation work? ______ employees

3. How would you describe your company's work? (check one)

   ❑ Mostly residential

   ❑ Mostly commercial

   ❑ About an equal mix of commercial and residential

4. We are interested in the *ages* of buildings your company painted during the past 12 months. Please estimate the percentage of buildings built in each age category. (Total should add to 100%.)

    _____ % built before 1950

    _____ % built 1950 to 1978

    _____ % built after 1978

    100 % TOTAL

5. During the past 12 months, has your company been involved in painting any metal structures that had a prior surface coating on them?

    ❑ Yes ❑ No

    IF YES: How many metal structures did your company paint? _______

6. During the past 12 months, how often did your company use the following surface preparation methods? (Check one box on each line.)

	Never	Occasionally	Frequently	Not Applicable
a) Abrasive Blasting (without dust collection system)	❑	❑	❑	❑
b) Power Sanding/Grinding (without dust collection system)	❑	❑	❑	❑
c) Torch/open flame burning	❑	❑	❑	❑

7. During the past 12 months, have you had any of your employees tested for the amount of lead in their blood?

    ❑ Yes ❑ No

    IF YES, how many times during the past 12 months did you have your employees tested?

    ❑ 1 time
    ❑ 2 to 5 times
    ❑ more than 5 times

8. During the past 12 months, how many times have you conducted air monitoring for lead at any of your job sites?

_______ times ☐ No air monitoring done

9. For this project, we will be developing information and resource materials on preventing lead poisoning. Please think about how important or helpful to your company information about the following items would be. Please rank the items in order of importance: 1 = Most Important → 8 = Least Important.

_____ OSHA Lead in Construction regulations

_____ Health effects and symptoms of lead poisoning

_____ How to set up a blood lead monitoring program for employees who work with lead

_____ Engineering controls or work practices to reduce employee lead exposure

_____ Respiratory protection

_____ How to train company employees about lead

_____ Hazardous waste disposal

_____ Other: ____

10. For the purpose of developing educational and training materials, we would like to know which languages besides English your painting employees would prefer to receive written materials and training in.

a) Would any of your employees prefer written materials in SPANISH?

☐ Yes ☐ No

b) Would any of your employees prefer training in SPANISH?

☐ Yes ☐ No

c) Would any of your employees prefer either written materials or training in another language?

☐ Yes ☐ No

IF YES, which language? ________________________________

11. Is your company a member of the Painting and Decorating Contractors of America (PDCA) or the Painting and Decorating Contractors of California, Inc. (PDCC)?

❑ Yes ❑ No

12. Are any of your employees a member of a Union?

❑ Yes ❑ No

IF YES, which Union Local are your employees members of?

Name of Union/Local ______________________________

Union representative ______________________________

13. Who is your worker's compensation carrier? (check one)

❑ State Compensation Insurance Fund

❑ Other (specify): ______________________________

❑ Employees are not covered by worker's compensation

(do not write below this line)

ID: ____________________ Category: ____________

STATE OF CALIFORNIA — DEPARTMENT OF HEALTH SERVICES
CALIFORNIA PUBLIC HEALTH FOUNDATION

OCCUPATIONAL HEALTH BRANCH
2151 Berkeley Way, Annex 11, Third Floor
Berkeley, CA 94704
(510) 540-2115
FAX (510) 540-3472

April 27, 1994

Dear Painting Contractor:

Congratulations! We are inviting you to participate in the California Painters Project, a project that is being conducted by the California Department of Health Services to reduce poisoning from lead paint among painters working in San Francisco. This project will determine the likelihood of lead poisoning among painters who disturb lead paint. We will be helping a group of contractors learn how to work safely with lead paint and meet the new lead poisoning prevention regulations.

Recently, we asked you and other contractors to answer a confidential questionnaire. We want to thank you for completing that questionnaire. Based on the answers you provided us, we determined that you are eligible to participate in this project.

You are probably becoming more aware of the new lead poisoning prevention laws and regulations which affect how you do business. Not having a lead safety program *could* mean fines from Cal/OSHA, increased workers' compensation costs and lawsuits from property dwellers or owners. Having a lead safety program *will* mean that you will be in a better position to increase your business as the demand and funding for lead-safe painting work grows.

The Department of Health Services tries to make compliance less difficult by providing tools and resources to learn how to work safely on lead paint. Examples of resources that will be provided in the project include: a contractors compliance assistance manual, seminars for employers, worker trainings, etc. Yes, there will be costs in setting up a lead safety program, but they will be less than what it would cost if you were not in the project.

We are inviting you to an important first meeting where we will provide you with details on project activities, answer your questions and enlist your participation. **The meeting will be held on Saturday, May 14, from 10:00 AM to 12:30 PM at Ft. Mason in San Francisco. The meeting will take place in Conference Center Room A-2. Maps of how to reach Fort Mason and to find Room A-2 are attached.** Parking is free and refreshments will be served.

We urge you not to miss this opportunity! If you have any questions, don't hesitate to call me at (510) 540-2788, or Pat Young at (510) 540-3449.

Sincerely,

David Harrington
David Harrington
Coordinator, California Painters Project

Informational Meeting for Employers: California Painters Project

May 14, 1994
Fort Mason, SF

MEETING AGENDA

10:00 AM	**Introduction & Welcome** David Harrington, California Painters Project Coordinator
10:05 AM	**What is the Occupational Lead Poisoning Prevention Program (OLPPP)?** **Overview of Lead Hazards** Barbara Materna, OLPPP Program Coordinator
10:20 AM	**California Painters Project Overview & Activities** Peter Scholz, OLPPP Industrial Hygienist
10:50 AM	Break
11:00 AM	**Why Participate in the California Painters Project?** David Harrington, California Painters Project Coordinator Stan Reynolds, OEP Painting
11:30 AM	**Questions & Answers** **Sign up & Scheduling**

PAINTING CONTRACTORS

Located in San Francisco are invited to participate in the CALIFORNIA PAINTERS PROJECT

The California Department of Health Services is conducting a project to reduce lead paint poisoning among painters in the City and County of San Francisco and we invite you to participate.

You may not be aware of the new lead poisoning prevention laws and regulations which now affect how you do business (they are just now beginning to be enforced). Not having a lead safety program could mean fines from Cal/OSHA, increased workers' compensation costs and lawsuits from property dwellers or owners. The Department of Health Services does not enforce these regulations. We are trying to make compliance easier by providing resources specifically for businesses like yours. If you want to help yourself and your trade deal with this important problem we invite you to participate in the California Painters Project.

The project will:

- determine the likelihood of lead-poisoning among painters disturbing lead paint;
- assist contractors in setting up a lead safety program and meeting new lead poisoning prevention regulations.

The project will provide to contractors:

- a step-by-step compliance assistance manual
- seminars on how to set up a lead safety program
- one day of monitoring for lead in air
- training on how to determine the lead paint concentration
- worker safety training classes
- other technical and informational assistance

Contractors will be requested to:

- participate fully and cooperatively in the project
- complete job logs for each jobsite for six months
- complete steps and three progress reports in the manual

The project has the wholehearted support of the Painting and Decorating Contractors of California, the International Brotherhood of Painters Union, the San Francisco Department of Public Health and others.

For more information contact the Occupational Lead Poisoning Prevention Program at the California Department of Health Services at (510) 540-3449.

EMPLOYEES OF PAINTING CONTRACTORS

Working in San Francisco are invited to participate in the CALIFORNIA PAINTERS PROJECT

The California Department of Health Services is conducting a project to reduce lead paint poisoning among painters in the City and County of San Francisco and we invite you to participate.

You may not be aware of the new lead poisoning prevention laws and regulations adopted to protect your health and the health of children. The Department of Health Services does not enforce these regulations. We are trying to make compliance easier by providing resources specifically for businesses like the one you work for. If you want to help yourself, your family, your co-workers and your trade deal with this important problem we invite you to participate in the California Painters Project.

The project will:

- determine the likelihood of lead-poisoning among painters disturbing lead paint;
- assist contractors and employees in setting up a lead safety program and meeting new lead poisoning prevention regulations.

The project will provide to employees:

- testing for lead in your blood and the air you breathe
- worker lead safety training classes
- assistance in setting up a lead safety program
- information on preventing lead from being taken home to your family and poisoning them

Employees will be asked to:

- cooperate in the project including being interviewed
- agree to have blood samples taken for testing for lead
- attend a one-day training course
- be involved in practicing lead safety

The project has the wholehearted support of the Painting and Decorating Contractors of California, the International Brotherhood of Painters Union, the San Francisco Department of Public Health and others.

For more information contact the Occupational Lead Poisoning Prevention Program at the California Department of Health Services at (510) 540-3449.

5/27/94 OLPPP/CDHS

APPENDIX 4

Information Packet Mailed to Contractors Who Did Not Attend Recruitment Meeting

.TATE OF CALIFORNIA — DEPARTMENT OF HEALTH SERVICES
CALIFORNIA PUBLIC HEALTH FOUNDATION

)CCUPATIONAL HEALTH BRANCH

2151 Berkeley Way, Annex 11, Third Floor
Berkeley, CA 94704
10) 540-2115
AX (510) 540-3472

May 17, 1994

Dear Painting Contractor:

We regret that you were unable to attend the May 14th Informational Meeting for the California Painter's Project. Enclosed are some informational materials which were used to describe the project at this and other meetings. Hopefully, these will answer some of your questions about the project. In addition, our project assistant, Pat Young, will be contacting you by phone to answer any questions you may have, and to sign up those who are interested in becoming part of the project.

The next phase of the project begins with interviews for employers, and interviews and blood lead testing for employees, on June 1st through June 8th at the Ft. Mason Center. If you are interested in participating in the project, we will need to schedule you for an appointment on one of these days (appointment times are: 8am, 9:30am, 11:30am, and 1:00pm.) The activities will take approximately two hours to complete. Pat will be contacting you to arrange appointments, or you may call her at (510) 540-3449.

We appreciate your interest in safety issues involving lead paint, and hope that you will decide to become a part of the California Painters Project.

Sincerely,

Barbara Materna

Barbara Materna, Ph.D., C.I.H.
Program Coordinator, Occupational Lead Poisoning Prevention Program

cc: Ana Maria Osorio, MD, MPH
Principal Investigator, California Painters Project

Frank Mycroft, Ph.D.
Acting Chief, Occupational Health Branch

David Harrington, MPH
Coordinator, California Painters Project

Pat Young, MPH
Research Assistant, California Painters Project

INFORMATIONAL MEETING FOR EMPLOYERS
CALIFORNIA PAINTERS PROJECT

MAY 14, 1994

OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM
CALIFORNIA DEPARTMENT OF HEALTH SERVICES

WHAT'S ALL THIS ABOUT LEAD IN PAINT?

- Lead used in paint to provide excellent durability, coverage, weather and corrosion resistance
- 1950s: paint with up to 50% lead oxide common
- 1978: Consumer Product Safety Commission limited lead concentration in paint for residential use to 0.06%
- 1990s: Major increase in awareness about hazards of lead in paint; major governmental actions to protect the public

HOW DOES LEAD IN PAINT BECOME A HAZARD?

- Lead paint can flake, blister, chip, chalk, or be disturbed, releasing lead into the environment
- Lead paint chips or dust can easily spread around, in the air and on surfaces
- Lead can be taken home from work on workers' clothes, shoes or bodies, exposing families
- Lead can be inhaled or (accidentally) swallowed
- Small children spend a lot of time low to the ground, putting dirty hands and objects in mouth

WHY ALL THE FOCUS ON LEAD IN PAINT NOW?

- New scientific evidence shows serious health effects at blood lead levels once considered "safe" (in children and adults)
- Concern about childhood lead poisoning has increased as more screening has been done and more children with lead poisoning identified

WHY ALL THE FOCUS ON LEAD IN PAINT NOW?(cont.)

- Making older housing "lead-safe" means more workers are being exposed to lead in surface preparation, renovation and demolition activities
- Owners and occupants of housing with lead paint are more aware of the hazards and want lead paint to be handled safely
- Government agencies (HUD, EPA, OSHA, state health departments) have been mandated to take specific actions to address and prevent lead poisoning
- The courts are determining that property owners and contractors have legal responsibility for poisonings and environmental damage related to lead paint

WHY IS OLPPP LAUNCHING A PROJECT WITH PAINTERS AND PAINTING CONTRACTORS?

1) <u>To assess the size of the problem</u>:

- We know that many painters may be at higher risk of lead poisoning due to surface preparation work
- We know that, without proper precautions, surface preparation can leave contamination
- We don't know the average blood lead levels among painting contractors--or enough about other factors and how they may affect exposure to lead paint

2) <u>To do something about the problem</u>:

- OLPPP will provide information and resources to help painters work safely around lead paint
- Employers and workers need to know about the new Cal/OSHA construction lead regulation
- Having more painters trained to work safely around lead will promote the health of the general public and the environment
- OLPPP will learn more about what it takes to have a successful lead safety program

Description of the California Painters Project

A. Pre-Project Questionnaire and Blood Testing

Why? Questionnaire will document current company and employee practices with regard to lead safety. Blood testing will establish level of lead exposure to employees.

How? June 1st through 8th, at Fort Mason. The time slot needs to be scheduled with OLPPP. Will take 2 hours and needs to be considered work time for employees. Breakfast and lunch will be provided.

B. Job logs

Why? Job logs are simple one page forms used to gather information on each job your employees did surface prep. work on during the project period

How? Participants will complete a job log for each job: 1st week June - 1st week Nov.

C. Contractor and Supervisor Seminars

Why? Three seminars present comprehensive information on how to set up and run a company lead safety program.

How? Three all day seminars on Saturdays: June 18th, Aug. 20, Oct. 22. at Fort Mason. For all supervisors at training, this should be considered paid work time.

D. Progress Reports

Why? Progress reports are brief forms used to gather information on whether important goals in establishing a lead safety program have been met.

How? Participants will fill out a brief form responding to material presented at each of the three seminars, approximately every two months.

E. Worker Training Courses

Why? To teach the important aspects of lead safety and safe work practices to employees doing surface prep. on lead paint.

How? Full one day course (7 hours), offered in English or Spanish on a number of dates: July 16th and 30th, August 6th and 13th, Sept. 17th and 24th, October 1st and 15th. This training should be considered paid work time for all employees. At Fort Mason.

2. Description of Risks

Your participation in the project will not result in a referral to Cal-OSHA for enforcement actions unless you fail to correct any serious unsafe conditions that were identified during the course of this project.

3. Description of Benefits

Your participation in this project will help you and others who are involved and work in this industry learn whether there is a lead poisoning problem in your trade. The project will identify the reasons for the problem, and what health and safety measures are needed. You may benefit from the resources provided by the project and by achieving safer and healthier working conditions for your employees. Your participation will help to develop lead poisoning prevention activities and educational materials that will be used by others across the country. The project will benefit the community by helping to meet the growing demand for qualified painting contractors and workers who are able to safely perform lead paint removal.

4. Alternative Procedures

You as the employer/contractor may refuse to participate in this project.

5. Confidentiality of Records

Your records will be handled as confidentially as is possible within the law. The information gathered from your participation in the project will not be released in any form that identifies you individually.

6. Compensation

You will not receive financial compensation for your participation in this project, beyond your usual wages. Project activities will be conducted during work hours.

7. Injury

If you are injured while participating in this project, you will be covered under your worker's compensation insurance. If any injury should occur, please contact both your worker's compensation carrier and the researchers at the numbers given below (you may call collect if necessary).

8. Questions

If you have any general questions about this project, you may call David Harrington at (510) 540-2788. If you have any medical-related questions, you may call Karen Hipkins, RN, Nurse Practitioner, at (510) 540-2750; you may call collect if necessary. You will be given a copy of this Consent Form and the Research Participant's Bill of Rights.

9. Voluntary Participation

You may refuse to participate in this project, any part of this project, or change your mind about participating and withdraw at any time.

10. Research Participant's Bill of Rights

See attached.

11. Consent

I have read the above and am satisfied with my understanding of the California Painters Project, its purposes, procedures, risks, and possible benefits. I have talked with one of the researchers about this project, and he/she has answered my questions. I have been given a copy of this Consent Form and the Research Participant's Bill of Rights to keep. I voluntarily consent to participate in the project as described.

Signature of Participant	Printed Name	Age	Date

Signature of Witness	Printed Name	Date

RESEARCH PARTICIPANT'S BILL OF RIGHTS

Any person who is asked to consent to participate as a human subject in a research study, or who is asked to consent on behalf of another, has the following rights:

1. To be told what the study is trying to find out about.
2. To be told what will happen in the study, and whether any of the procedures are different from those which are carried out in standard nursing practice.
3. To be told about the risks, adverse effects, or discomforts which may be expected.
4. To be told whether the subject can expect any benefit from participating, and, if so, what the benefit might be.
5. To be told of other choices available and how they may be better or worse than being in the study.
6. To be allowed to ask any questions concerning the study both before consenting to participate and at any time during the course of the study.
7. To be told of any medical treatment available if complications arise.
8. To refuse to participate at all, either before or after the study has begun. This decision will not affect any right to receive standard medical treatment.
9. To receive a signed and dated copy of the consent form and the Bill of Rights.
10. To be allowed time to decide to consent or not to consent to participate without any pressure being brought by the investigator or others.

APPENDIX 6

Employee Informed Consent Form
(English, Spanish, Chinese)

CONSENT TO PARTICIPATE IN A RESEARCH PROJECT
(EMPLOYEE)

California Department of Health Services (CDHS)
Occupational Health Branch
Occupational Lead Poisoning Prevention Program (OLPPP)

California Painters Project:
Developing and Evaluating Lead Poisoning Prevention Activities

1. Purpose, Participation, and Procedures

The California Painters Project will develop and evaluate lead poisoning prevention activities among painters at risk for lead exposure. The activities will include use of a step-by-step educational manual for employers, and educational seminars for employers and workers. The effectiveness of these activities will be assessed by measuring blood and air lead levels during the painting season, and by examining changes in reported work practices and knowledge about lead exposures.

If you agree to participate in the project, you will be asked to:

a. Answer questions about your work habits, use of protective equipment or other controls, personal habits (e.g., tobacco use), medical history related to potential health effects from lead exposure, other sources of lead exposure, and hygiene at work. Questionnaires will be given at the beginning of the project and six months later. You will also be asked to fill out two other brief questionnaires during the six-month study period. You may also be asked to fill out a brief questionnaire six months after the study period ends.

b. Have a small amount (7 ml) of blood drawn at two-month intervals four times over a period of six months, and have these samples analyzed for lead level and zinc protoporphyrin (ZPP) level. (No other tests, including drug or HIV testing, will be done.)

c. Participate in an eight-hour training session, provided by CDHS, on lead exposure at work and how to reduce these exposures.

d. Cooperate with project staff who will conduct one work-site visit during the study period for air and bulk lead sampling, and observation of work practices. One additional observational visit will also be conducted six months later.

2. Description of Risks

You may experience some discomfort when your blood is drawn. The risks from having your blood drawn include pain or discomfort from the needle stick, bruising, fainting, and, rarely, may include infection.

3. Description of Benefits

Your participation in this project will help you and other painters learn whether there is a lead poisoning problem in your trade. The project will identify the reasons for the problem, and what health and safety measures are needed. You may benefit by having safer and healthier working conditions. Your participation will help to develop lead poisoning prevention activities and educational materials that will be used by others across the country. The project will benefit the community by helping to meet the growing demand for qualified painting contractors and workers able to safely perform lead paint removal.

4. Alternative Procedures

There is no generally acceptable alternative to doing venipuncture to obtain blood for analysis of blood lead levels and zinc protoporphyrin. You may refuse to participate in this project, and you may refuse to provide a blood sample. This will not affect your job in any way.

5. Confidentiality of Records

Your records will be handled as confidentially as is possible within the law. The information gathered from your participation in the project will not be released in any form that identifies you individually. Your blood lead tests will be provided to both you and your employer, as is required under the OSHA Lead In Construction Standard. Your questionnaire responses will not be provided to your employer or to your co-workers.

6. Compensation

You will not receive financial compensation for your participation in this project, beyond your usual wages. Project activities will be conducted during work hours.

7. Injury

If you need first aid as a result of the two blood draws provided by the project, project staff will be available on-site. If you are injured at any other time while participating in this project, you will be covered under worker's compensation. Emergency or other medical attention will be provided as it normally is through your employer. If any injury should occur, please contact both your supervisor and the researchers at the numbers given below (you may call collect if necessary).

8. Questions

If you have any general questions about this project, you may call David Harrington at (510) 540-2788. If you have any medically-related questions, you may call Karen Hipkins, RN, Nurse Practitioner, at (510) 540-2750. You may call collect, if necessary. You will be given a copy of this Consent Form and the Research Participant's Bill of Rights.

9. Voluntary Participation

You may refuse to participate in this project, any part of this project, or change your mind about participating and withdraw at any time. This will not affect your job in any way.

10. Research Participant's Bill of Rights

See attached.

11. Consent

I have read the above and am satisfied with my understanding of the California Painters Project, its purposes, procedures, risks, and possible benefits. I have talked with one of the researchers about this project, and he/she has answered my questions. I have been given a copy of this Consent Form and the Research Participant's Bill of Rights to keep. I voluntarily consent to participate in the project as described.

Signature of Participant	Printed Name	Age	Date

Signature of Witness	Printed Name	Date

RESEARCH PARTICIPANT'S BILL OF RIGHTS

Any person who is asked to consent to participate as a human subject in a research study, or who is asked to consent on behalf of another, has the following rights:

1. To be told what the study is trying to find out about.
2. To be told what will happen in the study, and whether any of the procedures are different from those which are carried out in standard nursing practice.
3. To be told about the risks, adverse effects, or discomforts which may be expected.
4. To be told whether the subject can expect any benefit from participating, and, if so, what the benefit might be.
5. To be told of other choices available and how they may be better or worse than being in the study.
6. To be allowed to ask any questions concerning the study both before consenting to participate and at any time during the course of the study.
7. To be told of any medical treatment available if complications arise.
8. To refuse to participate at all, either before or after the study has begun. This decision will not affect any right to receive standard medical treatment.
9. To receive a signed and dated copy of the consent form and the Bill of Rights.
10. To be allowed time to decide to consent or not to consent to participate without any pressure being brought by the investigator or others.

FORMA DE PERMISO

CONSENTIMIENTO DE PARTICIPAR EN UN PROYECTO INVESTIGATIVO (TRABAJADOR)

Departamento de Servicios de Salud del Estado de California (CDHS)
División de Salud Ocupacional
Programa de la Prevención al Envenenamiento de
Plomo Ocupacional (OLPPP)

**El Proyecto de Pintores del Estado de California:
Desarrollando y Evaluando las Actividades de Prevención
al Envenenamiento de Plomo**

1. Propósito, Participación y Procedimientos

El Proyecto de Pintores de California va desarrollar y evaluar las actividades de prevención al envenenamiento de plomo entre los pintores que corren riesgo a la exposición del plomo. Las actividades incluirán un manual educativo para los patrones, y seminarios educativos para los patrones y trabajadores. La eficacia de estas actividades serán determinadas por la medida de niveles de plomo en la sangre y aire en la temporada de pintar, y por la revisión de cambios en las costumbres de trabajos reportados y el conocimiento de exposición al plomo.

Si está de acuerdo con participar en el proyecto, Usted va desempeñar lo siguiente:

a. Contestar preguntas sobre sus costumbres de trabajo, uso de equipo protectivo y otros controles, hábitos personales (por ejemplo, el uso de tabaco), historia médica relacionada a los efectos de salud posibles por causa de la exposición al plomo, otras fuentes de exposición al plomo, y el higiene en el trabajo. Los cuestionarios serán disponibles al comienzo del proyecto y 6 meses después. También, responderá 2 cuestionarios breves durante los 6 meses del estudio. Y posiblemente, responderá 1 cuestionario más 6 meses después de terminar el estudio.

b. Durante un período de 6 meses, donar cuatro veces una pequeña cantidad de sangre (7 ml) a intervalos de dos meses, y tener un análisis de nivel de plomo y de nivel de Protoporfirina de Cinc (ZPP) de las muestras de sangre donadas. (Otros análisis, como el exámen de droga ó HIV, no se llevarán acabo.)

c. Participar en un entrenamiento de 8 horas, administrada por el CDHS, sobre la exposición de plomo en el trabajo y cómo reducir esta exposición.

d. Cooperar con el personal del proyecto quienes llevarán acabo una visita al lugar de trabajo durante el período del estudio para tomar muestras de plomo en aire y bulto y para observar las prácticas de trabajo. Se llevará acabo otra visita de observación después de 6 meses.

2. Descripción de Riesgos

Puede ser que sienta incómodo cuando le toman el exámen de sangre. Los riesgos debido al exámen de sangre incluyen lo siguiente: dolor e incomodidad de la aguja, herida, desmayo, y raramente, una infección.

3. Descripción de Beneficios

Su participación en este proyecto ayudará que Ud. y los demás pintores se enteren acerca la existencia de problemas al envenenamiento de plomo en su profesión. El proyecto identificará las razones del problema, y las medidas de salud y seguridad necesarias. Ud. se puede beneficiar de las condiciones de trabajo seguros y saludables. Su participación ayudará desarrollar actividades de prevención al envenenamiento de plomo y materiales educativas que serán usadas por todas partes del pais. El proyecto beneficiará a la comunidad porque llegará a cumplir la grande demanda de calificados contratistas de pintura y trabajadores con capacidad de remover pintura a base de plomo sin peligro.

4. Procedimientos Alternativos

No existe en lo general una mejor alternativa acceptable para realizar una venepuntura para obtener sangre para el análisis de los niveles de plomo en la sangre y los niveles de protoporfirina de Cinc. Ud. puede negarse a participar en este proyecto, y Ud. puede negarse a disponer un análisis de sangre. Ésto no afectará su trabajo en ninguna manera.

5. Registros Confidenciales

Sus documentos serán usados en la manera más confidencial posible que la ley permite. La información adquirida de su participación en el proyecto no llegará a revelar en ninguna forma su identidad individualmente. Los análisis de plomo en su sangre serán disponibles para Ud. y su patrón, como es requerido bajo la Norma del Plomo en la Construcción de OSHA. Sus respuestas al cuestionario no serán disponibles para su patrón ó sus compañeros de trabajo.

6. Compensación

Además de su salario usual, no recibirá recompensa financiera por su participación en este proyecto. Las actividades del proyecto serán administradas durante las horas de trabajo.

7. Lesión

Si necesita primeros auxilios debido a los análisis de sangre administrados por el proyecto, el personal del proyecto estarán ubicados cerca. Si se lastima mientras que participa en este proyecto, Ud. estará protegido bajo la compensación de trabajadores (worker's compensation). Emergencias y otras atenciones médicas serán como siempre administradas por su patrón. Si sucede alguna lesión, por favor, comuníquese con el agente y con los investigadores a los números de teléfono adjuntos a la presente (si es necesario, lláme por cobrar).

8. Preguntas

Si tiene preguntas en lo general acerca el proyecto, comuníquese con David Harrington al (510) 540-2788. Si tiene preguntas con referencia médica, comuníquese con Karen Hipkins, RN, Enfermera Profesional, al (510) 540-2750. Si es necesario, lláme por cobrar. Ud. recibirá una copia de esta Forma de Permiso y una copia de los Derechos de Toda Persona Sujeta a la Participación Investigativo.

9. Participación Voluntaria

Ud. puede negarse a participar en este proyecto, ó cambiar de opinion y no participar, ó retirarse a cualquier tiempo. Ésto no afectará su trabajo en ninguna manera.

10. Derechos de Toda Persona Sujeta a la Participación Investigativo

Adjunto a la presente.

11. <u>Consentimiento</u>

He leído como se expresa arriba y estoy satisfecho(a) con mi conocimiento del Proyecto de Pintores del Estado de California, sus propósitos, procedimientos, riesgos, y beneficios posibles. Me he comunicado con uno de los investigadores sobre este proyecto, y el/ella respondieron mis preguntas. He recibido una copia de esta Forma de Permiso y una copia de los Derechos de Toda Persona Sujeta a la Participación Investigativo. Voluntariamente, estoy de acuerdo con participar en el proyecto como está descripto.

Firma de Participante	Nombre en Imprenta	Edad	Fecha

Firma de Testigo	Nombre en Imprenta	Fecha

DERECHOS DE TODA PERSONA SUJETA A LA PARTICIPACIÓN INVESTIGATIVO

Toda persona a quien se le pida participar como sujeto humano en un estudio investigativo ó a quien se le pida participar en nombre de otra persona tiene los siguientes derechos:

1. A ser informada del propósito del estudio.
2. A ser informada de en qué consistirá el estudio y de si alguno de los procedimientos es distinto de los que serían usados en la práctica normal.
3. A ser informada de los riesgos, efectos desfavorables, ómalestares que pueden resultar.
4. A ser informada de si puede esperar algún beneficio por participar en el estudio y si es así, cuales serían.
5. A ser informada de qué otras alternativas disponibles tiene y de si serían mejores ó peores que participar en el estudio.
6. A que se le permita hacer cualquier pregunta relacionada con el estudio, ya sea antes ó después de acceder a participar en el estudio, ó durante el transcurso de éste.
7. A ser informada de qué tratamientos médicos existen en el caso de que alguna complicación surgiera.
8. A negarse totalmente a participar en el estudio antes ódurante el desarrollo de éste. Esta decisión no afectará el derecho de la persona a recibir el tratamiento médico que recibiría si no participara en el estudio.
9. A recibir una copia de la forma de permiso firmada y fechada y una copia de los Derechos de Toda Persona.
10. A no ser presionada en ninguna forma por losinvestigadores del proyecto u otros con respecto a la decisión de participar ó no en el estudio.

同意参加一项研究计劃
(工人)

加州公共保康服務处,职業健康支部和防止职業鉛毒計劃贊助.

加州油漆工人計劃:

發展及评估鉛毒之预防活動.

1. 目的,参加和手續:

"加州油漆工人計劃"将發展一项评估及预防鉛毒活動给予那些常接觸含鉛油漆和有高度危险之油漆工人.这活動包括给雇主们一些按步就班,清楚教導的手册和提供给雇主及工人们教導性的講習会.我们将在工人油漆期间以驗血及驗空氣含鉛成分,檢驗報告有関工作執行情况及对接觸鉛質的见識而確定其活動效果.

若您同意参加本机構計劃,请回答以下问題:

a. 回答您工作習慣的问题,用保護工具或其他控制工具,个人習慣(如抽煙),与鉛毒有主要接觸而影响您的健康之有関病歷,其他与鉛毒有接觸之来源,工作衛生等.这些问题在計劃開始及六个月後交给您.在六个月的学習期间您必須填寫两張簡短的问题,也在六个月学習终止时再填寫一張簡單的问题.

b. 在整个六个月的时间内,我们要为您抽四次血來作鉛和另一种 Z.P.P. 的化学物質測驗.每次抽约七 cc.左右.在学期開始和每两个月抽一次血.(我们不驗愛滋病毒或任何其他試驗)

c. 参加一次八小时的训練,由加州公共健康服務处提供,講题是:"在工作时所接觸到之鉛毒及如何减少接觸鉛毒机会".

d. 本机構工作人员在計劃学習期间会到访您工作地方以取空氣和大量鉛質樣本和觀察您执行工作情况.另在六个月结束时也会再作一次觀察式访问.

2. 抽血後可能導致的感覺:

抽血後您可能会经历如下的感覺:針刺之处發疼或不舒服,淤黑,昏暈或極少有的發炎等.

3. 对您的利益说明:

参加本計劃将会为您和您的伙伴在行業中知道会否有中鉛毒的问题,本机構将会为您鑑定導致问题的原因和必須作何健康安全措施,因而使您工作狀况更为安全和健康.您的参加亦会促使我们發展一些

预防铅毒活動資料和教育性的資料,而这些资料可以提供给全國其他人廣泛使用.本机構亦将会幫助社团以達到要求更合資格的油漆承包商和其他工人能更安全地実行排除含鉛油漆之工作.

4. 选擇手續:

一般来说是没有其他别的方法可以代替抽血来验您的血中含鉛成份和 Z.P.P. 化学物質。您可以拒絶不参加本机構的计劃,也可以拒絶抽血,这都不会影响您的工作机会.

5. 記錄保密:

在法律上您的记錄将獲保密处理,我们從您的参加所得之資料絶不以个人名字發表;但验血中含鉛成份的结果报告却根據 OSHA Lead in Construction Standard 机構之要求,必须提供给您及您的雇主,而您所答的问题却将不提供给您的雇主或工友.

6. 酬勞:

您将不獲任何工資以外的酬勞.课程活動将会在工作时间内進行.

7. 受傷:

若您因抽血而须急診,本机構有医護人員在场幫您。若您在参加学習时受傷,您会獲勞工賠償.至於其他急症或医药治療将会如常的由您的雇主提供。若您在学習期间受傷,請立刻通知您的上司及本机構之研究員,电话如下:(510) 540-2788(必要时可打对方付錢之电话 Collect call.)

8. 问题:

如您有任何有关此计劃之问题,請电(510) 540-2788 给 David Harrington.如有任何有关医药问题,請电(510) 540-2750 给 Karen Hipkins 護士,必要的话亦可打 collect call.本机構将交给您这份同意書和参加研究的人权條例副本.

9. 自願参加:

您可拒絶参加本计劃或计劃的某一部份,或任何时候都可以改变意見不再继續下去.这絶不会影响您的工作.

10. 参加研究的人权条例：

请看附件.

11. 同意：

我已阅读过以上各项，满意及明白加拿大油漆计划之目的，手續及可能的危险和受益处。我也曾和某一研究员谈过此计划并獲答覆我所提出之问题。我已收到此同意书和参加研究之人权条例副本。我自愿并同意参加此计划。

参加者簽名	写印刷体名字	年齡	日期
見证者簽名	写印刷体名字		日時

CDHS • OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM

CALIFORNIA PAINTERS PROJECT

Fourth Employer Seminar
October 22, 1994
Conference Center Room A-2, Fort Mason, SF

AGENDA

8:00 - 8:30 Project Announcements *(Latecomers, please read below)*
Barbara Materna

- Evaluation of Oct. 11 seminar - Please complete & return form if you attended.
- **Make-up Seminar on Environmental Issues: Tuesday, Oct. 25, 3-6 PM, Building C, Room 205, Fort Mason**
- Hours needed for Interim Contractor Certification: If you intend to obtain 32 hours of lead training in this project, check with David Harrington to confirm the total number of hours you have now.
- Chapters 8 & 9 of the *Painting Contractor's Guide to Lead Safety* available today
- Please pass in completed job logs & Progress Report #2 today
- Complete job logs through Nov. 1, and bring them to your final interview
- **End-of-Project Blood Testing & Questionnaires: Nov. 1, 2, & 3, Conference Center Room A-1, Fort Mason--Please sign up today to schedule yourself and your employees!** Please note that blood testing is only for project participants who were tested in June--contact your Medical Supervisor to schedule other employees for their next blood tests.

8:30 - 9:15 Project Progress Review
Peter Scholz

9:15 - 10:15 <u>Workers' Compensation</u>

Health and Safety Services: What you can expect from your workers' compensation carrier
Gene Murphy, Loss Control Certification Unit, Div. of Occupational Safety & Health, Dept. of Industrial Relations

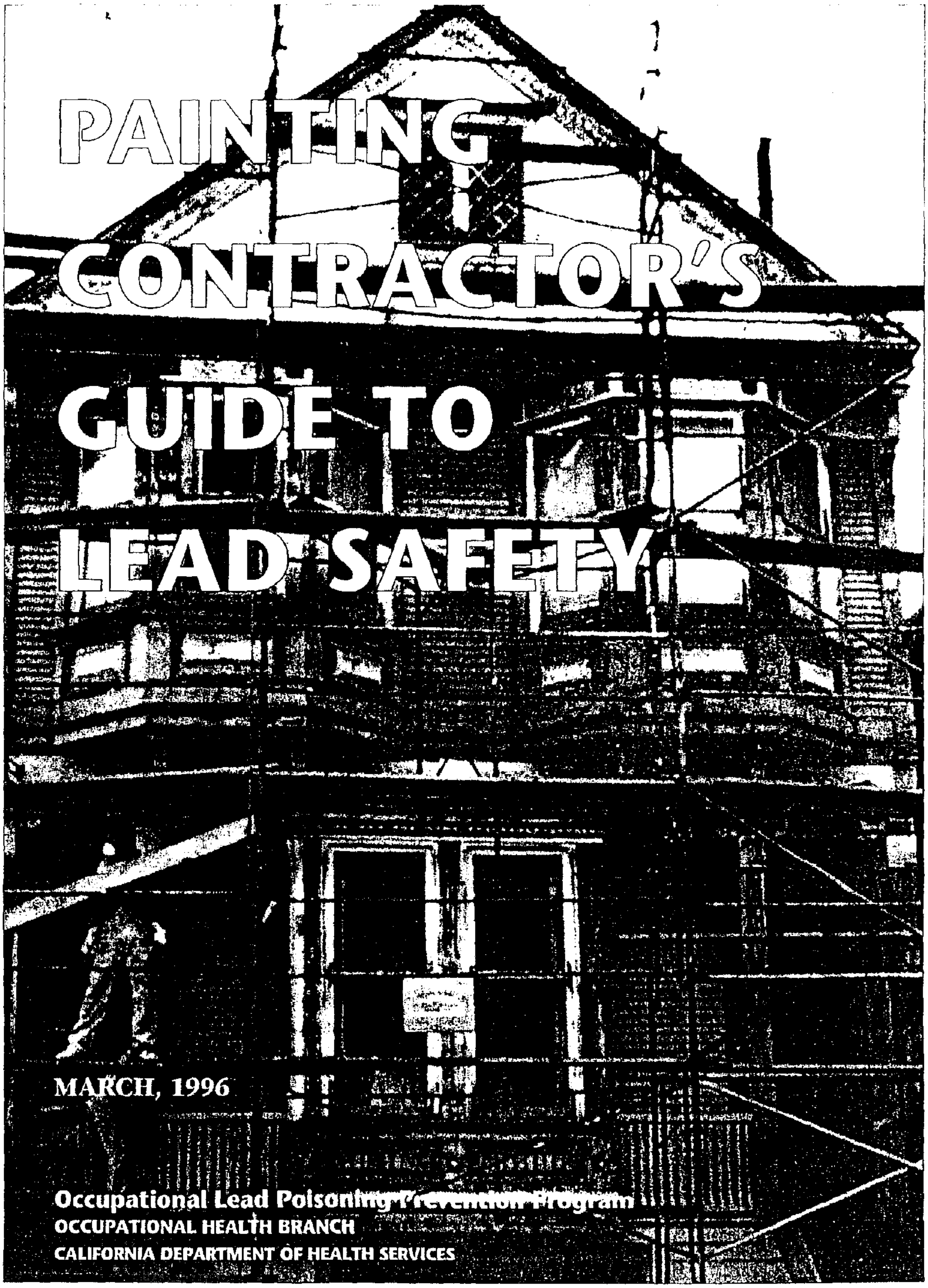
Health and safety services for contractors insured by State Compensation Insurance Fund
Heather Borman, Industrial Hygienist, SCIF

Questions & Answers

10:15 - 10:30	Break
10:30 - 12:00	<u>Contractor Liability and Insurance</u>
10:30 - 11:20	Managing the Risk of Contractor Liability *Rick Warren, Attorney* Questions & Answers
11:20 - 12:00	Contractors' Pollution Exclusion Clauses & Liability Insurance Coverage *Rick Warren* Questions & Answers
12:00 - 12:45	Lunch
12:45 - 1:15	Air and Wipe Sampling *Peter Scholz*
1:15 - 2:00	Bidding a Lead-Safe Job & Selling it to your Customer *Hans Stahlschmidt, Painting Contractor*
2:00 - 2:45	Bidding Exercise: Fort Mason Gatehouse *Emily Merideth & Hans Stahlschmidt*
2:45 - 3:45	Report-back & Discussion of Bids *Emily Merideth & Hans Stahlschmidt*
3:45 - 4:00	Putting It All Together: Lead Safety Program Checklist *Barbara Materna*
4:00 - 5:00	Evaluation *David Harrington*

APPENDIX 8

Table of Contents for Painters Manual



PAINTING CONTRACTOR'S GUIDE TO LEAD SAFETY

MARCH, 1996

Occupational Lead Poisoning Prevention Program
OCCUPATIONAL HEALTH BRANCH
CALIFORNIA DEPARTMENT OF HEALTH SERVICES

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APPENDIX 9

Worker Training Agenda

Worker Training Course
California Painters Project

❖

Agenda

8:30 a.m.	Introduction to the Course
9:00	Lead Basics
9:45	The Health Effects of Lead Exposure
10:15	Break (15 minutes)
10:30	Identifying Lead Hazards in the Workplace
11:30	The Lead Medical Program
12:15 p.m.	Lunch (45 minutes)
1:00	Prevention and Control of Lead Exposure
2:30	Know Your Rights: The Cal/OSHA Lead in Construction Standard
3:30	Break (15 minutes)
3:45	Making an Action Plan
4:15	Review and Wrap-up
4:50	Course Evaluation
5:00	Course Ends

Trainers:

David Harrington
Mary Deems
Barbara Materna
Geoff Lomax
Emily Merideth
Luz Soluaga
Peter Scholz
Karen Hipkins

Entrenamiento sobre el Plomo en el Lugar de Trabajo
Proyecto de Pintores del Estado de California

❖

Horario

8:30 a.m.	Introducción al curso
9:00	Información básica sobre el plomo
9:45	Los efectos que tiene el plomo en la salud
10:15	Descanso (15 minutos)
10:30	Identificando los peligros en el trabajo
11:30	El programa médico para el plomo
12:15 p.m.	Almuerzo (45 minutos)
1:00	La prevención y el control de la exposición al plomo
2:30	Conozca sus derechos: La Norma de Plomo en la Construcción de Cal/OSHA
3:30	Descanso (15 minutos)
3:45	Plan de acción
4:15	Repaso
4:50	Evaluación del entrenamiento
5:00	Clausura del entrenamiento

Entrenadores:

Emily Merideth
Luz Soluaga
Barbara Materna
Geoff Lomax
Mary Deems
David Harrington
Peter Scholz
Karen Hipkins

Worker Training Course
California Painters Project

❖

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5:00	Course Ends

Trainers:

Ching Wong
David Harrington
Karen Hipkins
Somphanh Phanivong
Emily Merideth

APPENDIX 10

Employer and Worker Notification of BLL Results
(English, Spanish, Chinese)

CDHS • OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM

CALIFORNIA PAINTERS PROJECT

22 June 1994

Dear Employer:

Enclosed are the Blood Lead Level (BLL) and Zinc Protoporphyrin (ZPP) test results for each of your employees participating in the California Painters Project. We are also mailing the results to each individual at their home address.

We are pleased to report that no employees in the project had a BLL higher than 40 ug/dl. Low levels of some test results do not mean that you should be less concerned about the potential for lead poisoning. There are many factors to consider. Remember that these tests were done early in the painting season and the BLL measures exposure during the recent 2 to 3 weeks. In addition, it is possible to have a brief high exposure that has not been detected on a single BLL.

Inadequate control of exposure in the coming months could cause BLLs to rise, especially as work progresses on building exteriors which usually have higher lead concentrations. Looking at BLL and ZPP trends over time is an informative way to assess how well your employee protections are working. These trends are what we will be looking at in the Painters Project and what you will need to do in the future.

Thank you for your attendance at the first Employer Seminar on Saturday, June 18. We learned a lot and hope you did as well. As discussed, we request that you have your employees' BLL and ZPP tests done again during the week of August 8, 1994 by the physician you select to supervise your Lead Medical Program. This physician will also need a copy of the enclosed results.
In addition, a copy of the laboratory forms showing the BLL and ZPP results from the August testing will need to be attached to your Progress Report and given to us at the August 20th seminar. Your medical supervisor should provide you with this information.

As soon as you have made your selection, please write, phone or fax to Karen Hipkins, NP, the physician/clinic's name, address, phone and the clinic contact person's name. Address: OHB/OLPPP, 2151 Berkeley Way, Annex 11, 3rd floor, Berkeley, CA 94704. Phone (510) 540-2750. Fax (510) 540-3472. If you have questions or need additional information about medical issues related to lead exposure and the program, please call Karen as well.

We look forward to seeing you at the next Employer Seminar on August 20, 1994.

Sincerely,

David Harrington

David Harrington, MPH
Coordinator, California Painters Project

Enclosures

CDHS • OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM

CALIFORNIA PAINTERS PROJECT

Date: ____/____/____

TO:

Employee: ______________________________

As you know, your work in this company may expose you to lead dust or fumes. To help find out whether or not your body has absorbed too much lead, a sample of your blood was collected and analyzed.

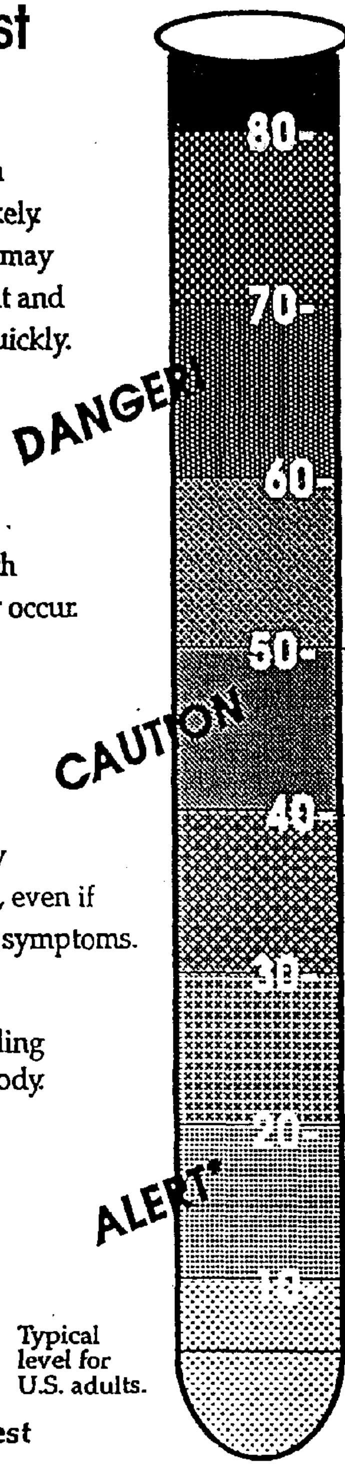
Test Date:	____/____/____	
Blood Lead Level:	__________	ug/dl (micrograms per deciliter)
ZPP Level:	__________	ug/dl

To help you understand your test results, please read <u>Understanding Your Blood Lead and ZPP Tests.</u> However, a blood test alone cannot show whether or not lead is affecting your body.

In the near future your employer will be identifying a physician to oversee the company's Medical Lead Surveillance Program and provide medical care. Meanwhile, if you think you have symptoms of lead poisoning or have any additional questions, you can call Karen Hipkins, Nurse Practitioner at the California Department of Health Services, Occupational Lead Poisoning Prevention Program (510) 540-2750.

This notification is required by OSHA regulations.

Understanding Your Blood Lead Test



Severe health damage is likely. The damage may be permanent and may occur quickly.

Serious health damage may occur.

Damage may be occurring, even if you have no symptoms.

Lead is building up in your body.

Typical level for U.S. adults.

What action is required?

For lead-related construction jobs.

Your test results help show what steps must be taken to protect your health. Most of the steps below are required by Cal/OSHA regulations.

50 OR GREATER

- **You must be removed from your lead exposure job until your blood level drops under 40 µg/dl on two consecutive tests. If a safe job is not available you must be paid full wages and benefits while you are off work.**
- **Your employer must arrange for you to be checked by a doctor and to have blood lead tests every month, at no cost to you.**
- **Your employer is required to reduce lead hazards on the job site.**

40 to 50

- **Your employer must arrange for you to be checked by a doctor once each year and arrange blood tests every two months, until your level is less than 40 ug/dl on two tests.**
- **Your employer is required to reduce lead hazards in the workplace.**

LESS THAN 40

- Your employer may be required to arrange for you to have blood tests every two months for the first six months and once every six months after that.
- Lead hazards in your workplace should be reduced as much as possible.

*Note: No amount of lead is completely safe. Levels near the U.S. average may not be safe for children or for pregnant women.

Understanding Your ZPP Test

What is a ZPP (Zinc Protoporphyrin) test?
ZPP is a blood test used to monitor the effect of lead exposure on the body along with the Blood Lead Level.

What does a ZPP test measure?
ZPP measures a substance in the blood that increases when lead interfers with the Red Blood Cell's ability to make hemoglobin. (Hemoglobin is the oxygen carrying part of the blood.)

What does the ZPP test result tell you about your exposure to lead?
The ZPP level rises and falls more slowly than the Blood Lead Level and is an indicator of the amount of lead exposure over the last 3 to 4 months.

What is an expected ZPP level?
A ZPP level of 50 ug/dl is expected for adults with little or no lead exposure. A few other medical conditions can cause an increased ZPP, the most common being iron deficiency anemia which is unusual in adult males.

CDHS • OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM

CALIFORNIA PAINTERS PROJECT

Fecha: _____/_____/_____

PARA:

Trabajador: ____

Como debe saber, su trabajo en esta compañía lo puede exponer al polvo y humo del plomo. Para poder saber si su cuerpo llegó a absorber altos niveles de plomo, una muestra de su sangre fue coleccionada y analizada.

Fecha del Análisis: _____/_____/_____

Resultados del Análisis: __________ ug/dl (microgramas por decilitro)

Nivel de ZPP: __________ ug/dl

Para ayudarle a entender sus resultados del análisis, por favor lea <u>Como Interpretar los Resultados de sus Exámenes de Sangre y ZPP.</u> Los efectos que el plomo tiene en la salud no se pueden determinar solamente por medio de un análisis de sangre.

Dentro de poco, su empleador llegará a identificar un médico que se encargará del Programa de Vigilancia Médica con Plomo de su compañía. Hasta entonces, si piensa que tiene síntomas por causa del envenenamiento con plomo o si tiene algunas preguntas adicionales, puede comunicarse con Karen Hipkins, enfermera del Programa de Prevención al Envenenamiento de Plomo Ocupacional que forma parte del Departamento de Servicios de Salud del Estado de California. Su número de teléfono es (510) 540-2750.[1]

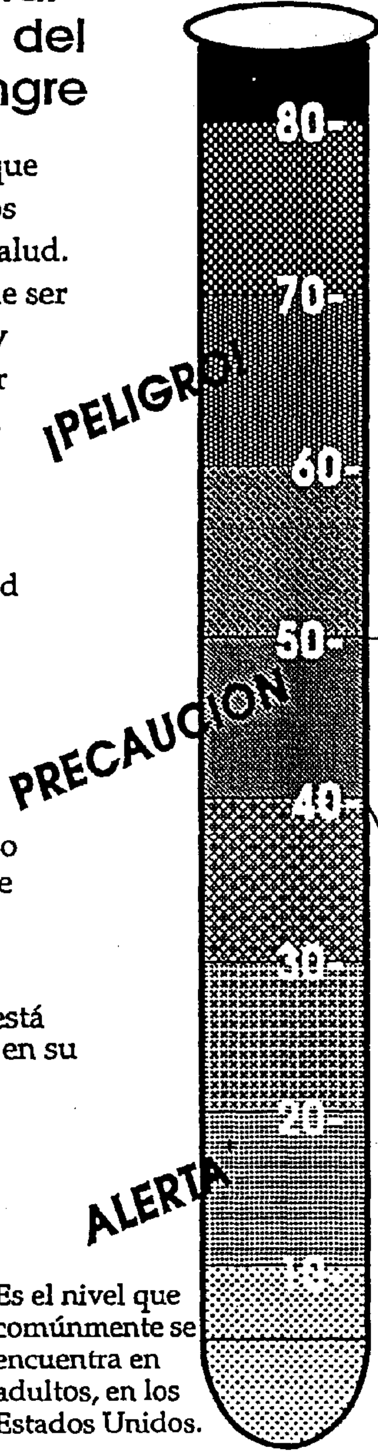
Como Interpretar Los Resultados del Análisis de Sangre

Es probable que ocurran daños severos a la salud. El daño puede ser permanente y puede ocurrir rápidamente.

Puede ocurrir daño a la salud muy severo.

Puede que esté sufriendo daño, aunque no sienta síntomas.

El plomo se está acumulando en su cuerpo.



Es el nivel que comúnmente se encuentra en adultos, en los Estados Unidos.

Qué Acción Se Requiere?

Para aquellos trabajos de construcción donde el plomo se usa. El resultado de su análisis ayuda a planear los pasos que se deben tomar para proteger su salud. La mayoría de los pasos son requeridos por regulaciones de Cal/OSHA.

50 o MÁS ALTO
Usted debe ser retirado de su trabajo que le expone al plomo hasta que el nivel de plomo en su sangre sea menos de 40 µg/dl , en dos exámenes consecutivos. Si no existen tareas que pueda desempeñar fuera de peligro al plomo, Ud. debe recibir su salario completo y beneficios durante su tiempo fuera del trabajo.

Su patrón debe hacer los arreglos necesarios para que lo examine un médico y para que cada mes le hagan un análisis de plomo en la sangre, todo esto sin costo para usted. Su patrón está obligado a reducir los peligros del plomo en el lugar de trabajo.

DE 40 a 50
Su patrón debe hacer los arreglos para que lo examine un médico una vez al año y hacerle un análisis de plomo en la sangre cada dos meses, hasta que su nivel sea menos de 40 µg/dl en dos exámenes. Su patrón está obligado a reducir los peligros del plomo en el lugar de trabajo.

MENOS DE 40
Su patrón puede estar obligado de hacer los arreglos necesarios para que le hagan un análisis de plomo en la sangre cada dos meses en los primeros seis meses, y después una vez cada seis meses.

Los peligros del plomo en el lugar de trabajo deben ser reducidos tanto como sea posible.

*Nota: No hay un nivel de plomo que se pueda considerar completamente seguro. Niveles comúnmente en adultos permitidos pueden no ser seguros para niños o durante el embarazo.

Como interpretar los resultados de su análisis de ZPP

¿Qué significa un análisis de ZPP (Protoporfirina de Cinc)?
La ZPP es un análisis de sangre la cual se usa para observar el efecto de exposición al plomo en el cuerpo.

¿Qué mide el análisis de ZPP?
La ZPP mide una substancia en la sangre que se aumenta cuando el plomo impede la habilidad de formar hemoglobina por medio de las Células Rojas Sanguíneas. (La hemoglobina es la parte de la sangre que transporta el óxigeno.)

¿Qué información recibe sobre su exposición al plomo del análisis de ZPP?
El nivel de ZPP sube y baja más lento que el Nivel de Plomo en la Sangre. Por eso, la ZPP es un indicador de la cantidad de exposición al plomo durante los últimos 3 a 4 meses.

¿Qué se espera de un nivel de ZPP?
Un nivel de ZPP de 50 µg/dl o menos es lo que se espera en adultos con poca o ninguna exposición al plomo. Pocas otras condiciones médicas pueden aumentar la ZPP. La más común es la anemia con deficiencia de hierro, la cual es fuera de lo usual entre los hombres adultos.

"DEAR EMPLOYEES: Blood-Lead Test Results"

***Employers--Use this letter to let each worker know the results of his or her blood-lead test.**

***Make a copy for each worker on your company's stationery. Keep a copy of each completed form for your records.**

敬啓者：________________________ 日期：____________

正如所知，您在此公司工作可能会接觸到鉛塵粒或其氣体，为了帮您找出是否体内已吸進过多的鉛毒，我们必須收集您的血樣本來作試驗和分析。

驗血日期：____________________.
血鉛水平：____________________.
Z.P.P.水平：____________________.

您下次驗血鉛的日期：____________________.

為使您明白驗血结果請看背頁之"明白您的血鉛和Z.P.P.檢驗"然而，單只一次的驗血不足以顯示您是否体内已受鉛毒影响。若您認為您有中鉛毒的病徵或有其他问题的话，请和主理您公司的驗血計劃之医生谈。

____________________ 医生 电话：(____) ____________.

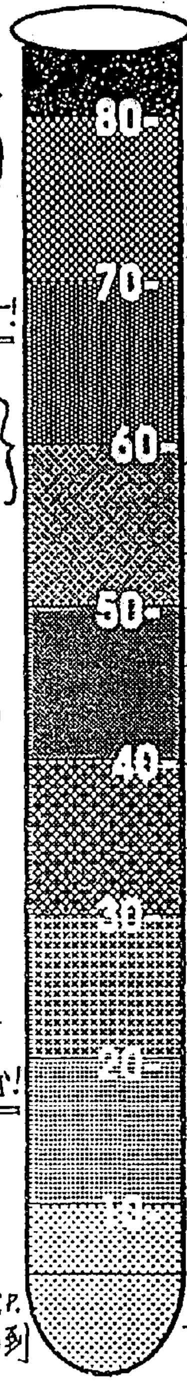
鉛毒会造成健康的什么損害？

鉛毒会逐渐地在您体内增加，鉛毒越多则造成伤害的可能性越大，大量的鉛毒可以嚴重地傷害您腦部，神经系，腎臟或血液。您会覺得疲倦，难以集中精神，头痛，暴躁，胃痛，没胃口，便秘，腹瀉，肌肉或骨節痛和身体衰弱等。有的人雖受其害，但也可能没有以上的病徵。每个人对鉛毒的反应都不一樣。鉛毒亦可以使您生下不健康的小孩，不管您是小孩的父親或母親。

* 明白您的血中含鉛試驗

該怎樣作防止行動？

体内有可能已嚴重受損，而受損情況可能成為永久性和迅速發展。



與鉛毒有关的建築工作。

驗鉛毒的结果可以讓您知道必須作那些步驟來保護您的体康。以下大部份的步驟是加州OSHA机構的規定：

50或超过：

您必須被調到一个不再和鉛接觸的部位工作，直到有两次連續驗血低过40才可回復舊職。如果公司不能提供一份安全的工作給您，公司必須在您停職期间負担您的薪金和应有的福利。

危險！

雇主必須安排您免費見医生檢查和每月一次驗血中含鉛成份。

您体康可能嚴重受損。

雇主也应該在工作地方减少員工接觸鉛毒的危險。

警覺！

40至50：雇主应該安排您每年見医生一次檢查身体和每两個月抽血一次檢驗血中含鉛成份直至血鉛連續两次低过40為止。

就算您沒有病癥，但体内可能已受損害。

雇主也必須在您工作的地方减少鉛毒的危險。

少过40：雇主必須連續六个月安排每两个月為您驗血一次，之後就每六个月驗血一次。

工作地方应当尽可能减少有鉛毒的危險。

鉛毒已在您体内逐漸增加。

留心！

注意：任何鉛毒成份都不安全。美國定下的平均鉛質水平对小孩和孕婦都不安全。

美國成人標準水平。

* 明白您的Z.P.P.檢驗

- Z.P.P.檢驗是什么？
  在驗血鉛水平的同时，Z.P.P.驗血也用来監察身体所接觸到的鉛毒影响情况。
- Z.P.P.驗血測量什么？
  Z.P.P.驗血測量血中的一种物質，当用以製造紅血素的紅血球受鉛毒干扰时，这种物質便会增高。（紅血素乃血液中攜帶氧氣的部份）
- Z.P.P.驗血结果能告诉我什么关於您接觸鉛毒的程度？
  Z.P.P.这种物質在血中的升降量比鉛質慢，它能指示出您过去三四个月中所接觸鉛質的數量。
- Z.P.P.的理想水平是什么？
  成年人的Z.P.P.理想水平是50 ug/dl，但须在極少或没有接觸鉛毒的情况下。某些其他病况可能造成Z.P.P.增高，最普遍的是缺鉄質之貧血症，但此貧血症在成年的男性中極少見。

CDHS • OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM

CALIFORNIA PAINTERS PROJECT

October 18, 1994

Dear Contractor,

I am enclosing a copy of a notification letter that has been sent to your employees from our office. This letter was written in order to inform participants in the California Painters Project of the preliminary results from the blood lead level testing and questionnaires that were done in early June. The information that is included in the letter is essentially the same information that was covered during the first part of the employer seminar at the Firehouse on October 11th.

If you have any questions regarding the letter, the data from the June blood lead level testing, or any other aspects of the Project, please don't hestitate to call me at (510) 540-2788.

Sincerely,

David Harrington
Project Coordinator

CDHS • OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM

CALIFORNIA PAINTERS PROJECT

October 14, 1994

Dear Participant,

Many of the painters involved in the California Painters Project have expressed an interest in receiving information about the entire group's blood lead test results. We are sending this letter to notify you of the group results from the initial blood lead testing in June and to keep you informed of the progress of the project. By collecting information on your exposure to lead and changes in your blood lead level over time, we hope to assess the risk of lead poisoning among the painting workforce. Up until now, very little information has been available about lead poisoning among painters.

As a reminder, the information below refers <u>only</u> to the initial blood test that was done in early June. The second blood test that you had in August was done as part of your employer's Lead Medical Program and is not included in the information presented here. We will send you a complete report in 1995 describing all the information collected during the project. This will include information such as which tasks involve the highest exposure to lead and whether blood lead levels changed significantly during the course of the project.

The following are the key points that have been gathered from the initial blood lead testing in June and the interviews with <u>employers</u> only.

❖ **June 1994 blood lead levels (BLLs)**

Of the 134 painters tested in early June, 16 had blood lead levels (BLLs) of 20 micrograms per deciliter (ug/dl) or higher. These employees worked for 9 of the 22 participating companies. The average BLL for the entire group was 10.7 ug/dl. <u>Compare this to the general adult population which has been found to have BLLs around 3 ug/dl</u>.

The following table shows the distribution of BLLs among the project participants:

BLL (ug/dl)	Number of painters	Percent of painters
less than 5	21	16%
5 - 9	62	46%
10 - 14	18	13%
15 - 19	17	13%
20 - 24	6	5%
25 - 29	7	5%
30 - 38	3	2%
Total	134	100%

No painter had a BLL above the OSHA medical removal limit of 50 ug/dl. However, it is important to remember that you can have damage to your health at blood lead levels below 50 ug/dl. Also, on-going exposure to lead, even at lower exposure levels, can deposit lead in your bones. When the amount of lead in your bones increases, your risk of long-term health damage from lead may also increase.

Remember: the BLL generally reflects a person's exposure to lead during the past 2-3 weeks. Factors that affect the BLL include:

- how much a person was working on lead paint prior to being tested,
- which job tasks he was doing, and
- what kind of protection or controls were used.

We cannot tell from a single blood test whether your BLL is increasing over time. For that reason, during the first week of November we will test your BLL and interview you again. We will then be able to compare the information collected early in the painting season (and before the implementation of the project) with information collected in August and in November.

❖ Lead Safety Programs

In general, we found that the majority of the 22 participating contractors had incomplete lead safety programs. This is not surprising given that many were unaware of the existence of the Cal/OSHA Lead in Construction Standard prior to participating in the project. Specifically, we found that:

- 37% of the companies were not testing for lead paint prior to doing surface preparation.
- Only one company had ever conducted air monitoring to measure employee exposures to lead.
- 81% of the companies had never done any employee blood lead testing.
- None had a physician in charge of a Lead Medical Program.

(Lead Safety Programs, continued)

- 55% of the companies did not provide any protective work clothing.
- More than half of the companies did not provide the correct respirator for a variety of surface preparation methods.

Your employer's participation in the project shows that he or she is interested in complying with the Lead in Construction standard in order to reduce or eliminate your exposure to lead on the job. In our visits to job sites and our discussions with the employers, we have already begun to see improvements in correct respirator use, testing for lead, and the implementation of the Lead Medical Program.

You can continue to take steps to protect your health by washing up and changing out of work clothes and shoes before leaving the job site, checking the fit of your respirator each time you put it on, and using safer work and cleaning methods.

In addition to the end-of-season blood lead testing and interviews in November, we will be conducting follow-up interviews with employers and workers in May, 1995 to see whether improvements in lead safety have been sustained over time. We also plan to report to you on additional information related to this project, including information from the interviews with you and other participating painters.

If you have any questions regarding the information presented here or any other parts of the California Painters Project, please contact me at (510) 540-2788.

Sincerely,

David Harrington
Project Coordinator

17 de octubre de 1994

Estimado Pintor,

Muchos de los participantes del Proyecto de Pintores de California estaban interesados en recibir los resultados de los análisis de plomo en la sangre de todos los participantes. Le enviamos esta carta para notificarle acerca de los resultados preliminarios de los análisis que se hicieron en junio. También le queremos informar sobre otros aspectos del proyecto. Al tener la información sobre su exposición al plomo y al ver los cambios en su nivel de plomo en la sangre a través del tiempo, podremos determinar el riesgo de envenenamiento con plomo entre todos los pintores. Hasta ahora, no hay mucha información disponible acerca del envenenamiento con plomo entre pintores.

Nuevamente, la información presentada aquí sólo refleja los resultados de los análisis que se hicieron en junio. El segundo análisis de sangre que se le hizo en agosto fue parte del Programa Médico de Plomo de su patrón y no está incluido en los resultados presentados en esta carta. Por favor, recuerde que éstos son resultados preliminarios. Le mandaremos un informe completo sobre el proyecto en 1995. Ésto incluirá información acerca de las tareas de trabajo que son relacionadas con la exposición más alta al plomo. También le informaremos si los niveles de plomo en la sangre de los participantes han cambiado durante el proyecto.

Los siguientes puntos fueron recogidos de los análisis que se hicieron en junio y de las entrevistas con sólo los empleadores.

❖ **Los análisis de plomo en la sangre (BLL) de junio 1994**

De los 134 pintores examinados al comienzo de junio, 16 resultaron con niveles de plomo en la sangre (BLL) de 20 microgramas por decilitro (ug/dl) o más. Estos pintores trabajaron para 9 de las 22 compañías en el proyecto. El promedio BLL para el grupo entero fue 10.7 ug/dl. Compare este nivel con el nivel que se encuentra comunmente en la población adulta en general, lo cual es un BLL de 3 ug/dl.

La siguiente tabla muestra la distribución de BLLs de todos los participantes:

BLL (ug/dl)	Número de pintores	Porcentaje de Pintores
menos de 5	21	16%
5 - 9	62	46%
10 - 14	18	13%
15 - 19	17	13%
20 - 24	6	5%
25 - 29	7	5%
30 - 38	3	2%
Total	**134**	**100%**

Ningún pintor tuvo un BLL más del límite de OSHA de 50 ug/dl, lo cual requiere que el pintor sea trasladado a otro tipo de trabajo por orden médica. Sin embargo, es importante recordar que su salud se puede dañar a niveles menos de 50 ug/dl. Aunque sea baja su exposición al plomo, éste se puede depositar en los huesos al estar usted expuesto constantemente. Cuando la cantidad de plomo en los huesos aumenta, el riesgo de daños permanentes a su salud por causa del plomo también aumenta.

Recuerde: el BLL refleja su exposición al plomo durante las últimas 2 a 3 semanas. Los factores que pueden afectar el BLL incluyen:

- la cantidad de tiempo que uno estuvo trabajando con pintura a base de plomo antes del análisis,
- las tareas o los métodos de trabajo, y
- la clase de equipo protector que se usó.

De un sólo análisis de sangre, no podemos informarle si su nivel de plomo está aumentando. Por tal razón, le vamos a medir el nivel de plomo y entrevistarlo nuevamente al principio de noviembre. Así, podremos comparar la información recibida al comienzo de la temporada de pintar en junio (y antes de la implementación del proyecto) con la información de los análisis de agosto y de noviembre.

❖ El Programa de Seguridad con Plomo

Por lo general, encontramos que la mayoría de los 22 contratistas del proyecto tuvieron programas incompletos de seguridad con plomo. Ésto no nos sorprendió porque muchos no sabían que existía la Norma de Plomo en la Construcción de Cal/OSHA antes de participar en el proyecto. Con respecto a ésto, encontramos lo siguiente:

- 37% de las compañías no inspeccionaron las superficies pintadas para saber si hay pintura a base de plomo antes de trabajar con la preparación de superficie.
- Sólo una compañía había medido el nivel de plomo en el aire durante la preparación de superficie.
- 81% de las compañías nunca habían analizado el nivel de plomo en la sangre de los trabajadores.
- Ninguna compañía tuvo un doctor encargado del Programa Médico de Plomo.
- 55% de las compañías no proveían ropa protectora de trabajo.
- Más de la mitad de las compañías no proveían el respirador correcto para diferentes métodos de preparación de superficie.

La participación de su empleador en el proyecto demuestra el interés que éste tiene en cumplir con la Norma de Plomo en la Construcción para reducir o eliminar la exposición al plomo en el trabajo. Por medio de nuestras visitas a los lugares de trabajo y nuestras pláticas con los empleadores, ya notamos que las medidas de seguridad se han mejorado. Por ejemplo, hemos visto el uso correcto de respiradores, inspecciones para saber si hay plomo, y la implementación del Programa Médico de Plomo.

Usted puede seguir protegiéndose del envenenamiento con plomo. Puede lavarse bien y cambiarse la ropa y los zapatos de trabajo antes de salir del trabajo, chequear el ajuste del respirador cada vez que se lo pone, y usar métodos de trabajo y limpieza más seguros.

Llevaremos a cabo una entrevista más detallada con los empleadores y trabajadores en Mayo 1995 para saber si se mantuvieron los avances del Programa de Seguridad con Plomo de su patrón. También, nos comunicaremos con usted en el futuro para darle más información relacionada con el proyecto. Ésta incluirá detalles de las entrevistas hechas a usted y otros pintores.

Si tiene alguna pregunta acerca de la información presentada aquí o acerca de cualquier otro aspecto del Proyecto de Pintores de California, favor de llamarme al (510) 540-2752.

Atentamente,

Emily Merideth
Educadora de la Salud

APPENDIX 11

Take Home Exposure Letter - Spanish, English

CDHS • OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM

CALIFORNIA PAINTERS PROJECT

June 15, 1994

Dear Painter,

Thank you for your participation in launching the California Painters Project at Fort Mason. We appreciate your interest in preventing lead poisoning on the job and look forward to the training session that will take place later in the summer.

During the interview, you reported that either a pregnant or nursing woman and/or children aged 6 or under live in your home. As a painter, you may be taking lead dust into your car and then home on your body or work clothes and shoes. This both increases your exposure to lead and puts other people in your household at risk for lead poisoning. Pregnant women and children are especially sensitive to lead.

We are currently working with your employer to set up a lead safety program. Until the program is in place, you should take the following precautions to prevent "take-home" contamination:

1. <u>Change into clean street clothes and shoes before you go home for the day.</u> Never wear your work clothes or shoes in your car or when you go home.
2. <u>Wash work clothes separately from other clothes.</u>
   If your employer does not wash your work clothes for you, take them home in a plastic bag and wash them separately from other clothes (preferably at a laundromat).
3. <u>Before leaving work, wash your face and hands thoroughly.</u>
4. <u>Take a shower as soon as you get home.</u>

We also strongly recommend that pregnant or nursing women and children aged 6 or under living in your house be tested for lead in their blood. Free blood lead testing is available for most children through the County Child Health and Disability Program (CHDP). Contact the County Health Department in your area for information on how to get household members tested for lead:

•San Francisco County	(415) 255-3747	•San Mateo County	(415) 573-2294
•Marin County	(415) 499-6879	•Contra Costa County	(510) 374-3101
•Alameda County	(510) 437-4752	•City of Berkeley	(510) 644-6822

If you have any questions or need more information, please call me at (510) 540-2788. Thank you again for your interest in the project.

Sincerely,

David Harrington

David Harrington
Coordinator, California Painters Project

CDHS • OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM

CALIFORNIA PAINTERS PROJECT

15 de junio de 1994

Estimado Pintor,

Gracias por su participación en el Proyecto de Pintores del estado de California. Le agradecemos su interés en prevenir el envenenamiento con plomo en el lugar de trabajo.

Durante la entrevista, usted indicó que vive una mujer embarazada o dando pecho o un niño de la edad de 6 años o menos en su hogar. Como pintor, puede ser que esté llevando el plomo a la casa en su cuerpo o en la ropa y los zapatos de trabajo. Esto lo expone a usted a más plomo y también les pone a otras personas que viven en su casa a riesgo de envenenamiento con plomo. Las mujeres embarazadas y los niños son especialmente sensibles al plomo.

Actualmente, estamos ayudando a su patrón a implementar un programa de seguridad con el manejo del plomo en el trabajo. Hasta que esté realizado, es muy importante que tome estas precauciones para protegerse a usted y a sus seres queridos:

1. Póngase ropa limpia antes de ir a la casa al fin de su turno de trabajo.
   No lleve la ropa ni los zapatos del trabajo puestos ni en su carro ni a la casa.

2. Lave la ropa del trabajo separada a la otra ropa de la casa.
   Si su patrón no se le lava la ropa de trabajo, llévela a la casa en una bolsa plástica. Lave la ropa de trabajo separada a la otra ropa de la casa (si es posible, vaya a una lavandería).

3. Antes de salir del trabajo, lávese bien las manos y la cara.

4. Tome un baño de ducha en cuanto llegue a la casa.

También, recomendamos que se le haga un análisis de sangre para el plomo a cualquier mujer embarazada o dando pecho o niño de la edad de 6 años o menos que vive en su casa. Se puede conseguir un análisis de sangre gratis a través del Programa de Salud y Desabilidad Infantíl (CHDP). Llame al Departamento de Salud en su área:

•San Francisco County	(415) 255-3747	•San Mateo County	(415) 573-2294
•Marin County	(415) 499-6879	•Contra Costa County	(510) 374-3101
•Alameda County	(510) 437-4752	•City of Berkeley	(510) 644-6822

Si tiene alguna pregunta o si quiere más información, por favor comuníquese conmigo al (510) 540-2752. Nuevamente, gracias por su participación en el Proyecto.

Sinceramente,

Emily Merideth

Emily Merideth
Educadora de la Salud

APPENDIX 12

Employer Questionnaires

EMPLOYER BASELINE QUESTIONNAIRE
CALIFORNIA PAINTERS PROJECT

Today's Date: ☐☐/☐☐/☐☐   Interviewer: ☐☐☐

month   *day*   *year*

Employer Name: ____________________   **ID Number:** ☐☐☐

[Employer Registry ID Number: ______________ **]**

Time Started: ____________ Interview conducted in (*circle one*) **English / Spanish**

Thank you again for your participation in the California Painters Project. Today, I'll be asking you some questions about your company and the kind of work you do. Your answers are confidential, and you are free not to answer any of the questions I ask. You are not required to answer all of the questions, but the more information we have, the more effective our project can be in preventing lead poisoning.

1. First, can I verify your company name and street address?

Company Name: ____

Address: ____

City: ______________________________ [State: CA] ZIP: ____________

2. Please tell me your name and job title.

Name: ______________________________ Title: ______________________

IF RESPONDENT IS NOT THE OWNER:

What is the company owner's name? ______________________________

2a. What is your work telephone number, and the best time to reach you?

Telephone No.:( )____ - __________ *(regular)* Best time to call: ____________

Telephone No.:( )____ - __________ *(mobile phone or alternate number)*

FAX No: ( )____ - __________

COMPANY DEMOGRAPHICS

Now I have some questions about your company.

3. During the past 12 months, how many painting employees did your company have, during your: 3.

3a. **SLOWEST** period	___ ___ ___ employees	☐☐☐	3a.
3b. and during your **BUSIEST** period?	___ ___ ___ employees	☐☐☐	3b.

4. How many of your <u>current employees</u> do surface preparation work? ___ ___ ___ **employees** ☐☐☐ 4.

5. How many years has your company been in business? ___ ___ **years** ☐☐ 5.

6. Is your company a member of the Painting and Decorating Contractors of America (PDCA)? **1=Yes, 2=No** ☐ 6.

7. Would you describe your company's work as mainly residential, mainly commercial, or about an equal mix of residential and commercial? **1=Residential 2=Commercial 3=Equal Mix** ☐ 7.

8. Besides painting, does your company do [*activity*]?

8a.	asbestos abatement	1=Yes, 2=No	☐	8a.
8b.	general contracting work	1=Yes, 2=No	☐	8b.
8c.	demolition or renovation	1=Yes, 2=No	☐	8c.
8d.	other work: ______________________	1=Yes, 2=No	☐	8d.
			☐	TYPE OF WORK: DO NOT CODE

9.	Does your company bid on lead abatement jobs?	1=Yes, 2=No	☐	9.

KNOWLEDGE SECTION

Now I have some general questions about lead safety and health. For each of the following statements, please tell me if you think the statement is true or false.

10.	If someone's job was making them sick from lead, they would know it.	1 = True 2 = False	☐	10.
11.	Lead can affect a man's ability to have children.	1 = True -2 = False	☐	11.
12.	Wearing work clothes and shoes home is not a problem.	1 = True 2 = False	☐	12.
13.	Breathing in lead dust is the only way lead can enter your body.	1 = True 2 = False	☐	13.
14	Lead paint is only found in buildings built before 1950.	1 = True 2 = False	☐	14
15.	Wearing a respirator is the only way to protect a worker against lead.	1 = True 2 = False	☐	15.
16.	If the amount of lead in an employee's blood gets too high, an employer can fire the employee before the job is over.	1 = True 2 = False	☐	16.

CURRENT WORK PRACTICES

Now I have a few questions about the work that your company does.

17.	During the past month, has your company done any jobs that involved SURFACE PREPARATION on PRE-1980 BUILDINGS, or on METAL SURFACES?	**1=Yes, 2=No (9 = don't know)**	☐	17.

IF NO, SKIP TO Q.20.
ASK METHODS FOR "IN GENERAL", NOT FOR "PAST MONTH"

IF YES (OR IF UNSURE): TURN TO NEXT PAGE AND FILL OUT THE JOB LOGS.

SHOW CARD 1 (surface prep./pre-'80/metal surfaces)

18. Please list all of the jobs your company did SURFACE PREPARATION on in the last month. (I don't need to know the exact location, just a name that you remember each job by).

For each job:

18a. How many days did your company do surface preparation on the **INTERIOR** of this [building / structure]?
18b. How many days did your company do surface preparation on the **EXTERIOR** of this [building / structure]?
18c. Please estimate the year this [building / structure] was constructed.
18d. On what type of surfaces did you do surface preparation for this [building / structure] ?
18e. Do you think lead paint was present on this job? IF YES: Why? (*record verbatim; code later*)

LOCATION OF JOB	# DAYS INTERIOR	# DAYS EXTERIOR	YEAR BUILT	TYPE OF SURFACE	LEAD? 1=Y, 2=N IF YES: WHY?
	☐☐.☐	☐☐.☐	☐☐☐☐	☐	☐ Lead? IF YES: WHY ☐
	☐☐.☐	☐☐.☐	☐☐☐☐	☐	☐ Lead? IF YES: WHY ☐
	☐☐.☐	☐☐.☐	☐☐☐☐	☐	☐ Lead? IF YES: WHY ☐
	☐☐.☐	☐☐.☐	☐☐☐☐	☐	☐ Lead? IF YES: WHY ☐
	☐☐.☐	☐☐.☐	☐☐☐☐	☐	☐ Lead? IF YES: WHY ☐

* CODES FOR TYPE OF SURFACE: 1=Wood, 2=Stucco, 3=Metal, 4=Cement, 5=plaster, 6=Other 1=Lead paint chip anal., 2=XRF, 3=Color indicating, 4=Age of bldg., 5=Info. from owner, 6=Metal surface

I'm going to be asking you about a number of different surface preparation methods.

19. In the <u>last month</u>, on your jobs that may involve lead: that is, pre-1980 buildings or metal surfaces, tell me whether you used each method often, sometimes, or never.

20. <u>In general</u>, on your jobs that may involve lead: that is, pre-1980 buildings or metal surfaces, tell me whether you used each method often, sometimes, or never.

ALSO SHOW RESPIRATOR CARD FOR Q. 21:

21. Shown here are 6 different types of respirators.

The respirators pictured include:

1. Disposable dust mask
2. Half-mask respirator with non-HEPA filters [HEPA stands for High Efficiency Particulate Air]
3. Half-mask respirator with HEPA filters
4. Full-face respirator with HEPA filters
5. Any Powered Air-Purifying Respirator (PAPR) with HEPA filter
6. Air-supplied respirator

<u>In general</u>, on your jobs that may involve lead: that is, pre-1980 buildings or metal surfaces, which respirator number do you select most often for your employees doing this task?

In Respirator Column, code "0" if NO RESPIRATOR WAS WORN. Code "7" if TASK NOT DONE.

METHOD	19. PAST MONTH		20. IN GENERAL		21. RESPIRATOR	USE LEFT COLUMN 1st: CODE UP TO 2 RESPIRATOR NUMBERS 0=NO RESP. WORN; 7=TASK NOT DONE
a. Dry manual scraping	1 = Often 2=Sometimes 3 = Never	☐ 19a.	1 = Often 2=Sometimes 3 = Never	☐ 20a.	___ ___ # of respirator	☐-☐
b. Manual scraping, with water mist	1 = Often 2=Sometimes 3 = Never	☐ 19b.	1 = Often 2=Sometimes 3 = Never	☐ 20b.	___ ___ # of respirator	☐-☐
c. Dry manual sanding	1 = Often 2=Sometimes 3 = Never	☐ 19c.	1 = Often 2=Sometimes 3 = Never	☐ 20c.	___ ___ # of respirator	☐-☐
d. Power tool cleaning, such as sanding or grinding, **with** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 19d.	1 = Often 2=Sometimes 3 = Never	☐ 20d.	___ ___ # of respirator	☐-☐
e. Power tool cleaning, such as sanding or grinding, **without** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 19e.	1 = Often 2=Sometimes 3 = Never	☐ 20e.	___ ___ # of respirator	☐-☐

[In the past month did you / In general do you]
use the following methods often, sometimes, or never:

f. Abrasive blasting, **with** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 19f.	1 = Often 2=Sometimes 3 = Never	☐ 20f.	___ ___ # of respirator	☐-☐
g. Abrasive blasting, **without** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 19g.	1 = Often 2=Sometimes 3 = Never	☐ 20g.	___ ___ # of respirator	☐-☐

	METHOD	19. PAST MONTH		20. IN GENERAL		21. RESPIRATOR	CODE UP TO 2 RESPIRATOR NUMBERS
	[In the last month did you / in general do you] use the following methods often, sometimes, or never:						
h.	**IF ABRASIVE BLASTING DONE:** Clean-up after abrasive blasting	1 = Often 2=Sometimes 3 = Never	19h.	1 = Often 2=Sometimes 3 = Never	20h.	___ ___ # of respirator	☐-☐
i.	Water blasting	1 = Often 2=Sometimes 3 = Never	19i.	1 = Often 2=Sometimes 3 = Never	20i.	___ ___ # of respirator	☐-☐
j.	Heat gun	1 = Often 2=Sometimes 3 = Never	19j.	1 = Often 2=Sometimes 3 = Never	20j.	___ ___ # of respirator	☐-☐
k.	Open flame/torch burning	1 = Often 2=Sometimes 3 = Never	19k.	1 = Often 2=Sometimes 3 = Never	20k.	___ ___ # of respirator	☐-☐
l.	Methylene chloride chemical stripper	1 = Often 2=Sometimes 3 = Never	19l.	1 = Often 2=Sometimes 3 = Never	20l.		
m.	Caustic chemical stripper (e.g., Peel Away)	1 = Often 2=Sometimes 3 = Never	19m.	1 = Often 2=Sometimes 3 = Never	20m.		
n.	Other chemical stripper *(specify)* ________________ ________________	1 = Often 2=Sometimes 3 = Never	19n.	1 = Often 2=Sometimes 3 = Never 4=NONE	19n.		
o.	Any other surface preparation / paint removal method: ________________	1 = Often 2=Sometimes 3 = Never 4=NONE	19n.	1 = Often 2=Sometimes 3 = Never 4=NONE	20o.	___ ___ # of respirator	☐-☐

DO NOT CODE (method past month) ☐ DO NOT CODE (method in general) ☐

22. In the LAST MONTH, did any of your jobs involve application of a lead-containing paint? 1=Yes, 2=No ☐ 22.

IF YES:

22a. What is the number of the respirator you selected for your employees doing this task? # ________ ☐ 22a.

PUT AWAY CARDS

RESPIRATOR PROGRAM

IF NO RESPIRATORS WERE USED, SKIP TO [illegible] QUESTION 29 (GENERAL WORK SECTION)

IF ONLY RESPIRATORS #1 or #6 were identified above, skip to Question 27.

IF RESPIRATORS #2, #3, #4, or # 5 WERE IDENTIFIED ABOVE, CONTINUE WITH Q. 23 on (USE CARD 2 TO INDICATE RESPIRATORS #2 THROUGH #5)

				DO NOT CODE
23.	During the past 6 months, have all employees who use negative pressure respirators been fit tested?	**1=Yes, 2=No** **3=THOUGHT SO (NOT)**	☐	23.
	23a. **IF YES:** How was fit testing done? (*record verbatim; code later*) ____________________ ____________________ *1=Irritant smoke challenge;2=Odor (amyl acetate, "banana oil") challenge;3=Quantitative: (actual concentration inside respirator measured); 4=Other*	**1=Smoke** **2=Odor** **3=Quantitative** **4=Neg/Pos.** **5=OTHER**	☐	23a.
24.	Do you know what a positive/negative pressure "fit check" is?	**1=Yes, 2=No**	☐	

IF NO:
A "fit-check" involves testing the face seal of your respirator for air leaks by first covering the exhalation valve with your palm and exhaling gently, and then covering the inhalation valves and inhaling gently.

25. Are your employees who use negative pressure respirators trained to do a positive/negative pressure "fit check" every time they put on the respirator? **1=Yes, 2=No** ☐ 25.

26. Are all male employees who must wear a negative pressure respirator clean-shaven in the areas where the respirator seals to the face? **1=Yes, 2=No** ☐ 26.

27. Does your company have a written respirator program? **1=Yes, 2=No** ☐ 27.

28. During the past 12 months, have all employees who must wear a respirator been seen by a doctor or nurse to determine whether they can wear a respirator safely while working? **1=Yes, 2=No** ☐ 28.

GENERAL WORK / HYGIENE/HOUSEKEEPING SECTION

Now I have some questions about your company's general work practices, NOT just those you have used in the last month. Think about the way your company works IN GENERAL.

29. I'm going to read you a list of methods used to determine if lead paint is present, or to determine the concentration of lead in paint. For each method I read you, please tell me if you use it often, sometimes, or never:

29a.	Paint chip sample analysis by a laboratory	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	29a.
29b.	X-ray fluorescence (XRF) analyzer	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	29b.
29c.	Color indicating test, for example "Lead Check"	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	29c.
29d.	Ask building owner	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	29d.
29e.	Some other method (*specify*): ______________________	1 = OFTEN 2= SOMETIMES 3 = NEVER 4=NONE USED	☐	29e.

DO NOT CODE: (method) ☐

30. Have you ever conducted personal monitoring for the amount of lead in air to assess employee exposure levels? 1=Yes, 2=No ☐ 30.

IF YES:
30a. 1=Yes, 2=No ☐ 30a.
Has an 8-hour time weighted average -TWA- lead exposure level ever exceeded 30 micrograms per cubic meter - the OSHA Action level?

IF NO to Q. 30a., SKIP TO Q. 31

IF YES (HAS EXCEEDED 30 micrograms/m3):
30b. 1=Yes, 2=No ☐ 30b.
Has an 8-hour time weighted average -TWA- lead exposure level ever exceeded 50 micrograms per cubic meter - the OSHA Permissible Exposure Level or PEL?

31. Does your company have a written Injury and Illness Prevention Program? 1=Yes, 2=No ☐ 31.

IF YES: 31a.
31a. 1=Yes, 2=No ☐
Does it specifically address lead hazards?

Now I have some questions about your company's hygiene and housekeeping practices. Again, I'll be asking you about your company's work practices IN GENERAL, when surface preparation work is being done on PRE-1980 BUILDINGS or METAL SURFACES.

SHOWCARD [illegible]

32. I'm going to read you a list of methods used to contain and/or clean up dust and paint chips. How often do you use the following methods: often, sometimes, or never?

32a.	Use a broom or brush	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32a.
32b.	Use a wet mop, sponges, or rags with plain water	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32b.
32c.	Use a wet mop, sponges, or rags with detergent or TSP	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32c.
32d.	Use a HEPA (High Efficiency Particulate Air) vacuum	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32d.
32e.	Use a regular vacuum	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32e.
32f.	Cover floors with tarps that are reused	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32f.
32g.	Cover floors with plastic that is disposed of	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32g.
32h.	Use plastic netting or other shroud on scaffolding	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32h.
32i.	Use another cleaning or containment method: ______________________________	1 = OFTEN 2= SOMETIMES 3 = NEVER 4=NONE USED	☐	32i.
		DO NOT CODE: METHOD	☐	

33. How do you usually dispose of surface preparation waste, such as paint chips? *(record verbatim, code later)* DO NOT CODE: ☐ 33.

____

____

34. Do you take steps to contain water runoff from your surface preparation jobs? **1=Yes, 2=No** ☐ 34.

IF YES:

34a. What steps do you take? *(record verbatim, code later)*

____ DO NOT CODE: ☐ 34a.

____

35. Does your company supply work clothing for employees? **1=Yes, 2=No** ☐ 35.

35a. **IF YES:** DO NOT CODE: ☐ 35a.

What kind of clothing is provided?: (*record verbatim; code later*)

____

____

IF NON-DISPOSABLE CLOTHING IS PROVIDED:

35b. How is the clothing you provide cleaned: by a laundering service, by employees taking their clothes home to launder, or some other means?

1=Laundering service,
2=Employees take home to launder
3=Other (specify):
________________ ☐ 35b.

36. Do you provide your employees with shoes or shoe coverings? **1=Yes, 2=No** ☐ 36.

37.	How often is a clean area provided on-site for changing into work clothes: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	37.
38.	How often are storage facilities provided for keeping street clothes separate from work clothes: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	38.
39.	How often are washing facilities including water, soap, and towels provided: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	39.
40.	How often is a shower including warm water, soap, and towels provided at the job site: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	40.

41. In GENERAL, on your jobs involving surface preparation on PRE-1980 BUILDINGS or METAL SURFACES, do you allow any of the following in the work area:

41a.	Eating or snacking?	**1=Yes, 2=No**	☐	41a.
41b.	Drinking beverages?	**1=Yes, 2=No**	☐	41b.
41c.	Smoking cigarettes, pipes, or cigars?	**1=Yes, 2=No**	☐	41c.
41d.	Use of other tobacco products?	**1=Yes, 2=No**	☐	41d.

PUT AWAY CARD

MEDICAL SURVEILLANCE SECTION

Now I have some questions regarding blood lead and other medical testing your company may have done.

42. Have you had any of your employees' blood tested for lead before today?	**1=Yes, 2=No**	☐	42.

If Respondent answered "NO," skip to Question 48

If "YES," continue with Questions 43 - 47

		DO NOT CODE	
43. Why did you test your employees' blood for lead? *(record verbatim; code later)* ______________________ ______________________	**1=Screening, 2=Symptomatic 3=Other**	☐	43.
44. Are your employees' blood lead levels measured routinely?	**1=Yes, 2=No**	☐	44.

IF YES:

44a. How often are blood lead levels measured? *(record verbatim; code later)* ______________________ ______________________	**1=Every month, 2=Every 2 months 3=Every 6 months, 4=Once a year 5=Other (specify)**	☐	44a.
44b. For how long have you had a blood lead testing program for you employees? ______________________ *years* *months*	☐☐+☐☐ years months		44b.

45.	Are your employees' Zinc protoporphyrin or ZPP levels measured routinely?	**1=Yes, 2=No**	☐	45.

IF YES: 44a. How often are ZPP levels measured? *(same codes as above)*	**1=Every month, 2=Every 2 months 3=Every 6 months, 4=Once a year 5=Other (specify)**	☐	45a.

46.	Did you ensure that your employees were notified of their blood lead levels in writing each time?	**1=Yes, 2=No**	☐	46.
47.	During the past 12 months, have you had an employee with a blood lead level of 50 micrograms per deciliter or greater?	**1=Yes, 2=No**	☐	47.

IF YES: 47a. When was the last time? ________ / __________ month year	☐☐/☐☐ month / year		47a.
47b. As a result of this high blood lead level, was the employee put on Medical Removal Protection?	**1=Yes, 2=No**	☐	47b.
47c. As a result of this elevated blood lead level, was the employee given a lead-related medical exam?	**1=Yes, 2=No**	☐	47c.

48. Do you have an agreement with a physician to supervise your lead medical program? **1=Yes, 2=No** ☐ 48.

48a. IF YES: 48a.

What is your physician's name, clinic or practice, address, and telephone number?

Name of Dr. ____________________

Clinic: ____________________

Street ____________________

City/State/Zip ____________________ __________

Telephone: (   ) ______ -- __________

48b. Do you have a written contract with this physician? **1=Yes, 2=No** ☐ 48b.

49. Have lead-specific medical exams been provided for all, some, or none of your employees? **1=All, 2=Some 3=None** ☐ 49.

If Respondent answered "NONE," skip to Question 50 (Training Section).

49a. **IF "SOME":**

How did you decide which employees received medical exams? *(record verbatim; code later)* **DO NOT CODE:** ☐ 49a.

____

____

____

TRAINING SECTION

Lastly, I have some questions about lead safety training you may have provided for your employees.

50.	During the past year, has your company provided any training on lead hazards in the painting and construction trades?	1=Yes, 2=No	☐	50.

If Respondent answered "NO," skip to QUESTION 51.

IF YES:

50a. Did you provide a tailgate training or other brief training?	1=Yes, 2=No	☐	50a.
50b. Did you provide a full day training that you taught?	1=Yes, 2=No	☐	50b.
50c. Did you provide a full day training taught by a consultant?	1=Yes, 2=No	☐	50c.
IF YES: Who did the training? ________________ ________________		☐	who c
50d. Did you provide a 3 to 5 day lead abatement course?	1=Yes, 2=No	☐	50d.
IF YES: Who taught the course? ________________ ________________		☐	who d

50e.
Did you provide some other kind of lead training? 1=Yes, 2=No ☐ 50e.

IF YES:

What kind of training was this?

______________________________ ☐ type e

Who did the training?

______________________________ ☐ who e

50f. How long has your training program been in place? ☐☐ + ☐☐ 50f.

____

years *months*

years months

51. Have **you** ever had any training on lead hazards in the painting and construction trades? 1=Yes, 2=No ☐ 51.

IF YES:

51a. How long was the training? ______________ ☐☐ 51a

circle: *(hours / days)* *(hours/ days)*

51b. Who provided the training? (*record verbatim, code later*) ☐ 51b.

____

That's all of the questions I have for you; I want to thank you again for your participation in the California Painters Project. We may be contacting you later if we have any questions.

Do you have any comments about lead poisoning prevention or your work that you think are important, but that we did not cover in the questionnaire?

____

____

TIME ENDED: ______________

Interviewer Comments:

____

____

____

____

Date Coded (IH): ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

Date Edited: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

SP Edit: ☐☐/☐☐/☐☐

month *day* *year*

Date Entered: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

EMPLOYER FINAL *(November)* QUESTIONNAIRE
CALIFORNIA PAINTERS PROJECT

Today's Date: ☐☐/☐☐/☐☐   **Interviewer:** ☐☐☐

month   *day*   *year*

Time Started: ______________ Interview conducted in (*circle one*) **English / Spanish / Cantonese**

Thank you again for your participation in the California Painters Project. Today, I'll be asking you some questions about your company and the kind of work you do. Your answers are confidential, and you are free not to answer any of the questions I ask. You are not required to answer all of the questions, but the more information we have, the more effective our project can be in preventing lead poisoning.

1. First, can I verify your company name, representative and street address?

CPP CO. ID: Reg. ID:

Representative:
Company:
Address:

Phone:
Alternate Phone: FAX:

IF CHANGES, indicate below:

Name of Company Representative: ______________________

Address: ______________________

City: ______________ [State: CA] ZIP: ________

Telephone No. ( ) ____ - ________ *(regular)* Best time to call: ________

Telephone No.( ) ____ - ________ *(mobile phone or alternate number)*

FAX No. ( ) ____ - ________

4.	How many of your <u>current employees</u> do surface preparation work?	___ ___ ___ employees	4.
4x.	Do you do surface preparation work yourself? IF YES: Complete WORKER INTERVIEW also.	1=Yes, 2=No	4x.
9.	Does your company bid on lead abatement jobs?	1=Yes, 2=No	9.

KNOWLEDGE SECTION

Now I have some general questions about lead safety and health. For each of the following statements, please tell me if you think the statement is true or false.

10.	If someone's job was making them sick from lead, they would know it.	1 = True 2 = False	10.
11.	Lead can affect a man's ability to have children.	1 = True 2 = False	11.
12.	Wearing work clothes and shoes home is not a problem.	1 = True 2 = False	12.
13.	Breathing in lead dust is the only way lead can enter your body.	1 = True 2 = False	13.
14	Lead paint is only found in buildings built before 1950.	1 = True 2 = False	14
15.	Wearing a respirator is the only way to protect a worker against lead.	1 = True 2 = False	15.
16.	If the amount of lead in an employee's blood gets too high, an employer can fire the employee before the job is over.	1 = True 2 = False	16.

CURRENT WORK PRACTICES

Now I have a few questions about the work that your company does.

17.	During the past month, has your company done any jobs that involved SURFACE PREPARATION on PRE-1980 BUILDINGS, or on METAL SURFACES?	**1=Yes, 2=No (9 = don't know)**	☐	17.

IF NO: SKIP TO Q. 20.
ASK METHODS FOR "IN, GENERAL", NOT FOR "PAST MONTH".

IF YES (OR IF UNSURE): TURN TO NEXT PAGE AND FILL OUT THE JOB LOG.

SHOW CARD 1 (surface prep./pre-80/metal surfaces)

[ ]. Did you bring your completed Job Log for October 22 through today? 1=Y, 2=N ☐

IF YES: Transcribe job names/locations; ask **18e** only for these

[ ]. Verify list of jobs transcribed for Job Log for October 1 - 22; add new jobs if any not listed.

Ask **18a** through **18e** for jobs not previously listed.

Ask **18e only** for jobs already listed on next page.

18. Please list all of the jobs your company did SURFACE PREPARATION on in the last month. (I don't need to know the exact location, just a name that you remember each job by).

For each job:

18a. How many days did your company do surface preparation on the **INTERIOR** of this [building / structure]?

18b. How many days did your company do surface preparation on the **EXTERIOR** of this [building / structure]?

18c. Please estimate the year this [building / structure] was constructed.

18e. Do you think lead paint was present on this job? IF YES: Why? (*record verbatim; code later*)

LOCATION OF JOB	# DAYS INTERIOR	# DAYS EXTERIOR	YEAR BUILT	LEAD? 1=Y, 2=N IF YES: WHY?	JOB CODE (DO NOT CODE)
	☐☐.☐	☐☐.☐	☐☐☐☐	☐ Lead? ☐ IF YES: WHY	
	☐☐.☐	☐☐.☐	☐☐☐☐	☐ Lead? ☐ IF YES: WHY	
	☐☐.☐	☐☐.☐	☐☐☐☐	☐ Lead? ☐ IF YES: WHY	
	☐☐.☐	☐☐.☐	☐☐☐☐	☐ Lead? ☐ IF YES: WHY	
	☐☐.☐	☐☐.☐	☐☐☐☐	☐ Lead? ☐ IF YES: WHY	

1=Lead paint chip anal., 2=XRF, 3=Color indicating, 4=Age of bldg.,5=Info. from owner, 6=Metal surface

I'm going to be asking you about a number of different surface preparation methods.

19. In the <u>last month</u>, on your jobs that may involve lead: that is, pre-1980 buildings or metal surfaces, tell me whether you used each method often, sometimes, or never.

20. <u>In general</u>, on your jobs that may involve lead: that is, pre-1980 buildings or metal surfaces, tell me whether you used each method often, sometimes, or never.

ALSO SHOW RESPIRATOR CARD FOR Q. 21:

21. Shown here are 6 different types of respirators.

The respirators pictured include:

1. Disposable dust mask
2. Half-mask respirator with non-HEPA filters [HEPA stands for High Efficiency Particulate Air]
3. Half-mask respirator with HEPA filters
4. Full-face respirator with HEPA filters
5. Any Powered Air-Purifying Respirator (PAPR) with HEPA filter
6. Air-supplied respirator

<u>In general</u>, on your jobs that may involve lead: that is, pre-1980 buildings or metal surfaces, which respirator number do you select most often for your employees doing this task?

In 'Respirator' column, code '0' if NO RESPIRATOR WAS WORN. Code '7' if TASK NOT DONE.

METHOD		19. PAST MONTH		20. IN GENERAL		21. RESPIRATOR	USE LEFT COLUMN 1st: CODE UP TO 2 RESPIRATOR NUMBERS 0=NO RESP. WORN; 7=TASK NOT DONE
	[In the past month did you / in general do you] use the following methods often, sometimes, or never.						
a.	Dry manual scraping	1 = Often 2=Sometimes 3 = Never	☐ 19a	1 = Often 2=Sometimes 3 = Never	☐ 20a.	___ ___ # of respirator	☐-☐
b.	Manual scraping, with water mist	1 = Often 2=Sometimes 3 = Never	☐ 19b	1 = Often 2=Sometimes 3 = Never	☐ 20b.	___ ___ # of respirator	☐-☐
c.	Dry manual sanding	1 = Often 2=Sometimes 3 = Never	☐ 19c	1 = Often 2=Sometimes 3 = Never	☐ 20c.	___ ___ # of respirator	☐-☐
e.	Power tool cleaning, such as sanding or grinding, **without** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 19d	1 = Often 2=Sometimes 3 = Never	☐ 20d.	___ ___ # of respirator	☐-☐
d.	Power tool cleaning, such as sanding or grinding, **with** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 19e	1 = Often 2=Sometimes 3 = Never	☐ 20e.	___ ___ # of respirator	☐-☐
g.	Abrasive blasting, **without** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 19g	1 = Often 2=Sometimes 3 = Never	☐ 20g.	___ ___ # of respirator	☐-☐
f.	Abrasive blasting, **with** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 19f.	1 = Often 2=Sometimes 3 = Never	☐ 20f.	___ ___ # of respirator	☐-☐

METHOD	19. PAST MONTH		20. IN GENERAL		21. RESPIRATOR	CODE UP TO 2 RESPIRATOR NUMBERS
[In the last month did you / in general do you] use the following methods often, sometimes, or never:						
h. **IF ABRASIVE BLASTING DONE:** Clean-up after abrasive blasting	1 = Often 2=Sometimes 3 = Never	☐ 19h	1 = Often 2=Sometimes 3 = Never	☐ 20h	___ ___ # of respirator	☐-☐
i. Water blasting	1 = Often 2=Sometimes 3 = Never	☐ 19i.	1 = Often 2=Sometimes 3 = Never	☐ 20i.	___ ___ # of respirator	☐-☐
j. Heat gun	1 = Often 2=Sometimes 3 = Never	☐ 19j.	1 = Often 2=Sometimes 3 = Never	☐ 20j.	___ ___ # of respirator	☐-☐
k. Open flame/torch burning	1 = Often 2=Sometimes 3 = Never	☐ 19k	1 = Often 2=Sometimes 3 = Never	☐ 20k	___ ___ # of respirator	☐-☐
l. Methylene chloride chemical stripper	1 = Often 2=Sometimes 3 = Never	☐ 19l.	1 = Often 2=Sometimes 3 = Never	☐ 20l.		
m. Caustic chemical stripper (e.g., Peel Away)	1 = Often 2=Sometimes 3 = Never	☐ 19m	1 = Often 2=Sometimes 3 = Never	☐ 20m.		
n. Other chemical stripper *(specify)* ________	1 = Often 2=Sometimes 3 = Never	☐ 19n	1 = Often 2=Sometimes 3 = Never 4=NONE	☐ 20n.		
________ ________		☐		☐		
o. Any other surface preparation / paint removal method: ________	1 = Often 2=Sometimes 3 = Never 4=NONE	☐ 19o	1 = Often 2=Sometimes 3 = Never 4=NONE	☐ 20o.	___ ___ # of respirator	☐-☐

DO NOT CODE (method past month) ☐ DO NOT CODE (method in general) ☐

22. In the LAST MONTH, did any of your jobs involve application of a lead-containing paint? 1=Yes, 2=No ☐ 22.

IF YES:

22a.
What is the number of the respiratory you selected for your employees doing this task? # ________ ☐ 22a.

PUT AWAY CARDS.

RESPIRATOR PROGRAM

IF NO RESPIRATORS WERE USED, SKIP TO QUESTION 29 (GENERAL WORK SECTION).

IF ONLY RESPIRATORS #1 or #6 were identified above, skip to Question 27.

IF RESPIRATORS #2, #3, #4, or # 5 WERE IDENTIFIED ABOVE, CONTINUE WITH Q. 23 on (USE CARD 2 TO INDICATE RESPIRATORS #2 THROUGH #5)

DO NOT CODE

23. During the <u>past 6 months</u>, have all employees who use negative pressure respirators been fit tested? — **1=Yes, 2=No 3=THOUGHT SO (NOT)** ☐ 23.

23a. **IF YES:**
How was fit testing done? (*record verbatim; code later*) — **1=Smoke 2=Odor 3=Quantitative 4=Neg/Pos. 5=OTHER** ☐ 23a.

____

____

1=Irritant smoke challenge;2=Odor (amyl acetate, "banana oil") challenge;3=Quantitative: (actual concentration inside respirator measured); 4=Other

24. Do you know what a positive/negative pressure "fit check" is? — **1=Yes, 2=No** ☐

IF NO:
A "fit-check" involves testing the face seal of your respirator for air leaks by first covering the exhalation valve with your palm and exhaling gently, and then covering the inhalation valves and inhaling gently.

25. Are your employees who use negative pressure respirators trained to do a positive/negative pressure "fit check" every time they put on the respirator? 1=Yes, 2=No ☐ 25.

26. Are all male employees who must wear a negative pressure respirator clean-shaven in the areas where the respirator seals to the face? 1=Yes, 2=No ☐ 26.

27. Does your company have a written respirator program? 1=Yes, 2=No ☐ 27.

28. Since June, 1994, have all employees who must wear a respirator been seen by a doctor or nurse to determine whether they can wear a respirator safely while working? 1=Yes, 2=No ☐ 28.

GENERAL WORK / HYGIENE/HOUSEKEEPING SECTION

Now I have some questions about your company's general work practices, NOT just those you have used in the last month. Think about the way your company works IN GENERAL.

29. I'm going to read you a list of methods used to determine if lead paint is present, or to determine the concentration of lead in paint. For each method I read you, please tell me if you use it often, sometimes, or never:

29a.	Paint chip sample analysis by a laboratory	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	29a.
29b.	X-ray fluorescence (XRF) analyzer	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	29b.
29c.	Color indicating test, for example "Lead Check"	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	29c.
29d.	Ask building owner	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	29d.
29e.	Some other method (*specify*): ______________________________	1 = OFTEN 2= SOMETIMES 3 = NEVER 4=NONE USED	☐	29e.

DO NOT CODE: (method) ☐

30. Have you ever conducted personal monitoring for the amount of lead in air to assess employee exposure levels? 1=Yes, 2=No ☐ 30.

IF YES:

30a.

Has an 8-hour time weighted average -TWA- lead exposure level ever exceeded 30 micrograms per cubic meter - the OSHA Action level? **1=Yes, 2=No 3=Results not yet avail.** ☐ 30a.

IF NO to Q. 30a., SKIP TO Q. 31

IF YES (HAS EXCEEDED 30 micrograms/m3):

30b.

Has an 8-hour time weighted average -TWA- lead exposure level ever exceeded 50 micrograms per cubic meter - the OSHA Permissible Exposure Level or PEL? **1=Yes, 2=No 3=Results not yet avail.** ☐ 30b.

31. Does your company have a written Injury and Illness Prevention Program? 1=Yes, 2=No ☐ 31.

IF YES:

31a.

Does it specifically address lead hazards? 1=Yes, 2=No ☐ 31a.

Now I have some questions about your company's hygiene and housekeeping practices. Again, I'll be asking you about your company's work practices IN GENERAL, when surface preparation work is being done on PRE-1980 BUILDINGS or METAL SURFACES.

SHOW CARD II (surfaceprep)

32. I'm going to read you a list of methods used to contain and/or clean up dust and paint chips. How often do you use the following methods: often, sometimes, or never?

32a. Use a broom or brush	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32a.
IF OFTEN OR SOMETIMES: Do you wet down the material before sweeping?	1=Yes, 2=No	☐	wet
32b. Use a wet mop, sponges, or rags with plain water	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32b.
32c. Use a wet mop, sponges, or rags with detergent or TSP	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32c.
32 Use a regular vacuum	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32
32d. Use a HEPA (High Efficiency Particulate Air) vacuum	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32d.
32f. Cover floors with tarps that are reused	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32f.
32g. Cover floors with plastic that is disposed of	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32g.
32h. Use plastic netting or other shroud on scaffolding	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32h.
32i. Use another cleaning or containment method: ____________________	1 = OFTEN 2= SOMETIMES 3 = NEVER 4=NONE USED	☐	32i.
____________________ ____________________	DO NOT CODE: METHOD	☐	

33 How do you usually dispose of surface preparation waste, such as paint chips? *(record verbatim, code later)* DO NOT CODE: ☐ 33

____

____

34 Do you take steps to contain water runoff from your surface preparation jobs? 1=Yes, 2=No ☐ 34

IF YES:

34a. What steps do you take? *(record verbatim, code later)*

______________________________ DO NOT CODE: ☐ 34a.

____

____

35 Does your company supply work clothing for employees? 1=Yes, 2=No ☐ 35

35a. **IF YES:** DO NOT CODE: ☐ 35a.

What kind of clothing is provided?: *(record verbatim; code later)*

____

____

IF NON-DISPOSABLE CLOTHING IS PROVIDED:

35b. How is the clothing you provide cleaned: by a laundering service, by employees taking their clothes home to launder, or some other means? **1=Laundering service, 2=Employees take home to launder 3=Other (specify):** ______ ☐ 35b.

36	Do you provide your employees with shoes or shoe coverings?	1=Yes, 2=No	☐	36
37	How often is a clean area provided on-site for changing into work clothes: every day, some days, or never?	1 = Every day 2 = Some days 3 = Never	☐	37
38x xx.	Do you provide a means for storing work clothes separately from street clothes? IF YES: Please describe: ______________________________ ______________________________	1 = Yes 2 = No	☐ DO NOT CODE: ☐	38x. storage
39x xx.	How often do you ensure that water, soap, and towels are available for washing: every day, some days, or never?	1 = Every day 2 = Some days 3 = Never	☐	39
40.	How often is a shower including warm water, soap, and towels provided at the job site: every day, some days, or never?	1 = Every day 2 = Some days 3 = Never	☐	40.

41. In GENERAL, on your jobs involving surface preparation on PRE-1980 BUILDINGS or METAL SURFACES, do you allow any of the following in the work area:

41a.	Eating or snacking?	1=Yes, 2=No	☐	41a.
41b.	Drinking beverages?	1=Yes, 2=No	☐	41b.
41c.	Smoking cigarettes, pipes, or cigars?	1=Yes, 2=No	☐	41c.
41d.	Use of other tobacco products?	1=Yes, 2=No	☐	41d.

PUT AWAY CARD.

MEDICAL SURVEILLANCE SECTION

Now I have some questions regarding blood lead and other medical testing your company may have done.

48. Do you have an agreement with a physician to supervise your lead medical program? 1=Yes, 2=No ☐ 48.

48a. **IF YES:** 48a.

What is your physician's name, clinic or practice, address, and telephone number?

Name of Dr. ______________________________

Clinic: ______________________________

Street ______________________________

City/State/Zip ______________________ __________

Telephone: (   ) ______ -- ____________

48b. Do you have a written contract with this physician? 1=Yes, 2=No ☐ 48b.

Finally, I have some questions about health and safety purchases your company may have made recently.

49. During the course of this project, did you purchase:

a. A HEPA vacuum cleaner?	1=Yes, 2=No	☐	49a.
b. Vacuum attachments for power tools?	1=Yes, 2=No	☐	49b.
c. "Lead Checks" or other colorimetric tests?	1=Yes, 2=No	☐	49c.
d. Plastic sheeting?	1=Yes, 2=No	☐	49d.
e. Equipment & supplies needed to do irritant smoke fit tests?	1=Yes, 2=No	☐	49e.
f. Half-face or full-face respirators for employees doing surface prep. on lead containing surfaces?	1=Yes, 2=No	☐	49f.
g. HEPA filter cartridges for your employees' half-face or full-face respirators?	1=Yes, 2=No	☐	49g.
h. Tyvek or other disposable clothing?	1=Yes, 2=No	☐	49h.
i. Disposable shoe coverings?	1=Yes, 2=No	☐	49i.
j. Any other health & safety items? IF YES: ____________________	1=Yes, 2=No	☐	49j.

PROJECT EVALUATION

Since we would like to improve our project and future projects of this type, we'd like to know what you thought of the Painters Project.

i. How do you think participating in this project has changed the way your company does its work?

____

____

ii. Which part of the project was <u>most</u> useful in assisting you to make changes in your lead safety program?

____

____

iii. How has the *Painting Contractor's Guide to Lead Safety* (the manual) helped you to improve your lead safety program?

____

____

____

____

iv. In which areas of lead safety do you feel you still need additional information or training?

____

____

____

____

v. Overall, what was the most significant benefit from participating in the project?

____

____

vi. Overall, what was the biggest drawback to participating in this project?

____

____

vii. Do you have any suggestions for improving this project if it were to be repeated in the future with other contractors?

____

____

____

____

vii. Would you recommend to other painting contractors that they participate in a project like this one?

☐ Yes ☐ No

If yes, Why?
If no, Why Not?

____

____

____

____

That's all of the questions I have for you; I want to thank you again for your participation in the California Painters Project. We'll be scheduling future meetings to discuss the findings of the project, and conducting another short interview with you in the summer of 1995.

TIME ENDED: ____________________

If this employer does surface prep, note ID number of Worker Interview completed: ☐☐☐

How well do you think respondent understood questions:

☐ Understood all / almost all ☐ Understood some / sometimes

☐ Seemed to have difficulty understanding / understood little

Was Continuation Sheet: ☐ Used in Interview ☐ Given to mail back ☐ Not Used

Other Comments about this interview:

Date Edited (1st): ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

Date Coded (IH): ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

SP Edit: ☐☐/☐☐/☐☐

month *day* *year*

Date Entered: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

Record Number in datafile: ☐☐

Date QC'd: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

EMPLOYER *SUMMER 95* QUESTIONNAIRE
CALIFORNIA PAINTERS PROJECT

Today's Date: ☐☐/☐☐/☐☐ **Interviewer:** ☐☐☐

month *day* *year*

Time Started: ______________ ☐ AM ☐ PM

Interviewed in: ☐ English ☐ Spanish ☐ Cantonese

How interviewed: ☐ In person ☐ By phone

Thank you again for your participation in the California Painters Project. Today, I'll be asking you some final questions to determine the overall effectiveness of the project. Your answers are confidential, and you are free not to answer any of the questions I ask.

1. First, can I verify your company name and street address?

CPP CO. ID: Reg. ID:

Representative:
Company:
Address:

Phone:
Alternate Phone: FAX:

IF CHANGES, indicate below:

Name of Company Representative: ______________________

Address: ______________________

City ______________________ (State: CA) ZIP: __________

Telephone No.: ( ) ______________ *(regular)* Best time to call: __________

Telephone No.: ( ) _____ - __________ *(mobile phone or alternate number)*

FAX No.: ( ) _____ - __________

c:\cpp\wp\emp95cvr.wp6

4. How many of your current employees do surface preparation work? ___ ___ ___ employees 4.

4x. Do you do surface preparation work yourself? 1=Yes, 2=No 4x.

IF YES: Complete WORKER INTERVIEW also.

KNOWLEDGE SECTION

Now I have some general questions about lead safety and health. For each of the following statements, please tell me if you think the statement is true or false.

10.	If someone's job was making them sick from lead, they would know it.	1 = True 2 = False	10.
11.	Lead can affect a man's ability to have children.	1 = True 2 = False	11.
12.	Wearing work clothes and shoes home is not a problem.	1 = True 2 = False	12.
13.	Breathing in lead dust is the only way lead can enter your body.	1 = True 2 = False	13.
14	Lead paint is only found in buildings built before 1950.	1 = True 2 = False	14
15.	Wearing a respirator is the only way to protect a worker against lead.	1 = True 2 = False	15.
16.	If the amount of lead in an employee's blood gets too high, an employer can fire the employee before the job is over.	1 = True 2 = False	16.

Now I have some questions about surface preparation methods your company uses.

20. In general, on your jobs that may involve lead: that is, pre-1980 buildings or metal surfaces, tell me whether you use each method often, sometimes, or never.

SHOW RESPIRATOR CARD FOR Q.21.

21. Shown here are 6 different types of respirators.

The respirators pictured include:

1. Disposable dust mask
2. Half-mask respirator with non-HEPA filters [HEPA stands for High Efficiency Particulate Air]
3. Half-mask respirator with HEPA filters
4. Full-face respirator with HEPA filters
5. Any Powered Air-Purifying Respirator (PAPR) with HEPA filter
6. Air-supplied respirator

In general, on your jobs that may involve lead: that is, pre-1980 buildings or metal surfaces, which respirator number do you select most often for your employees doing this task?

In 'Respirator' column, code '0' if NO RESPIRATOR WAS WORN. Code '7' if TASK NOT DONE.

METHOD	20. IN GENERAL		21. RESPIRATOR	USE LEFT COLUMN 1st: CODE UP TO 2 RESPIRATOR NUMBERS	
In general do you use the following methods often, sometimes, or never:					
a. Dry manual scraping	1 = Often 2=Sometimes 3 = Never	☐ 20a.	___ ___ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	☐-☐
b. Manual scraping, **with** water mist	1 = Often 2=Sometimes 3 = Never	☐ 20b.	___ ___ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	☐-☐
c. Dry manual sanding	1 = Often 2=Sometimes 3 = Never	☐ 20c.	___ ___ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	☐-☐
e. Power tool cleaning, such as sanding or grinding, **without** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 20e.	___ ___ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	☐-☐
d. Power tool cleaning, such as sanding or grinding, **with** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 20d.	___ ___ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	☐-☐
g. Abrasive blasting, **without** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 20g.	___ ___ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	☐-☐
f. Abrasive blasting, **with** HEPA dust collection system on the tool	1 = Often 2=Sometimes 3 = Never	☐ 20f.	___ ___ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	☐-☐
h. **IF ABRASIVE BLASTING DONE:** Clean-up after abrasive blasting	1 = Often 2=Sometimes 3 = Never	☐ 20h.	___ ___ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	☐-☐

In general do you use the following methods often, sometimes, or never:

METHOD	20. IN GENERAL		21. RESPIRATOR	USE LEFT COLUMN 1st: CODE UP TO 2 RESPIRATOR NUMBERS	
i. Water blasting	1 = Often 2=Sometimes 3 = Never	20i.	____ ____ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	-
j. Heat gun	1 = Often 2=Sometimes 3 = Never	20j.	____ ____ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	-
k. Open flame/torch burning	1 = Often 2=Sometimes 3 = Never	20k.	____ ____ # of respirator	0 = NO RESP. WORN; 7 = TASK NOT DONE	-

PUT AWAY CARD

RESPIRATOR PROGRAM

IF NO RESPIRATORS WERE USED, SKIP TO QUESTION 29 (GENERAL WORK SECTION).

IF ONLY RESPIRATORS #1 or #6 were identified above, skip to Question 29

IF RESPIRATORS #2, #3, #4 or #5 WERE IDENTIFIED ABOVE, CONTINUE WITH Q. 23 on (USE CARD 2 TO INDICATE RESPIRATORS #2 THROUGH #5)

23.	During the <u>past 6 months</u>, have all employees who use negative pressure respirators been fit tested?	1=Yes, 2=No 3=THOUGHT SO (NOT)	☐	23.
	23a. IF YES: How was fit testing done? (*record verbatim; code later*) ______________________________ ______________________________ *1=Irritant smoke challenge;2=Odor (amyl acetate, "banana oil") challenge;3=Quantitative: (actual concentration inside respirator measured); 4=Other*	1=Smoke 2=Odor 3=Quantitative 4=Neg/Pos. 5=OTHER	☐	23a.
24.	Do you know what a positive/negative pressure "fit check" is?	1=Yes, 2=No	☐	24.

IF NO:
A "fit-check" involves testing the face seal of your respirator for air leaks by first covering the exhalation valve with your palm and exhaling gently, and then covering the inhalation valves and inhaling gently.

25.	Are your employees who use negative pressure respirators trained to do a positive/negative pressure "fit check" every time they put on the respirator?	1=Yes, 2=No	☐	25
25S.	Have all of your employees hired <u>since September 1, 1994</u>, who wear a respirator been seen by a doctor or nurse to determine whether they can wear a respirator safely while working?	1=Yes, 2=No 3=no new hires	☐	25S.

GENERAL WORK / HOUSEKEEPING / ENVIRONMENTAL

29 I'm going to read you a list of methods used to determine if lead paint is present, or to determine the concentration of lead in paint. For each method I read you, please tell me if you use it often, sometimes, or never:

29a. Paint chip sample analysis by a laboratory

1 = OFTEN
2= SOMETIMES
3 = NEVER

☐ 29a.

If OFTEN or SOMETIMES,under what circumstances did you take paint chip sample(s)?

____

Do Not Code: ☐

29c. Color indicating test, for example "Lead Check"

1 = OFTEN
2= SOMETIMES
3 = NEVER

☐ 29c.

Now I have some questions about your company's hygiene and housekeeping practices. Again, I'll be asking you about your company's work practices IN GENERAL, when surface preparation work is being done on PRE-1980 BUILDINGS or METAL SURFACES.

32. I'm going to read you a list of methods used to contain and/or clean up dust and paint chips. How often do you use the following methods: often, sometimes, or never?

32b. Use a wet mop, sponges, or rags with plain water

1 = OFTEN
2= SOMETIMES
3 = NEVER

☐ 32b.

32c. Use a wet mop, sponges, or rags with detergent or TSP

1 = OFTEN
2= SOMETIMES
3 = NEVER

☐ 32c.

32d. Use a HEPA (High Efficiency Particulate Air) vacuum

1 = OFTEN
2= SOMETIMES
3 = NEVER

☐ 32d.

32f. Cover floors with tarps that are reused

1 = OFTEN
2= SOMETIMES
3 = NEVER

☐ 32f.

32g. Cover floors with plastic that is disposed of

1 = OFTEN
2= SOMETIMES
3 = NEVER

☐ 32g.

32h.	Use plastic netting or other shroud on scaffolding	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	32h.
33S1.	Before the Project began in June 1994, how often did you use a broom or brush to sweep up dry paint chips and dust: often, sometimes or never?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S1.
33S2.	Currently, how often do you use a broom or brush to sweep up **dry** paint chips and dust?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S2.
33S3.	Before the Project began in June 1994, how often did you mist paint chips and dust with water before sweeping or shoveling: often, sometimes or never?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S3.
33S4.	Currently, how often do you mist paint chips and dust with water before sweeping or shoveling?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S4.
33S5.	Before the Project began in June 1994, how often did you use **new** polyethylene sheeting to seal off rooms while doing **interior** surface preparation work: often, sometimes, or never?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S5.
33S6.	Currently, how often do you use **new** polyethylene sheeting to seal off rooms while doing **interior** surface preparation work?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S6.
33S7.	Before the Project began in June 1994, how often did you use **new** polyethylene sheeting to seal off windows or doors when doing **exterior** surface preparation: often, sometimes, or never?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S7.
33S8.	Currently, how often do you use **new** polyethylene sheeting to seal off windows or doors when doing **exterior** surface preparation?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S8.
33S9.	Before the Project began in June 1994, how often did you use polyethylene sheeting or tarps on **exterior** jobs to contain lead paint chips and dust: often, sometimes, or never?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S9.
33S10.	Currently, how often do you use polyethylene sheeting or tarps on **exterior** jobs to contain lead paint chips and dust?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S10.

33S11.	<u>Before the Project began in June 1994</u>, how often did you take steps to prevent lead paint chips from entering drains or sewers when water blasting or power washing? o/s/n	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S11.
33S11a.	If OFTEN or SOMETIMES, What steps did you take?________________	Do not code:	☐	33S11a.
33S12.	<u>Currently</u>, how often do you take steps to prevent lead paint chips from entering drains or sewers when water blasting or power washing?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S12.
33S12a.	If OFTEN or SOMETIMES, What steps do you take?________________	Do not code:	☐	33S12a.
33S13.	<u>Before the Project began in June 1994</u>, how often did you take steps to ensure that hazardous lead waste was disposed of at a licensed disposal facility: often, sometimes or never?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S13.
	If OFTEN or SOMETIMES, What steps did you take?________________	Do not code:	☐	33S13a.
33S14.	<u>Currently</u>, how often do you take steps to insure that hazardous lead waste is disposed of at a licensed disposal facility?	1 = OFTEN 2= SOMETIMES 3 = NEVER	☐	33S14.
33S14a.	If OFTEN or SOMETIMES, What steps did you take?________________	Do not code:	☐	33S14a.
35	Does your company supply work clothing for employees?	1=Yes, 2=No	☐	35

35a. **IF YES:** What kind of clothing is provided?: (*record verbatim; code later*) ________________	**Do Not Code:**	☐	35a.
IF NON-DISPOSABLE CLOTHING IS PROVIDED: 35.b How is the clothing you provide cleaned: by a laundering service, by employees taking their clothes home to launder, or some other means?	1= laundering service 2= Emp take home 3= other (specify) ________ ________	☐	35b.

36S.	Before the Project began in June 1994, did you take steps to ensure that your employees did not wear lead-contaminated shoes home at the end of the day?	1=Yes, 2=No	☐	36S.
36Sa.	If YES, What steps did you take? ______________ ____	Do not code:	☐	36Sa.
37S.	Currently, do you take steps to ensure that your employees do not wear lead-contaminated shoes home at the end of the day?	1=Yes, 2=No	☐	37S.
37Sa.	If YES, What steps do you take? ______________ ____	Do not code:	☐	37Sa.
39xxx.	How often do you ensure that water, soap, and towels are available for washing: every day, some days, or never?	1 = Every day 2 = Some days 3 = Never	☐	39xxx.

41 In GENERAL, on your jobs involving surface preparation on PRE-1980 BUILDINGS or METAL SURFACES, do you allow any of the following in the work area:

41a.	Eating or snacking?	1=Yes, 2=No	☐	41a.
41b.	Drinking beverages?	1=Yes, 2=No	☐	41b.
41c.	Smoking cigarettes, pipes, or cigars?	1=Yes, 2=No	☐	41c.
41d.	Use of other tobacco products?	1=Yes, 2=No	☐	41d.

MEDICAL SURVEILLANCE / TRAINING

Now I have some questions regarding your lead medical & training programs.

48 Do you have an agreement with a physician to supervise your lead medical program? 1=Yes, 2=No ☐ 48.

48a. **IF YES:** 48a.
What is your physician's name, clinic or practice?

Name of Dr. ______________________

Clinic: ______________________

<u>If different from Diane Liu / UCSF Occ. Medicine Clinic</u>, what is the address and telephone?

Street ______________________

City/State/Zip ______________________ __________

Telephone: (   ) ______ -- __________

48b. Do you have a written contract with this physician? 1=Yes, 2=No ☐ 48b.

48S. Have you provided lead hazard training to new employees who do surface preparation on lead paint? 1=Yes, 2=No 3 = No new hire ☐ 48S.

IF YES:

48S1a. Did you send new employees to a 32 hr accredited training course? 1=Yes, 2=No ☐ 48S1a.

48S2b. If you provided training yourself, please describe the training: **Do not code:** ☐ 48S2b.

____

____

48S3c. How many hours of training did you provide? **Do not code:** ☐ 48S3c.

____

48S3d. What materials did you use? **Do not code:** ☐ 48S3d.

____

49	Since the project began, did you purchase:			49
49a.	A HEPA vacuum cleaner?	1=Yes, 2=No	☐	49a.
49b.	Vacuum attachments for power tools?	1=Yes, 2=No	☐	49b.
49c.	"Lead Checks" or other colorimetric tests?	1=Yes, 2=No	☐	49c.
49e.	Equipment & supplies needed to do irritant smoke fit tests?	1=Yes, 2=No	☐	49e.
50S.	Since the Project started in June 1994, have you been referred a job by or referred a job to another Painters Project participant?	1=Yes, 2=No	☐	50S.
51S.	Since the Project started in June 1994, have you worked together on a job with another Painters Project participant?	1=Yes, 2=No	☐	51S.
52S.	Since the Project started in June 1994, have you cooperated with other project participants to purchase, loan, or borrow equipment?	1=Yes, 2=No	☐	52S.
53S.	Since participating in the Project, have you applied for or become certified by the Department of Health Services?	1=Yes, 2=No	☐	53S.
54S.	Since participating in the Project, have you had any jobs where customers requested lead certification, training, or expertise?	1=Yes, 2=No	☐	54S.
55S.	If the customer does not raise the issue of lead safety, how often do you bring it up: often, sometimes, never?	1=OFTEN 2=SOMETIMES 3= NEVER	☐	55S.

56S. Has participation in the Project resulted in any rate reduction or rebates from your workers' compensation insurance carrier? 1=Yes, 2=No ☐ 56S.

56Sa. If YES, Please explain:______________________________________

______________________________________ Do not code: ☐ 56Sa.

That's all of the questions I have for you; I want to thank you again for your participation in the California Painters Project. We will be contacting you again later this year with the final results of the project.

TIME ENDED: ________________

If this employer does surface prep, note ID number of Worker Interview completed: ☐☐☐

How well do you think respondent understood questions:

☐ **Understood all / almost all** ☐ **Understood some / sometimes**

☐ **Seemed to have difficulty understanding / understood little**

Was Continuation Sheet: ☐ **Used in Interview** ☐ **Given to mail back** ☐ **Not Used**

Other Comments about this interview:

____

____

____

____

Date Edited (1st): ☐☐/☐☐/☐☐ By: ☐☐☐

month day year

Date Coded (IH): ☐☐/☐☐/☐☐ By: ☐☐☐

month day year

SP Edit: ☐☐/☐☐/☐☐

month day year

Date Entered: ☐☐/☐☐/☐☐ By ☐☐☐

month day year

Record Number in Batch: ☐☐

Date QC'd ☐☐/☐☐/☐☐ By ☐☐☐

month day year

APPENDIX 13

Worker Questionnaires

WORKER BASELINE QUESTIONNAIRE
CALIFORNIA PAINTERS PROJECT

Today's Date (mm/dd/yy): ☐☐/☐☐/☐☐ Interviewer: ☐☐☐

[*Employer Name:* ____________________________]

Worker ID Number: ☐☐☐ [*Worker Registry ID:* ______________]

Time Started: ______________ Interviewed in: ☐ English ☐ Spanish

Check if Anyone Else Was ☐ Other: ______________________

Present During Interview: ☐ Who: ______________________________

Thank you again for your participation in the California Painters Project. Today, I'll be asking you some questions about your work and hobbies. Your answers are confidential, and will not be discussed with your employer. You are not required to answer all of the questions, but the more information we have, the more effective our project can be in preventing lead poisoning.

HOUSEHOLD SECTION

First, I have some questions about you and your household.

Can I verify your name? ____

Can you tell me your home address, telephone number, and the best times to reach you:

1. **Address:** ____

   City: ____________________ **State:** __________ **ZIP:** ______________

   Telephone Number: ( ) ____ - ________ **Best time to call:** _______ *(am / pm)*

2. What is your date of birth? ☐☐/☐☐/☐☐ (2)

   month *day* *year*

3.	*GENDER (by observation):* **1=Male, 2=Female**		☐	3.
4.	Which of the following best describes you: • White or Caucasian • Black or African American • Asian or Pacific Islander • or Native American/Alaska native ?	**1 = white** **2 = black** **3 = Asian** **4 = Native American** **5 = Other:** ______________	☐	4.
5.	Are you of Hispanic origin?	**1 = Yes, 2 = No**	☐	5.
6.	Do any women who are pregnant or nursing live in your household?	**1 = Yes, 2 = No**	☐	6.
7.	How many children aged 6 or under live in your household?	**number** ___________ ☐	☐	7.
8.	What is the highest grade of school you have completed? ________________________________	**1 = Grade school (grades 1-8)** **2 = Some high school** **3 = High school graduate** **4 = Some college** **5 = College graduate / higher**	☐	8.
9.	As part of the California Painters Project, we will be providing educational materials to you. Do you prefer to receive written materials in English or Spanish?	**1 = English** **2 = Spanish** **3 = both English & Spanish**	☐	9.

10. If resources allow us to offer educational materials in another language besides English or Spanish, do you prefer to receive written materials in another language?	**1 = Yes, 2 = No**	☐	10.

IF YES:

DO NOT CODE: ☐

10a. What language? 10a.

(record verbatim, code later)

____

____

11. Would you prefer training classes in English or Spanish?	**1 = English** **2 = Spanish** **3 = both English & Spanish**	☐	11.
12. If resources allow us to offer training classes in another language besides English or Spanish, do you prefer training classes in another language?	**1 = Yes, 2 = No**	☐	12.

IF YES:

DO NOT CODE: ☐

12a. What language? 12a.

(record verbatim, code later)

____

____

NON - OCCUPATIONAL RISK FACTORS

Now I have some questions about your hobbies and other habits. I'm going to read you a list of activities people sometimes do. Have you done any of the following during the past month:

13.	Surface preparation before painting, **not** with your current employer?	**1 = Yes, 2 = No**	☐	13.
	IF YES: 13a. Was this work done on a building built before 1980, or a metal surface?	**1 = Yes, 2 = No** **9 = Don't know**	☐	13a.
14.	Other remodeling work, **not** with your current employer?	**1 = Yes, 2 = No**	☐	14.
	IF YES: 14a. Was this work done on a building built before 1980 or a metal surface?	**1 = Yes, 2 = No** **9 = Don't know**	☐	14a.
15.	Made pottery/ceramics using glazes?	**1 = Yes, 2 = No**	☐	15.

Have you done any of the following during the past month:

16.	Made stained glass?	**1 = Yes, 2 = No**	☐	16.
17.	Shot firearms (target practice) or assembled ammunition?	**1 = Yes, 2 = No**	☐	17.
18.	Cast molten lead into fishing weights or other objects?	**1 = Yes, 2 = No**	☐	18.
19.	Done soldering, brazing, or tinning?	**1 = Yes, 2 = No**	☐	19.

20. During the past month, have you used any ceramics for cooking or serving food that were made by hand or made outside the U.S.? **1 = Yes, 2 = No** **9 = Don't know** ☐ 20.

DO NOT CODE 21.:

21. During the past month, have you used any home remedies, such as Greta, Azarcon or Paylooah? **1 = Yes, 2 = No** **9 = Don't know** ☐ 21.

IF YES (or don't know):
21a. What remedy was this? **DO NOT CODE:** ☐ 21a.
(record verbatim; code later)

____

____

22. Do you currently smoke cigarettes, pipes, or cigars? **1 = Yes, 2 = No** ☐ 22.

IF YES:

22a. Do you smoke at work? **1 = Yes, 2 = No** ☐ 22a.

IF YES (SMOKES AT WORK):

22b. How often do you wash your hands before smoking at work: every time, sometimes, or never? ☐ 22b.
1 = Every time
2 = Sometimes
3 = Never

23. Do you currently use other tobacco products? **1 = Yes, 2 = No** ☐ 23.

IF YES:

23a. Do you use other tobacco products at work? **1 = Yes, 2 = No** ☐ 23a.

IF YES (TOBACCO AT WORK):

23b. How often do you wash your hands before using tobacco products at work: every time, sometimes, or never? ☐ 23b.
1 = Every time
2 = Sometimes
3 = Never

KNOWLEDGE SECTION

Now I have some questions about lead safety and health. For each of the following statements, please tell me if you think the statement is true or false.

24.	If your job were making you sick from lead, you would know it.	**1 = True, 2 = False**	☐	24.
25.	Lead can affect a man's ability to have children.	**1 = True, 2 = False**	☐	25.
26.	Wearing your work clothes and shoes home is not a problem.	**1 = True, 2 = False**	☐	26.
27.	Breathing in lead dust is the only way lead can enter your body.	**1 = True, 2 = False**	☐	27.
28.	Lead paint is only found in buildings built before 1950.	**1 = True, 2 = False**	☐	28.
29.	Wearing a respirator is the only way to protect yourself against lead.	**1 = True, 2 = False**	☐	29.
30.	If the amount of lead in your body gets too high, your employer can fire you before the job is over.	**1 = True, 2 = False**	☐	30.

MEDICAL SURVEILLANCE SECTION

Now I have some questions about blood lead testing you may have had.

31. Have you ever had your blood tested for lead before today? — **1 = Yes, 2 = No (9 = Don't know)** ☐ 31.

IF NO SKIP TO QUESTION 37

IF YES (or don't know), continue with Question 32

32. Approximately how many times have you had your blood tested for lead? — **# of times________** ☐ ☐ ☐ 32.

33. Were the tests done because:
- of a company blood testing or screening program
- because you felt symptoms
- or for other reasons?

1 = screening program
2 = felt symptoms
3 = other reasons: ________________ ☐ 33. ☐

34. Have you ever been taken off work or been reassigned to a job away from high lead exposure, because of too much lead in your blood? — **1 = Yes, 2 = No** ☐ 34.

IF YES:
34a. When were you taken off work or reassigned? ☐☐/☐ ☐ 34a.
month *year*

35. Have you ever been treated with medication to lower your blood lead level? **1 = Yes, 2 = No (9 = Don't know)** ☐ 35.

IF YES (or don't know):

35a. When were you treated with medication to lower your blood lead level? ☐☐/☐ ☐ 35a.
month year

35b. What kind of medication was this? DO NOT CODE: ☐ 35b.

(record verbatim; code later)

____

____

36. Have you ever been hospitalized for a high blood lead level? **1 = Yes, 2 = No 9 = Don't know** ☐ 36.

37. Have you ever had a medical examination (other than blood testing), for working with lead? **1 = Yes, 2 = No 9 = Don't know** ☐ 37.

IF YES (or don't know):

37a. When did you have the medical exam? ☐☐/☐ ☐ 37a.
month year

(If more than one, ask about most recent)

37b. Was this medical exam performed as part of your current employer's lead program? **1 = Yes, 2 = No 9 = Don't know** ☐ 37b.

WORK SECTION

Now I have some questions about your work.

38. Can I verify your current employer's name and address:

Company name: ______________________ ID: ☐☐☐ 38.

Address: ______________________

City: __________ State: ________ ZIP: __________

39. When did you start working for this company? ☐☐/☐☐ 39.

month *year*

40. On average, how many hours per week do you work for this company? ________ ☐☐ 40.

hours / week

41. In the last month, have you worked as a painter for another employer besides this company, or as a self-employed painter? **1 = Yes, 2 = No** ☐ 41.

IF YES:
41a How many days in the last month did you work for other employers or as a self-employed painter? ________ ☐☐ 41a.

days

42. Are you a member of the Painters Union? **1 = Yes, 2 =No** ☐ 42.

43. How many years, in total, have you worked as a painter (not just for this employer) ? ________ ☐☐ 43.

years years

44. For how many of these years have you worked at least 6 months of the year as a painter (not just for this employer) ? ______ **years** ☐☐ years 44.

45. During the last 3 years, what other kinds of work, besides painting, have you done? **0=None** ☐

FOR EACH TYPE OF WORK, ASK 'WHAT DID YOU DO' TO GET TASK DESCRIPTION

45b. How long did you do [*type of work*]?

			DO NOT CODE: TYPE OF WORK
______ *Type of Work*	______ *How Long*	☐☐ *(months / yrs)*	☐
______ *Type of Work*	______ *How Long*	☐☐ *(months / yrs)*	☐
______ *Type of Work*	______ *How Long*	☐☐ *(months / yrs)*	☐

Now I have some questions about painting work you have done for [*employer name*] in the LAST **MONTH.**

46. During the last month, have you spent at least half your time doing surface preparation and/or cleanup? **1 = Yes, 2 = No** ☐ 46.

47. Do you think that lead was present on any of the jobs you worked on in the last month? **1 = Yes, 2 = No** ☐ 47.

IF YES:
47a. Why do you think so? DO NOT CODE: ☐ 47a.

(record verbatim; code later)

____

____

48. In the **LAST MONTH,** have you done any surface preparation work on **BUILDINGS BUILT BEFORE 1980 or METAL SURFACES?** **1 = Yes, 2 = No** ☐ 48.

IF NO, SKIP TO QUESTION 5[illegible]

IF YES, CONTINUE WITH QUESTION 49 [illegible]

SHOW CARD 15: past month

49. Please think about the jobs you did in the last month that involved surface preparation work on pre-1980 buildings or metal surfaces. Please list all of the jobs you did **surface preparation on** in the last month. I don't need the exact address, just a name that you remember each job by.

For each job:

49a. How many days did you do surface preparation on the **INTERIOR** of this [building /structure]?

49b. How many days did you do surface preparation on the **EXTERIOR** of this [building / structure]?

49c. Please estimate the year this [building / structure] was constructed.

49d. On what type of surfaces did you do surface preparation for this [building / structure] ?

JOB NAME / LOCATION	# DAYS INTERIOR	# DAYS EXTERIOR	YEAR BUILT	TYPE OF SURFACE *
	☐☐.☐	☐☐.☐	☐☐☐☐	☐
	☐☐.☐	☐☐.☐	☐☐☐☐	☐
	☐☐.☐	☐☐.☐	☐☐☐☐	☐
	☐☐.☐	☐☐.☐	☐☐☐☐	☐
	☐☐.☐	☐☐.☐	☐☐☐☐	☐

* *1 = Wood, 2 = Stucco, 3 = Metal, 4 = Concrete, 5 = Plaster / walls, 6 = Other*

50. I'm going to be asking you about a number of different surface preparation methods.
In the last month, while doing surface preparation on pre-1980 buildings or metal surfaces, tell me whether you used each method often, sometimes, or never.

0 = No respirator; 7=task not done

a.	Dry manual scraping	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50a.	____ respirator #	☐	51a.
b.	Manual scraping, with a water mist	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50b.	____ respirator #	☐	51b.
c.	Dry manual sanding	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50c.	____ respirator #	☐	51c.
d.	Power tool cleaning, such as sanding or grinding, without HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50d.	____ respirator #	☐	51d.
e.	Power tool cleaning, such as sanding or grinding, with HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50e.	____ respirator #	☐	51e.

Did you use these methods often, sometimes, or never:

f.	Abrasive blasting, without HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50f.	____ respirator #	☐	51f.
g.	Abrasive blasting, with HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50g.	____ respirator #	☐	51g.
h.	**IF ABRASIVE BLASTING DONE:** Clean up after abrasive blasting	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50h.	____ respirator #	☐	51h.

i.	Water blasting or power washing	1 = **Often** 2 = **Sometimes** 3 = **Never**	☐	50i.	______ respirator #	☐	51i.
j.	Heat gun	1 = **Often** 2 = **Sometimes** 3 = **Never**	☐	50j.	______ respirator #	☐	51j.
k.	Open flame/torch burning	1 = **Often** 2 = **Sometimes** 3 = **Never**	☐	50k.	______ respirator #	☐	51k.

Did you use these methods often, sometimes, or never:

l.	Methylene chloride chemical stripper	1 = **Often** 2 = **Sometimes** 3 = **Never**	☐	50l.			
m.	Caustic chemical stripper, such as Peel Away.	1 = **Often** 2 = **Sometimes** 3 = **Never**	☐	50m			
n.	Other chemical stripper (*specify*): ______________	1 = **Often** 2 = **Sometimes** 3 = **Never**	☐ ☐	50n. **DO NOT CODE :type**			
o.	Any other methods I did not list: (*Specify*):____________	1 = **Often** 2 = **Sometimes** 3 = **Never** 4 = **None**	☐ ☐	50o. **DO NOT CODE :method**	______ respirator #	☐	51o.

If Respondent answered "NEVER" to all of the above questions, skip to Question 52.

CONTINUE TO SHOW CARD 1 (past month).
ALSO: SHOW CARD 2 (respirators).

51. Shown here are 6 different types of respirators, including:
    1. Disposable dust mask
    2. Half-mask respirator with non-HEPA filters [HEPA stands for High Efficiency Particulate Air]
    3. Half-mask respirator with HEPA filters
    4. Full-face respirator with HEPA filters
    5. Any Powered Air-Purifying Respirator (PAPR) with HEPA filter
    6. Air-supplied respirator

For each of the surface preparation methods you used in the past month, please tell me the number of the respirator you wore most often if you wore a respirator while performing the task.

Read the list of the tasks (where a method was used). In respirator column, enter the number of the respirator used while doing this task.
(enter 0 if no respirator used; enter 7 if task not done)

52.	In the LAST MONTH, did you ever work in an area where **other workers** were doing surface preparation on BUILDINGS BUILT BEFORE 1980 or METAL SURFACES?	**1 = Yes** **2 = No**	☐	52.

IF YES:

52a. What is the number of the respirator you wore most often while the surface preparation/paint removal was being done by others?	**respirator #** ________	☐	52a.

53. In the last month, did you ever apply a lead-containing paint?

1=Yes
2=No
9=Don't know

☐ 53.

IF YES:

53a. Please look again at these pictures of respirators. What is the number of the respirator you wore most often while applying the lead-containing paint?

number: ____________

☐ 53a

PUT AWAY CARDS.

IF NEVER USED ANY RESPIRATOR:
SKIP TO QUESTION 59
("GENERAL" WORK SECTION)

IF RESPIRATOR #2, #3, #4, or #5 WAS USED: answer Questions 54 on.

IF ONLY RESPIRATOR #1 OR #6 WAS USED: SKIP TO QUESTION 58
(seen by a doctor or nurse).

RESPIRATOR PROGRAM

54.	During the past 6 months, were you ever fit tested for this respirator? This is a test where you wear the respirator, and a chemical with an odor, or an irritating smoke, is sprayed around your face to see if your respirator leaks.	**1 = Yes, 2 = No** **9 = Don't know**	☐	54.
	IF YES: 54a. Was the fit test provided by your current employer?	**1 = Yes, 2 = No**	☐	54a.
55.	Do you know what a positive/negative pressure "fit check" is?	**1 = Yes, 2 = No**	☐	55.
	IF NO: A "fit-check" involves testing the face seal of your respirator for air leaks by first covering the exhalation valve with your palm and exhaling gently, and then covering the inhalation valves and inhaling gently.			
56.	When you put on a respirator, how often do you do a positive/negative pressure fit check: every time, sometimes, or never?	**1 = Every time** **2 = Sometimes** **3 = Never**	☐	56.
	IF RESPONDENT IS MALE:			
57.	Are you always clean-shaven in the areas where your respirator seals to your face?	**1 = Yes, 2 = No** **3 = Female (not asked)**	☐	57.
58.	During the past 12 months, have you been seen by a doctor or nurse to determine that you can wear a respirator while working?	**1 = Yes, 2 = No**	☐	58.
	IF YES: 58a. Did your current employer arrange and pay for this medical visit?	**1 = Yes, 2 = No**	☐	58a.

"GENERAL" WORK: HYGIENE / HOUSEKEEPING

59.	Have you ever worn equipment while you worked, to measure the level of lead in the air you breathe?	**1 = Yes, 2 = No**	☐	59.

For the following questions, please think about your surface preparation work IN GENERAL, on OLDER (pre-1980) BUILDINGS or METAL SURFACES.

SHOW CARD 3 (in general)

60. I'm going to read you a list of methods used to contain and/or clean up dust and paint chips. Please tell me whether you use each of these methods often, sometimes, or never.

60a.	Use a broom or brush	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60a.
60b.	Use a wet mop, sponges, or rags, with plain water	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60b.
60c.	Use a wet mop, sponges, or rags with detergent or TSP	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60c.
60d.	Use a HEPA (High Efficiency Particulate Air) vacuum	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60d.

Did you use these methods often, sometimes, or never.

60e.	Use a regular vacuum	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60e.
60f.	Cover floors with tarps that are reused	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60f.

60g.	Cover floors with plastic that is disposed of	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60g.
60h.	Use another cleaning or containment method(s) (*specify*): ____________	**1 = Often** **2 = Sometimes** **3 = Never** **4 = None**	☐ ☐	60h. DO NOT CODE: METH.
61.	Does your current employer supply you with work clothing?	**1 = Yes** **2 = No**	☐	61.

IF YES: **DO NOT CODE:**

61a. What kind of clothing is provided? ____________ ☐ 61a.
(record verbatim; code later) ____________

62.	How often do you wear home the clothes you wore while working: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	62.
63.	How often do you wear home the same shoes you work in: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	63.
64.	How often is a clean area provided on-site for you to change into your work clothes: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	64.
65.	How often are storage facilities provided for keeping street clothes separate from work clothes: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	65.

66.	How often do you do the following activities in the work area: every day, some days, or never?			66.
66a.	Eat or snack	**1 = Every day** **2 = Some days** **3 = Never**	☐	66a.
66b.	Drink beverages	**1 = Every day** **2 = Some days** **3 = Never**	☐	66b.
66c.	Smoke cigarettes, pipes, or cigars	**1 = Every day** **2 = Some days** **3 = Never** **(4 = Non-User)**	☐	66c.
66d.	Use other tobacco products	**1 = Every day** **2 = Some days** **3 = Never** **(4 = Non-User)**	☐	66d.

67. How often are washing facilities including water, soap, and towels available: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	67.

If "Every Day" or "Some Days":

When washing facilities are available, how often do you wash your face and hands before doing the following, every day, some days, or never?

67a. Eating or snacking	**1 = Every day** **2 = Some days** **3 = Never**	☐	67a.
67b. Drinking beverages	**1 = Every day** **2 = Some days** **3 = Never**	☐	67b.
67c. Smoking cigarettes, pipes or cigars	**1 = Every day** **2 = Some days** **3 = Never** **4 = (Non-User)**	☐	67c.
67d. Using other tobacco products	**1 = Every day** **2 = Some days** **3 = Never** **4 = (Non-User)**	☐	67d.
67e. Going home at the end of the shift	**1 = Every day** **2 = Some days** **3 = Never**	☐	67e.

68. How often is a shower (with warm water, soap, and towels) available at the job site: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	68.

IF "Every Day" or "Some Days "

68a. When showers are available, how often do you shower before going home at the end of the shift: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	68a.

PUT AWAY CARDS

TRAINING SECTION

Finally, I have a few questions about lead hazard training you may have received.

69.	In the past 12 months, have you had any training on lead hazards in the painting and construction trades?	**1 = Yes, 2 = No** **9 = Don't know**	☐	69.

IF YES:

69a.	Did you have a tailgate training or other brief training?	**1 = Yes** **2 = No**	☐	69a.
69b.	Did you have a full day training provided by your employer?	**1 = Yes** **2 = No**	☐	69b.
69c.	Did you have a full day of training provided by consultant?	**1 = Yes** **2 = No**	☐	69c.
69d.	Did you have a 3 to 5 day lead abatement course?	**1 = Yes** **2 = No**	☐	69d.
69e.	Did you have some other kind of training? (*specify*) ______________________	**1 = Yes** **2 = No**	☐	69e.
	______________________	**DO NOT CODE:** **TYPE OF TRNG:**	☐	

That is all of the questions I have for you; I want to thank you again for your participation in the California Painters Project. We may be contacting you if we have any questions.

Do you have any comments about your work as a painter, or lead poisoning prevention, that you think are important but that I haven't asked about?

____

____

TIME ENDED: ______________________________

Interviewer Comments:

Date Coded (IH): ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

Date Edited: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

SP Edit: ☐☐/☐☐/☐☐

month *day* *year*

Date Entered: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

WORKER FINAL *(November)* QUESTIONNAIRE
CALIFORNIA PAINTERS PROJECT

Today's Date (mm/dd/yy): ☐☐/☐☐/☐☐	**Interviewer:** ☐☐☐
Time Started: ________________	**Interviewed in:** ☐ English ☐ Spanish ☐ Cantonese
Check if Anyone Else Was Present During Interview: ☐	**Who:** ________________________

Thank you again for your participation in the California Painters Project. Today, I'll be asking you some questions about your work and hobbies. Your answers are confidential, and will not be discussed with your employer. You are not required to answer all of the questions, but the more information we have, the more effective our project can be in preventing lead poisoning.

1. First, can I verify your current employer's name?

Company name:	Co. ID:

HOUSEHOLD SECTION

Now, I have some questions about you and your household.

Can I verify your name, address, and telephone number?

CPP WKR ID:

Name:
Address:

Phone:

IF CHANGES, indicate below

Name: ________________________________

Address: ________________________________

City: ______________ State: __________ ZIP: ______________

Telephone Number: (____) ______ - ______

6. Do any women who are pregnant or nursing live in your household? 1 = Yes, 2 = No ☐ 6.

7. How many children aged 6 or under live in your household? number __________ ☐ ☐ 7.

7a. Since June, 1994, have any of your household members had their blood tested for lead? 1 = Yes, 2 = No ☐ 7a.

IF YES:

Can you tell me the age and gender of your household members who were tested?

		Age (circle yr or mo)	*1=M, 2=F*
__________ yrs / mos	M or F	☐☐ *yr / mo*	☐
__________ yrs / mos	M or F	☐☐ *yr / mo*	☐
__________ yrs / mos	M or F	☐☐ *yr / mo*	☐
__________ yrs / mos	M or F	☐☐ *yr / mo*	☐
__________ yrs / mos	M or F	☐☐ *yr / mo*	☐

7xx What country were you born in?

____

1=U.S.; 2=Mexico; 3=Ireland; 4=El Salvador; 5=Tibet; 6 =Russia; 7 = China; 8=Nicaragua;
A= B=
c=

☐ 7xx.

NON - OCCUPATIONAL RISK FACTORS

Now I have some questions about your hobbies and other habits. I'm going to read you a list of activities people sometimes do. Have you done any of the following during the past month:

13. Surface preparation before painting, <u>not</u> with your current employer? **1 = Yes, 2 = No** ☐ 13.

IF YES:

13a. Was this work done on a building built before 1980, or a metal surface? **1 = Yes, 2 = No 9 = Don't know** ☐ 13a.

13bx. How many days during the last month did you do surface preparation, <u>not</u> with your current employer? ___ ___ ☐ ☐ **13bx.**

14. Other remodeling work, <u>not</u> with your current employer? **1 = Yes, 2 = No** ☐ 14.

IF YES:

14a. Was this work done on a building built before 1980 or a metal surface? **1 = Yes, 2 = No 9 = Don't know** ☐ 14a.

14bx. How many days during the last month did you do other remodeling work, <u>not</u> with your current employer? ___ ___ ☐ ☐ 14bx.

15. Made pottery/ceramics using glazes? **1 = Yes, 2 = No** ☐ 15.

IF YES:

15ax. How many days during the last month did you make glazed pottery? ___ ___ ☐ ☐ 15ax.

16. Made stained glass? **1 = Yes, 2 = No** ☐ 16.

	IF YES: 16x. How many days during the last month did you make stained glass?	___ ___	☐ ☐	16ax
17.	Shot firearms (target practice) or assembled ammunition?	**1 = Yes, 2 = No**	☐	17.
	IF YES: 17ax.How many days during the last month did you shoot firearms?	___ ___	☐ ☐	17ax.
18.	Cast molten lead into fishing weights or other objects?	**1 = Yes, 2 = No**	☐	18.
	IF YES: 18ax.How many days during the last month did you make fishing weights?	___ ___	☐ ☐	18ax.
19.	Done soldering, brazing, or tinning?	**1 = Yes, 2 = No**		19.
	IF YES: 17ax.How many days during the last month did you do soldering?	___ ___	☐ ☐	19ax.
19q.	Used artists paints?	**1 = Yes, 2 = No**	☐	19qx.
	IF YES: 19qxx.How many days during the last month did you use artists paints?	___ ___	☐ ☐	19qxx
22.	Do you currently smoke cigarettes, pipes, or cigars?	**1 = Yes, 2 = No**	☐	22.

IF YES:

22a. Do you smoke at work? **1 = Yes, 2 = No** ☐ **22a.**

IF YES (SMOKES AT WORK):

22b. How often do you wash your hands before smoking at work: every time, sometimes, or never? ☐ **22b.**

1 = Every time
2 = Sometimes
3 = Never

23. Do you currently use other tobacco products? **1 = Yes, 2 = No** ☐ 23.

IF YES:

23a. Do you use other tobacco products at work? **1 = Yes, 2 = No** ☐ 23a.

IF YES (TOBACCO AT WORK):

23b. How often do you wash your hands before using tobacco products at work: every time, sometimes, or never? ☐ 23b.

1 = Every time
2 = Sometimes
3 = Never

KNOWLEDGE SECTION

Now I have some questions about lead safety and health.

23xa. How does lead get inside your body? *(record verbatim; code later)*

1=breathe air w/dust/fume/mist
2= swallow lead dust: food/drink/tobacc/hands&face
3=other

________________________________ ☐

________________________________ ☐

________________________________ ☐

23xb. What are three symptoms of lead poisoning? *(record verbatim; code later)*

________________________________ ☐

________________________________ ☐

________________________________ ☐

23xc. What is the best way to find out if you have too much lead in your body?
(record verbatim; code later)

1=blood lead test;
2=other

________________________________ ☐

23xd. Can you tell me three ways to protect yourself from lead poisoning?

____

____

____

MEDICAL SURVEILLANCE SECTION

Now I have some questions about the results of previous blood lead testing you may have had.

34. Have you ever been taken off work or been reassigned to a job away from high lead exposure, because of too much lead in your blood? 1 = Yes, 2 = No 34.

IF YES:
34a. When were you taken off work or reassigned? __ __/__ __ *month* *year* 34a.

WORK SECTION

Now I have some questions about your work.

43. In the last month, have you worked as a painter for another employer besides this company, or as a self-employed painter ? 1=Yes, 2=No 41.

IF YES:
41a. How many days in the last month did you work for other employers, or as a self- employed painter? ____ ____ days 41a days

45. During the last 6 months, what other kinds of work, besides painting, have you done? **0=None** ☐

FOR EACH TYPE OF WORK, ASK 'WHAT DID YOU DO' TO GET TASK DESCRIPTION

45b. How long did you do [*type of work*]?

			DO NOT CODE: TYPE OF WORK
____________	____	☐☐	☐
Type of Work	*How Long*	*(months)*	
____________	____	☐☐	☐
Type of Work	*How Long*	*(months)*	
____________	____	☐☐	☐
Type of Work	*How Long*	*(months)*	

Now I have some questions about painting work you have done for [*employer name*] in the **LAST MONTH**

47. Do you think that lead was present on any of the jobs you worked on in the last month? **1 = Yes, 2 = No** ☐ 47.

IF YES:
47a. Why do you think so? DO NOT CODE: 47a.

(record verbatim; code later)

____

____

48xx In the last month, have you done any cleanup, or other work besides surface preparation, that involved contact with paint dust or chips? 1 = Yes, 2 = No ☐ 48xx

IF YES:
Please describe what you did:

____

____

DO NOT CODE: ☐

IF YES:
How many days in the last month did you do this work? ☐ ☐ (days)

_____ _____
days

48. In the LAST MONTH, have you done any surface preparation work on BUILDINGS BUILT BEFORE 1980 or METAL SURFACES? 1 = Yes, 2 = No ☐ 48.

IF NO, SKIP TO QUESTION 52.

IF YES, CONTINUE WITH QUESTION 49 ON.

SHOW CARD 1 : past month

49.Please think about the jobs you did in the last month that involved surface preparation work on pre-1980 buildings or metal surfaces. Please list all of the jobs you did **surface preparation on** in the last month. I don't need the exact address, just a name that you remember each job by.

For each job:

49a. How many days did you do surface preparation on the **INTERIOR** of this [building / structure]?

49b. How many days did you do surface preparation on the **EXTERIOR** of this [building / structure]?

49c. Please estimate the year this [building / structure] was constructed.

JOB NAME / LOCATION	# DAYS INTERIOR	# DAYS EXTERIOR	YEAR BUILT	JOB CODE (DO NOT CODE)
	☐☐.☐	☐☐.☐	☐☐☐☐	
	☐☐.☐	☐☐.☐	☐☐☐☐	
	☐☐.☐	☐☐.☐	☐☐☐☐	
	☐☐.☐	☐☐.☐	☐☐☐☐	
	☐☐.☐	☐☐.☐	☐☐☐☐	

50. I'm going to be asking you about a number of different surface preparation methods. In the last month, while doing surface preparation on pre-1980 buildings or metal surfaces, tell me whether you used each method often, sometimes, or never.

0 = No respirator; 7=task not done

a.	Dry manual scraping	**1 = Often** **2 = Sometimes** **3 = Never**	☐ 50a.	____ respirator #	☐ 51a.
b.	Manual scraping, with a water mist	**1 = Often** **2 = Sometimes** **3 = Never**	☐ 50b.	____ respirator #	☐ 51b.
c.	Dry manual sanding	**1 = Often** **2 = Sometimes** **3 = Never**	☐ 50c.	____ respirator #	☐ 51c.
d.	Power tool cleaning, such as sanding or grinding, **without** HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐ 50d.	____ respirator #	☐ 51d.
e.	Power tool cleaning, such as sanding or grinding, **with** HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐ 50e.	____ respirator #	☐ 51e.

Did you use these methods often, sometimes, or never:

f.	Abrasive blasting, **without** HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐ 50f.	____ respirator #	☐ 51f.
g.	Abrasive blasting, **with** HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐ 50g.	____ respirator #	☐ 51g.
h.	**IF ABRASIVE BLASTING DONE:** Clean up after abrasive blasting	**1 = Often** **2 = Sometimes** **3 = Never**	☐ 50h.	____ respirator #	☐ 51h.

i.	Water blasting or power washing	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50i.	respirator #	☐	51i.
j.	Heat gun	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50j.	respirator #	☐	51j.
k.	Open flame/torch burning	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50k.	respirator #	☐	51k.

Did you use these methods often, sometimes, or never:

l.	Methylene chloride chemical stripper	1 = Often 2 = Sometimes 3 = Never	☐	50l.			
m.	Caustic chemical stripper, such as Peel Away.	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50m			
n.	Other chemical stripper (*specify*): ______________ ______________	**1 = Often** **2 = Sometimes** **3 = Never**	☐ ☐	50n. **DO NOT CODE :type**			
o.	Any other methods I did not list: (*Specify*):______________ ______________	**1 = Often** **2 = Sometimes** **3 = Never** **4 = None**	☐ ☐	50o. **DO NOT CODE :method**	respirator #	☐	51o.

If Respondent answered "NEVER" to all of the above questions, skip to Question 52.

CONTINUE TO SHOW CARD 1 (past month).
ALSO: SHOW CARD 2 (respirators).

51. Shown here are 6 different types of respirators, including:

1. Disposable dust mask
2. Half-mask respirator with non-HEPA filters [HEPA stands for High Efficiency Particulate Air]
3. Half-mask respirator with HEPA filters
4. Full-face respirator with HEPA filters
5. A Powered Air-Purifying Respirator (PAPR) with HEPA filter
6. Air-supplied respirator

For each of the surface preparation methods you used in the past month, please tell me the number of the respirator you wore most often if you wore a respirator while performing the task.

Read the list of the tasks (where a method was used). In the respirator column enter the number of the respirator used while doing this task. *(enter 0 if no respirator used; enter [illegible] if task not done)*

53.	In the last month, did you ever apply a lead-containing paint?	1=Yes 2=No 9=Don't know	☐	53.

IF YES:

53a. Please look again at these pictures of respirators. What is the number of the respirator you wore most often while applying the lead-containing paint?	number: ____________	☐	53a

PUT AWAY CARDS.

IF NEVER USED ANY RESPIRATOR,

or,

IF USED ONLY #1 or #6:

SKIP TO QUESTION 59, page 15,
("GENERAL WORK SECTION)

IF RESPIRATOR #2, #3, #4, or #5
WAS USED: answer Questions 54 on.

54. During the past 6 months, were you ever fit tested for this respirator? This is a test where you wear the respirator, and a chemical with an odor, or an irritating smoke, is sprayed around your face to see if your respirator leaks. — **1 = Yes, 2 = No** **9 = Don't know** ☐ 54.

IF YES:

54a. Was the fit test provided by your current employer? — **1 = Yes, 2 = No** ☐ 54a.

55. Do you know what a positive/negative pressure "fit check" is? — **1 = Yes, 2 = No** ☐ 55.

IF NO:
A "fit-check" involves testing the face seal of your respirator for air leaks by first covering the exhalation valve with your palm and exhaling gently, and then covering the inhalation valves and inhaling gently.

56. When you put on a respirator, how often do you do a positive/negative pressure fit check: every time, sometimes, or never? — **1 = Every time** **2 = Sometimes** **3 = Never** ☐ 56.

IF RESPONDENT IS MALE:

57. Are you always clean-shaven in the areas where your respirator seals to your face? — **1 = Yes, 2 = No** **3 = Female (not asked)** ☐ 57.

"GENERAL" WORK: HYGIENE / HOUSEKEEPING

For the following questions, please think about your surface preparation work IN GENERAL, on OLDER (pre-1980) BUILDINGS or METAL SURFACES.

SHOW CARD 3 (in general)

60. I'm going to read you a list of methods used to contain and/or clean up dust and paint chips. Please tell me whether you use each of these methods often, sometimes, or never.

60a.	Use a broom or brush	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60a.
	IF OFTEN OR SOMETIMES: Do you wet the material before sweeping?	1=Yes, 2=No	☐	wet
60b.	Use a wet mop, sponges, or rags, with plain water	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60b.
60c.	Use a wet mop, sponges, or rags with detergent or TSP	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60c.
60d.	Use a regular vacuum	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60d.

Did you use these methods often, sometimes, or never.

60e.	Use a HEPA (High Efficiency Particulate Air) vacuum	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60e.
60f.	Cover floors with tarps that are reused	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60f.

60g.	Cover floors with plastic that is disposed of	1 = Often 2 = Sometimes 3 = Never	☐	60g.
60h.	Use another cleaning or containment method(s) (*specify*): ____________________	1 = Often 2 = Sometimes 3 = Never 4 = None	☐ ☐	60h. DO NOT CODE: METH.
61.	Does your current employer supply you with work clothing?	1 = Yes 2 = No	☐	61.

IF YES: DO NOT CODE:

61a. What kind of clothing is provided? ____________________ ☐ 61a.
(record verbatim; code later)

61b. How is the clothing cleaned? ____________________ ☐ 61b.

62.	How often do you wear home the clothes you wore while working: every day, some days, or never?	1 = Every day 2 = Some days 3 = Never	☐	62.
63.	How often do you wear home the same shoes you work in: every day, some days, or never?	1 = Every day 2 = Some days 3 = Never	☐	63.
64.	How often is a clean area provided on-site for you to change into your work clothes: every day, some days, or never?	1 = Every day 2 = Some days 3 = Never	☐	64.
65xx	Do you store your work clothes separately from your street clothes? IF YES: How do you store your clothes? ____________________	1 = Yes 2 = No DO NOT CODE:	☐ ☐	65xx. how

66.	How often do you do the following activities in the work area: every day, some days, or never?			66.
66a.	Eat or snack	**1 = Every day** **2 = Some days** **3 = Never**	☐	66a.
66b.	Drink beverages	**1 = Every day** **2 = Some days** **3 = Never**	☐	66b.
66c.	Smoke cigarettes, pipes, or cigars	**1 = Every day** **2 = Some days** **3 = Never** **(4 = Non-User)**	☐	66c.
66d.	Use other tobacco products	**1 = Every day** **2 = Some days** **3 = Never** **(4 = Non-User)**	☐	66d.

67xx	How often are water, soap, and towels available for washing: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	67xx

If "Every Day" or "Some Days":

When water, soap, and towels are available, how often do you wash your hands before doing the following, every day, some days, or never?

67axx. Eating or snacking	**1 = Every day** **2 = Some days** **3 = Never**	☐	67a xx.
67bxx. Drinking beverages	**1 = Every day** **2 = Some days** **3 = Never**	☐	67b xx.
67cxx. Smoking cigarettes, pipes or cigars	**1 = Every day** **2 = Some days** **3 = Never** **4 = (Non-User)**	☐	67c xx.
67dxx. Using other tobacco products	**1 = Every day** **2 = Some days** **3 = Never** **4 = (Non-User)**	☐	67d xx.
67exx. Going home at the end of the shift	**1 = Every day** **2 = Some days** **3 = Never**	☐	67e xx.

68.	How often is a shower (with warm water, soap, and towels) available at the job site: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	68.

IF "Every Day" or "Some Days "

68a. When showers are available, how often do you shower before going home at the end of the shift: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	68a.

PUT AWAY CARD 3.

Since we would like to improve our project and future projects of this type, we'd like to know what you thought of the Painters Project.

What did you like most about the California Painters Project?

____

____

What did you like least about the California Painters Project?

____

____

Do you have any suggestions for making the California Painters Project more useful for painters?

____

____

Were the worker training classes helpful in learning about how to better protect yourself from lead hazards, and what your employer's responsibilities are in providing a safe workplace?

☐ Yes ☐ No

Why or why not?: ____

____

If you had the opportunity to participate in a project like this in the future, would you?

☐ Yes ☐ No

Why or why not?: ____

____

Do you have any other comments?

____

____

____

That is all of the questions I have for you; I want to thank you again for your participation in the California Painters Project. We'll be having future meetings to discuss the findings of the project *[as appropriate: In English, Spanish, and Cantonese]*, and we may interview you once more this Spring.

TIME ENDED: ______________________

How well do you think respondent understood questions:

☐ **Understood all / almost all** ☐ **Understood some / sometimes**

☐ **Seemed to have difficulty understanding / understood little**

Comments: ______________________________

____

Was continuation sheet used? ☐Yes ***(write ID number on sheet)*** ☐No

Other Comments about this interview:

____

____

____

____

____

Date Edited: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

Date Coded (IH): ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

SP Edit: ☐☐/☐☐/☐☐

month *day* *year*

Date Entered: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

RECORD NUMBER IN DATA FILE: ☐☐☐

Date QC'd: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

CDHS • OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM

CALIFORNIA PAINTERS PROJECT

Focus Group

Employer Discussion Group and Certification Meeting
March 21, 1995,
Conference Center Room A-2, Fort Mason, San Francisco

4:00 - 4:30	Food and Refreshments Available Project Announcements -Using Your Lead Safety Program to Lower Your Workers' Compensation Costs -Lead Safe Bid Form -Upcoming Medical Monitoring of Employees Issues *David Harrington, CA Painters Project Coordinator* Draft Painting Contractor Brochure *Pat Coyle, Occupational Lead Poisoning Prevention Program, California Department of Health Services*
4:30 - 6:30	What Did You Think of the Painters Project? Group Discussion *Facilitators: Ed Mamary and Elana Reinin* *Observers: Jim Rogge and Larry Bilick*
6:30 - 6:40	Break: Food and Refreshments Available
6:40 - 7:30	How to Become a Certified Lead in Construction Supervisor or Worker Questions and Answers *Kim Cox and Mike Ducey, Accreditation and Certification Unit, Childhood Lead Poisoning Prevention Branch, California Department of Health Services*

QUESTION 1.

(Before the Project started) What are some of the factors that *initially* influenced you to participate in the CA Painters Project?

Probes: -Involvement of trade associations and unions? How?
- Project's recruiting activities? How?
- Did the fact that it's a state-operated program affect you? How?
- What did you think you would get out of participating?
- Other factors
- Examples

Write impressions here and backside:

QUESTION 2.

What *kept* you involved with the project?

Probes:
- Motivating factors
- Other factors
- Examples

QUESTION 3.

Let's discuss lead safety in general. I understand that you all have made changes in the way you work around lead paint. **Can you talk a bit about what helped you to make changes to improve lead safety?**

Probes: Outside influences (e. g. economic, educational, resources such as available services)

Project influences

- What aspects?
    - manual
    - seminars
    - BLL testing
    - air monitoring and site visits
    - networking with other painting contractors
    - using peer educators (Hans Stahlschmidt and demo teaching)
    - creating opportunities for group purchases
    - cooperative nature of project
    - doable (cost effectiveness)
    - step-by step approach (multi-sessions)
    - incentives (e.g.: free air monitoring)
- In what way?
- Why?
- The most useful aspect of the project?
- Examples
- Any other thoughts?

QUESTION 4.

Let's focus on the project a bit more.

If you could change the project in any way, what would you change?

Probes:
- What deletions would you make? (i.e.: what was not useful for you?)
  - Manual?
  - Time commitment?
- What additions would you make?
- Why?
- How would this change make a difference?
- Any other thoughts?
- Examples

QUESTION 5.

What are some of the obstacles that you have encountered in trying to improve lead safety?

Probes:
- Non-project factors
  - Cost
  - How have your employees responded?
- Project factors
- Why?
- What would help you in overcoming these obstacles?

QUESTION 6.

How has participating in the project affected your approach to carrying out your business?

Probes:
- With customers/the outside world
  - How you approach a potential lead job/how you talk to your customers
  - The bidding process
  - Jobs you take
  - networking
  - collaboration with others
  - economic development
- Within your business
  - Employees you hire
  - How you work with employees
- Why?
- Anything else?

APPENDIX 15

Focus Group Questions and Probes

Fourth Employer Seminar

Tell Us What You Thought of Today's Seminar

In order to improve the Painters Project and future seminars of this type, we would like to know what you thought of today's seminar. Please take a few minutes to answer these questions. Thank you.

1. In general did you like this Seminar?

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

2. Was the information for each of the following areas presented so that it was **understandable and helpful to you:**

Health and Safety Services You Can Expect From Your Workers' Compensation Carrier:
Other comments:

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

State Compensation Insurance Fund Health and Safety Services:
Other comments:

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

Managing the Risk of Contractor Liability:
Other comments:

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

Contractor's Pollution Exclusion Clauses and Liability Insurance Coverage:
Other comments:

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

(OVER)

Air and Wipe Sampling: check:☐ Very Much
Other comments: ☐ Quite a bit
☐ A little
☐ Not at all

Bidding a Lead-Safe Job & Selling it to Your Customer:
Other comments: check:☐ Very Much
☐ Quite a bit
☐ A little
☐ Not at all

Bidding a Lead-Safe Job Group Exercise: check:☐ Very Much
Other comments: ☐ Quite a bit
☐ A little
☐ Not at all

3.What did you like the most about this Seminar?

4. What did you like the least about this Seminar?

5. What would you like us to change? check:

	more	same	less
Lecture:	☐	☐	☐
Audience questions and discussion:	☐	☐	☐
Group exercises:	☐	☐	☐

6. How do you think this Seminar could be improved?

7. Do you have any additional comments you would like to make?
If so, please do so here:

Third Employer Seminar

Tell Us What You Thought of Tonight's Seminar

In order to improve the Painters Project and future seminars of this type, we would like to know what you thought of tonight's seminar. Please take a few minutes to answer these questions. Thank you.

1. In general did you like the Seminar?

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

2. Was the information for each of the following areas presented so that it was **understandable and helpful to you:**

Early Findings of the Painters Project:
Other comments:

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

Overview of Environmental Regulations:
Other comments:

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

San Francisco Hazardous Waste Program:
Other comments:

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

CA Regional Water Pollution Issues:
Other comments:

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

(OVER)

SF Water Pollution Prevention Issues: check: ❑ Very Much
Other comments:
❑ Quite a bit
❑ A little
❑ Not at all

3.What did you like the most about the Seminar?

4. What did you like the least about the Seminar?

5. What would you like us to change? check:

	more	same	less
Lecture:	❑	❑	❑
Audience questions and discussion:	❑	❑	❑
Group discussion and case studies:	❑	❑	❑

6. How do you think the Seminar could be improved?

7. Do you have any additional comments you would like to make?
If so, please do so here:

Tell Us What You Thought of Today's Seminar

In order to improve the Painters Project and future seminars of this type, we would like to know what you thought of today's seminar. Please take a few minutes to answer these questions. Thank you.

1. In general did you like the Seminar?

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

2. Was the information for each of the following areas presented so that it was **understandable and helpful to you:**

How are Things Going? Discussion:
Other comments:

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

Choosing Safer Surface Prep Methods:
Other comments:

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

Using Respirators to Protect Against Lead:
Other comments:

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

Keeping the Job Clean:
Other comments:

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

Tooling Up for Lead Safety:
Other comments:

check: ❑ Very Much
❑ Quite a bit
❑ A little
❑ Not at all

(OVER)

So, What Do I do on Monday...?: check:❑ Very Much
Other comments: ❑ Quite a bit
❑ A little
❑ Not at all

Training/Certification: check:❑ Very Much
Other comments: ❑ Quite a bit
❑ A little
❑ Not at all

3.What did you like the most about the Seminar?

4. What did you like the least about the Seminar?

5. What would you like us to change? check:

	more	same	less
Lecture:	❑	❑	❑
Audience questions and discussion:	❑	❑	❑
Group discussion and case studies:	❑	❑	❑

6. How do you think the Seminar could be improved?

7. Do you have any additional comments you would like to make?
If so, please do so here:

First Employer Seminar

Tell Us What You Thought of Today's Seminar

In order to improve the Painters Project and future seminars of this type, we would like to know what you thought of today's seminar. Please take a few minutes to answer these questions. Thank you.

1. In general did you like the Seminar?

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

2. Was the information for each of the following areas presented so that it was **understandable and helpful to you:**

Overview on the Problem of Lead:

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

Health Effects of Exposure to Lead:

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

Regulations, Abatement and Liability:

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

Overview of Cal/OSHA Lead in Construction Standard:

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

Finding Out if Lead is Present:

check:
- ❑ Very Much
- ❑ Quite a bit
- ❑ A little
- ❑ Not at all

(OVER)

Setting Up a Medical Surveillance Program:

check: ☐ Very Much
☐ Quite a bit
☐ A little
☐ Not at all

Safety Training for Workers:

check: ☐ Very Much
☐ Quite a bit
☐ A little
☐ Not at all

3. What did you like the most about the Seminar?

4. What did you like the least about the Seminar?

5. What would you like us to change? check:

	more	same	less
Lecture:	☐	☐	☐
Audience questions and discussion:	☐	☐	☐
Group discussion and case studies:	☐	☐	☐

6. How do you think the Seminar could be improved?

7. Do you have any additional comments you would like to make?
If so, please do so here:

APPENDIX 14

Written Employer Seminar Evaluation Form

Date Edited: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

Date Coded (IH): ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

SP Edit: ☐☐/☐☐/☐☐

month *day* *year*

Date Entered: ☐☐/☐☐/☐☐ By: ☐☐☐

month *day* *year*

RECORD NUMBER IN DATAFILE: ☐☐☐

Date QC'd: ☐☐/☐☐/☐☐ **By:** ☐☐☐

month *day* *year*

67xx	How often are water, soap, and towels available for washing: every day, some days, or never?	**1 = Every day** **2 = Some days** **3 = Never**	☐	67xx

If "Every Day" or "Some Days":

When water, soap, and towels are available, how often do you wash your hands before doing the following, every day, some days, or never?

67axx. Eating or snacking	**1 = Every day** **2 = Some days** **3 = Never**	☐	67a -xx.
67bxx. Drinking beverages	**1 = Every day** **2 = Some days** **3 = Never**	☐	67b xx.
67cxx. Smoking cigarettes, pipes or cigars	**1 = Every day** **2 = Some days** **3 = Never** **4 = (Non-User)**	☐	67c xx.
67dxx. Using other tobacco products	**1 = Every day** **2 = Some days** **3 = Never** **4 = (Non-User)**	☐	67d xx.
67exx. Going home at the end of the shift	**1 = Every day** **2 = Some days** **3 = Never**	☐	67e xx.

TRAINING SECTION

69xx	Since August 1994, have you had any training in lead hazards that lasted 8 hours or longer?	**1 = Yes** **2 = No** **9 = Don't know**	☐	69xx

IF YES:	**DO NOT CODE:**		
69xa. Who provided the training? *(record verbatim; code later)*	________________	☐	69xa
69xb. How long did it last? *(record verbatim; code later)*	________________	☐	69xb

END OF INTERVIEW

That is all of the questions I have for you. I want to thank you again for your participation in the California Painters Project. We will contact you later this year with the final results of the project.

TIME ENDED: ____________________

COMPLETE AFTER INTERVIEW:

How well do you think respondent understood questions:

☐ Understood all / almost all ☐ Understood some / sometimes

☐ Seemed to have difficulty understanding / understood little

Comments: ____

____

Was continuation sheet used? ☐Yes *(write ID number on sheet)* ☐No

Other comments about this interview: ______________________________

____

____

61. Does your current employer supply you with work clothing? | 1 = Yes 2 = No | ☐ 61.

IF YES:
61a. What kind of clothing is provided? *(record verbatim; code later)* | DO NOT CODE: ________ ☐ 61a.

IF TYVEK or DISPOSABLE clothing provided, SKIP to Q. 62.

IF NON-DISPOSABLE:
61b. How is the clothing cleaned? *(record verbatim; code later)* | DO NOT CODE: ________ ☐ 61b.

62. How often do you wear home the clothes you wore while working: every day, some days, or never? | **1 = Every day 2 = Some days 3 = Never** ☐ 62.

If "Every day" or "Some days":
62a. Do you change clothes before you enter your home? | **1=Yes 2=No** ☐ 62a.

63. How often do you wear home the same shoes you work in: every day, some days, or never? | **1 = Every day 2 = Some days 3 = Never** ☐ 63.

If "Every day" or "Some days":
63a. Do you change shoes before you enter your home? | **1=Yes 2=No** ☐ 63a.

22. Do you currently smoke cigarettes, pipes, or cigars? | **1 = Yes, 2 = No** ☐ **22.**

23. Do you currently use other tobacco products? | **1 = Yes, 2 = No** ☐ 23.

66. How often do you do the following activities in the work area: every day, some days, or never?

66a. Eat or snack	**1 = Every day** **2 = Some days** **3 = Never**	☐	66a.
66b. Drink beverages	**1 = Every day** **2 = Some days** **3 = Never**	☐	66b.
66c. Smoke cigarettes, pipes, or cigars	**1 = Every day** **2 = Some days** **3 = Never** **(4 = Non-User)**	☐	66c.
66d. Use other tobacco products	**1 = Every day** **2 = Some days** **3 = Never** **(4 = Non-User)**	☐	66d.

RESPIRATOR PROGRAM

54.	During the past 6 months, were you ever fit tested for this respirator? This is a test where you wear the respirator, and a chemical with an odor, or an irritating smoke, is sprayed around your face to see if your respirator leaks.	**1 = Yes, 2 = No** **9 = Don't know**	☐	54.

IF YES:

54a. Was the fit test provided by your current employer?	**1 = Yes, 2 = No**	☐	54a.

55.	Do you know what a positive/negative pressure "fit check" is?	**1 = Yes, 2 = No**	☐	55.

IF NO:
A "fit-check" involves testing the face seal of your respirator for air leaks by first covering the exhalation valve with your palm and exhaling gently, and then covering the inhalation valves and inhaling gently.

56.	When you put on a respirator, how often do you do a positive/negative pressure fit check: every time, sometimes, or never?	**1 = Every time** **2 = Sometimes** **3 = Never**	☐	56.

IF RESPONDENT IS MALE:

57.	Are you always clean-shaven in the areas where your respirator seals to your face?	**1 = Yes, 2 = No** **3 = Female (not asked)** .	☐	57.

"GENERAL" WORK: HYGIENE / HOUSEKEEPING

For the following questions, please think about your surface preparation work IN GENERAL, on OLDER (pre-1980) BUILDINGS or METAL SURFACES.

60. I'm going to read you a list of methods used to contain and/or clean up dust and paint chips. Please tell me whether, IN GENERAL, you use each of these methods often, sometimes, or never.

60b.	Use a wet mop, sponges, or rags, with plain water	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60b.
60c.	Use a wet mop, sponges, or rags with detergent or TSP	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60c.
60e.	Use a HEPA (High Efficiency Particulate Air) vacuum	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60e.
60xx	Before the Project began in June 1994, how often did you use a broom or brush to sweep up **dry** paint chips and dust?	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60xx
60yy	Currently, how often do you use a broom or brush to sweep up **dry** paint chips and dust?	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60yy
60zz	Before the Project began in June 1994, how often did you **mist** paint chips with water before sweeping or shoveling?	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60zz
60aa	Currently, how often do you **mist** paint chips with water before sweeping or shoveling?	**1 = Often** **2 = Sometimes** **3 = Never**	☐	60aa

i.	Water blasting or power washing	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50i.	respirator #	☐	51i.
j.	Heat gun	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50j.	respirator #	☐	51j.
k.	Open flame/torch burning	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50k.	respirator #	☐	51k.

IF answers "NEVER" TO ALL methods:

SKIP to Question 60, page 9.
(GENERAL WORK Section).

SHOW CARD 2 (respirators).

51. Shown here are 6 different types of respirators, including:

1. Disposable dust mask
2. Half-mask respirator with non-HEPA filters [HEPA stands for High Efficiency Particulate Air]
3. Half-mask respirator with HEPA filters
4. Full-face respirator with HEPA filters
5. A Powered Air-Purifying Respirator (PAPR) with HEPA filter
6. Air-supplied respirator

For each of the surface preparation methods you used in the past month, please tell me the number of the respirator you wore most often if you wore a respirator while performing the task.

Read the list of the tasks (where a method was used). In respirator column, enter the number of the respirator used while doing this task. ***(enter 0 if no respirator used; enter 7 if task not done)***

IF NEVER USED ANY RESPIRATOR,

or,

IF USED ONLY #1 or #6:

SKIP to Question 60, page 9.
(GENERAL WORK Section).

IF RESPIRATOR #2, #3, #4, or #5 WAS USED:

CONTINUE with Questions 54 on.

49. Please think about the jobs you did in the last month that involved surface preparation work on pre-1980 buildings or metal surfaces.
Please list all of the jobs you did **surface preparation on** in the last month. I don't need the exact address, just a name that you remember each job by.

For each job:

49a. How many days did you do surface preparation on the **INTERIOR** of this [building / structure]?
49b. How many days did you do surface preparation on the **EXTERIOR** of this [building / structure]?
49c. Please estimate the year this [building / structure] was constructed.

JOB NAME / LOCATION	# DAYS INTERIOR	# DAYS EXTERIOR	YEAR BUILT	JOB CODE (DO NOT CODE)
	☐☐.☐	☐☐.☐	☐☐☐☐	
	☐☐.☐	☐☐.☐	☐☐☐☐	
	☐☐.☐	☐☐.☐	☐☐☐☐	
	☐☐.☐	☐☐.☐	☐☐☐☐	
	☐☐.☐	☐☐.☐	☐☐☐☐	

50. I'm going to be asking you about a number of different surface preparation methods. In the last month, while doing surface preparation on pre-1980 buildings or metal surfaces, tell me whether you used each method often, sometimes, or never.

0 = No respirator; 7=task not done

a.	Dry manual scraping	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50a.	____ respirator #	☐	51a.
b.	Manual scraping, with a water mist	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50b.	____ respirator #	☐	51b.
c.	Dry manual sanding	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50c.	____ respirator #	☐	51c.
d.	Power tool cleaning, such as sanding or grinding, **without** HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50d.	____ respirator #	☐	51d.
e.	Power tool cleaning, such as sanding or grinding, **with** HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50e.	____ respirator #	☐	51e.

Did you use these methods often, sometimes, or never:

f.	Abrasive blasting, **without** HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50f.	____ respirator #	☐	51f.
g.	Abrasive blasting, **with** HEPA dust collection system on the tool	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50g.	____ respirator #	☐	51g.
h.	**IF ABRASIVE BLASTING DONE:** Clean up after abrasive blasting	**1 = Often** **2 = Sometimes** **3 = Never**	☐	50h.	____ respirator #	☐	51h.

WORK EXPOSURE SECTION

Now I have some questions about your painting work.

13.	During the <u>last month</u>, have you done any surface preparation before painting, **<u>not</u>** with your current employer?	**1 = Yes, 2 = No**	☐	13.
	IF YES:			
13a.	Was this work done on a building built before 1980, or a metal surface?	**1 = Yes, 2 = No** **9 = Don't know**	☐	13a.
13bx.	How many days during the <u>last month</u> did you do surface preparation on a pre-1980 building or metal surface, <u>not</u> with your current employer?	____ ____ days	☐☐	13bx

Now I have some questions about painting work you have done for [*employer name*] in the **LAST MONTH**

48xx	In the last month, have you done any cleanup, or other work besides surface preparation, that involved contact with paint dust or chips?	**1 = Yes, 2 = No**	☐	48xx
	IF YES: Please describe what you did: ______________________________ ______________________________	DO NOT CODE:	☐	
	IF YES: How many days in the last month did you do this work?	____ ____ days	☐☐	(days)
48.	In the LAST MONTH, have you done any surface preparation work on BUILDINGS BUILT BEFORE 1980 or METAL SURFACES?	**1 = Yes, 2 = No**	☐	48.

IF NO, SKIP to Question 60, page 9 (GENERAL WORK Section).

IF YES, CONTINUE with Questions 49 on.

WORKER *SUMMER 95* QUESTIONNAIRE
CALIFORNIA PAINTERS PROJECT

Today's Date (mm/dd/yy): ☐☐/☐☐/☐☐ **Interviewer:** ☐☐☐

Time Started: ______________ **Interviewed in:** ☐ English ☐ Spanish ☐ Cantonese

Check if Anyone Else Was Present During Interview: ☐ **Who:** ______________

Thank you again for your participation in the California Painters Project. Today, I'll be asking you some questions about your work and hobbies. Your answers are confidential, and will not be discussed with your employer. You are not required to answer all of the questions, but the more information we have, the more effective our project can be in preventing lead poisoning.

38. Can I verify your current employer's name and address:

Company name: ______________ ID: ☐☐☐

Address: ______________

City: ______________ State: ________ ZIP: ________

HOUSEHOLD SECTION

work on the flow of this...

First, I have some questions about you and your household.

Can I verify your name, address, and telephone number?

[if any changes, note below:]

Name: ______________

Address: ______________

City: ______________ **State:** ________ **ZIP:** ________

Telephone Number: ( ) ____ - ______

KNOWLEDGE SECTION

First, I have some questions about lead safety and health.

23ya	How does lead get inside your body? *(record verbatim; code later)* __________ __________ __________	DO NOT CODE:	☐	23ya
23yb	Is it possible for lead to damage your health without you knowing it?	**1 = Yes** **2 = No**	☐	23yb
23yc	What is the best way to find out if you have too much lead in your body? *(record verbatim; code later)* __________ __________ __________	DO NOT CODE:	☐	23yc
23yd	Complete the following sentence: Your blood lead test tells you about your exposure to lead during the last: year, 6 months, or 2 to 3 weeks?	**1 = year** **2 = 6 months** **3 = 2 to 3 wks**	☐	23yd
23ye	Can you tell me three ways to protect yourself from lead poisoning at work? *(record verbatim; code later)* __________ __________ __________	DO NOT CODE:	☐	23ye

APPENDIX 16

Focus Group Observer Guidelines and Observer Notes

California Painters Project Focus Group
Observer Guidelines and Report Form

The areas of interest you should look for and report on in writing include the following:

- identify when there is not a consensus on a question/discussion section;
- report dissenting opinions that are not well expressed or evident on the tape recording;
- indicate emotional reaction/state when responding or discussing something;
- note silences, confusion especially when probes are being used;
- report whether you think participants are speaking honestly or telling the facilitator what they think they want to hear;
- report the amount of time dedicated/spent on each question;
- report whether participants appeared to have had more to say on a question or whether discussion was complete when facilitator moved on;
- report body language - e.g. restlessness, people wanting to leave, people leaving, people getting up and down, level of attention/focused on discussion, side discussions;
- any other salient behavioral factors that either are not captured by the tape recording or provide supplemental information to the recording.

California Painter's Project Focus Group 3/21/95

(Jim Rogge's observations of the Blue Group discussion)

Summary

The contractors were initially reticent about their opinions of the project, but fairly rapidly became open about their feelings and views. Their main recommendations were that

- there be less "academic" content and more practical "hands-on" type of information and training
- more sessions be taught by other contractors
- the manual was too "stuffy"/academic/long, and that a video to accompany the manual, demonstrating some of the techniques, would have been helpful and more "attractive" to themselves and their workers
- more information be provided on sources of equipment; e.g. HEPA vacuums, etc.
- less time be spent on worker's compensation insurance, and more time be spent on liability insurance and liability issues, especially with regard to practical advice on how to protect themselves from liability suites

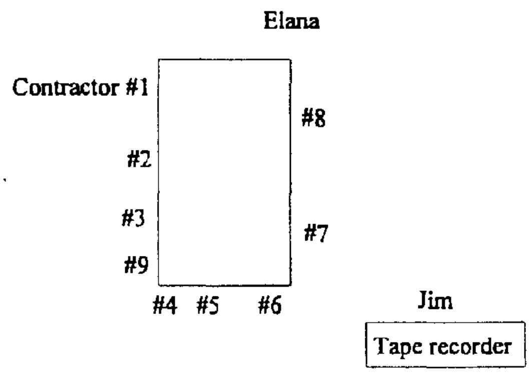
The areas of the project they felt most helpful were

- the chance to network to discuss how they were each being affected and deaiing with the issue of lead
- that their workers had training in the importance of good hygiene in protecting themselves
- the BLL testing provided (for various reasons; made the issue real, was good value, etc)
- just being exposed to the information, for many it was the first time they really thought about the problem, and there familiarity with the subject now influences how they approach many of their tasks

They thought that project staff had absolute or near absolute authority with decision-making bodies/regulatory agencies; i.e power to control how those bodies voted, unlimited access, etc. They thought the OLPPP staff professional, cooperative, and even-handed (had no ax to grind).

Start time 5:00 pm, End time 6:50

There were 11 people present at the discussion. Elana, myself, and 9 contractors. One of the contractors had to leave after the first twenty minutes, one contractor didn't arrived twenty minutes late. The physical layout of the room was as pictured.



Contractor #1 was attentive to the discussion. He had a foreign accent, and did not volunteer information. If asked he would give his opinion. It was difficult to tell if his reticence was due to unease with English or his natural manner. His body language expressed openness, and he seemed genuinely involved in all the discussion, and willing to listen openly to all points discussed.

Contractor #2 was attentive, forthright, and generally addressed the questions or points for discussion more directly than any of the other participants. He was a very productive member of the group. His body language was generally that of an open, involved individual. He expressed some irritation and impatience when some other members of the group began getting of the discussion points and started to dwell on the negative aspects of regulation.

Contractor #3 was also attentive and forthcoming. Unfortunately, he was only able to stay for twenty minutes.

Contractor #4 was attentive but often made statements and comments off the discussion point. Much of the time he spent speaking was not about the project but rather about the inequity and unreasonableness of the Lead Standard, Cal/OSHA, etc.

Contractor #5 was very reticent during the entire discussion. It was not due to language barriers. He made a very clear, comprehensible statement in the very beginning of the discussion expressing his great dissatisfaction with the current state of government regulation in general, and lead regulation in specific, and after that time sat with his arms crossed, looking straight ahead, following the discussion but not apparently interested unless someone made a statement supporting his view of the unfairness of current regs. Contractor #5 and # 4 had two or three episodes where they would exchange a sentence, laugh, and then resume listening.

Contractor #6 was also relatively reticent. His body position was of partial recline with arms folded. Initially he would only comment when asked, but later in the discussion was more spontaneous. He made some comments disparaging regulations, but generally gave the impression of someone working to find a way to deal with the regs, somewhat frustrated in his attempts, and unhappy with the unlevel playing field presented by the black-market painters.

Contractor #7 was almost completely silent during the entire discussion. He did not volunteer any points spontaneously, and only answered two questions directly asked of him by Elana. His back was to me so I could not see his face or body position, so I can't say if he was listening.

Contractor #8 was very attentive. He did not make many points but those he did were very to the point, very salient. He sat back in his chair most of the discussion but turned to look at each speaker, and would occasionally be moved to join in and make a spontaneous point.

Contractor #9 came in 20 minutes into the discussion. He was obviously well known and respected by the group as evidenced by their salutations of greeting and attentiveness to his points. He was very involved in the discussion, however he sometimes tended to drift from the point at hand. Overall his answers were quite informative, often reiterated by other members of the group.

All in all, the level of involveness was probably about what one could expect from the setting. The contractors did seem to be uncomfortable when it was mentioned that the conversation would be taped, even when promised that there answers would be kept confidential. In the future it would probably help if there was a plan for someone outside of the project to tape the session and for someone outside of the project to transcribe the session. If this method was used, and if it was fully explained to the group, some of their concern would probably be alleviated.

Additionally, the setting was somewhat formal being in a conference center. It probably helped keep the conversation on track, but much more direct, honest feedback might have occurred if the meeting could have been held at a restaurant, especially if the contractors could have had a chance to kick back,blow off some steam (especially about regulations, Cal/OSHA, etc) and then be asked the same set of questions. Discussion of regulations crept into just about every point discussed. Contractor #2 was obviously frustrated by this, as well as a few other contractors, and suggested that if the project was redone, that on the first day everyone be allowed to vent, and that no discussion of regulations be allowed after that.

The following is a running account of the points brought up, by whom, and reactions from the group.

Question #1-What are some of the factors that initially influenced you to participate in the CA Painters Project?

Brief Transcription of Discussion	Group Response
#1-Was looking for info on lead exposure	initially everyone carefully listening, but closed body positions, no nodding
#2-Wants to be at forefront of trade	
#3- New type of exposure so wanted to learn, OLPPP didn't approach him trying to sell him something which is how he has been approached by others and didn't like	
#4-Cal/OSHA deadline, wasn't much info available at first about what becoming certified would entail, so wanted info	<- some nodding from others
#3-(asked to give general impression of project before having to leave) Wanted more information on variety of ways to handle remediation/abatement. Said that most customers would not want clean-up to the "n-th" degree and he would have appreciated having more info on available options and effectiveness of each option.	<-nods from others <-some laughs
#5-to educate self, to decide whether to stay in or get out of trade because of the burden and inequity of regs	<-some nodding
#6- to learn how to protect self and workers and avoid liability	
#7- educate self	
#8- *I don't have contractor's answer to this.*	
#9- wanted to get involved in hope that he could help influence development of standards, wanted to get something back from lead fees, help reduce number of regs.	<-laughs <-strong agreement group as whole

Question 1a- What kept you involved?

#6-everyone else stayed in	
#7-getting info back	
#2-it was free, easy, what we had to pay for was reasonable	<-nods
#8-to be grandfathered in	<-some nods
#9-exchange of info with other contractors	<-nods
#4- *Comment unrelated to subject*-seminars were too long	

Question #2- What did you think you would get out of participating?

#2-wanted to help develop info on subject to help protect others, etc	a few leaned back with arms crossed, not much spontaneity

Question 3#- Can you talk a bit about what helped you to make changes to improve lead safety?

#4- info on availability of equipment, *COMMENT*, some info was not applicable, I don't use TYVEK, info passed on during open sessions between contractors,	
#8-info and participating in collecting data and chance to review data with workers, basically having such immediate direct use of data	<-nods
#2-(agrees with previous comments), BLL testing made more sense after this	
#9-having someone arrange all aspects of program; teaching of workers, arranging BLL, etc. , having workers trained in personal hygiene	<nods <-vigorous agreement

#2-(agrees with previous comment) very practical	
#8-good effort in the training, well done, not condescending	<-nods
#1-workers have become more aware	
#9-(agree with previous comment), company still struggling with building awareness of necessity of all tasks being done, *Related incident with Cal/OSHA*	<-laughs at description of incident
#7-BLL's	
#4-air monitoring was beneficial in that contractors didn't have to pay, but it was off-putting to residents and neighbors	
#7-air monitoring seemed to be performed in unorganized fashion, results were not helpful, "mumbo-jumbo", not a good value	<-laughs

Question #3a- Was it helpful to network with other contractors?

#7-helped comparing BLL's to make sure wasn't totally different from everyone else	<-nods and agreement
#4- *Comment unrelated to discussion point:* Disturbing having to get certified, was told would be certified	PERIOD OF LOOSENING UP
#2- Important to find out what others have done	
#4- helped bring in a job	
#7- misery loves company	<-laughs
#4-very helpful having other contractor give lessons	<-NODS
#6-"they should hire us next"	<-laughs

#9-this is info should be put on CD-ROM disk, this group could have alot of power if it would work together and lobby	<-agreement vocally and with nods

Question #3b- Did group purchasing help you make changes to improve lead safety?

#4-good for BLL, not good for tools	
#8-company reps weren't aggressive in arranging group purchases	

Question #3c-Did the manual help you make changes?

#8-needs a video to go with it	<-lots of agreement
#2-video would be more practical and attractive	

Question #3d-What other outside influences helped you to make changes to improve lead safety?

#4-fear of being sued	
#9-(agree) everyone is very afraid of being sued	
#8-being sued, also enforcement, **would like** info from project to reach Cal/OSHA so they are more helpful rather than picky	

Question #4-If you could change the project in any way, what would you change?

#7-more focus on customers to convince customers that need lead-certified painters

#4-(disagree with previous statement) worried that customers may get to frightened

#7-jobs should be permitted

#9-if permitting done, should be on annual basis, need more info and training on how to bridge gap to customers about lead hazards

<-nods of agreement

#4-include info on alternative ways of performing jobs in brochure

#5-concerned that regs are going to drive good companies out of business, because can't compete with black market

#2-"On day 1, have a gripe session about how painters are abused by regs but from then on don't allow that talk anymore.", many sessions were tedious and slow, self paced study would be good so not everyone is slowed down

<-agreement

#8-should be market and also general contractor education

<-agreement

THE NEXT FEW COMMENTS WERE SLIGHTLY OBTUSE AND I'M SKIPPING THEM. YOU'LL HAVE TO REVIEW THE TAPE.

#9-comments on training and practicality of regs should get back to bodies that develop the regs, workers comp info not that good, liability needs to be alot better explained

<-agreement

#4-would like to see summary of results and also would like to know if DHS considers painting a high risk industry

#2-would like to know how painters compare to other industries, would like a less academic slant to training, more real life, especially have more contractors running

#1-felt overwhelmed by info, but still would have liked info on sources of equipment

Question #5- What are some obstacles that you have encountered in trying to improve lead safety?

#5-physical difficulty of worksites, lack of equipment

#7-convincing customers of danger of lead, warning clients without panicking them

#2- extremes in clients attitudes-extreme indifference versus extreme fear and also cost issues

#6-no clear standard on HOW CLEAN the site needs to be after remediation

#2-workers wouldn't consistently follow training

#9-expensive to get rid of waste, have to keep reminding workers of safe work practices, very tough to figure extra costs, especially when other contractors aren't following the rules <-lots of nods

#4-(agreed with previous statement)

#6-impossible to absolutely meet regs

AT THIS POINT THERE WAS A GENERAL AGREEMENT THAT NOTHING OF THE PROJECT ITSELF WAS AN OBSTACLE TO IMPROVING LEAD SAFETY. CONVERSATION THEN SOMEWHAT VEERED AWAY FROM TOPIC.

#9-there was a hazardous waste materials session that was voluntary, it should have been part of the course

#1-hazardous waste disposal should not be a part of our cost, it should be free to us

#8-there should be an incentive program to make waste handlers give better deals (MY NOTES ARE UNCLEAR HERE. THIS IS PROBABLY INACCURATE DESCRIPTION OF STATEMENT)

<-very great agreement, cheers

Question #6- How has participating in the project affected your approach to carrying out your business?

#2-more proactive

#9-get more referrals

#4-need more time with people involved in writing specs for project so they can take this back (AGAIN MY NOTE TAKING IS POOR AT THIS POINT. BETTER CHECK THE TAPE TO SEE WHAT THIS MEANT.)

#2-has formalized testing of workers

#6-now always tells clients to sit down before giving them the price

<-laughs

#4-more employee and general job protection

#8-have become matter of fact about bringing matter up to clients

#2-(agrees with previous statement), also has started educating others

California Painters Project Focus Group 3/21/95
Larry Bilick's observations of Red Group discussion

The group was gathering and Ed pointed to a list of group ground rules. One rule was "no stupid comments". Ed explained the rules. One member laughed and said, "I thought you meant don't make stupid comments". Everyone laughed.

Question 1. start time: 5:00

P., who spoke first, announced before the tape went on "I have a lot to say".

P. again spoke first in first discussion.

Onc man got up and took a brief break just when two new people (a man and a woman) arrived

P. starts the discussion again

At the start Ed had everyone go around the table and say how and why they participated in the painters project. Everyone spoke. For this question all the participants were attentive with a serious affect. People's comments were a little tentative but seemed honest. The question seemed to be covered adequately with ample opportunity for full participation.

Question 2. start time: 5:15

F., the only woman in the group, talked on top of someone's comment with a smile. This was the first spontaneous comment.

A new person joins the group.

F. seems to have replaced P. as the lead respondent.

P. and F. and man with F. are most active about the need for there to be a "level playing field" in the industry.

Another new person joins the group.

A comment about OSHA's ignorance got a chuckle and nods from a few

D. says a cynical comment; some, but not all, nodding.

The discussion got lively about Cal OSHA. (W. was dozing off occasionally)

There was not full agreement on the role of OSHA. Differences were able to be expressed. Discussion was honest and group was ready to move on.

Question 3. start time: 5:30

A new person started the discussion.

D. said in regard to why he made changes "It's mostly just common sense."

Two people get up and take a break

For much of this discussion Ed did not give the list of aspects in the *probes* so the contractors did not refer to several of them. At one point Ed asked if everyone could give their opinion, G. said "Can you ask that question again?"

Many in the group mention "training" as important.

There is a lot of nodding and agreement that the classes with the manual, not just the manual were important

S.'s comment that when a reluctant worker got a blood lead level of 40 that got the workers' attention also got the attention of the group.

Comments about sandblasters not being required tobe tested was angry and many appeared to be angry about this.

At this point Ed lists *probe* items.

Demonstration of equipment listed as a plus, many nod in agreement.

Liability discussion is of interest to many. This is one of the first times that there was interactive questions and discussions between the contractors.

Disposal of toxic substances got an interested response from several contractors.

The cynical guy keeps making comments but then makes a positive comment about employees learning from the training.

The man who was dozing earlier's beeper goes off and he takes a break.

By this time everyone has spoken on this question.

When cooperation between the contractors is mentioned most nod in agreement.

I think most of the comments were honest. All aspects were not covered.

Question 4. start time: 6:10

G's beeper goes, off he takes a break.

Idea of on-site training got some agreement, but then opposite opinion got some support.

There was lots of nodding around the need for more questions.

Having more painters conduct the training got some nods but not all seemed to agree.

The idea that the manual should be briefer and then have a video got some agreement but there was also some who appeared to disagree.

The comment about having a laminated sign about lead rules at the work site did not generate other support.

At this point the discussion is not mostly about the project but rather about regulations. Ed gets them back and focused.

The draft brochure gets a comment about how this is something that's been done right. He holds up the brochure.

The comment that the lawyer was good and that he should be brought in early got agreement.

Mention of a video (This time not linked to the manual) got support.

Comment about condensing the time of the training did not get much support.

Someone said that someone else should pay for the training. Others seemed to have these same feelings. (The comment that "I don't have health insurance for me or my workers" was really understood.

The concern that trained workers would leave to go out on their own got some support but at least two people said that this was not their concern.

This question had some real disagreement, but no one seemed unable to express themselves. There also was not hostility at the project itself or the staff of the project expressed. I did not feel that this was being hidden.

Question 5. Start time: 6:28

There was lots of support for the idea that workers should pay for their own training.
There was a lot of interest in this topic

F. was strong about profiting from the workers training. Her statement that if a worker does not show up at training they get it deducted from their pay got much admiration.

The point of view that it is not good to bring up the issue of lead with customers because they don't want to hear it got support from at least four people, but not all.

The big contractors seemed to be most annoyed by record keeping requirements.

It was suggested that a sample contract with lead language would be useful. This got much support.

I think the conversation was honest but not all issues were covered. It could have gone on for longer.

Question 6. Start time: 6:44

There was agreement among the big contractors that they have changed their marketing for commercial jobs.

Clearly there is a desire for them, as trained contractors, to get recognition and benefits such as they being the ones that must be hired for some jobs. This point of view got general agreement.

End time: 6:54

This group of contractors approached the meeting in a straight forward way. They seemed to view it as in their interest that the group be honest and workman like. No one seemed intimidated. There were things that were not said but there did not seem to be an attempt to cover anything up.

APPENDIX 17

Impact Evaluation Objectives

APPENDIX 17

IMPACT EVALUATION OBJECTIVES

A. EMPLOYER OBJECTIVES

Lead Paint Hazard Identification

1. 75% of target employers will increase the frequency with which they use color indicating chemical tests for lead in paint.

Surface Preparation Methods

2. 50% of target employers will decrease the frequency of dry manual sanding.

3. 33% of target employers will decrease the frequency of dry manual scraping.

4. 50% of target employers will increase the use of HEPA-exhausted power tools.

5. 50% of target employers will decrease the frequency of open flame burning.

Respiratory Protection

6. 90% of target employers who do not provide the respirator required by Cal/OSHA for dry manual sanding will do so.

7. 50% of target employers who did not provide the respirator required by Cal/OSHA for power tools without HEPA exhaust will do so.

8. 50% of target employers who provided initial medical clearance for respirators will provide an annual update.

9. 50% of target employers will provide new hires with medical clearance for respirator use.

10. 50% of target employers who have not provided fit testing in the prior 6 months will do so.

Protective Clothing and Hygiene

11. 75% of target employers who do not provide adequate protective clothing will do so.

12. 75% of target employers who do not take steps to prevent take-home contamination via work shoes will do so.

13. 90% of target employers who do not consistently make certain that water, soap, and towels for hand washing are available for workers will do so more frequently.

14. 90% of target employers who do not prohibit eating, drinking, and smoking in the work area will do so.

Housekeeping, Containment, and Environmental Control

15. 75% of target employers will decrease the frequency of dry sweeping.

16. 90% of target employers will increase the frequency of misting debris before sweeping or shoveling.

17. 50% of target employers will increase the frequency of using a HEPA vacuum for cleanup.

18. 50% of target employers will decrease the frequency of covering floors with reusable tarps during surface preparation.

19. 50% of target employers will increase the frequency of covering floors with plastic sheeting during surface preparation.

20. 30% of target employers will increase the frequency of using a containment material on scaffolding.

21. 50% of target employers will increase the frequency of using plastic to seal off rooms during interior surface preparation.

22. 50% of target employers will increase the frequency of using plastic to seal windows and doors during exterior surface preparation.

23. 50% of target employers will increase the frequency of using sheeting or tarps to prevent exterior contamination.

24. 50% of target employers will increase the frequency of taking effective steps to prevent paint chips from entering storm drains.

25. 50% of target employers will increase the frequency of taking steps to ensure that hazardous waste is disposed of at a licensed facility.

Lead Medical Program

26. 90% of target employers will routinely provide BLL and ZPP testing to lead-exposed workers.

Training about Lead Safety

27. 50% of target employers with new hires will provide them with at least 4 hours of lead hazard training.

B. WORKER OBJECTIVES

Respiratory Protection

1. 75% of all target workers will do a fit check every time they put on a respirator.

Protective Clothing and Hygiene

2. 75% of target workers will decrease the frequency of wearing work clothes home.
3. 75% of target workers will decrease the frequency of wearing work shoes home.
4. 75% of target workers who do not consistently wash up before eating will do so more frequently.
5. 50% of target workers who do not consistently wash up before drinking beverages will do so more frequently.
6. 50% of target workers who do not consistently wash up before smoking will do so more frequently.
7. 90% of target workers who do not consistently wash up before going home will do so more frequently.
8. 90% of target workers who eat in the work area will do so less frequently.
9. 75% of target workers who drink in the work area will do so less frequently.
10. 75% of target workers who smoke in the work area will do so less frequently.

Housekeeping, Containment, and Environmental Control

11. 75% of target workers will decrease the frequency of dry sweeping.

12. 90% of target workers will increase the frequency of misting debris before sweeping or shoveling.

APPENDIX 18

Interviewers Manual

Introduction: Role of the Interviewer: The California Painters Project (*described in the Appendix to this manual)* represents many hours of dedicated effort by staff of the State of California Department of Health Services, the California Public Health Foundation, and the U.S. Centers for Disease Control and Prevention (CDC), National Institute for Occupational Safety and Health (NIOSH). This effort has produced study protocols and procedures, identification of project participants, and development of questionnaires. However, the final quality of the information gathered during this project, information which will be used to enable us to measure the success of our training and materials, will depend to a large degree on the quality of each interviewer's work. The interviewer is a crucial link with the California Painters Project (CPP) participant.

This manual will help each interviewer perform high-quality work, and includes sections on General Guidelines, Asking the Questions, Probing and Clarifying Answers, Specific Instructions for Selected Questions, Questions You May Be Asked, Keeping the Respondent "On Track", Recording Responses, Ending the Interview, Editing the Questionnaires, and Definitions. A brief description of the California Painters Project is included as an Appendix.

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GOALS OF THE INTERVIEWER

During the CPP, answers obtained in the first (baseline) interview will be compared to answers obtained in the follow-up interviews in order to measure changes in certain items. As in all studies which use structured interviews, it is *extremely important* that every interviewer is administering the questionnaire in the same way, and that each participant "hears" the question in the same way. In addition, project participants should all "receive" the same information if they have questions about something they are being asked. For these reasons, interviewers must follow some standard procedures and guidelines when interviewing. You are the "eyes and ears" of the project staff, and your ability to effectively obtain accurate information is essential. An interviewer's goals are to:

① **Obtain, accurately and completely, all information that is asked for in the questionnaire**

② **Record this information legibly**

③ **Maintain a rapport with the participant, without straying from the content of the questionnaire**

The following GUIDELINES should help you achieve these goals.

(One important goal of a research interviewer is often to obtain consent to participate from subjects, including explaining the rationale for the study, and why it is important that a subject participate. In the CPP, you will be interviewing subjects that have already consented to participate, and have some idea of what the study is about. Thus, you will not need to obtain informed consent.)

I. GENERAL GUIDELINES

I.1 Before your first interview, make sure that you **know the questionnaire.** Read each question aloud, practice using the form with friends or co-workers, make sure that you know the skip patterns and "show card" instructions.

I.2 Try to **develop a rapport** with the person you are interviewing; maintain a professional yet understanding attitude. Show interest in what the participant is saying, but keep to the structured questionnaire. The participant should feel as though his or her answers are important, and you should be relaxed and (hopefully!) enjoying the interview.

I.3 **Read the questionnaire exactly as it is written to every person you interview.** Plenty of practice beforehand, in order to sound as natural as possible, will help. Each question needs to be asked in the order it appears in the questionnaire.

I.4 **Be objective:** be a "sponge" or information-gatherer, without interpreting, guessing, or explaining any participant's response to any question asked.

I.5 **Record your participants' responses exactly as they are given.** Record verbatim responses using the exact words said to you; clearly mark the answer chosen where answer choices are given.

I.6 **Speed of the interview**: You want to keep a fairly rapid flow during the questions, but the respondent shouldn't feel rushed, or that they don't have enough time to answer the questions.

II. ASKING THE QUESTIONS

Types of Questions: The CPP Worker and Employer Baseline Questionnaires contain two types of questions, Precoded (or closed-ended) questions, and Open-ended questions.

Precoded Questions: In Precoded questions, the answer choices are contained in the question, and these answer choices are sometimes read to the participant. The answers to precoded questions are usually mutually exclusive, and exhaustive: choices do not duplicate one another, and all possible answers are listed. An example of a pre-coded question is:

When you put on a respirator, how often do you do a positive/negative pressure fit check: every time, sometimes, or never?	**1=every time** **2=sometimes** **3=never**

Open-ended Questions: In open-ended questions, answer choices are not given, and the question is followed by a blank space (with the instruction to *"record verbatim")*. The participant's answer is recorded exactly as given. These types of questions are then coded by another CPP staff member after the interview. An example of an open-ended question is:

What kind of medication was this? *(record verbatim; code later)*

____

For questions that state: *"record verbatim; code later"*, coding is not done by the interviewer. There will be an instruction adjacent to the coding box that says: "DO NOT CODE", as well as the *"record verbatim"* instruction.

Another example of an open-ended question is:

What type of surface does this [building / structure] have? ☐ ________________________________ *(1=Wood, 2=stucco, 3=metal, 4=concrete, 5=other)*

In this example, the respondent may give a response that fits more than one coding category; i.e., they may say "wood and stucco". Whatever response to this open-ended question is given should be recorded exactly; if the response does not fit a coding category, the coding box is left blank for later coding *(see section on "Recording Responses").*

Either Precoded or Open-Ended questions may also be **Dependent:** the question is not asked of every participant in the project. For Dependent questions, you will have an instruction that tells you which participants are asked the question, and (if you are to skip anywhere besides the next question), where to skip to for those participants who do not get asked.

IF YES:		
Was this work done on a building built before 1980?	**1=Yes** **2=No** **9=Don't Know**	☐

Continuation Sheets: Both the Worker and Employer Baseline Questionnaires contain a question for which the respondent may have more items to list than the response columns allow. You will be provided with Continuation Sheets for these questions. Should a respondent have done surface preparation on more than 5 jobs during the past month (Worker Baseline question 49 and Employer Baseline question ___), use the appropriate Continuation Sheet to record more responses. **ALWAYS USE AN ID STICKER** ON A CONTINUATION SHEET WHEN THE USE OF A SHEET IS REQUIRED.

GUIDELINES FOR ASKING THE QUESTIONS:
Below are some guidelines for asking the questions on the CPP Worker and Employer Baseline Questionnaires.

II.1 Read each question **exactly as it is written, in a conversational manner.** Be sure that you know how to pronounce all the words and the questionnaire "flows" well as you are reading it. Only words in bold or underlined should be emphasized, and pauses should occur at commas or after answer categories.

II.2 **Ask all of the questions in the order they are written.** Do not skip any questions, even if you think some repetition may occur. (Questions that should be skipped depending on a respondent's answer are clearly marked, and, of course, should be skipped as appropriate). *(If you mistakenly skip a question, and notice the mistake, do go back and ask: apologize by saying "I've forgotten to ask..")*

II.2 **Use a neutral, non-judgemental tone.** Don't assume that you know the answer to any question: let the respondent tell you. Do stay alert to any possible inconsistencies, however, which should be more fully probed by stating "I want to make sure I'm clear about your answer".

II.3 Keep your **eyes on the questionnaire when asking the questions,** to let the participant know that you are fulfilling a professional role, not just making conversation. Try to discourage unrelated conversation (while maintaining rapport, however!).

II.4 Try to **keep the participant from seeing the questionnaire itself.** Knowing what questions are coming or what answers are "expected" can bias a respondent's answers.

II.5 **There are no "correct" answers**; the interview is not a quiz or an intelligence test. Even in the section of the questionnaire where "True / False" answers are obtained, we are interested in whether the participant *thinks* the question is true or false. There is no "wrong" answer.

II.6 If a participant objects to a particular question, you can always agree that you do not know why a particular question is being asked, but reiterate that your instructions are to ask every question. Also, the respondent's opinion is very important to the project. (Don't "push" a respondent into answering something they do not want to answer; the participant can, of course, choose not to answer any question.)

II.7 For open-ended questions, **always record the participant's response verbatim.** Every word the respondent gives may be important in later coding. We are not interested in what you *think* the respondent means, but in exactly what the response was.

II.8 **Positive feedback** can be given to clarify the respondent's role. However, words such as "good", "yes", or "o.k." should NOT be used, since these can imply that you agree or that the "correct" response has been given. Instead, a nod of the head, "I see", "uh huh", or "I understand" are examples of feedback which are positive but do not imply right or wrong.

II.9 "Don't Know" is never read as a response.

III. GUIDELINES FOR CLARIFYING RESPONSES AND PROBING FOR ADDITIONAL INFORMATION

Probing for additional information and clarifying a participant's responses are two skills that an interviewer needs in order to obtain accurate information. Probing serves both to clarify responses and to focus the respondent on the specific focus of the questionnaire. Both these techniques, however, can lead to bias and should be used only when a response is not a clear answer to the question. Neutral or non-leading probes must always be used; probing **should not suggest answers to the respondent.**

When to probe: A respondent's answer must be probed for more information or clarification when it does not satisfactorily answer the question. A response that doesn't satisfactorily answer the question may be an irrelevant answer, or an incomplete answer. This can occur if the respondent didn't hear the entire question, or missed a key phrase or word.

Types of Probes: All probes must be neutral: the respondent should not feel that a particular answer is expected (i.e. do not lead or bias the respondent). Nor should the respondent feel that you are not satisfied with a given answer. Neutral probes do not bias a respondent, or imply any judgement of what the respondent has said. Below are some examples of neutral probes that can be used.

Repeating the question: Sometimes a respondent gives an unclear response because they did not hear the entire question, or has misunderstood the question. Repeating the question, in a neutral, conversational tone, is often an effective probe.

An expectant pause; silence and waiting a moment: Pausing for a moment indicates to the respondent that an answer has been heard, but that more information is expected.

Repeating the respondent's answer back to them can also indicate that the response was heard, but that more information is expected.

Asking a neutral question:

For a closed-ended question, asking: "*Which category comes closest?*"
or, "*In general, would you say...?*",
or, "*If you had to choose, would you say [ ] or [ ]?*" *(reading all responses)*

It is extremely important if using the above probes to **READ ALL OF THE RESPONSE CHOICES** to avoid biasing the respondent's answer.

If an answer is unclear, *"Could you say more about that?"*

For **open-ended questions:**

"Is there anything else?"

"Could you say more about that?"

EXAMPLES: Probing is necessary when a respondent's answer does not clearly answer the question. For example, the respondent is asked:

Question	Response
"How often did you use a regular vacuum: often, sometimes, or never?"	

and responds:

"Well, I mostly used a regular vacuum".

Since the respondent has not chosen one of the response options, you need to probe this response with:

"Would you say often, sometimes, or never?"

An **incorrect probe** would be:

"So would you say often?"

(assuming "mostly" means "often"). This is biasing the respondent's answer. When probing, always repeat ALL of the response options.

"Don't know" responses should be probed at least once. When a respondent answers "I don't know", give them a moment to think about the question. Often, "I don't know" is simply an indication that the respondent is thinking about what you asked and is stalling for time. After pausing, if an answer has not been given, use one of the neutral probes. For example, "Which comes closest: (repeat all response options)".

IV. SPECIFIC INSTRUCTIONS FOR SELECTED QUESTIONS

HOUSEHOLD SECTION

2. *What is your date of birth?*
   If respondent doesn't remember date of birth, ask *"How old are you?"*, record age, and leave birthdate coding boxes blank

NON-OCCUPATIONAL RISK FACTORS

21. *What home remedy was this?*
    If respondent took a home remedy, but does not know the name, ask: *"What did the home remedy look like: what color was it?" "Were they pills or powder?"* and record verbatim the respondent's answer

23. *Do you currently use other tobacco products?*
    "Other tobacco products" includes chewing tobacco, snuff

KNOWLEDGE SECTION

It is especially important in this section to remember that there really are no right or wrong answers. We want to know what the respondent thinks is true.

A respondent may answer these questions by saying "Yes" or "No" rather than "True" or "False": this is o.k. Often, repeating the response options a couple of times for the first items will trigger the "pattern" of expected responses so that the respondent will begin using "True" and "False".

MEDICAL SURVEILLANCE SECTION

35. *What kind of medication was this?*
    If respondent has been treated with medication, but is not sure what kind of medicine (does not know the name), ask: *"What did the medicine look like?" "Did you take it orally, or was it given by a needle?"*

OLPPP Interviewers Only:

(44b. on Employer): When a question is asked regarding "How long _____", record the exact response. When coding this, convert the answer to years plus months: e.g., "2 and a half years" would be 02 + 06 (02 years + 06 months). (In the Medical Surveillance section, this is question _____ "For how long have you had a blood lead testing program for your employees?"

WORK SECTION

45. *During the last 3 years, what other kinds of work, besides painting, have you done?* Be sure to circle either *"months"* or *"years"* when recording "how long worked.."

49. **"Surface Preparation" Chart: location, # days, year constructed, type of surface:**

When using "SHOW CARDS", be sure to place the card on the table so that the respondent can read it.

The "location" of each job is simply the way the respondent remembers each of his/her jobs. We do not need to know the exact address; however the respondent chooses to remember or refer to each job is fine. For instance, the respondent might say "123 Main Street", or, "The Hamilton Building", or, "the Golden Gate Bridge". Any of these are fine; simply record the way the respondent refers to the job, and use his/her words when you ask the following questions.

Record the list of jobs (all of the job locations / names) in the past month first, then ask the remaining questions.

For "interior" and "exterior" number of days, if a respondent says "about 1/2 day", or "only 6 hours", or any other response that is not a number of days, record their response exactly as it was said to you. Code the "1/2 day" as 00.5 days. If you cannot easily determine what fraction of a day was given (if the response was not in whole days), leave the coding box blank and these will be coded later.

If a respondent does not know the exact year a building was constructed, ask them *"Can you estimate the decade it was built?"* or *"Your best guess is fine; about when do you think it was built?"* When coding this section, if the respondent did not give you an exact year it was built (e.g., 1927), but gave only the decade: "1920's", code the MIDPOINT of the decade given. Write the exact response below the coding boxes, and then (in the above example), code as "1925".

For the "type of surface", more than one response is fine here, i.e., a respondent may say "Part of it is brick and part is wood". Just record the entire response (i.e. don't worry about getting "only one" response here). If the response does not fit into the coding choices given, leave the coding box blank. (These responses, for instance "brick and wood" or "wood and concrete", etc., will be coded later).

50. *"I'm going to read you a list of surface preparation methods..."*

51. Read the entire question (list of choices) first, before going on to question 51 (respirators). The respirator question is coded alongside the "methods" response. For each method a respondent used (with the "RESPIRATOR CARD" showing), ask "Which respirator did you wear while doing [*task*] in the last month?"

Question 51 responses are recorded in the boxes alongside Question 50 responses (page 14). Do not ask the respirator question for methods that were "never" used; do not ask the respirator question for the three methods that do not have a coding box for respirators (methylene chloride chemical stripper, caustic chemical stripper, and other chemical stripper): the correct respirator for these three methods is not pictured on our card.

When coding the responses to question 51, if a respirator was not worn, code '8'. (If a task was not done, code '0'. This coding will be done after the interview: you are not asking about respirator use for the tasks that were never done.)

RESPIRATOR PROGRAM

The Respirator Program section of the questionnaire involves the most complicated skip pattern you will encounter.

For questions 51, 52a., and 53 (each of the three questions in which workers are asked to identify the respirator they wear most often during specific tasks), you need to be aware of whether the respondent wore any respirator, and, if so, which respirator number was worn:

If **no respirator was worn**, skip the entire Respirator Program section (skip to the General Work section).

If **Respirator #1 or #6** (only) was worn, skip to Question 59 (the last question in the Respirator Section: have you been seen by a doctor or nurse...

If **Respirator #2, #3, #4, or #5** was worn, read all of the questions in the Respirator Program.

Pay careful attention to the skip pattern instructing you on dependent questions in this section.

"GENERAL" WORK: HYGIENE / HOUSEKEEPING

67. and 68.: If a respondent does not smoke cigarettes or use any other tobacco products, do not ask these items. Circle '4' or 'Non-User'; later record a "4" in the coding box. (If you find that you asked these by mistake, just say, "I'm sorry, you *did* tell me that you don't smoke already.." Do apologize for your mistake.) This is one of the few areas in the questionnaire where you should remember a previous response that may have been given some time ago (i.e. is not immediately previous to the question you are asking).

OLPPP interviewers only:

[For the employer questionnaire: question 35., *"What kind of clothing is provided?"*. If you are not sure whether the type of clothing mentioned is DISPOSABLE or NON-DISPOSABLE, you should ask the respondent "Is this type of clothing disposable or non-disposable?", in order to determine whether to ask question 35b. A "Tyvek" suit is disposable.]

TRAINING SECTION

OLPPP Interviewers Only:

(51d. on Employer): When a question is asked regarding "How long _____", record the exact response. When coding this, convert the answer to years plus months: e.g., "2 and a half years" would be 02 + 06 (02 years + 06 months). (In the Training section, this is question ____ *"How long has your training program been in place?"*

V. QUESTIONS YOU MAY BE ASKED

When the Respondent Asks for More Information:

Because our project will use a comparison of respondents' answers before and after receiving education and training in preventing lead poisoning in order to measure the effectiveness of our training efforts, careful attention must be paid during the interviews not to "contaminate" the intervention. The interview should not be used as an opportunity to educate workers about lead poisoning (unlike some interviews our program does). Rather, we are simply gathering information from the respondents.

Information on all aspects of lead poisoning prevention, including ample time for questions, will be provided to the respondents in their Worker Training class. Most questions you may be asked should be answered by saying:

What is ____________ ?

I'm not completely sure what that means. You'll be learning much more about _____ in your Worker Training class, and will have a chance to ask all the questions you might have at that time.

How can I learn more about ____________?

Your Worker Training class will cover all aspects of lead poisoning prevention, including information on _____________. You'll also be given some written materials, and phone numbers you can call for more information.

You may also be asked other questions, including:

How dangerous is it to be working around lead?

I know that everyone who works around lead should be concerned. I don't know all of the details, however, and you will be learning much more about this in your Worker Training class. You'll have plenty of time to ask questions, too.

Why wasn't anyone as concerned about lead poisoning a few years ago?

There are new regulations to protect construction workers from lead. New scientific evidence shows that lead has health effects at lower levels than previously thought (especially in children).

When will I get my blood lead results?

You should receive your blood lead test results in about 2 to 3 weeks.

What is NIOSH?

The National Institute for Occupational Safety and Health, within the Centers for Disease Control and Prevention (CDC), is the Federal agency that researches worker health and safety issues.

Who sponsored this project?

The California Painters Project is funded partly by NIOSH, and partly by a program of the State Health Department. The project is a collaborative effort of these agencies, and is supported by the Painting and Decorating Contractors of California (PDCC), International Brotherhood of Painters Union, San Francisco Department of Public Health, and other groups.

Do you have anything to do with Cal-OSHA?

No, the California Painters Project is part of the State Health Department, which is does not enforce safety regulations. Our program provides information and other resources for workers, employers, and physicians in California. (However, employers are sometimes referred to CalOSHA if they do not correct serious health and safety hazards.)

How will my information be kept confidential?	The information you provide us is not reported individually; group statistics are used to report the information. Forms are kept in locked filing cabinets.
Will my employer see my answers?	Your employer will **not** see any of your responses.

VI. KEEPING THE PARTICIPANT "ON TRACK"

Sometimes, during the course of an interview, you may encounter a respondent who is quite talkative, or tries to engage you in conversation that is not related to the questionnaire. Try to focus the respondent, politely but firmly, back to the questionnaire. You may need to say "That's very interesting, now, [repeat the question]", or, "I see"... and continue with the questions.

If the respondent gives information on topics that are covered later in the questionnaire, let them know that you *are* interested in this, but that it would be helpful to you to record their responses in the order contained in the questionnaire.

VII. GUIDELINES FOR RECORDING RESPONSES

The CPP Worker and Employer Baseline Questionnaires follow a general format with the question to be read on the left of the page, a section for recording the respondent's answer in the middle, and a coding box to the right of each question. After a question is read, circle the respondent's answer in the "response column". The responses will be entered into the coding column after the questionnaire is completed.

VII.1 Use a **ball point pen**, (not pencil or felt-tip pen), to record the participant's responses

VII.2 Use **blue-ink to record responses**; use **black ink when editing, coding, and making comments** on the completed questionnaire. Comments might include something you realized needed correcting after the close of the interview. For instance, if you have found that a section of the questionnaire that should have been asked was accidentally skipped, note that in black ink (these participants will be called later). All coding and editing should be done in black pen, to distinguish it from the information that was gathered during the interview.

VII.3 At the start of the interview, you should be able to write comfortably, and the respondent should not be able to see the questionnaire. You can use a clipboard to hold the questionnaire, if that is comfortable for you.

VII.4 Make sure that the answer choice is **clearly indicated** (by circling the response).

VII.5 If you make a mistake in recording a response, or if a respondent changes their mind about an answer, make sure that the **correct response is clearly circled and the incorrect response is lightly crossed out.**

VII.6 During lengthy responses (to open-ended questions), repeat "I just want to write down exactly what you're saying", to encourage the respondent to slow down. Do make sure that you record everything the respondent says. If a respondent is talking too fast for you to record the answer, you can also say "Just a moment, I want to record all of what you're saying".

VI.7 If a respondent refuses to answer a question, write "REFUSED", and any comments given. "Refused" responses are coded as "8", "88", etc. Always write "REFUSED" if the respondent refuses to answer.

VI.8 "Don't Know" responses are coded as "9", "99", etc.

VI.9 For responses with fewer digits than the number of coding boxes, always **right-justify** the number and **fill in with leading "0"s**. For instance, if the respondent's answer is "4 years" and there are two coding boxes, record "0 4".

VI.10 For the end of a list of items where *"any other method"*, *"some other method"*, etc. is asked for, if no "other" method is used, write "NONE" in space, and code as 4.

VI.11 For questions with responses in years and months, record the answer exactly as given. Then, when coding the response, convert partial-years into the number of months and code months plus the number of full years. For example, if the response is: *"2 1/2 years"*, this would be coded as 02 years + 06 months. If the response is: *"18 months"*, this would be coded as 01 years plus 06 months. If you are unsure about the math, leave the coding columns for years and months blank, and they will be post-coded by the interviewer supervisor.

VIII. ENDING THE INTERVIEW

Always thank the respondent for his or her time, and make sure that the respondent has a chance to give you any other information they think is important about their work as a painter. (At the end of the interview, you have a "thank you / closing" script). Often, very useful information is obtained by simply asking "do you have any comments about your work as a painter... ?"

The script mentions that we may be contacting them for more information; this is in case a question or section was inadvertantly missed, or if there is some confusion about a particular response. (Some of the respondents will have a very brief "Follow Back" questionnaire, based on responses to a few of the items we ask about).

IX. EDITING THE INTERVIEW

As soon as you finish the "thank you / closing", take a moment to record your own comments about the interview: were there any problems? Did the respondent seem "rushed", or appear to have difficulty understanding the questions? Did a situation arise that you would handle differently if it happened again? You won't necessarily have comments or problems to record for every interview, but do take a moment to record your general impression. *("None" is an adequate response in the "Interviewer Comments" section.)*

Check over the questionnaire and make sure that each answer is fully and legibly recorded. Switch to black ink. Code the respondent's answer in the coding box for each question, again writing legibly.

If the use of a Continuation Sheet was required, check to make sure that an ID Sticker is attached to the sheet.

X. DEFINITIONS

SURFACE PREPARATION	refers to preparing surfaces of a bulding (or other structure) for new paint. This must be done to ensure that the new primer and paint will form a long-lasting, weather-resistant bond with the surface. Primarily, this involves removing paint which is no longer intact or properly adhering to the surface. A variety of methods may be used to do surface preparation, including: water blasting, hand scraping, using a propane torch or heat gun to soften paint before scraping, and hand- or power-sanding.
"Power"	refers to job tasks that are completed using a machine (for example, power sanding).
"Manual"	refers to job tasks that are completed by hand, without a machine (for example, manual sanding).
RESPIRATOR	A respirator is a type of mask workers wear to reduce the amount of lead dust and fume they inhale. Most respirators work by using filter cartridges which filter the particles out of the air as it enters the mask, to prevent breathing the particles in.
HEPA	A HEPA filter is a high efficiency particulate air filter. This is a particular kind of high efficiency filter that is used in respirator filter cartridges and in toxic dust vacuums when working with lead paint.

Appendix 1

Additional Information on the California Painters Project

Nature of Project: The California Painters Project (CPP) is a project which will design, implement, and evaluate a lead-poisoning prevention intervention among painters who are at risk of lead poisoning because of their work. Although lead is no longer present in residential paint (since 1978), painters who are doing surface preparation work on buildings painted before 1978 or on metal surfaces may still be exposed to lead on the job if they work on older buildings. This project will:

- Assess the nature and extent of lead exposure among painters who do surface preparation
- Design a training intervention (for both workers and their employers) which will teach painters how to reduce the risk of lead poisoning, and help bring employers into compliance with new regulations regarding workplace health and safety
- Measure the effectiveness of the training intervention by comparing workers' and employers' responses to questionnaire items regarding work practices and knowledge, before and after the intervention. During the project, participants will also have their blood lead measured, to assess their exposure to lead, several times during the course of the project

How many painters are involved? The CPP will enroll approximately 30 painting contractors, with approximately 250 painting employees. Both the contractors and the employees will be interviewed.

Type of Interview: Questionnaires will be administered to project participants two times during the course of the project: a baseline questionnaire in June, 1994, and a follow-up questionnaire in November, 1994. Both questionnaires are structured, in-person interviews, and will be conducted in either English or Spanish depending on the language of the participant. Both painting employees and contractors will be interviewed at baseline (during June) and at follow-up (during November). (A subset of contractors and employees will also receive a follow-up interview in June, 1995, by telephone. Regular staff of our program will conduct these interviews.)

13 May 1994

TO: CPP Interviewers

FROM: Susan

RE: Baseline Questionnaires; Interviewer Manual

Enclosed are the close-to-final copies of both the Worker and Employer Baseline Questionnaires, and the Interviewer Manual.

Please use the manual to guide your interview practice. Let me know if you have questions or are unclear about anything (especially those of you who have not done epi. interviewing before).

When you do the role-play, you should switch back and forth between Respondent and Interviewer roles. As Respondent, try to give responses that will cause the Interviewer to "probe", etc.

As I mentioned, I would like each of you to interview me before we call ourselves "ready". If you want to pilot with real contractors, that opportunity is available (Barbara & Luz will be coming on Monday, the 16th).

The "show cards" will be on firm backing, with rings (Pat to prepare). They are included with your interview forms today; you should separate them and use as "cards" when you practice interview.

Thanks, and good luck!

APPENDIX 19

CPP Site and Materials Characterization Form

CPP Site and Materials Characterization Form

Site #: ____________ Date: ____________
Contractor: ____________ On-site Supervisor: ____________
Site Address: ____________
____

Type and Estimated Age of Building or Structure: ____________
____

Bulk Sample #'s: ________ B, ________ B, ________ B
Area Sampled: ________, ________, ________
Material Description: ____________
____
Location(s) & Type of Substrate(s) : ____________
____
Visual estimation of # of layers: ______ Rhodizinate test: which layers indicate lead content/no lead content ? ____________
____
Contractors' comments: ____________
____
____

Bulk Sample #'s: ________ B, ________ B, ________ B
Area Sampled: ________, ________, ________
Material Description: ____________
____
Location(s) & Type of Substrate(s) : ____________
____
Visual estimation of # of layers: ______ Rhodizinate test: which layers indicate lead content/no lead content ? ____________
____
Contractors' comments: ____________
____
____

Bulk Sample #'s: ________ B, ________ B, ________ B
Area Sampled: ________, ________, ________
Material Description: ____________
____
Location(s) & Type of Substrate(s) : ____________
____
Visual estimation of # of layers: ______ Rhodizinate test: which layers indicate lead content/no lead content ? ____________
____
Contractors' comments: ____________
____
____

Bulk Sample #'s: ______ B, ______ B, ______ B
Area Sampled: ______, ______, ______
Material Description: ______

Location(s) & Type of Substrate(s) : ______

Visual estimation of # of layers: ______ Rhodizinate test: which layers indicate lead content/no lead content ? ______

Contractors' comments: ______

Bulk Sample #'s: ______ B, ______ B, ______ B
Area Sampled: ______, ______, ______
Material Description: ______

Location(s) & Type of Substrate(s) : ______

Visual estimation of # of layers: ______ Rhodizinate test: which layers indicate lead content/no lead content ? ______

Contractors' comments: ______

Bulk Sample #'s: ______ B, ______ B, ______ B
Area Sampled: ______, ______, ______
Material Description: ______

Location(s) & Type of Substrate(s) : ______

Visual estimation of # of layers: ______ Rhodizinate test: which layers indicate lead content/no lead content ? ______

Contractors' comments: ______

APPENDIX 20

CPP Full-Shift Exposure Monitoring Form

C.P.P. Full-Shift Exposure Monitoring Form

Site #: ________ Contractor: ________________________ Date: ____________ Employee: ___________________________

Pump #: ________________________ Rotameter #: _______________ Blanks: ______________________________

Sample #	Time On	Rotameter 1	Flowrate 1 (liters/min)	Time Off	Rotameter 2	Flowrate 2 (liters/min)	Duration (min.)	Av. Flowrate (liters/min)	Volume (liters)
F									
F									
F									
F									
F									
F									
F									

Documentation of Work Shift Activities

Time Interval	Location / material / condition area covered, (ref. bulk sample #)	Work task / work methods / tools / controls/ characterize disturbance of surfacing/ PPE description	Environmental conditions: weather, ventilation, proximate operations

Time Interval	Location / material / condition area covered, (ref. sample number)	Work task / work methods / tools / controls/ characterize disturbance of surfacing/ PPE description	Environmental conditions: weather, ventilation, proximate operations

APPENDIX 21

CPP Task-Specific Exposure Monitoring Form

C.P.P. Task-Specific Exposure Monitoring Form

C.P.P Site #: ______ Contractor: ____________________ Date: __________

Exposure Scenario: 1. Employee: ____________________ 2. Material/ Bulk Sam. #: ________________
3. Surface Prep. Method (tools and work method): ______________________________

Pump: ________________ Rotameter #: ____________ Blanks: ________________

Tare Number	Sample #	Time On	Rot. 1	Flowrate 1 (liters/min)	Time Off	Rot. 2	Flowrate 2 (liters/min)	Duration (min.)	Av. Flowrate (liters/min)	Volume (liters)	mg/cu.m. total	mg/cu.m Pb
	T											
	T											
	T											
	T											
	T											

Characterization of Work Conducted during Task-Specific Sampling

Sample #	Location, material condition, area covered	Description of work: disturbance of surface, intensity of work, breaks over 5 mins., contractor reported skill level, work posture and habits relevant to exposure. / PPE description	Environmental conditions: weather, natural or mechanical ventilation, proximate operations.

Characterization of Work Conducted during Task-Specific Sampling

Sample #	Location, material condition, area covered	Description of work: intensity of work, breaks over 5 mins., contractor reported skill level, work posture and habits relevant to exposure. / PPE description	Environmental conditions: weather, natural or mechanical ventilation, proximate operations.

APPENDIX 22

Questionnaire Data Tables

Employer use of paint chip sampling and analysis for lead (Figure 9.2)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	1	4.8	1	4.8	1	4.8
Sometimes	6	28.6	7	33.3	10	47.6
Never	14	66.7	13	61.9	10	47.6
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	1	0	0	1
Sometimes	0	4	2	6
Never	0	3	11	14
November Total	1	7	13	21

Post-Intervention Percent Change: 15% (3 of 20) increased use. (2 decreased use)

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	1	0	0	1
Sometimes	0	5	1	6
Never	0	5	9	14
Summer Total	1	10	10	21

Final Follow-up Percent Change: 25% (5 of 20) increased use. (1 decreased use)

NOTE: Shaded boxes indicate improvement of target population.

Employer use of color-indicating tests for lead (Figure 9.3)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	3	14.3	13	61.9	12	57.1
Sometimes	8	38.1	8	38.1	8	38.1
Never	10	47.6	0	0.0	1	4.8
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	3	0	0	3
Sometimes	5	3	0	8
Never	5	5	0	10
November Total	13	8	0	21

Post-Intervention Percent Change: 83% (15 of 18) increased use.

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	3	0	0	3
Sometimes	5	3	0	8
Never	4	5	1	10
Summer Total	12	8	1	21

Final Follow-up Percent Change: 78% (14 of 18) increased use.

NOTE: Shaded boxes indicate improvement of target population.

Employer use of dry manual sanding (Figure 9.4)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	19	90.5	14	66.7	14	66.7
Sometimes	2	9.5	6	28.6	6	28.6
Never	0	0.0	1	4.8	1	4.8
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	14	5	0	19
Sometimes	0	1	1	2
Never	0	0	0	0
November Total	14	6	1	21

Post-Intervention Percent Change: 29% (6 of 21) decreased use.

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	14	4	1	19
Sometimes	0	2	0	2
Never	0	0	0	0
Summer Total	14	6	1	21

Final Follow-up Percent Change: 24% (5 of 21) decreased use.

NOTE: Shaded boxes indicate improvement of target population.

Employer use of dry manual scraping (Figure 9.5)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Employers	Percent	# Employers	Percent	# Employers	Percent
Often	18	85.7	15	71.4	15	71.4
Sometimes	3	14.3	6	28.6	5	23.8
Never	0	0.0	0	0.0	1	4.8
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	14	4	0	18
Sometimes	1	2	0	3
Never	0	0	0	0
November Total	15	6	0	21

Post-Intervention Percent Change: 19% (4 of 21) decreased use. (1 increased use)

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	14	3	1	18
Sometimes	1	2	0	3
Never	0	0	0	0
Summer Total	15	5	1	21

Final Follow-up Percent Change: 19% (4 of 21) decreased use. (1 increased use)

NOTE: Shaded boxes indicate improvement of target population.

Employer use of wet manual scraping (Figure 9.6)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	2	9.5	2	9.5	6	28.6
Sometimes	7	33.3	12	57.1	10	47.6
Never	12	57.1	7	33.3	5	23.8
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	1	1	0	2
Sometimes	1	6	0	7
Never	0	5	7	12
November Total	2	12	7	21

Post-Intervention Percent Change: 32% (6 of 19) increased use. (1 decreased use)

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	2	0	0	2
Sometimes	3	4	0	7
Never	1	6	5	12
Summer Total	6	10	5	21

Final Follow-up Percent Change: 53% (10 of 19) increased use.

NOTE: Shaded boxes indicate improvement of target population.

Employer use of HEPA-ventilated power tools (Figure 9.7)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Employers	Percent	# Employers	Percent	# Employers	Percent
Often	0	0.0	1	4.8	3	14.3
Sometimes	1	4.8	3	14.3	4	19.0
Never	20	95.2	17	81.0	14	66.7
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	0	0	0	0
Sometimes	0	1	0	1
Never	1	2	17	21
November Total	1	3	17	21

Post-Intervention Percent Change: 14% (3 of 21) increased use.

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	0	0	0	0
Sometimes	1	0	0	1
Never	2	4	14	20
Summer Total	3	4	14	21

Final Follow-up Percent Change: 33% (7 of 21) increased use.

NOTE: Shaded boxes indicate improvement of target population.

Employer use of power tools without HEPA ventilation (Figure 9.8)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	8	38.1	5	23.8	4	19.0
Sometimes	10	47.6	9	42.9	8	38.1
Never	3	14.3	7	33.3	9	42.9
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	4	3	1	8
Sometimes	1	5	4	10
Never	0	1	2	3
November Total	5	9	7	21

Post-Interventio Percent Change: 44% (8 of 18) decreased use. (2 increased use)

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	3	4	1	8
Sometimes	1	4	5	10
Never	0	0	3	3
Summer Total	4	8	9	21

Final Follow-up Percent Change: 56% (10 of 18) decreased use. (1 increased use)

NOTE: Shaded boxes indicate improvement of target population.

Employer use of open flame burning (Figure 9.9)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Employers	Percent	# Employers	Percent	# Employers	Percent
Often	0	0.0	0	0.0	0	0.0
Sometimes	12	57.1	7	33.3	4	19.0
Never	9	42.9	14	66.7	17	81.0
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	0	0	0	0
Sometimes	0	7	5	12
Never	0	0	9	9
November Total	0	7	14	21

Post-Interventio Percent Change: 42% (5 of 12) decreased use.

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	0	0	0	0
Sometimes	0	4	8	12
Never	0	0	9	9
Summer Total	0	4	17	21

Final Follow-up Percent Change: 67% (8 of 12) decreased use.

NOTE: Shaded boxes indicate improvement of target population.

Employer respirator selection for dry manual sanding (1/2 mask w/ HEPA) (Figure 9.10)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Employers	Percent	# Employers	Percent	# Employers	Percent
Adequate	6	28.6	17	85.0	18	90.0
Inadequate	15	71.4	3	15.0	2	10.0
Total	21	100.0	20	100.0	20	100.0
			Task not done = 1		Task not done = 1	

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Task not done	Adequate	Inadequate	Baseline Total
Adequate	1	5	0	6
Inadequate	0	13	2	15
November Total	1	18	2	21

Post-Intervention Percent Change: 87% (13 of 15) went from 'inadequate' to 'adequate'.
(1 went from 'adequate' to 'task not done')

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Task not done	Adequate	Inadequate	Baseline Total
Adequate	1	5	0	6
Inadequate	0	13	2	15
Summer Total	1	18	2	21

Final Follow-up Percent Change: 87% (13 of 15) went from 'inadequate' to 'adequate'.
(1 went from 'adequate' to 'task not done')

NOTE: Shaded boxes indicate improvement of target population.

Employer respirator selection for non-HEPA power tool use (full-face w/ HEPA) (Figure 9.11)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Adequate	0	0.0	2	15.4	0	0.0
Inadequate	18	100.0	11	84.6	12	100.0
Total	18	100.0	13	100.0	12	100.0
	Task not done = 3		Task not done = 8		Task not done = 9	

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	Task not done	Adequate	Inadequate	Baseline Total
Task not done	2	0	1	3
Adequate	0	0	0	0
Inadequate	6	2	10	18
November Total	8	2	11	21

Post-Intervention Percent Change: 11% (2 of 18) went from 'inadequate' to 'adequate'.
(6 of 18 went from 'inadequate' to 'task not done'.
10 of 18 stayed 'inadequate')

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Task not done	Adequate	Inadequate	Baseline Total
Task not done	3	0	0	3
Adequate	0	0	0	0
Inadequate	6	0	12	18
Summer Total	9	0	12	21

Final Follow-up Percent Change: 0% went from 'inadequate' to 'adequate'.
(6 of 18 went from 'inadequate' to 'task not done'.
12 of 18 stayed 'inadequate')

NOTE: Shaded boxes indicate improvement of target population.

Employer-provided fit testing for all respirator users within last 6 months (Figure 9.12)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Yes	2	10.5	11	52.4	10	47.6
No	16	84.2	10	47.6	11	52.4
DK if last 6 mo.	1	5.3	0	0.0	0	0.0
Total	19	100.0	21	100.0	21	100.0
	Missing = 2					

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Yes	No	Baseline Total
(Missing)	1	1	2
Yes	2	0	2
No	7	9	16
DK if in last 6 mo.	1	0	1
November Total	11	10	21

Post-Intervention Percent Change: 47% (8 of 17) provided fit testing by November.

NOTE: Shaded boxes indicate improvement of target population.

Employer-provided fit testing for all respirator users within last 6 months (Figure 9.12) *(con't:)*

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Yes	No	Baseline Total
(Missing)	0	2	2
Yes	2	0	2
No	7	9	16
DK if in last 6 mo.	1	0	1
Summer Total	10	11	21

Final Follow-up Percent Change: 47% (8 of 17) provided fit-testing by Summer.

NOTE: Shaded boxes indicate improvement of target population.

Employer provision of protective clothing (Figure 9.14)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Adequate	7	33.3	11	52.4	16	76.2
Does not supply clothes (or Inadequate)	14*	66.7	10	47.6	5	23.8
Total	21	100.0	21	100.0	21	100.0
	* Inadequate = 1					

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	Adequate	**Inadequate/Does not supply**	**Baseline Total**
Adequate	5	2	7
Does not supply clothes (or Inadequate)	6	8	14
November Total	11	10	21
	* Inadequate = 1		

Post-Intervention Percent Change: 43% (6 of 14) provided adequate work clothes by Nov.

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Adequate	**Inadequate/Does not supply**	**Baseline Total**
Adequate	7	0	7
Does not supply clothes (or Inadequate)	9*	5	14
Summer Total	16	5	21
	* Inadequate = 1		

Final Follow-up Percent Change: 64% (9 of 14) provided adequate work clothes by Summer.
NOTE: Use of disposable clothing increased over time:
Baseline - 2 employers; Final - 5 employers; Summer - 9 employers

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of wearing work clothes home (Figure 9.15)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Workers	Percent	# Workers	Percent	# Workers	Percent
Everyday	40	46.0	14	16.3	13*	14.6
Some days	23	26.4	29	33.7	21*	23.6
Never	24	27.6	43	50.0	55	61.8
Total	87	100.0	86	100.0	89	100.0
(No data)	Missing = 2		Missing = 3			

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	(Missing)	Everyday	Some days	Never	Baseline Total
(Missing)	1	0	1	0	2
Everyday	0	12	14	14	40
Some days	2	1	11	9	23
Never	0	1	3	20	24
November Total	3	14	29	43	89

Post-Interventnion Percent Change: 59% (37 of 63) decreased frequency.
(7 increased frequency)

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Everyday	Some days	Never	Baseline Total
(Missing)	0	1	1	2
Everyday	11	8	21	40
Some days	2	11	10	23
Never	0	1	23	24
Summer Total	13	21	55	89

Final Followup Percent Change: 62% (39 of 63) decreased frequency.
(3 increased frequency)

* NOTE: In Summer we asked additional question, "If wore clothes home, did you change before entering home?". 22 of those who wore clothes home every/some days said 'yes'.

NOTE: Shaded boxes indicate improvement of target population.

Employer ensuring work shoes are not worn home (Figure 9.16)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**
Yes	3	14.3	17	81.0
No	18	85.7	4	19.0
Total	21	100.0	21	100.0

Response Changes Over Time (Before study to Currently)

Before study (down) vs. Currently (across)

	Yes	No	Before study Total
Yes	3	0	3
No	14	4	18
Currently Total	17	4	21

Final Follow-up Percent Change: 78% (14 of 18) ensured workers do not wear work shoes home by Summer.

What Steps Were Taken to Ensure that Workers Did Not Wear Shoes Home

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**
Tell wkrs not to	2	100.0	13	76.5
Wkrs have 2 sets of shoes	0	0.0	3	17.6
Provide shoe covers	0	0.0	1	5.9
Total	2	100.0	17	100.0

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of wearing work shoes home (Figure 9.17)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Workers**	**Percent**	**# Workers**	**Percent**	**# Workers**	**Percent**
Everyday	48	55.2	34	39.5	28*	31.5
Some days	21	24.1	18	20.9	23*	25.8
Never	18	20.7	34	39.5	38	42.7
Total	87	100.0	86	100.0	89	100.0
(No data)	Missing = 2		Missing = 3			

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	(Missing)	Everyday	Some days	Never	Baseline Total
(Missing)	0	1	0	1	2
Everyday	1	29	8	10	48
Some days	2	4	7	8	21
Never	0	0	3	15	18
November Total	3	34	18	34	89

Post-Intervention Percent Change: 38% (26 of 69) decreased frequency.
(7 increased frequency)

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of wearing work shoes home (Figure 9.17) *(con't:)*

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Everyday	Some days	Never	Baseline Total
(Missing)	0	1	1	2
Everyday	20	11	17	48
Some days	7	9	5	21
Never	1	2	15	18
Summer Total	28	23	38	89

Final Follow-up Percent Change: 48% (33 of 69) decreased frequency.
(10 increased frequency)

* NOTE: In Summer we asked additional question, "If wore shoes home, did you change before entering home?". 34 of those who wore clothes home every/some days said 'yes'.

Employer ensuring that water, soap, and towels are available (Figure 9.18)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Employers	Percent	# Employers	Percent	# Employers	Percent
Everyday	8	38.1	7	33.3	9	42.9
Some days	9	42.9	13	61.9	12	57.1
Never	4	19.0	1	4.8	0	0.0
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Everyday	Some days	Never	Baseline Total
Everyday	4	3	1	8
Some days	3	6	0	9
Never	0	4	0	4
November Total	7	13	1	21

Post-Intervention Percent Change: 54% (7 of 13) increased availability.
(4 decreased availability)

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Everyday	Some days	Never	Baseline Total
Everyday	4	4	0	8
Some days	4	5	0	9
Never	1	3	0	4
Summer Total	9	12	0	21

Final Follow-up Percent Change: 62% (8 of 13) increased availability.
(4 decreased availability)

* NOTE: Baseline asked: 'Wash facility including water, soap, towels...'.

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of washing before eating (Figure 9.19)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Workers	Percent	# Workers	Percent	# Workers	Percent
Everyday	52	68.4	63	80.8	73	90.1
Some days	19	25.0	12	15.4	8	9.9
Never	5	6.6	3	3.8	0	0.0
Total	76	100.0	78	100.0	81	100.0
(No data)	No washing provisions available = 12; Missing = 1		No washing provisions available = 11		No washing provisions available = 7; Missing = 1	

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	(No provisions/ missing)	Everyday	Some days	Never	Baseline Total
(No provisions/ missing)	5	6	1	1	13
Everyday	4	44	2	2	52
Some days	1	13	5	0	19
Never	1	0	4	0	5
November Total	11	63	12	3	89

Post-Intervention Percent Change: 67% (24 of 36) increased frequency.
(4 decreased frequency)

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of washing before eating (Figure 9.19) *(con't:)*

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	(No provisions/ missing)	Everyday	Some days	Never	Baseline Total
(No provisions/ missing)	4	9	0	0	13
Everyday	3	46	3	0	52
Some days	1	14	4	0	19
Never	0	4	1	0	5
Summer Total	8	73	8	0	89

Final Follow-up Percent Change: 78% (28 of 36) increased frequency.
(3 decreased frequency.)

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of washing before drinking (Figure 9.20)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Workers**	**Percent**	**# Workers**	**Percent**	**# Workers**	**Percent**
Everyday	28	36.8	37	47.4	41	50.0
Some days	36	47.4	32	41.0	37	45.1
Never	12	15.8	9	11.5	4	4.9
Total	76	100.0	78	100.0	82	100.0
(No data)	No washing provisions available = 12; Missing = 1		No washing provisions available = 11		No washing provisions available = 7	

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	(No provisions / missing)	Everyday	Some days	Never	Baseline Total
(No provisions /missing)	5	3	4	1	13
Everyday	2	20	5	1	28
Some days	2	13	16	5	36
Never	2	1	7	2	12
November Total	11	37	32	9	89

Post-Intervention Percent Change: 35% (21 of 60) increased frequency.
(11 decreased frequency)

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of washing before drinking (Figure 9.20) *(con't:)*

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	(No provisions)	Everyday	Some days	Never	Baseline Total
(No provisions /missing)	4	6	2	1	13
Everyday	0	18	9	1	28
Some days	3	13	19	1	36
Never	0	4	7	1	12
Summer Total	7	41	37	4	89

Final Follow-up Percent Change: 40% (24 of 60) increased frequency.
(11 decreased frequency.)

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of washing beore smoking at work *(among those who smoke at work, and have washing facilities available, only)* (Figure 9.21)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Workers**	**Percent**	**# Workers**	**Percent**	**# Workers**	**Percent**
Everyday	0		2		4	
Some days	4	28.6	5		5	
Never	10	71.4	5		3	
Total	14	100.0	14* *(1 quit; 1 no wash fac.)	100.0	14* *(2 quit)	100.0

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	(No provisions / quit)	Everyday	Some days	Never	Baseline Total
Some days	1	2	1	0	4
Never	1	0	4	5	10
November Total	2	2	5	5	14

Post-Intervention Percent Change: 50% improved (6 of 14 increased in frequency, and 1 quit smoking)

Response Changes Over Time (Baseline to Summer '95)

Baseline (down) vs. Summer (across)

	(Quit)	Everyday	Some days	Never	Baseline Total
Some days	1	1	2	0	4
Never	1	3	3	3	10
Summer Total	2	4	5	3	14

Final Follow-up Percent Change: 64% improved (7 of 14 increased in frequency, and 2 quit smoking)

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of washing before going home (Figure 9.22)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Workers**	**Percent**	**# Workers**	**Percent**	**# Workers**	**Percent**
Everyday	54	71.1	70	89.7	73	89.0
Some days	19	25.0	7	9.0	8	9.8
Never	3	3.9	1	1.3	1	1.2
Total	76	100.0	78	100.0	82	100.0
(No data)	No washing provisions available = 12; Missing = 1		No washing provisions available = 11		No washing provisions available = 7	

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	(No provisions / missing)	Everyday	Some days	Never	Baseline Total
(No provisions/ missing)	5	7	1	0	13
Everyday	5	46	2	1	54
Some days	1	15	3	0	19
Never	0	2	1	0	3
November Total	11	70	7	1	89

Post-Intervention Percent Change:

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of washing before going home (Figure 9.22) *(con't:)*

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	(No provisions)	Everyday	Some days	Never	Baseline Total
(No provisions/ missing)	4	7	1	1	13
Everyday	2	49	3	0	54
Some days	1	15	3	0	19
Never	0	2	1	0	3
Summer Total	7	73	8	1	89

Final Follow-up Percent Change: 76% (26 of 34) increased frequency.
(3 decreased frequency.)

NOTE: Shaded boxes indicate improvement of target population.

Employer prohibition of eating, drinking, smoking and other tobacco use in the work area (Figure 9.23)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Employers	Percent	# Employers	Percent	# Employers	Percent
Yes	4	19.0	17	81.0	13	61.9
No	17	81.0	4	19.0	8	38.1
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	Yes	No	Baseline Total
Yes	4	0	4
No	13	4	17
November Total	17	4	21

Post-Intervention Percent Change: 76% (13 of 17) prohibited all 4 activities by Nov.

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Yes	No	Baseline Total
Yes	3	1	4
No	10	7	17
Summer Total	13	8	21

Percent Change: 59% (10 of 17) prohibited all 4 activities by Summer.
(1 went from prohibiting all 4 activities to allowing at least 1)

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of eating in work area (Figure 9.24)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Workers**	**Percent**	**# Workers**	**Percent**	**# Workers**	**Percent**
Everyday	36	40.9	19	21.6	8	9.0
Some days	35	39.8	32	36.4	37	41.6
Never	17	19.3	37	42.0	44	49.4
Total	88	100.0	88	100.0	89	100.0
(No data)	Missing = 1		Missing = 1			

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	(Missing)	Everyday	Some days	Never	Baseline Total
(Missing)	0	0	0	1	1
Everyday	0	14	13	9	36
Some days	0	4	18	13	35
Never	1	1	1	14	17
November Total	1	19	32	37	89

Post-Intervention Percent Change: 49% (35 of 71) decreased frequency. (6 increased)

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Everyday	Some days	Never	Baseline Total
(Missing)	0	0	1	1
Everyday	5	15	16	36
Some days	2	20	13	35
Never	1	2	14	17
Summer Total	8	37	44	89

Percent Change: 62% (44 of 71) decreased frequency. (5 increased frequency.)

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of drinking in work area (Figure 9.25)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Workers**	**Percent**	**# Workers**	**Percent**	**# Workers**	**Percent**
Everyday	44	50.0	25	28.4	20	22.5
Some days	33	37.5	39	44.3	39	43.8
Never	11	12.5	24	27.3	30	33.7
Total	88	100.0	88	100.0	89	100.0
(No data)	Missing = 1		Missing = 1			

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	(Missing)	Everyday	Some days	Never	Baseline Total
(Missing)	0	0	0	1	1
Everyday	0	19	18	7	44
Some days	0	5	17	11	33
Never	1	1	4	5	11
November Total	1	25	39	24	89

Post-Intervention Percent Change: 47% (36 of 77) decreased frequency (10 increased)

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Everyday	Some days	Never	Baseline Total
(Missing)	0	0	1	1
Everyday	14	16	14	44
Some days	5	20	8	33
Never	1	3	7	11
Summer Total	20	39	30	89

Final Follow-up Percent Change: 49% (38 of 77) decreased frequency. (9 increased)

NOTE: Shaded boxes indicate improvement of target population.

Worker frequency of smoking in work area (Figure 9.26)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Workers	Percent	# Workers	Percent	# Workers	Percent
Everyday						
Some days						
Never						
Total						

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Every day	Some days	Never	Non-User	Baseline Total
(Missing)	0	0	1	0	1
Every day	12	2	0	1	15
Some days	0	3	0	0	3
Never	1	0	5	0	6
November Total	13	5	6	1	25

Post-Intervention Percent Change: 17% (3 of 18) decreased frequency. (1 quit; 1 increased)

Response Changes Over Time (Baseline to Summer '95)

Baseline (down) vs. Summer (across)

	Everyday	Some days	Never	Non-User	Baseline Total
(Missing)	0	1	0	0	1
Everyday	7	3	3	2	15
Some days	0	1	1	1	3
Never	0	0	4	2	6
Summer Total	7	5	8	5	25

Final Follow-up Percent Change: 56% (10 of 18) decreased frequency. (3 quit smoking)

NOTE: Shaded boxes indicate improvement of target population. *Appendix 22-29)*

Employer use of dry sweeping (Figure 9.27)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	19	90.5	5	23.8
Sometimes	2	9.5	14	66.7
Never	0	0.0	2	9.5
Total	21	100.0	21	100.0

Response Changes Over Time (Before study to Currently)

Before study (down) vs. Currently (across)

	Often	Sometimes	Never	Before study Total
Often	5	12	2	19
Sometimes	0	2	0	2
Never	0	0	0	0
Currently Total	5	14	2	21

Post-Intervention Percent Change: 67% (14 of 21) decreased use.

NOTE: Shaded boxes indicate improvement of target population.

Worker use of dry sweeping (Figure 9.28)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Workers**	**Percent**	**# Workers**	**Percent**
Often	65	74.7	34	39.1
Sometimes	20	23.0	37	42.5
Never	2	2.3	15	17.2
Task not done	0	0.0	1	1.1
Total	87	100.0	87	100.0
(No data)	Missing = 2		Missing = 2	

Response Changes Over Time (Before study to Currently)

Before study (down) vs. Currently (across)

	(Missing)	Often	Sometimes	Never	Task not done	Before study Total
(Missing)	2	0	0	0	0	2
Often	0	31	24	10	0	65
Sometimes	0	3	13	3	1	20
Never	0	0	0	2	0	2
Currently Total	2	34	37	15	1	89

Percent Change: 44% (37 of 85) decreased use. (3 increased use.)

NOTE: Shaded boxes indicate improvement of target population.

Employer use of misting before sweeping (Figure 9.29)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	# Employers	Percent	# Employers	Percent
Often	2	9.5	9	42.9
Sometimes	5	23.8	11	52.4
Never	14	66.7	1	4.8
Total	21	100.0	21	100.0

Response Changes Over Time (Before study to Currently)
Before study (down) vs. Currently (across)

	Often	Sometimes	Never	Before study Total
Often	1	1	0	2
Sometimes	3	2	0	5
Never	5	8	1	14
Currently Total	9	11	1	21

Final Follow-up Percent Change: 84% (16 of 19) increased use. (1 decreased use)

NOTE: Shaded boxes indicate improvement of target population.

Worker use of misting before sweeping (Figure 9.30)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Workers**	**Percent**	**# Workers**	**Percent**
Often	6	6.9	30	34.5
Sometimes	27	31.0	34	39.1
Never	54	62.1	23	26.4
Total	87	100.0	87	100.0
(No data)	Missing = 2		Missing = 2	

Response Changes Over Time (Before study to Currently)

Before study (down) vs. Currently (across)

	(Missing)	Often	Sometimes	Never	Before study Total
(Missing)	2	0	0	0	2
Often	0	5	1	0	6
Sometimes	0	9	15	3	27
Never	0	16	18	20	54
Currently Total	2	30	34	23	89

Final Follow-up Percent Change: 53% (43 of 81) increased use. (4 decreased use.)

NOTE: Shaded boxes indicate improvement of target population.

Employer use of HEPA vacuum for cleanup (Figure 9.31)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	0	0.0	3	14.3	6	28.6
Sometimes	1	4.8	4	19.0	7	33.3
Never	20	95.2	14	66.7	8	38.1
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)

Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	0	0	0	0
Sometimes	1	0	0	1
Never	2	4	14	20
November Total	3	4	14	21

Post-Intervention Percent Change: 33% (7 of 21) increased use.

Response Changes Over Time (Baseline to Summer)

Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	0	0	0	0
Sometimes	1	0	0	1
Never	5	7	8	20
Summer Total	6	7	8	21

Final Follow-up Percent Change: 62% (13 of 21) increased use.

NOTE: Shaded boxes indicate improvement of target population.

Employer use of reusable tarps on interior floors (Figure 9.32)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	15	71.4	11	52.4	6	28.6
Sometimes	5	23.8	8	38.1	13	61.9
Never	1	4.8	2	9.5	2	9.5
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	9	5	1	15
Sometimes	2	2	1	5
Never	0	1	0	1
November Total	11	8	2	21

Post-Intervention Percent Change: 35% (7 of 20) decreased use. (3 increased use)

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	5	9	1	15
Sometimes	1	3	1	5
Never	0	1	0	1
Summer Total	6	13	2	21

Final Follow-up Percent Change: 55% (11 of 20) decreased use. (2 increased use)

NOTE: Shaded boxes indicate improvement of target population.

Employer use of plastic sheeting on interior floors (Figure 9.33)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Employers	Percent	# Employers	Percent	# Employers	Percent
Often	8	38.1	13	61.9	13	61.9
Sometimes	9	42.9	8	38.1	6	28.6
Never	4	19.0	0	0.0	2	9.5
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	7	1	0	8
Sometimes	4	5	0	9
Never	2	2	0	4
November Total	13	8	0	21

Post-Intervention Percent Change: 62% (8 of 13) increased use. (1 decreased use)

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	8	0	0	8
Sometimes	2	5	2	9
Never	3	1	0	4
Summer Total	13	6	2	21

Final Follow-up Percent Change: 46% (6 of 13) increased use. (2 decreased use)

NOTE: Shaded boxes indicate improvement of target population.

Employer use of a containment material on scaffolding (Figure 9.34)

Response Totals at 3 Points in Time

	Baseline June 1994		Final Nov. 1994		Summer June/July 1995	
Response	# Employers	Percent	# Employers	Percent	# Employers	Percent
Often	4	19.0	6	28.6	10	47.6
Sometimes	11	52.4	11	52.4	4	19.0
Never	6	28.6	4	19.0	7	33.3
Total	21	100.0	21	100.0	21	100.0

Response Changes Over Time (Baseline to November)
Baseline (down) vs. November (across)

	Often	Sometimes	Never	Baseline Total
Often	2	1	1	4
Sometimes	4	6	1	11
Never	0	4	2	6
November Total	6	11	4	21

Post-Intervention Percent Change: 47% (8 of 17) increased use. (3 decreased use)

Response Changes Over Time (Baseline to Summer)
Baseline (down) vs. Summer '95 (across)

	Often	Sometimes	Never	Baseline Total
Often	3	0	1	4
Sometimes	5	3	3	11
Never	2	1	3	6
Summer Total	10	4	7	21

Final Follow-up Percent Change: 47% (8 of 17) increased use. (4 decreased use)

NOTE: Shaded boxes indicate improvement of target population.

Employer use of plastic to seal rooms during interior surface preparation (Figure 9.35)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	# Employers	Percent	# Employers	Percent
Often	4	19.0	10	50.0
Sometimes	11	52.4	9	45.0
Never	6	28.6	1	5.0
Total	21	100.0	20	100.0
			Task not done = 1	

Response Changes Over Time (Before study to Currently)

Before study (down) vs. Currently (across)

	Task not done	Often	Sometimes	Never	Before study Total
Often	0	4	0	0	4
Sometimes	0	4	7	0	11
Never	1	2	2	1	6
Currently Total	1	10	9	1	21

Final Follow-up Percent Change: 47% (8 of 17) increased use.
(1 went from 'never' to 'task not done: no interior work')

NOTE: Shaded boxes indicate improvement of target population.

Employer use of plastic to seal widows and doors during exterior surface preparation (Figure 9.36)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	1	4.8	8	38.1
Sometimes	7	33.3	11	52.4
Never	13	61.9	2	9.5
Total	21	100.0	21	100.0

Response Changes Over Time (Before study to Currently)

Before study (down) vs. Currently (across)

	Often	Sometimes	Never	Before study Total
Often	0	1	0	1
Sometimes	6	1	0	7
Never	2	9	2	13
Currently Total	8	11	2	21

Final Follow-up Percent Change: 85% (17 of 20) increased use. (1 decreased use)

NOTE: Shaded boxes indicate improvement of target population.

Employer use of tarps or plastic to contain paint chips / dust on exterior jobs (Figure 9.37)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	4	19.0	13	61.9
Sometimes	7	33.3	7	33.3
Never	10	47.6	1	4.8
Total	21	100.0	21	100.0

Response Changes Over Time (Before study to Currently)

Before study (down) vs. Currently (across)

	Often	**Sometimes**	**Never**	**Before study Total**
Often	3	1	0	4
Sometimes	4	3	0	7
Never	6	3	1	10
Currently Total	13	7	1	21

Final Follow-up Percent Change: 76% (13 of 17) increased use. (1 decreased use)

NOTE: Shaded boxes indicate improvement of target population.

Employer taking steps to prevent paint chips from entering drains or sewers (Figure 9.38)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	2	10.5	15	75.0
Sometimes	3	15.8	4	20.0
Never	14	73.7	1	5.0
Total	19	100.0	20	100.0
	Task not done = 2		Task not done = 1	

Response Changes Over Time (Before study to Currently)

Before study (down) vs. Currently (across)

	Task not done	Often	Sometimes	Never	Before study Total
Task not done	1	0	0	1	2
Often	0	2	0	0	2
Sometimes	0	3	0	0	3
Never	0	10	4	0	14
Currently Total	1	15	4	1	21

Final Follow-up Percent Change: 100% (17 of 17) increased use.
(1 went from 'task not done' to 'never')

What Steps Were Taken to Prevent Pb Chips from Entering Drains/Sewers

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**
Screen/filter	1	25.0	15	78.9
Divert water	0	0.0	3	15.8
Sweep up chips	3	75.0	1	5.3
Total	4	100.0	19	100.0

NOTE: Shaded boxes indicate improvement of target population.

Employer taking steps to ensure that lead waste is disposed of at a licensed facility (Figure 9.39)

Response Totals at 2 Points in Time

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**
Often	1	4.8	13	61.9
Sometimes	3	14.3	3	14.3
Never	17	81.0	5	23.8
Total	21	100.0	21	100.0

Response Changes Over Time (Before study to Currently)
Before study (down) vs. Currently (across)

	Often	Sometimes	Never	Before study Total
Often	1	0	0	1
Sometimes	2	1	0	3
Never	10	2	5	17
Currently Total	13	3	5	21

Final Follow-up Percent Change: 70% (14 of 20) increased use.

What Steps Were Taken to Ensure Pb Waste Disposed of at Licensed Facility

	Before study (before June 1994)		Currently (June/July 1995)	
Response	**# Employers**	**Percent**	**# Employers**	**Percent**
Leave with owner	0	0.0	6	37.5
Take to haz waste facility	0	0.0	5	31.3
Haz waste hauler	3	75.0	2	12.5
VSQG program	1	25.0	2	12.5
Lv w/ owner &Take to facility	0	0.0	1	6.3
Total	4	100.0	16	100.0

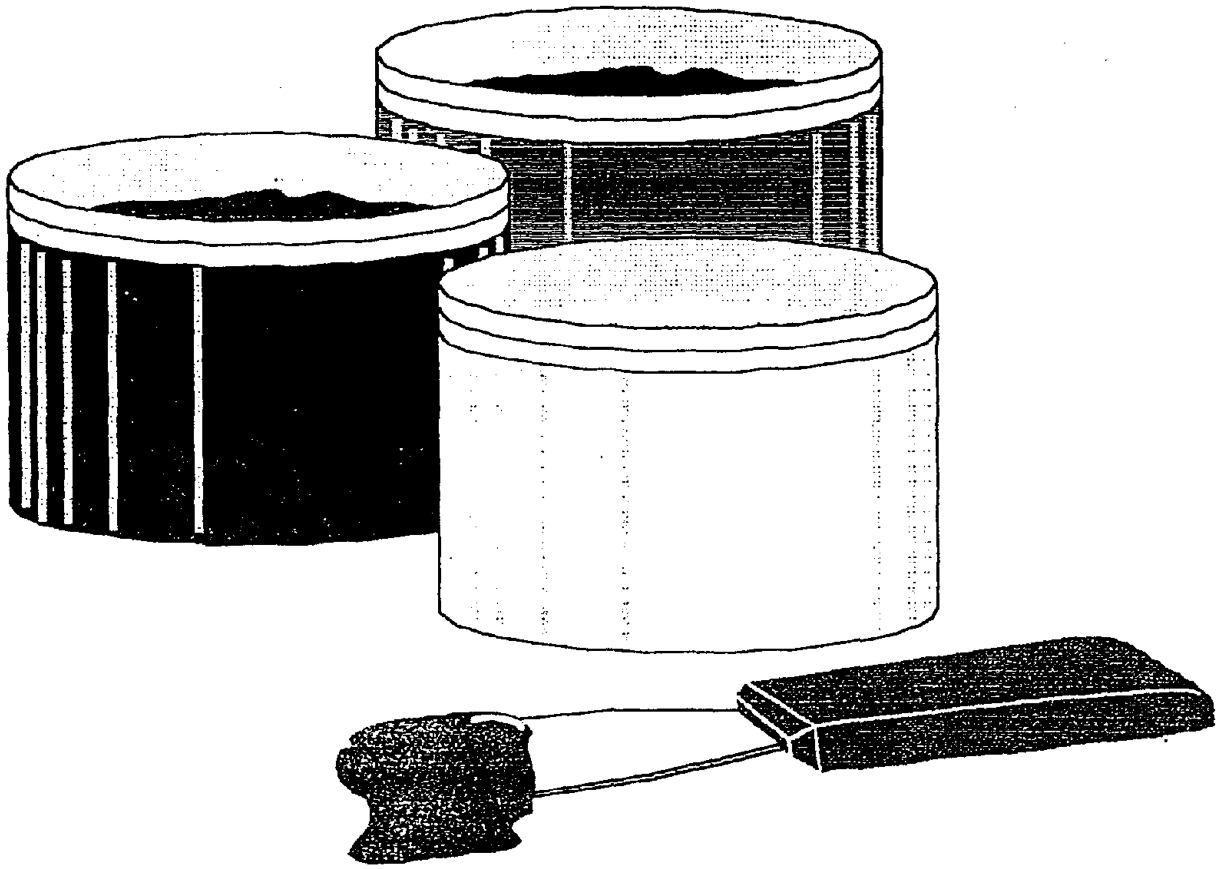
NOTE: Shaded boxes indicate improvement of target population.

APPENDIX 23

Focus Group Report

OCCUPATIONAL LEAD POISONING PREVENTION PROJECT

CALIFORNIA PAINTERS PROJECT



FOCUS GROUP REPORT:
A DISCUSSION WITH PAINTING CONTRACTORS

Objectives, discussion and conclusions
from
focus groups conducted on March 21, 1995

INTRODUCTION

On March 21, 1995, two focus groups were simultaneously conducted with painting contractors who participated in the California Painters Project (CPP).

This three-year research project was conceived, designed, and implemented by the Occupational Lead Poisoning Prevention Project of the California State Department of Health Services.

The focus groups were conducted in order to gather qualitative data as part of the evaluation component of the project.

Following are the objectives, discussion and conclusions derived from the focus group interactions.

OBJECTIVES

The primary objectives of the focus groups were to identify:

- Factors that initially influenced the painting contractors to participate in the CPP;
- Motivations for staying involved with the project;
- Factors that helped the painting contractors make changes to improve lead safety;
- Obstacles encountered by the painting contractors in trying to improve lead safety;
- How project participation affected the painting contractors' approach to carrying out their business; and
- Specific changes that would make the project more effective.

DISCUSSION

FACTORS THAT INITIALLY INFLUENCED THE PAINTING CONTRACTORS TO PARTICIPATE IN THE CPP

A number of factors were mentioned by the painting contractors as influential in their decision to participate in the California Painters Project (CPP). The factors most commonly cited were previous personal experience with lead and/or asbestos, project recruiting procedure, the free/low cost services offered by the project, the desire to get educated, the opportunity to interact and learn with peers, and concern about liability.

Previous personal experience with lead and/or asbestos

A number of statements were made about either a family member or friend who was affected by exposure to lead, and this influenced the contractor to want to get involved with the CPP:

> *When I first started in San Francisco, I worked for a company that did a lot of burning. One of the employees had severe lead poisoning. He happened to be one of the guys I worked with a lot. So, I knew a lot about how to get over lead poisoning and using medication.*

> *My son was born in '91 and he had not a very high level of lead, but the level he had caused an impairment. He was tested at eight months, and he obviously got it at home - where we brought it home. So, it made me aware and we had very good housekeeping practices, so I was appointed to enlighten the rest of our employees.*

The devasting affect of asbestos on this painting contractor's family member influenced his decision to participate in the CPP:

> *In general, I started looking at health issues in construction after my father died from asbestos. And it scared me - how deadly that stuff turned out to be. And, I wasn't really sure about what. And I had the kids, and I read through various periodicals and stuff like that, about bringing lead back into the house, and was already looking at how to change my overall system before I'd come on in (to the CPP.) So, that got me thinking about it, too. Because I sure as hell did not want to be contaminating my own family. And then just the whole move about revamping the paints in general, never mind lead, but mercury and arsenic, and whatever else is in there, is all getting pulled back because of the ...regulations,*

started turning me towards looking at what painting has been doing to us all of these years. Suddenly, lead became the biggest issue out of all of them.

Project recruiting procedure

Many comments reflected the opinion that the project presented itself in a professional, open-minded manner, which seemed to instill trust in a number of contractors, thus influencing their decision to participate. According to some contractors:

> *.......they (CPP) were presenting themselves fairly professionally. It was done at a better level than some of the other things I had talked to people about. It wasn't slanted towards insurance policy. It wasn't slanted towards product. It wasn't slanted towards buy this, it will cure everything. It was no cure-all disease. It was just a fact-finding expedition instead of trying to sell you something. Everybody else has an angle on the sales and it didn't come across (as) that. I felt real comfortable that I wasn't being sold a bill of goods, that there was something I had to buy at the end of the procedure. It was independent. That is what really sold me.*

> *Like (NAME) said, they (CPP) weren't trying to sell you something like a class. There was no effort to try to sell me something.*

> *It was a surprise to find that they (CPP) were not narrow-minded bureaucrats who were just going to lay down a bunch of regulations and we were going to conform to them. It was much more open discussion...*

The fact that the project solicited feedback from the painting contractors was quite influential for some in the decision to participate:

> *...they (CPP) were interested in our feedback, and creating something that was feasible rather than just laying down the law on what you have to do to conform.*

> *I was informed of this program as being a pilot program, and that I would be able to give some input into it in terms of opinions and they were willing to listen to us as contractors before they were going to write this whole spec, as far as I understood. So, I wanted to have an opportunity to be right there to see if I could in any way help out from the contractor's point of view.*

One contractor explained that his interest in the project stemmed from the fact that it was research-based:

> *The reason I'm here is the research, because I think that if you have good data, because there is no data for painters in CA ... So if there is good data here in CA, hopefully, the laws as I understand them will change as the statistics change related to what's going on out there. (The goal is)...to help get the regulations closer to reality.*

Free/low cost services offered by the project

The project offered a number of services to painting contractors, such as blood lead level testing, air monitoring, certification, and training for employees in a variety of languages, all of which were seen as incentives for participating in the project. The fact that these services were offered at low or no cost was 'a big carrot', as one contractor put it, and influenced many to participate:

> *Well, they did pay for the initial blood testing. I was able to run quite a few employees through them.*
>
> *You also get air monitoring free as well - a big savings.*
>
> *The clincher was the certification. It was a way to get certified without going to expensive classes.*
>
> *I was frustrated because although I had my people in compliance, doing blood tests and all the other stuff, I couldn't get any trained in Spanish. And this would also be a great opportunity to get training in Spanish for my employees. Very difficult to come by, otherwise.*
>
> *...this seemed like a cost-effective method to get with the flow...*
>
> *That was a big carrot, that it was relatively low cost. It was going to happen anyway, and this was a way for us to get it at a much lower price than we should have had to pay.*

Desire to get educated

One of the recurring themes in response to the question, "*What initially influenced you to participate in this project?*" was the desire to get educated. Many comments focused on wanting to learn more about how lead affects health and safety:

> *My lack of knowledge in the dangers of lead is what I'm interested in.*
>
> *I wanted to find out what the safety factors are and how to protect the men as far as how serious this lead was.*
>
> *We knew the whole city is nothing but lead. So, I just wanted to see how serious it was, and for all of my employees of 25 and 30 years, how much have they absorbed.*

As suggested in the quotes above, some statements centered on wanting to educate oneself so as to learn how to protect oneself and one's employees:

> *(I wanted to know) what it has done to me for the last 20 years. Have I ruined my health? And, then, how to protect myself and my employees?*

I, initially, was generally curious about lead. I didn't know as much as I'd like to know, and I've been involved in the industry working with lead myself for 18 years. I wanted to know what kind of damage I might have done to myself or people that have worked for me up to this point.

The main thing that made me come over to the project is that Chinese (workers) don't know how dangerous it (lead) is. So, that is why I've come here to know how dangerous it can be, and then I can explain it to them.

A few comments reflected an interest in learning more about procedures, rules and regulations:

I guess I look at it as a new exposure to procedures that we didn't know about. We've been through the asbestos bit, and we could see that this is the way that we wanted to go...then we got into it, what was my responsibility as an owner to the people I had hired...and in the course (of this) to educate myself and see how far I can carry the program into my workforce.

I wanted to educate myself and see how far these (rules/regulations) would go. So I joined this project to find what it is we're going to do, lead tests and other tests and what have you.

Still other comments had to do with a general desire for more information:

Before the project began, I was teaching...for various organizations and colleges,...so I looked at it as an opportunity to pick up information where very few scientific-type experiments have been done. It is all medical work that's pivotal in lead stuff, cancer ... So, this is a great opportunity to find out about stuff in a rational fashion, what the levels are, what happens to painters.

Well, I was also curious. I knew that I could gather information here quite quickly and relatively easy that would otherwise take me a hell of a lot of research to figure out.

Opportunity to interact and learn with peers

A few of the contractors mentioned their interest in interacting with their peers as influential in deciding to participate in the project:

I got into it to meet other painting contractors...

Why we got involved is because I was aware that there was going to be a bigger problem. And it gave me an opportunity to be on the frontier and learn about it with a group of our own peers.

Concern about liability

A number of comments were made reflecting a concern about liability. Participation in the CPP was seen as an opportunity to learn how to be in compliance with current regulations, thus avoiding lawsuits. According to some contractors:

The liability issue is important.

What influenced me was getting informed that Cal/OSHA had deadlines as far as putting safety programs into action, and you (CPP) had implemented something for us to be grandfathered into the lead paint accreditation program. That influenced me a lot.

(I wanted to know) just how to comply to the lead guidelines.

Well, I was just bowing to the inevitable, I think. I mean, we all knew the regulations were tightening up,...and (I wanted to) get a little bit ahead of the way, perhaps.

I didn't want to be caught behind either, figuring that if its all going to be turning around towards the general lead prevention for us contractors, I wanted to be out there in front with everybody else.

I was under the misguided thought that I would be able to learn how to protect myself from certain liability. That's what clinched it. It's the liability angle and I was concerned about myself and the guys I work with. It's the legal liability and ...that is why I'm here.

MOTIVATIONS FOR STAYING INVOLVED WITH THE PROJECT

The reasons given for staying involved with the California Painters Project closely parallel the factors mentioned which initially influenced painting contractors to participate in the project. They include the availability of information and services, the desire to be in compliance with regulations, interaction with peers, and the opportunity to influence policy.

Availability of information and services

Many of the same services which contractors mentioned as incentives for joining the project were also cited as motivations for staying involved with the project. These services include blood lead level testing, air monitoring, and training on lead health and safety issues:

> *I think it was the information with regard to blood lead level testing and on-site programs ...The ease of, and availability of stuff like that, rather than having to go find a forensic pathologist to do lead tests ...That to me was very good. It motivated me to stay.*
>
> *...working with (the) UC medical system on the blood lead level testing.*
>
> *To know about the hazards, to know about how to avoid the hazards and have safe conditions for yourself, your workers, it (participating in the project) just gives you inside information on how to handle certain situations.*
>
> *I did not really know what hazards were presented (by exposure to lead). So, a lot of it is out of curiosity.*

A few statements focused on interest in the project's research findings and materials developed by the project:

> *(I was interested in) the results of the findings over the last six months. I know they were doing up some brochures and we are eager to see that.*
>
> *This is the payoff. This is when they tell us what is happening out there - we get an overview. Something we could never get on our own. An overview of what's happening with lead and painters in San Francisco.*

Paraphrasing one contractor who appreciated the project for setting up the medical monitoring program:

> *(Certainly the blood lead and the monitoring were a draw. It was a practical package. It (CPP) did actually set a lot of this stuff up, setting up the medical monitoring program for employees. So instead of having to set it all up ourselves,*

a fair bit of it was handled. We did pay for it ourselves, but it was very reasonable.)

This contractor was motivated to stay involved in the project not only because of free air monitoring, but also because of the legitimacy of the research being conducted:

I was different from everybody else in that I was in compliance, and had been through the same course as (NAME) in 1992. I didn't come into this blind-sided. All the other things applied, I got to keep the free air monitoring. And this is the only large-scale project that I am aware of in all of the U.S. where they have done a real study, a legal study.

Desire to be in compliance with regulations

Some statements reflected an awareness that new regulations were about to take effect, and this motivated a number of painting contractors to stay involved with the project. Paraphrasing one contractor:

(They (CPP) were offering to grandfather the participants into the new "regime" and that offered us an incentive. There was an understanding that the time invested would have some return. I thought they did a good job.)

...I decided that we should get involved because I knew that the laws were changing...

...and wanting to know exactly what are the potential liabilities.

This contractor was motivated to stay involved so as to be able to be in compliance with Cal/OSHA regulations:

...So if I have something like this (air monitoring) and Cal/OSHA comes a long and asks if I have a safety program, I can say "Yes, I've got this, and I've had air monitoring done and I'm not exposing my workers to a lead level that you say is dangerous to them." So, to me that was a big motivational factor.

Interaction with peers

The opportunity to network and interact with peers was also cited as a motivator for staying involved with the project:

I liked the inter-exchange. I've sat at a lot of regulatory meetings and a lot of time there are no contractors there. So whenever I get a chance to talk like this, with other contractors providing different perceptions, it makes it more realistic. We all work at different levels, we all do different things, everyone has something new to say.

(...I liked) the networking aspect, the exchange with other contractors ... I must admit you couldn't beat the price and you get group purchasing.

Opportunity to influence policy

A number of comments reflected a desire to influence policy so that all contractors would be on equal status with each other. Essentially, this is a self-protective mechanism, as explained here, and motivated contractors to stay involved with the project:

> *It's more to protect my own, to make sure that I am on an equal status with all other contractors. If we have to conform, have a safety program, possibly/probably charge more because we are doing more, and others don't have those expenses, then we obviously are going to be at a disadvantage. So, we may have some influence in seeing that that doesn't happen.*
>
> *I'd like to see all of the contractors have to conform. I don't want laws and rules that we can't live by, but I want something that is set so that everybody has to abide by(them).*
>
> *To have some influence, if that is possible. A program which would not put us at a disadvantage so that ...we are going to be charging more and probably not getting half the jobs because people will see us and declare, "Here comes trouble, let's get somebody whose not going to lay this stuff on us." So, that is what attracted me ... to make sure that everybody be certified as we are.*

FACTORS THAT HELPED THE PAINTING CONTRACTORS MAKE CHANGES TO IMPROVE LEAD SAFETY

Focus group participants identified several aspects of the project that helped contractors make changes to improve lead safety. The trainings themselves (also referred to as seminars), along with specific aspects of the training, were cited repeatedly as an important contributing factor to making changes. Other factors mentioned included specific project components, such as blood level testing, air monitoring, and the manual; and factors not directly related to the project, such as networking and concerns about liability.

The trainings

Several comments indicated that as a result of the trainings, business opportunities improved for the painting contractors:

> *I have been getting work painting because of the lead abatements I can do, and I have sold jobs because of the lead abatement aspect of it.*
>
> *Where you can, they should make lead work to your advantage and you can make some money off it. We did one job where we had to remove lead and that was an automatic changeover, so that helped us. We had the education to go ahead and tell them to get tested, and be able to say yes, this is lead contaminated.*
>
> *In our company, we actually got a couple of jobs because of the lead problem. ... Besides, for the regular paint job, we can almost get a third to half more (money) just to contain it and do it safely.*

Participation in the trainings facilitated learning about lead safety for both contractors and their employees, leading to increased awareness and changes in practices:

> *Learning about all the types of equipment to use and where, what sorts of measures you can take for protecting an area, be it outside or inside, just the overall program made me much more aware of the lead hazards.*
>
> *... the education is the biggest part. Knowing the blood levels, knowing all that, knowing what that means. Respirators, lead checks, it's hard to pinpoint any specific thing... I'm not an expert in it by any means, but at least I know what I'm talking about. And there are a lot of people that are very interested in the situation... But I feel the same - that my guys have a stake, not only in their own health, but they have a stake in my organization and they are looking to protect themselves as well as me, and even the clients.*

A lot of the safety, to me, was just common sense. We had a lot of heavy prep, we always put down plastic over carpeting anyway, now we just do it all the time. It's easier to clean up at the end of the day. And you don't get blamed for someone's carpeting having a paint swatch on it. So, the lead course has made us be safer.

One thing that actually influenced what we were doing on the job was starting to really realize (as a result of the training) that we were leaving a lot of contamination behind. Up until now we were leaving lead contamination all over the place.

The project motivated me to really document. They brought in people to talk to us about it.

One participant stated an appreciation for the training because it 'legitimized' the operation of his business. For another, the training conveyed a cost-effective way to be lead safe:

I'm happy to come into compliance legally as I was always scared of third-party lawsuits coming at me and I don't want to be thrashing around out there in terms of regulations. And the training itself basically enabled me to try my business legally and protect my own people.

It is something I could live with knowing it's not going to cost me a lot of money on the job site.

<u>Specific aspects of the training</u>

The fact that employees were required to undergo training, and the effectiveness of that training, were important factors to some participants:

Each of my employees had to go through a training program, and some of them have been through it before... that brought up the awareness of what they are doing, awareness of the hazards, awareness of some common sense things. I don't have to institute more costly measures to reduce the lead. There are things they can do on their own. I'm talking about the personal hygiene stuff... Give them respirators, they have to know how to use them and take care of them. Everything, all kind of filters, down to personal hygiene and good common sense. I think that right there helps.

Because they (employees) were a part of it ... In order to get their paycheck they have to attend the safety meeting and this time they listened and really took it in and apply it.

The most crucial change for us has been that my painters got the message where previously I had been lecturing them with my limited knowledge, and they didn't really follow through on. But once they were educated and trained by someone else, they listened and changed their ways a lot more easily. And they continued after the training. By getting trained outside of the company seemed to carry more weight with them.

My employees now know the ground rules. It makes it easier to get done and to keep things done the same way so that they don't lapse back into the easy old patterns.

The communication skills of the training staff played a role in the success of the trainings, according to a number of comments:

(Instructors) deserve a lot of credit. Not only did they communicate well to the employers and contractors, they did a very good job in the training sessions with the employees as well. Several languages and I thought it was well done in that way. And it was not done in a condescending fashion, the communication was good.

In the training, you are shown very specific methods. Part of my fear was that it was going to be so complicated that I wouldn't be able to get this thing going, and they have slowly polished things so that it is not that complicated. If someone had just given me this manual and said this is what you have to do, I would have panicked and not done it. But we were introduced bit-by-bit and discussed each of these particular things so that it wasn't such a major thing.

Particularly helpful was the use of hands-on demonstrations:

The information I received from the seminars in regard to HEPA filters (helped me to improve lead safety). And you become aware that it is not that much more expensive to do a lead safe job as opposed to a job that is not lead safe.

I was impressed with ... demonstration of equipment and stuff.

Rather than just hearing respirator, I saw it.

(The demonstrations were) excellent. I would like to suggest that they have more of that. More practical, less theory.

Resources offered by the project, particularly the sanitary fill disposal program, were considered by one participant to be very important in changing employee practices in the buying and disposal of paint:

Another thing that I found fascinating was just the resources... The sanitary fill disposal program...was very beneficial. Now my painters, when they order paints, will not get me five gallons but get two. So it has made them more conscious about disposal and throwing cans out and all that sort of thing.

<u>Specific project components: BLL testing, air monitoring, manual</u>

The blood lead level (BLL) testing program, air monitoring, and manual were specific features of the project that were useful, according to the comments made by contractors.

BLL Testing

BLL measures were seen as particularly important in providing feedback regarding lead exposure, thus serving as a valuable indicator of the extent of lead safety on the job:

> *You get feedback on the lead tests so you see that the employees lead levels are not going up so we must be doing something right. So that keeps you going.*
>
> *My guys just didn't take much interest in what I told them (until) the first blood lead level test came back ...*
>
> *I had no idea where to go to get my men blood tested, and now I can call up any time and make a next-day appointment.*
>
> *We've kind of been operating in the dark for many years and it's been very instructive to find out what my employees' BLLs were and how they went up or down over the course of the season.*
>
> *The helpful side of it was getting the company oriented towards blood lead testing, getting everybody used to the idea. It also brought to workers a certain awareness of their personal hygiene that also became evident as the BLLS went down.*
>
> *I had one employee quit smoking because he realized how much dust he was ingesting through the cigarettes and handling cigarettes at his work station. So that was a real big plus.*
>
> *(Employees now say that) we have people looking out for our health and our welfare. They're testing our blood and looking at the results and they're acting proactively so it made a big difference.*

Air monitoring

The availability of quantitative data from air monitoring served to boost this contractor's claims that he operates safely:

> *One of the changes I've done and that we have done is air monitoring, we didn't do that before. It has really been a big boost. Ninety percent of the time we are under the PEL and I think it's much better than insurance. I can say to somebody that we worked on this job and the dust levels is at a tenth of the PEL - there is no way you can have me clean up your whole lawn because I have documentation that we didn't do anything and my employees weren't exposed. I just feel much better when I have the back-up results.*

Manual

While several comments indicated that the manual was too long, one participant described the manual as essential:

> *(The manual is) a bridge between us and the consumer. It's like "Hey, I have to do this. See here's the manual telling me all the things I have to do." I would like*

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OBSTACLES ENCOUNTERED BY THE PAINTING CONTRACTORS IN TRYING TO IMPROVE LEAD SAFETY

A number of obstacles encountered while trying to improve lead safety in their own businesses were discussed by the painting contractors. The obstacles mentioned tended to fall into the categories of meeting the lead standards, cost, the customer, lack of equipment, environmental factors, employee compliance, and record-keeping.

Meeting the lead standards

A great deal of concern and uncertainty was expressed both about legal liability and meeting government standards. Many of the contractors' comments reflected fear that they may be found liable for not being in compliance with the standards. According to some painting contractors:

> *(There is) the uncertainty of the legal liability. Who knows if there is going to be a bunch of lawyers who think this is going to be a great way to make money and start stirring the whole thing up? You might be the one who is singled out.*
>
> *You can be more exposed because your employees now know enough to maybe toddle off to a lawyer.*

There were also a number of comments expressing confusion about the standards, as exemplified in the following statements:

> *There is no clear standard. That's the thing. There is nothing that says, "This is what you need. This will make it safe. This is what it's going to cost."*
>
> *...It's very, very difficult in many cases to comply with so many different structures that we have....*
>
> *The whole law is so unclear.*
>
> *...it seems impossible to really meet the standards. You know that you are going to break the law, its just a matter of how much you are going to break it by.... If I had lead chips on a piece of plastic, and roll up the piece of plastic, that becomes part of the lead chips and then it becomes a small percentage of lead you can just throw in the dump. Or do you pick up the lead chips and it becomes hazardous waste, you get an EPA number and they follow you around for the rest of your life?*

Some resentment was expressed about regulations concerning the disposal of hazardous waste:

> *Of all the peripheral industries around this thing, peripheral to us, the hazardous waste collectors, they are just drooling. Standing outside our doors: "You guys gotta get rid of this stuff, and you can't do it. We have to do it for you, and we have to haul it for you."*
>
> *I think that all of the hazardous materials, we should be able to drop it off free. Why should we have to pay for it?*

Cost

A number of comments focused on cost as an obstacle in trying to improve lead safety. The cost of hazardous waste disposal, as suggested in the above comment, was of concern to this contractor as well:

> *I take a lot of paint off commercial buildings and I have barrels of this stuff in my shop now. It cost me $2,500 last month to get rid of barrels. Before, if it was paint chips, if it was dry, I put it in a dumpster or just hauled it away. Now I've got this hazardous waste, and its another cost factor....*

Some concern was expressed about correctly estimating the cost of a job so that accurate bids are made:

> *....when my estimators are out estimating a job , what do we do, we have to power wash, it's insane. Do we put plastic up to contain the water? Do they put a filter on the drain to collect the paint chips? If it's windy do they put a containment up? We have to put that in the bid, so it's always having enough forethought to put these factors in, then just put your price out there and hope you get the job. It's really tough, and I don't know how to resolve it.*

One contractor complained about the ongoing costs of blood lead level testing:

> *...the only part that bothers me a lot is having to test my employees every six months and running into the doctors....it's just going to be an added expense that can go on forever.*

Insurance was also mentioned as a cost obstacle. As this contractor put it:

> *The other thing is insurance. I can still do the work but I'm still trying to position - I don't know if I am employee protected. It seems as there are so many different groundrules out there, and the laws are not enforced yet. So it's hard to gauge how to attack.*

The customer

Dealing with customers was seen as a real obstacle to improving lead safety. There were many statements made by the painting contractors about the difficulty of communicating with clients, customers, and neighbors around the issue of lead and lead removal:

> *The most difficult thing I'm having is convincing people (customers, neighbors) of the danger of lead with house painting, like everybody else.*
>
> *One of the obstacles is dealing with the ignorance overall .....with the general public. And then sit down and having to educate them yourself. I think for us it is difficult to approach the lead issue. I just as soon figure out a price for the job, tell them that we have lead safety, and don't make it a big issue and follow the proper procedure. I don't feel comfortable bringing up the issue.*

Some painting contractors also discussed their perceptions of customer concern with cost, which they see as an obstacle to doing their job in a lead-safe way, and to selling a job:

> *People don't care. They haven't been sensitized to it. (This contractor goes on to suggest that customers are adverse to doing the right thing because it's going to cost money. 'You have to downplay it, tell them it's not a big deal, it's not going to cost you a lot more money. You have to soft pedal it or you're not going to sell it.')*
>
> *We just did a job recently .... and I asked how long ago it was painted. She said in 1965 .....We knew it was lead, and told her how we were going to prepare the house, and she was not interested.......Her only concern was 'more money.'*

Another concern expressed was that bringing up lead is a red flag to customers because of the customer's fear of regulations:

> *...they are afraid of regulations. They think you are going to bring in inspectors they have never heard about who'll start tinkering around with their building and give them lots of problems, so many of them don't want to hear about it.*

The conflict described by some contractors was, on the one hand, that they don't want to scare their customers away by discussing 'the lead problem' at great length, but on the other hand, they don't want to be held liable for non-disclosure of a potential problem.

One contractor explained the problem this way:

> *...I feel like I have a liability if I don't say somethiing in some fashion, so what I have been doing is writing in the contract ,'there is probably lead in this building, or if I test that there is lead, then we are going to take precautions', and put it in very vague and general terms and not make a big deal about it. I don't even speak about it with them, and just carry on and do what I have to do.*

Finally, some resentment was expressed, both toward the customer in general, with his or her perceived lack of responsibility in dealing with 'the lead problem', and toward regulations which hold the painting contractors solely accountable for handling lead on the job:

> *I think that as the OSHA law is written now, all the responsibility is on us. There is no doubt about it, there is no other way to read the law. The contractor must test, the contractor must protect the employees. The owner may not care if there is a problem there. Then, when there is a problem, that person will be the first one to sue me because we were supposed to know. That is their attitude. They have the attitude that it's not their problem, so why should they care about it. "It's your problem, I just want my building painted." They say to me, "It's your problem, you deal with it." And that is so misleading. It's not only wrong because it's their hazardous material I'm taking off, but it's also that they are not being a part of the process.*

Lack of equipment

A number of comments reflected frustration over the lack of adequate information about equipment, and the unavailability of the equipment itself:

> *(I'm interested in) product information, not theory, but actual practical aspects of how you do it, how you properly achieve it. It's not the expense of doing it. It's not that much more expensive to go out and buy those tools, but it's finding out how you get them.*

> *...the availability of HEPA equipment and attachments. I'm still kind of at a loss as far as that's concerned.*

> *We don't have equipment available at this time. I was talking to another contractor the other day and I was told that someone would be selling a machine that you put in the wall that takes all the paint off. It's about 20 or 30 thousand dollars. In San Francisco you work with a lot of Victorians. Even if you have the money to purchase the equipment you can't use it on Victorians.*

Environmental Factors

A few comments centered around environmental factors as obstacles to improving lead safety, albeit out of the realm of human control:

> *Obstacles, we have many. We are trying to minimize, the paint chips for example, on the water blasting, when you spray, when you remove all the loose paint. If you have a windy day, if you have a suspended scaffold, it's very difficult....You can have the respirators, you can have your men wear different clothing, but in San Francisco around 1 o'clock it's hot.*

Employee Compliance

The need to keep reminding workers about safety practices on the job was cited as an obstacle to improving lead safety. The need to be vigilant with employees was seen as so important by one contractor that he envisioned it as a full-time job:

> *It's almost enough work for another full-time employee. Just to do the supervision, go around to different jobs and make sure they are lead safe. It is almost to your advantage to have an employee, if you have enough work and jobs to do that, or assign one of your guys to that type of assignment.*

Recordkeeping

Recordkeeping, and the administrative aspects associated with it, was cited as an obstacle to improving lead safety according to this contractor:

> *I can deal with the lead jobs; I can't deal with the paperwork and keeping records for 20 years on each person.*

HOW PROJECT PARTICIPATION AFFECTED THE PAINTING CONTRACTORS' APPROACH TO CARRYING OUT THEIR BUSINESS

Focus group participants indicated several ways that the project has affected their approach to carrying out their business. Many of the comments revealed that contractors have improved their communication with customers and the way they market their business. Other comments indicate that the project has helped some contractors to better assess a potential job in terms of lead risks or evaluating the disposition of the customer. There have been changes regarding work approaches for and by employees. One respondent indicated that he now uses the project staff as an ongoing resource.

Improved communication with customers

Improved communication with customers included being more proactive and better able to convey information about low-cost procedures and general information about lead safety.

> *I'm certainly more proactive (about lead safety) in informing the clients.*
>
> *Even if ... there is lead on a job...I have found that it is not as costly as I thought.*

And, on the other hand,

> *I always tell them to sit down before I give them a price!*

One participant indicated that he is now more knowledgeable about lead and is able to inform other people on the job. When asked if he considered himself working as an educator, he responded, "*Yes, very much.*"

Improved marketing practices.

Many of the comments seem to indicate that contractors have improved their marketing practices or skills by participating in the project. This is especially true for marketing to commercial establishments:

> *It's helped a lot in the commercial field. We got a job several weeks ago because we knew about it (lead). I was able to tell the lady what I was involved in.*
>
> *Commercial is easier. You can mention lead in commercial, you can bring it up.*

I get a lot of business referrals. I advertise that I know how to do lead paint work. I advertise that I am willing to do lead abatement work. I don't go out and try to sell it as a business, so to speak, but I do let people know that I can do it and that it is not something that they have to go to someone else to get. Especially since I'm a painting contractor. So, I get a lot of referrals, and I pick-and-choose the work that I want. I've created a network.

Better able to assess potential jobs

As a result of participating in the project, several of the comments suggested that contractors are better able to assess whether or not they wish to take on a particular job due to the magnitude of lead hazards or because of customer factors:

If I were to look at a job and there was a school yard of children over here, there was a vegetable garden on the other side, I would just say "Good-bye."

For us, we are assessing our customers. We are looking at it a lot closer. We try to find out what they do, depending on how the conversation goes whether or not we really want the job; their occupation. You can usually tell if a client is going to be a pain in the ass from the start. (When asked if the project helped to assess the customer, the respondent replied,) *"It has opened our eyes a little more, to know who you are working with."*

It made me know what to look for in old houses.

...I'm on a job and I bid the job to do it a certain way, and once I'm there I find out that there is a lead hazard and I submit the change orders.

Change in practices for and by employees

Several comments indicated that the project has helped change workplace procedures for and by employees. One respondent has been able to formalize his medical program and respirator fit testing program for employees. Other comments were made regarding changes in employee practices:

We do physical exams and test them (employees). We hadn't been doing that. We make sure when we hire somebody there's not a potential Workers Compensation claim. I want to know more than ever (who) I'm hiring now.

Just hygiene, housecleaning. That was the big change for them (employees). They realized that there was a problem and they kept themselves cleaner, kept their environment cleaner.

(Employees) can tell a contractor where they think there might be lead contamination or might not be.

...And once your trained employees have changed their ways, it becomes embedded in the company culture and so new guys coming in conform ...

I think the most important thing is that we talk to the employees because regardless of whether they stay with the company or move on, at least they know ... So maybe the word will get around, and it will force the people who aren't going to be in compliance to change too as their employees start asking them questions.

<u>Access to additional resources</u>

One respondent indicated that as a result of the project he now has access to additional resources:

... the project has also helped because there is something else out there that you can now refer to....DHS (Department of Health Services) - they 're pretty serious about this. Talk to them and they have umpteen people who know about this (lead hazards).

SPECIFIC CHANGES THAT WOULD MAKE THE PROJECT MORE EFFECTIVE

Focus group participants suggested several modifications to the program. Most of the comments recommended ways to change the format of the training sessions, including the order of instruction, the methods used, and how discussions were facilitated. Additions and changes to the curriculum and manual were also suggested. Time considerations were discussed along with employee training. Several of the comments suggested that the project provide training to the public and other types of contractors.

Suggestions for changing training sessions

Several of the suggestions by participants indicated a preference for more hands-on types of presentations:

> *(I wanted) what we could do right away. We all came here to do something. More hands-on.*

When asked what he would like to see more of, one contractor replied:

> *Being shown the respirator. Being given something more tangible to pass along. The same with the equipment for removing it.*

There was also a preference by some to have the more practical and hands-on aspects of the training presented first:

> *I wanted them to start with what I can do today to help my people - what kind of respirators, what kind of equipment ... and I didn't get that. They told me what was going to go wrong, and what was wrong, but they didn't tell me what to use. Three months later, I was told what I should use and I felt it was two months too late as my men have already been subjected to two months' worth of sanding without the right respirator.*

> *If they flipped that around and given us the hands-on, real world stuff first and then explain the theoretical later...*

One participant however, cited an advantage of having the theoretical information presented at the beginning:

> *The thing about starting a course like this with the respirator stuff, is that it still doesn't sink in until you have gone through the theory part of it. You hammer home the dangers of lead, that gets the attention. And from that point on, people listen to you ...*

One recommended format change was for the project to list additional ways to get the same job done:

> *If I were to redesign the program, the one thing I would like to see done (is) ...make it so that, let's say, there are 10 different ways we could do painting; steel-sashed doors, stucco, sheet rock, concrete. List them down like that, and then list the ways how heavy we can get into it. Because none of us here really want to get into it to the stage where it gets to the 'nth degree where you got to do it. Because you aren't going to sell it. Nobody's going to buy it.*

There was also a request for more time to be allotted for participants to ask questions:

> *The only thing I would change about the way this particular course was presented, was that some days we had about eight speakers in a very rushed fashion with not enough time to answer questions. It was well organized and well planned except for allowing enough time for input and questions from the group.*

Suggestions on how to handle the liability/insurance issues were offered:

> *Something else that should be happening right after the equipment thing at the beginning. They should bring the lawyer in next. He was very well spoken, and they brought him in last. We really wanted to know liability up front. That was our biggest question - safety and liability...*

> *But I think as far as the program is concerned, the insurance part could be a lot better. I thought the Worker's Compensation thing was totally mishandled, and very confusing. ... it was totally disorganized. Liability insurance could have been expressed more because that is more directly related to some of our liability and worker's compensation, it's kind of cut and dry.*

> *A lot of insurers have put a lead exemption into the liability insurance. That was never even touched on.*

Suggestions for training methods included "on-the-job" instruction to minimize the number of hours of classroom instruction, more "peer education," and the presentation of case studies:

> *Have instructors on the job, instead of coming and sitting down for eight hours, perhaps work for six, review some things, and then go through the whole method...*

> *Most of the presentations were done by the health services people and not contractors...(would have preferred more contractors as instructors)*

> *Having more of our peers come in and do some of the teaching...*

> *... less technical information, more real-life case studies.*

One participant was concerned about the need for the group to stay on track. He suggested that contractors be allowed to "unload" at the beginning of the training, but then get the group back on track:

> *First, I'd like to (suggest that they have) a gripe session that allow(s) the contractors to gripe about lead regulations. (After that point, they should refuse to allow any of those comments. They need to maintain control. Let people know that further comments on those issues are out of line. Need to stay on course, stay on time. He acknowledges that there is so much resistance to regulations and that during the course of the program OLPPP staff spent a lot of time trying to overcome the resistance.)*

One participant saw a need for a summary of the project results to be made known to the contractors:

> *As far as improvement, I'd like to see a conclusion or a summary of the whole seminar (including the results of the data collected assessing workers for lead exposures).*

One participant suggested that the project offer a specialty license as a result of attending the trainings:

> *... move forward to dealing with lead paint. Like a specialty. I think this is something that this seminar should move towards.*

Suggestions for editing the manual

Suggestions for changing the manual included adding contractors as authors, reducing the number of pages, and using a "how to" format:

> *I think, personally, in order to do a manual like this on painting you should be a painter to start with. The contractors should write the book on painting with lead. I think that would make it a lot easier for the next group to come through and really know what is being talked about so they can answer questions.*

> *I would ask them to write a briefer manual.*

> *... the book could probably be condensed in terms of a "how-to" (format). There is a lot of information in there that is very useful, but in terms of the practical approach, actually doing a job, it could probably be 15-20 pages.*

> *I must say that the manual is so thick and involved that one would be lost without instruction.*

> *I want a painting contractors manual for dummies.*

> *What I would suggest is maybe an accompanying CD ROM, or at least some type of videotape presentation that accompanies the manual. (It) could be distributed relatively cheaply, and most people have a VCR.*

Instructional aides

Several instructional aides were suggested as additions to the trainings, including a video, posters, and informational brochures:

> *... make a video (showing on site procedures) that people can take home...*
>
> *... (a video) showing a typical work site exterior, a typical interior and how they are handling it, skits involving lead on site with children and how contractors might handle the situation , etc., so you could get an idea visually, how the homeowners ask some of the difficult questions. I think it would be a much more powerful medium...*
>
> *There are a huge amount of regulations in general, and there are increasing the number of posters at job sites. Something similar could be done with lead - techniques on site, where you could get a lot of the diagrams out of the manual, laminated sheet, where you could post it at a job site as a constant reminder - "this is the way we should be doing it."*
>
> *... gather all of this information (rules, regulations and codes) and simplify it, and put it in brochure format. Specific information, with phone numbers.*

Time considerations

Comments varied concerning the length of time for the trainings. Some preferred a condensed version of the program, while others liked a program that spanned over a period of time. Comments suggested that time considerations for training may be different for employees than for contractors:

> *I would have preferred that it be more condensed - I'd rather do it five days in a row than take it over four months...*
>
> *I think that having it over a period of time gives you time to learn because you can come back and ask questions and get feedback. Whereas if you did it all in a week, it is a lot of information to absorb and a lot of methods to implement quickly.*
>
> *... you'll just cram it all in and forget it by the next week.*
>
> *For a small company like me ... five days is tough.*
>
> *Most of us are single owners of small companies, and for us to just take a week off is unrealistic. But for employee training, that is different. There might be benefits in biting the bullet and doing it.*

Issues concerning employee training

There were several other opinions offered about employee training, particularly related to its cost:

I think somebody else should pay for the training. I don't think it should be a burden for the contractors to train their employees. Why should I pay for them to walk?

I think the reasons why its important that the employees pay is that there is a big turnover is this business and you could hire somebody and pay a couple hundred bucks in training and they could be gone in three weeks for any reason... Another reason is that it gives him an incentive. If he has gone out and paid a couple hundred bucks, he is going to take his job more seriously. It's also going to separate the sheep from the goats; if somebody doesn't care about what they are doing, they're going to dilly-dally and put this thing off as long as possible. So you will be able to hire somebody if you have a better idea who is the better employee if he has comes to you with certification.

I told my employees that if they (do) not get certified, it would be deducted from their final paycheck.

I essentially said, "You (employee) pay for the training. If you are still with me in a year's time, I will give you that money back."

(Tell the employee if he works) for six months ... we'll pay so much, you pay the $50 or so, then we will promise you 18 names of contractors who are hiring certified people.

Providing education to the public and other contractors

The need to educate others about the hazards of lead and how to take the necessary precautions was raised. Convincing a customer about the importance of lead safety was particularly challenging for one participant:

How do we get across that it's going to cost a little more, and things will be a little different, and get them to buy that and level the playing field, so that we can all bid on an equal playing field? Or how do I talk to the consumer who is totally flipped out about it (lead) and saying "Take all the paint off my house!" for tens and tens of thousands of dollars. You may want to do that, but there may be a way to say that it's not necessary. How do we communicate that?

Other comments about the importance of educating the public and general contractors about lead safety were made:

Disseminate it(information provided at the training)! Not only for the painting contractors but for people who are going to the site. There is not enough public awareness.

What we need to do is have more focus on the customer ...this is one of the things that's useful (holding up the brochure.)

You are also seeing on public radio, in English and Spanish, they are now advertising about getting your kids tested for blood lead levels. And to me it's a bit of scaremongering to a degree. And maybe it will drive the customer towards *us, I still don't know if it will. But making the public aware of the product that you sell is a good idea.*

There is a greater deal of ignorance on the part of the general contractors in regard to this regulatory regime. (Project should also do outreach to general contractors.)

CONCLUSIONS

From the focus group discussions, a number of recurring themes were identified:

- Contractors valued the fact that the CPP was research-based, and as such, presented itself as independent from other organizations.

- Contractors appreciated being asked for their input and feedback by the project and were influenced to participate in the CPP by the opportunity to potentially have an impact on lead-related policies.

- Both the services offered by the project, such as blood lead level testing, air monitoring, training for employees and certification, and the fact that they were free or low-cost, were big incentives for continued participation in the program.

- Overall, contractors were drawn to the project because of the opportunity to become educated about lead safety. There was a real interest expressed in wanting to learn about the hazards of lead.

- Overall, there was concern about the liability incurred by taking on lead jobs. Although there seemed to be agreement that liability will never be eliminated, there was recognition that it can be minimized through compliance with regulatory codes. Many felt the need for universal compliance among all contractors and supported certification to level the playing field.

- Cost was identified as a barrier to conducting business in a lead-safe way. The additional cost of including lead-safe procedures when quoting bids for customers was of great concern. The project has contributed to easing some of the contractors' concerns by offering ways to communicate the need for lead safety to customers.

- Networking was seen as a real benefit to project participation, as it provided opportunities for contractors to share information with and learn from their peers.

• Overall, the project was perceived to be effective in helping contractors and their employees to create a safer work environment. Several of the proposed changes to the project included:

- Reducing the size of the manual and making it more user friendly;
- Consolidating regulatory information into one document;
- Creating visuals, including videos, posters, and CD ROM software as instructional aides;
- More peer education and hands-on instruction

• Overall, a positive and appreciative tone was conveyed by the painting contractors throughout the focus group discussions toward the California Painters Project and its staff:

> *...these people (CPP staff) deserve a lot of credit. Not only did they communicate well to the employers and contractors, they did a very good job in the training sessions with the employees as well. Several languages and I thought it was well done in that way. And it was not done in a condescending fashion, the communication was good.*

APPENDIX 24

Contractors Regional Seminar Flyer, Agenda, and Evaluation Form

Come to a **FREE** seminar for Painting & Remodeling Contractors!

Prevent Lead Poisoning
Before It Poisons Your Business!

◆ Hear a contractor talk about how to approach a lead job

◆ Get up-to-date information on lead regulations and requirements

◆ Learn about contractor liability and how you can avoid it

◆ Begin to learn how to work safely around lead paint

◆ Find out about further training and how to become certified to perform lead-related construction work

Attend and receive the *Painting Contractor's Guide to Lead Safety,* worker tailgate training materials and a lead-safety video.

Tuesday, July 8, 1997
12:30 - 4:45 p.m.
State Compensation Insurance Fund office
2901 North Ventura Road
Oxnard, CA

Wednesday, July 9, 1997
12:30 - 4:45 p.m.
State Compensation Insurance Fund office
1750 East Fourth Street
Santa Ana, CA

Refreshments provided

Call or fax in your registration today!
see other side

For directions, see the attached maps.
For more information, call (510) 540-3448 and leave a message. We will return your call within 1-2 working days.

Co-sponsored by:
Occupational and Childhood Lead Poisoning Prevention Programs, California Department of Health Services and State Compensation Insurance Fund.

Endorsed by:
Painting and Decorating Contractors of America chapters: Southern California and Ventura;
Southern California Builders Association; Cal/OSHA Consultation Service;
Ventura, Santa Barbara, and Orange County Health Departments' Childhood Lead Poisoning Prevention Programs.

Prevent Lead Poisoning

Before It Poisons Your Business!

• • •

Fax or call in your registration ***today****

PLEASE COMPLETE
Check which seminar you will attend:

☐ **Tuesday, July 8, 1997**
Oxnard

☐ **Wednesday, July 9, 1997**
Santa Ana

Your
Name:________________________________

Company
Name: ________________________________

Number of persons attending: ______

Mailing Address:

____

____

Phone: (____) ____________________

Fax: (____) ____________________

Two ways to register:

1. Fax this form to (510) 597-8074.

or

2. Call (800) 597-5323.
Press "5 #" at the voice mail menu and leave a message with your name, your phone number with area code, and the date of the seminar you will be attending.

*Seating is limited. **Please register by July 7, 1997**.
Easy parking. On-site registration only if seating is available.

Prevent Lead Poisoning Before It Poisons Your Business!

A lead in construction safety seminar for painting and remodeling contractors (residential and public buildings)

Wednesday, July 9, 1997; 12:30 to 4:45 p.m.,
Santa Ana, California

AGENDA

12:30 Welcome: Agenda review
State Compensation Insurance Fund

12:35 Why did you come to today's seminar?
David Harrington, Occupational Lead Poisoning Prevention Program

12:45 The Problem of Lead Paint in California/Overview of Regulations
David Harrington

1:15 Rating Your Lead Safety Program
Peter Scholz, Occupational Lead Poisoning Prevention Program

1:55 Resources For a Lead Safety Program
Luz Soluaga, Occupational Lead Poisoning Prevention Program

2:10 Presentations: Contractor organizations; County program; Cal/OSHA

2:25 Break: refreshments

2:40 Why Lead Safety is Good for Your Business/
How a Lead-Safe Contractor Handles a Job
Hans Stahlschmidt, Painting Contractor

3:40 Why and How To Get More Training and Become Certified in Lead-Related Construction
Ed Guzman, CLPPB, Accreditation and Certification Unit

4:10 Contractor Liability and How Best to Manage It
Rick Warren, Attorney (by video)

4:40 What did you think of the seminar?
State Compensation Insurance Fund

4:45 Seminar Ends

Co-sponsored by:
Occupational and Childhood Lead Poisoning Prevention Programs, California Department of Health Services and the State Compensation Insurance Fund.

Endorsed by:
Painting and Decorating Contractors of America, Southern California Chapter;
Southern California Builders Association;
Cal/OSHA Consultation Service;
Orange County Health Department, Childhood Lead Poisoning Prevention Program.

Seminar Evaluation

Wednesday, July 9, 1997; 12:30 to 4:45 p.m.,
Santa Ana, California

Thank you for attending today's seminar. We would appreciate your comments to help us improve future seminars. Please take a few minutes to answer these questions.

1. What kind of work do you do?

❑ Painting Contractor ❑ General/Remodeling Contractor ❑ Other: specify____________

2. How did you hear about this seminar?

Received invitation in the mail: ❑ Contractor organization newsletter/mailing: ❑
County health department: ❑ News media: ❑
Other: ______________________________

3. Overall the information provided in this seminar was:

Circle: very helpful somewhat helpful not so helpful

4. Rate the presentations:

Circle a number under both headings:

Excellent = 4, Good = 3, Fair = 2, Poor = 1

	Information	Presenter
The Problem of Lead Paint in CA/ Overview of Regulations	4 3 2 1	4 3 2 1
Rating Your Lead Safety Program	4 3 2 1	4 3 2 1
Resources for a Lead Safety Program	4 3 2 1	4 3 2 1
Lead Safety and Business/ How a Lead-Safe Contractor Handles a Job	4 3 2 1	4 3 2 1
Why and How to Become Certified in Lead-Related Construction	4 3 2 1	4 3 2 1
Liability and How Best to Manage It	4 3 2 1	4 3 2 1

5. What was the most useful thing you learned at this seminar?

6. How do you think this seminar could be improved?

7. What lead-safety changes do you think you will make in your business?