COUNTERPOINT

ON LEAD SCREENING

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CDC's Lead Screening Guidance: A Systematic Approach to More Effective Screening

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CHILDHOOD LEAD POISONING is a major preventable environmental health problem in the United States. Since the mid-1970s, there has been major progress in eliminating or reducing lead in gasoline, food cans, new house paint, and conduits of drinking water. Ongoing screening programs led by health departments have identified children with elevated blood lead levels (BLLs) and provided them with environmental, medical, and other services to limit the health impact of lead exposure. As a result of these efforts to reduce sources of lead and to identify lead poisoned children, there was a decrease of more than 80% in the BLLs of the U.S. population between 1976, when the first national survey[1] of BLLs was conducted, and 1994, when the most recent national survey was completed.[2]

The Centers for Disease Control and Prevention (CDC) has issued five guidance documents on preventing childhood lead poisoning—in 1975,[3] 1978,[4] 1985,[5] 1991,[6] and 1997[7]—basing each document on new scientific and practical information. For example, in several successive documents CDC lowered the threshold BLL of concern because of new information on the health effects of low levels of lead exposure. Although CDC guidelines have mainly been aimed at individual practitioners and health departments involved in secondary prevention activities, each has also emphasized the need for more primary prevention activities.

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According to recent studies, some 890,000 children in the United States still have elevated BLLs (≥10 μg/dL). Although BLLs are continuing to decline in the U.S. population as a whole, young children who live in older housing, or who are poor, or who are members of certain minority groups continue to have BLLs that are higher than the national average for children.[2] In November 1997, CDC issued its most recent guidance on screening children for lead poisoning[7] after taking into account extensive and often conflicting input from an advisory committee and comments from interested and knowledgeable groups. In that guidance, CDC recommended a systematic approach to the development of appropriate lead screening in states and communities.

The purpose of the guidance is to help states and communities expand screening and follow-up of children who most need these services and limit screening among children who are not exposed to lead. CDC recommends that state and local health officials develop a statewide plan for childhood lead screening that is based on local data about lead exposure. The plan should bring about screening for all children who: *(a)* live in areas with risk for lead exposure, *(b)* belong to groups who may be at risk (poor children, for example), or *(c)* are found to be at risk by means of a personal risk questionnaire. State and local health officials will be responsible for deciding on detailed screening criteria with the advice of concerned groups (such as health care providers). In some places, the plan will call for screening all children in a jurisdiction, while in others the plan will call for screening children in selected areas and from selected populations.

In their "Viewpoint," Manheimer and Silbergeld raise important issues about lead screening and especially about the role of a universal screening policy in preventing the harmful effects of lead exposure among children. They argue that a continued national policy of universal screening, such as that called for by CDC in 1991, would be more effective in identifying children with elevated BLLs than would the policy of more localized decision-making about lead screening that is recommended in CDC's most recent (1997) guidance.

Dr. Silbergeld in particular, along with a number of her concerned colleagues, has provided critical and insightful leadership in successful efforts to reduce childhood lead poisoning. CDC has also had an unwavering commitment to the prevention of childhood lead poisoning and was the major contributor to the 1991 Strategic Plan for the Elimination of Childhood Lead Poisoning[8] of the U.S. Department of Health and Human Services. The plan called for a society-wide effort to eliminate childhood lead poisoning. Thus, there is great accord between us at CDC and Mr. Manheimer and Dr. Silbergeld regarding the need to eliminate this disease. We differ only in our determination of which screening method will most effectively identify children with elevated BLLs, not in our shared goal of identifying as many as possible.

WHY DID CDC REVISE PREVIOUS GUIDANCE ON SCREENING?

CDC revised its previous recommendation of blood lead screening for virtually all young children in the United States for the following reasons:

Despite the fact that the 1991 CDC recommendation had ardent support from CDC as well as Mr. Manheimer, Dr. Silbergeld, and others, universal screening did not become a reality.[9] Only a minority of U.S. children are screened, and, given the marked decline in BLLs nationally, this fact is unlikely to change. This "retreat from recommending universal screening" is correctly identified in the title of Manheimer and Silbergeld's article: it is a retreat from a *recommendation,* not from an established practice.

Universal screening is not a reality even for high risk children.[9] The issue at stake is not how to rededicate support to the 1991 CDC guidance and extend universal screening to low-risk communities, but rather how to effectively implement screening for children who most need it.

The continuing emphasis on universal screening alienates significant portions of the broader medical community whose members see little justifica-

tion for screening low risk children and in the long run undermines support for appropriate screening. The full support of the public health and medical communities must be marshaled to ensure that children who are at risk are appropriately screened. Is there even a remote chance of achieving universal screening without the full support of groups such as the American Academy of Pediatrics? Ongoing friction, often among well-intentioned members of the public health and care provider communities, has the potential to detract from or to jeopardize necessary screening.

We now have much more extensive data on the distribution of risks for childhood lead poisoning. Computer-assisted means of displaying and disseminating such data to states and communities are widespread. The ability of states and communities, with technical and financial support from CDC, to focus screening efforts where they are needed has increased significantly in recent years.

BLLs have declined in the U.S. population and today there are areas of the United States where appreciable childhood exposure to lead does not take place. As the prevalence of a health condition declines, it is common practice to consider a transition from universal to targeted screening. For example, decreasing prevalence underlies an evolving national policy on tuberculosis screening for children, under which targeting is now recommended. As Manheimer and Silbergeld note, the decline in BLLs for U.S. children from 1976 to 1994 was precipitous; this decline is a major public health success. The issue that should be considered at this juncture is not *if,* but *when* and *how,* we should alter our screening strategy to meet changed conditions.

CRITERIA FOR AN EFFECTIVE SCREENING TEST

We would like to comment briefly on the views expressed by Manheimer and Silbergeld regarding their six criteria for an effective screening test.

Criterion 1. The condition screened for must be serious. We agree that having an elevated BLL is a serious condition, but we also note that severity varies by degree of BLL elevation.[10] As Manheimer and Silbergeld note, the greatest urgency should be associated with those children with the highest BLLs. Because this is true, it is critical that screening policy account for the fact that high risk populations *have a much higher prevalence of seriously elevated BLLs* than do low risk populations. For example, in a population with typical (log-normal) distribution of BLLs, in which 20% of children have BLLs that are ≥10 µg/dL, 12 children in a thousand are expected to have BLLs ≥ 25 µg/dL; in a population in which 5% of children have BLLs that are ≥10 µg/dL, only one child in a thousand is expected to have a BLL ≥ 25 µg/dL. In this example, the high risk population has a prevalence of elevated BLLs that is *four times* that of the low risk population but a prevalence of BLLs ≥ 25 µg/dL that is *twelve times* that of the low risk population.

Criterion 2. The condition screened for must be treatable. An elevated BLL is a treatable condition. It is clear that at higher BLLs, interventions can reduce BLLs and markers of toxicity.[11] However, the effectiveness of interventions for treating elevated BLLs below 20 µg/dL is less clear. In this regard, we differ with Manheimer and Silbergeld on the usefulness of the Kimbrough study[12] in proving the effectiveness of family education about lead exposure, which is the major intervention for children whose elevated BLLs are below 20 µg/dL. The study lacked a control group and probably overestimates the effectiveness of this intervention for two reasons: first, it did not account for regression to the mean (that is, the tendency of subjects with extreme values of a test to have scores closer to the mean on retesting), and second, it did not account for the effect that the aging of the study subjects had on their BLLs (after approximately age 2, BLLs tend to decline with age). A recent randomized study[13] of the effects of family education about lead exposure did not show an effect for children who had BLLs somewhat lower than the levels for which CDC recommends action. This is a critical issue that needs further study and is clearly important for assessing the value of interventions for children with elevated BLLs below 20 µg/dL.

Criterion 3. The disease must have an asymptomatic period during which treatment results in significant reductions in morbidity and mortality. Furthermore, treatment given during the asymptomatic stage must have greater therapeutic value than treatment given at the appearance of symptoms. Early detection of childhood lead exposure is preferable because it maximizes the opportunities for both treatment and prevention of future exposure. As we pointed out in connection with Criterion 1 above, children with higher BLL elevations (for example, ≥ 25 µg/dL) are much more likely to be present in high risk populations than in low

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risk ones, and the critical issue is how best to recognize and screen such children. We must improve approaches to identifying children with elevated BLLs, *particularly* those who are likely to develop more serious disease.

Criterion 4. The screening test must be accurate. We agree with the comments of Manheimer and Silbergeld on the use of the finger-stick sampling method, but we also considered an additional aspect of the accuracy of the BLL test. Among low-prevalence populations, within-individual variation in measured BLLs over time is critical to a determination of the accuracy and reliability of the BLL screening test. Such variation includes laboratory measurement error and biologic variation as well as the slight positive bias resulting from using finger-stick sample collection instead of venipuncture. As with cholesterol measurements, it is the within-individual variation in measured values over time that determines the performance of the screening test.[14] Considering only laboratory variation will generally lead to an underestimate of test-retest variation. The impact of test-retest variation is that as the underlying population prevalence declines, there is a substantial increase in the percentage of false positive results on screening tests and thus a substantial decrease in the predictive value of a positive screening test result.

Criterion 5. The test which detects the condition in the asymptomatic period must be acceptable to the patient and must be available at low cost. The cost of a screening test must be considered in relation to its effectiveness in bringing about health benefits. As with other screening tests, the effectiveness of the blood lead screening test depends upon the risk for illness in the population to be screened. The U.S. Preventive Services Task Force takes into account the risk for illness in populations to be screened in its *Guide to Clinical Preventive Services.*[15] Childhood blood lead screening stands as an example of screening that should be applied according to individual risk, as outlined in the *Guide:* "Individual risk factors are also important to consider in designing the periodic health examination. The leading causes of morbidity and mortality may differ considerably for persons in special high risk groups as compared to individuals of the same age and sex in the general population."

In weighing the cost-effectiveness of blood lead screening, CDC accepts that there are, at present, considerable limitations to the conduct of a rigorous cost-benefit analysis because of the limited data and small number of available studies on which to base such an analysis. The 1997 guidance from CDC emphasized the need for better data for such analyses. Just as the BLL of concern for an individual child has changed over time as a result of newer scientific results, the population prevalence at which universal screening is justified may need to be modified as new data become available.

Criterion 6. The condition must have a high enough incidence to warrant screening. Manheimer and Silbergeld maintain that, despite a precipitous drop in the last 20 years, the prevalence of elevated BLLs in the United States remains sufficiently high to warrant universal screening. This is clearly a key point of difference between us, and we have presented the above arguments to underscore our belief that the national population prevalence supports a change in screening policy. We would also argue that a policy of focused screening corresponds to the fact that the remaining major sources of lead exposure are themselves focused (in clusters of old housing) rather than evenly dispersed (in lead-contaminated automobile exhaust).

Manheimer and Silbergeld's conclusions reveal the common ground between themselves and CDC as well as the differences. We agree that lead is ubiquitous, but we at CDC emphasize the fact that lead exposure varies dramatically from place to place. Although all populations are susceptible to the harm caused by exposure to lead, populations vary widely in the magnitude of such exposure. We disagree on the need for communities without plausible sources of lead exposure to screen all children in order to prove the obvious: in low risk communities, most children do not have elevated BLLs. Many child health care providers are reluctant to perform universal screening for the purpose of proving the negative. We prefer that the focus be on the screening of children who are at risk.

We agree on the importance of ensuring screening for children at highest risk, but we differ with regard to the likelihood that a reaffirmation of the 1991 CDC screen-

ing recommendation will be more effective in identifying children with elevated BLLs than will a more directed program that is based on regional and local data and that engages the collaborative efforts of public health agencies, child health care providers, managed care organizations, and others in communities. We do not feel the status quo has the greater chance of success.

Finally, Manheimer and Silbergeld state that lead poisoning is predominantly a disease of the most vulnerable, namely poor children, and lament that there is not greater support for screening among child health care providers and the broader health community. We agree, but we do not agree on the wisdom of recommitment to a course that provokes frustration and alienation in key segments of these critical groups. Is it not better to attempt a joint, focused, workable strategy, even if it is theoretically less comforting?

CONCLUSIONS

Our primary goal must be to prevent lead exposure to children; much has been accomplished, but much, especially in the reduction of household lead hazards, remains to be done. Chasing the distant and retreating mirage of universal screening is a dubious mission. Our goal at this juncture should *not* be to screen as many children as possible. Rather, our goal must be to find as many lead-burdened children as possible and to improve their environments. It is wasteful of all our capital—the time and goodwill of parents and health care providers as well as health care dollars for our children—to screen every child irrespective of lead exposure or plausible risk.

CDC's 1997 guidance, far from retreating from the use of the blood lead test to screen children, offers a systematic approach to bringing about increased screening in high risk areas through the involvement of health departments, health care providers, and communities in a cooperative effort to develop explicit local recommendations with broad community buy-in. Such targeted screening, conducted with broad local support, will increase the proportion of children with elevated BLLs who are identified and served. CDC will examine the impact of this guidance in bringing about more effective lead screening as appropriate data become available and will take those data into consideration in formulating future guidance on screening procedures.

CDC remains completely committed to the elimination of childhood lead poisoning. We stand ready to provide health departments with technical assistance in planning for improved screening and in evaluating, analyzing, and displaying relevant data. CDC will continue to provide funding to states and localities through the State- and Community-Based Childhood Lead Poisoning Prevention Program grants. CDC also provides materials and technical assistance to health departments to aid them in communications with other agencies, health care providers, managed care organizations, and the public. The 1997 screening guidance contains an approach that will move the nation closer to its goal of eliminating childhood lead poisoning. We look forward to working closely with all those who share this goal.

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