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Case Studies

Protecting Workers with Developmental Disabilities

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Reported by Steven W. Lenhart

Introduction

National Institute for Occupational Safety and Health (NIOSH) researchers finished a health hazard evaluation at a sheltered workshop in 1999.[1] A sheltered workshop is a nonprofit business employing predominantly people with developmental disabilities and other chronic mental and physical impairments. The study's findings suggested that sheltered workshop employees would benefit from increased management awareness and a more proactive approach to worker health and safety.

A search for occupational health and safety information focusing on workers with developmental disabilities produced few results. Therefore, NIOSH researchers visited 10 additional sheltered workshops to learn more from workshop managers, staff members, and workers. From these visits, issues affecting the health and safety of workers with developmental disabilities were determined. Ten of the issues are discussed in this report. Recommendations for protecting workers with developmental disabilities and issues needing research are also given.

Background

Developmental Disabilities

Developmental disability functionally describes a condition of someone who has had one or more mental or physical impairments from an early age that are likely to continue indefinitely. Examples include cognitive impairments (e.g., mental retardation), sensory impairments (e.g., blindness and deafness), neurological disorders (e.g., autism, epilepsy, and cerebral palsy), or genetic disorders (e.g., Down syndrome and fragile-X syndrome). Approximately 1.6 percent of school-age children and 1.5 percent of adults in the United States are developmentally disabled.[2]

People with developmental disabilities were once thought of as unable to work, and most were cared for at home or in state-funded institutions. In the 1970s, states began reallocating resources from institutions to community-based services. Demonstration projects in the late 1970s and early 1980s showed that people with developmental disabilities could work when given opportunities and support.[2] In 1990, the Americans with Disabilities Act (ADA) declared that people with disabilities had the right to employment and to participate in all aspects of society.

Approximately 280,000 adults with developmental disabilities were employed in the United States in 1990.[3] Of these workers, 228,000 (82%) were in facility-based settings, which included sheltered workshops and day-habilitation programs. In some locations, sheltered workshops are known as "diversified industries," "community rehabilitation programs," or "adult activity centers." A day-habilitation program provides training in communication, daily living, and social skills to people with severe disabilities.

The remaining 52,000 people (18%) worked in integrated employment, which includes competitive and supported employment. Competitive employment is a job in the community done by workers with and without disabilities. Supported employment is a job in the community done by workers with disabilities who need assistance to learn job requirements or adapt to a competitive employment setting.

The number of employed people with developmental disabilities increased between 1990 and 1996 to nearly 400,000. Of these workers, approximately 305,000 people with developmental disabilities worked in facility-based settings, and almost 91,000 worked in supported employment.[4]

Mental Retardation

Mental retardation is the most common developmental disability.[4,5] It involves substantial functional limitations manifested before age 18 and is characterized by "significantly subaverage intellectual functioning, existing concurrently with related limitations in two or more of the following adaptive skill areas: communication, self-care, home living, social skills, community use, self-direction, health and safety, functional academics, leisure, and work."[4,6]

The American Psychiatric Association defines significantly subaverage intellectual functioning as an IQ of 70 or less.[2] Using the Wechsler Scales, a person is considered to have mild mental retardation with an IQ from 55 to 69, moderate mental retardation from 40 to 54, severe mental retardation from 25 to 39, and profound mental retardation with an IQ of 24 or less.[2] Epidemiologists have generally used *severe* to describe the functioning level of persons with IQs less than 50 and *mild* to refer to the level of those with IQs from 50 to 70.[7]

People with mild mental retardation can learn basic academic and vocational skills. Those with moderate or severe mental retardation can learn basic social, communication, and self-help skills. People with profound mental retardation may be able to learn some basic self-help skills, but they require constant supervision and care.[2]

Prevalence estimates of mental retardation vary with the gender and age of the people included in an epidemiologic study. They also vary with the data collection method (i.e., whether the data are from total population screening or from case registries or agencies for people with mental retardation) and the definition of mental retardation used.[4,7,8]

In the 1980s, The ARC of the United States, a national organization on mental retardation, reviewed prevalence studies and concluded that from 2.5 percent to 3 percent of the United States population had mental retardation.[9] Other prevalence estimates are lower and vary from 0.7 percent to 1.25 percent.[4] Thus, using a 1999 population of 270 million people, between 2 and 8 million people in the United States have mental retardation.

An estimated 0.66 percent of working-age adults (ages 18 to 64) in the United States have mental retardation. State-based percentages range from 0.25 percent in Alaska to 1.57 percent in West Virginia.[5]

Many people with mental retardation have multiple impairments, which can interact and have a multiplicative effect on a person's ability to function.[2] The most common concomitant physical disabilities include cerebral palsy and other motor impairments (present in 20% to 30% of the people with mental retardation) and seizure disorders (present in 15% to 30% of the people with mental retardation).[4] Visual or hearing impairments are present in 10 percent to 20 percent of the people with mental retardation. Behavioral or psychiatric disorders are present in 15 percent to 35 percent of the people with mental retardation.[4]

Issues Affecting Workers with Developmental Disabilities

The following 10 issues affect the health and safety of workers with developmental disabilities. Although the primary sources of first-hand information were site visits to sheltered workshops, the recommendations apply to any business employing people with developmental disabilities.

Emergency Medical Services and First Aid

When a workplace does not have an infirmary, a clinic, or a hospital in near proximity to it, the OSHA medical services and first aid standard (29 CFR Part 1910.151) requires that an employer have a person or persons available who are trained to give first aid to injured employees. Also, first aid supplies must be readily available. In workplaces where a life-threatening or permanently disabling injury or illness can be expected, OSHA interprets in near proximity to mean a three- to four-minute response time from an accident's occurrence to the administration of first aid.[10]

The following events associated with a sheltered workshop employee's death show the importance of training staff members how to respond when a medical emergency occurs.

In 1995, a sheltered workshop employee collapsed while doing a bagging task and died later the same day in a hospital.[1] The 31-year-old worker had multiple disorders, including mild mental retardation, impulsive control disorder, Pierre Robin syndrome, sleep apnea, hypertension, and bilateral hearing loss. An autopsy was not done, but the cause of death recorded on the death certificate was "probable respiratory arrest due to blockage of the airway due to a congenital deformity."

The state's Department of Mental Health (DMH) investigated the worker's death. (OSHA did not do a fatality investigation because the employer did not report the worker's death, although required to do so.) Because the worker received DMH services, the investigator evaluated whether abuse or neglect contributed to his death. The DMH report concluded with the following findings:

- State certification standards did not require the sheltered workshop to have staff members trained in cardiopulmonary resuscitation (CPR) and first aid because a hospital was nearby.
- Two staff members had been certified in CPR and first aid, but neither one was at the facility when the worker collapsed. Another staff member, although familiar with CPR from past training, had not been certified. He did not do mouth-to-mouth resuscitation because he could not find a mouth barrier.
- The worker had an extremely small tracheal opening, and emergency medical personnel made repeated attempts to place an endotracheal airway before succeeding.

The DMH investigator drew no conclusions as to whether the worker's death was related to workplace exposures or conditions. In addition, the investigator's report contained no information about whether anyone at the workshop knew that the worker had a condition that may have hindered immediate medical care. Whether the presence of someone trained in CPR or first aid, or awareness of the worker's congenital tracheal abnormality would have altered the outcome is unknown.

Recommendations. Staff members of sheltered workshops should be trained in CPR and first aid. Specialized training or on-site medical support may also be beneficial and should be based on workers' medical needs. These recommendations agree with guidelines of the Commission on the Accreditation of Rehabilitation Facilities.[11]

Ergonomics

The ergonomic aspects of a task may affect a worker's productivity, but more importantly, may also affect whether the task injures a worker. Ergonomics is also important economically to sheltered workshop workers because they are usually paid a piece-rate wage. A commensurate wage is determined using the prevailing wage paid to experienced workers for essentially the same type of work. Wages are based on the quantity and quality of work produced by a worker with a disability compared to the work produced by experienced workers.

Ensuring that a job is ergonomically safe is especially important to workers with cognitive impairments. Such workers may not associate their jobs with injuries to a wrist or leg, back fatigue, or discomfort or pain. Consequently, a worker's employer may not be aware of a problem until a more serious injury has occurred.

For example, NIOSH researchers were told about a sheltered workshop worker, who, after doing a hand-intensive task successfully for several days, suddenly stopped working and refused to continue. At first, the worker's supervisor thought a behavioral problem caused the person's work stoppage. However, the real problem was that the worker knew no other way to express that his wrists hurt other than to stop working.

Jobs that could have benefited from ergonomic improvements were often seen at the sheltered workshops visited by NIOSH researchers. At some facilities, workers stood while doing their jobs. A workshop manager explained that workers seemed more productive when standing and that, before staff members removed the chairs, a few workers would lie their heads on the worktables. To reduce the risk of fatigue and discomfort, workers at this workshop stood on rubber mats or on layers of corrugated cardboard.

Some jobs at other workshops could be done only while standing. The workers shown in Figure 1 stood on a concrete floor and used pneumatic nail guns to construct wooden pallets. Cushioned floor mats may have reduced their risk for leg and back fatigue and discomfort. Suspending the nail guns above the work surface may have reduced hand and wrist fatigue caused by lifting and holding the nail guns.

Because her wheelchair did not fit under the worktable, the worker in Figure 2 had to twist and reach for parts for bagging. She also had to reach to put bagged parts in storage trays. Replacing the worktable with a table having a cutout to accommodate her wheelchair would have reduced body twisting and reach distances.

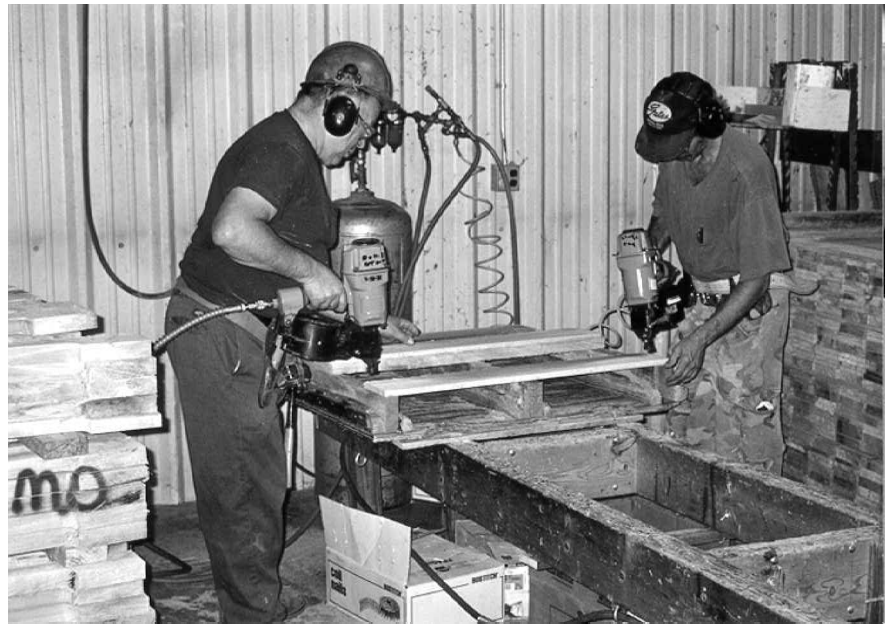

FIGURE 1
Employees of a sheltered workshop using pneumatic nail guns to make wooden pallets.

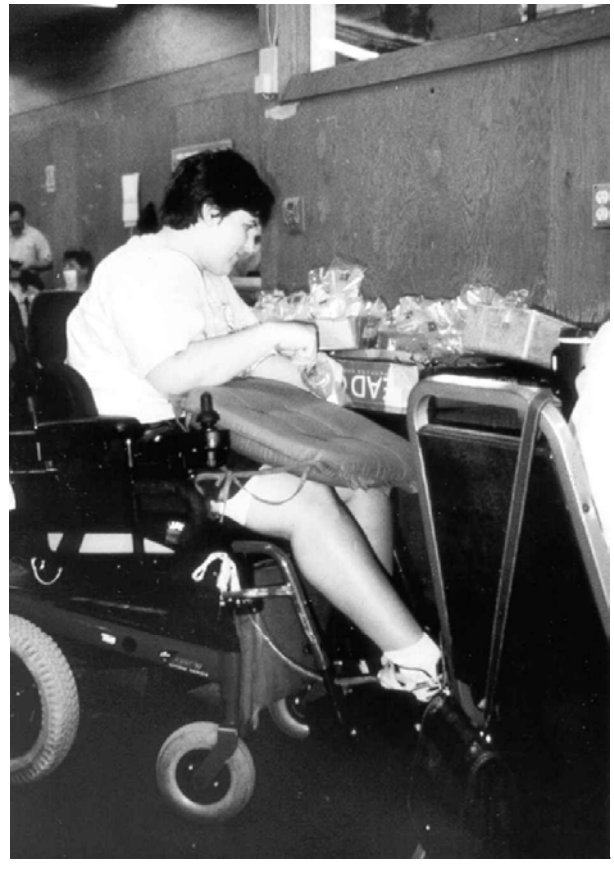

FIGURE 2
Worker doing a packaging task at a sheltered workshop.

FIGURE 3
Employee of a sheltered workshop using a pneumatic torque wrench to tighten nuts on bolts.

Before ergonomic improvements were made, by the end of a workday the worker in Figure 3 had to use both hands to hold a pneumatic torque wrench. Installing a counterbalancing system to suspend the wrench and securing the bracket assembly reduced the worker's risk of hand and wrist fatigue. However, improvements to the foot rest and chair position and addition of lumbar support were also needed to reduce the worker's risk of leg and back fatigue.

Recommendations. In any workplace, ergonomic principles should be applied to fit jobs to workers, and this principle also applies to workers with disabilities. However, employers of workers with cognitive impairments should be particularly vigilant. Such workers may not associate the onset of an injury with their job and may have difficulty communicating that a problem exists.

Unless a task can be done only while standing, workers should have the option of sitting or standing. Laboratory studies have shown that standing for long periods causes fatigue, discomfort, and pain in the lower back and legs.[12] One researcher found that the incidence of low back pain was highest in workers who stood for more than four hours a day.[13] Another researcher found a significant association between osteoarthritis and standing work lasting longer than two hours a day.[14]

Interactions between floor surface conditions and a worker's body and shoes should be considered to reduce the risk of worker injury from prolonged standing.[15] A foot rest or rail placed from four to six inches above the floor is thought to reduce foot fatigue and the risk of back stress for standing workers.[16]

Cushioned, "anti-fatigue" mats should be selected carefully. The results of a limited study suggested that some mats appeared to reduce muscular fatigue in the back but not in the legs.[17] Authors of another study reported that while extremely stiff mats did not seem to reduce fatigue or discomfort, extremely soft and thick mats may not be desirable either.[15]

Exposures to Chemical and Physical Agents

Occupational exposure limits are not absolutes; they are levels to which *most* workers may be exposed without experiencing adverse health effects. Because of variation in individual susceptibility, some workers may experience adverse health effects when exposed to a substance at levels below its occupational exposure limit. Individual hypersusceptibility, pre-existing medical conditions, genetic factors, age, interactions with other workplace agents, medications taken by a worker, and environmental conditions are typically not all considered when occupational exposure limits are established.[18]

No published studies were found addressing whether workers with developmental disabilities are at greater risk of developing occupational illnesses than nondisabled workers. People with Down syndrome have an increased risk of developing leukemia,[19,20] but whether risks associated with exposures to carcinogenic agents differ between workers with and without Down syndrome is unknown. Whether workers who are neurologically compromised are at increased risk, even with minimal exposures to neurotoxic substances (e.g., certain organic solvents, metals, and pesticides), is also unknown.[21–23]

Workers with developmental disabilities frequently have concomitant medical conditions. Some medical conditions and medications interact with occupational exposures and increase a person's susceptibility to adverse health effects. For example, some medical conditions increase a person's risk of heat stress. Heart disease limits maximum cardiac output and impairs the body's capacity to increase cutaneous circulation. Diabetic or atherosclerotic vascular disease impairs vasodilation. People with diseases of the spinal cord and central and peripheral nervous systems also exhibit impaired thermoregulatory responses.[24]

Prescription and over-the-counter medications may also increase a person's heat stress risk. Antihistamines, phenothiazines, and cyclic antidepressants impair sweating. β-adrenergic receptor blockers and calcium-channel blockers, used to treat hypertension, limit maximal cardiac output and alter normal vascular distribution of blood flow in response to

heat exposure. Diuretics can limit cardiac output and affect heat tolerance and sweating.[24]

Recommendations. Issues concerning exposures of workers with developmental disabilities are complex and research is needed to assess whether they are at greater risk of developing occupational illnesses than nondisabled workers. Thus, when evaluating exposures of workers with developmental disabilities, occupational exposure limits should be used carefully and with an understanding that they may not be adequately protective.

The ADA places the ultimate responsibility for worker placement with the employer and provides guidance for determining when someone should be excluded from a job because the person poses a "direct threat"—a significant, likely, imminent, severe, risk—to the health and safety of others in the workplace.[25,26] Regulations of the Equal Employment Opportunity Commission expanded the concept of direct threat to include a risk to the health and safety of the individual or others that cannot be eliminated or reduced by reasonable accommodation.[26]

Jobs having high levels of risk were not seen during the 11 NIOSH site visits. However, an informed decision based on a job placement evaluation should always be made before assigning workers with developmental disabilities to jobs involving exposures to chemical or physical agents.

Job placement evaluations should include objective evidence of work-related factors (e.g., estimated exposure levels, exposure durations and controls, and assistive technology accommodations), and an individual's risk factors. Although no single approach has been identified for clinicians to follow when evaluating workplace risks and worker fitness,[25] a pre-assignment assessment of a worker's medical status by a physician or other licensed health care professional may be helpful for making a medical clearance decision.

The worker should be involved in a job placement decision through discussion of risks and associated uncertainties. For some workers, a person responsible for making decisions on a worker's behalf (e.g., a parent or legal guardian) should also be involved in the decision-making process.

Hazard Communication Training

A researcher reported the results of a pilot study designed to compare the effectiveness of two hazard communication training sessions.[27] Twenty-eight workers with IQs less than 70 and 30 workers with IQs of 70 or greater participated in the study. Both training sessions were done in a lecture format with demonstrations. The study's results showed that the workers with IQs less than 70 had no significant improvement in their responses to pre- and post-training questions. The workers with IQs of 70 or greater showed significant improvement.

The study's author recommended development of training programs tailored to the needs and conditions of workers with IQs less than 70. Suggested ways to accommodate training needs included spending more time in training; breaking the description of a job into small, clearly defined steps; instructing in clear, basic language; and developing pictures or diagrams showing job sequences to help teach tasks.

The findings of this study are important to workers with developmental disabilities because most of them have some degree of mental retardation. Authors of a 1990 study estimated that 91 percent of the people with developmental disabilities in facility-based settings and 85 percent of such workers in integrated employment had mental retardation.[3]

Recommendations. Training programs for workers with developmental disabilities should meet their needs. Individual assessments of training effectiveness should not be limited to a demonstration of new skills at the end of a training session but should be an ongoing process. For workers with moderate or severe mental retardation, some retraining may be necessary as frequently as daily.

Hepatitis B

The Centers for Disease Control and Prevention (CDC) estimates that four percent of hepatitis B virus (HBV) cases are acquired from occupational exposures and recommends pre-exposure vaccination of people at high risk of infection.[28] The Immunization Practices Advisory Committee (ACIP) has noted that "staff of nonresidential day-care programs (e.g., schools, sheltered workshops for the developmentally disabled) attended by known HBV carriers have a risk of HBV infection comparable to that among healthcare workers and therefore, should be vaccinated."[28] Though ACIP commented that the risk of HBV infection for employees of a sheltered workshop may be lower than the staff's risk, they recommended that vaccination of employees should also be considered.

OSHA promulgated the bloodborne pathogens standard to protect workers against "pathogenic microorganisms that are present in human blood and can cause disease in humans, including HBV and human immunodeficiency virus."[29] OSHA defines an occupational exposure to a bloodborne pathogen as "a reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from an employee's duties."[29]

Sheltered workshops must comply with OSHA's bloodborne pathogens standard. The standard requires an employer whose employees are at risk of exposure to bloodborne pathogens to prepare a written exposure control plan and an exposure determination. Employers are also required to provide a training program to employees. In addition, an employer must make available HBV vaccination at no charge to all employees who have occupational exposure and post-exposure evaluation and follow-up to all employees who have had an exposure incident.

Recommendations. All requirements of OSHA's bloodborne pathogens standard should be met at a sheltered workshop. A written exposure control plan should be available, and a

training program concerning bloodborne pathogens should be given regularly to all employees and staff members. The employees' training program should be tailored to accommodate workers with cognitive impairments.

Pica

During a NIOSH site visit, workers were seen assembling devices made of small parts. When their supervisor was asked about precautions taken to reduce the risk of ingestion of these items by those with pica, he said that he was not familiar with this disorder.

In 1997, a 29-year-old worker with Down syndrome and pica died the day after drinking dish washing liquid. The coroner reported that the cause of death was a probable electrolyte imbalance due to vomiting and diarrhea resulting from ingestion of the soap.

Pica is an eating disorder manifested by a craving for nonnutritional, nonfood items (e.g., lead paint chips, clay, hair, soap, and plant leaves) or for unusual amounts of food items.[30] It does not apply to infants and small children up to 18 months old, when putting everything into their mouths is common. People with mental retardation are at increased risk of having pica.[30]

Recommendations. Sheltered workshop staff should be aware of those workers with pica. Workshop staff members should understand that such workers are never to be left alone with inedible substances that they may try to drink or eat. Constant observation of some people with pica may be necessary even during work breaks. Cleaning supplies stored in a break room (e.g., dish washing liquid and floor wax) should be kept in a locked cabinet.

Recording Occupational Injuries and Illnesses

Sheltered workshops are in Standard Industrial Classification (SIC) major group 83, social services. Businesses in SIC 83 and 22 other major groups are exempt from keeping the OSHA Log and Summary of Occupational Injuries and Illnesses (OSHA form 200), unless the Bureau of Labor Statistics (BLS) sends them written notice to do so.[31]

Although the BLS considers exempt employers to be low-hazard industries,[32] it conducts an annual survey of a sample of randomly selected, exempt employers. Incidence rates of nonfatal injuries and illnesses for 1997 are shown in Table I for private industry, manufacturing, and five subcategories of social services.[33] The data suggest that job training and related services (e.g., sheltered workshops) and residential care facilities have risks of occupational injuries and illnesses equivalent to manufacturing businesses.

For the 1997 BLS survey, employers classified as job training and related services reported 5688 nonfatal injuries and illnesses involving days away from work. Sprains and strains occurred most frequently and accounted for 45 percent of the lost workday injuries. The most frequently reported events causing an injury were overexertion (26%), contact with an object or equipment (22%), falls (19%), assaults and other violent acts (6%), and transportation accidents (6%). The people injured most frequently were managerial and professional staff members (31%); operators, fabricators, and laborers (28%); and service personnel (23%).[34]

In a 1993 interpretation letter, the chief of OSHA's Office of Statistics wrote that a sheltered workshop should be assigned the four-digit SIC code for job training and vocational rehabilitation services (8331) only when this, not manufacturing, was the primary function of the business.[35] This interpretation may cause confusion at a sheltered workshop because these two activities are interrelated. Sheltered workshop income used to finance worker training and rehabilitation usually comes in large part from manufacturing.

The confusion over SIC codes is illustrated by businesses with "sheltered workshop" in their names being assigned SIC codes other than 8331. Table II lists 10 SIC codes other than SIC 8331 assigned to such businesses that were inspected by OSHA in the 1990s.[36] Some of these SIC codes require that OSHA form 200 be kept, while others do not. Between April 1991 and January 1998, OSHA compliance officers made 21 inspection visits at 12 businesses having "sheltered workshop" in their names. Of the 12 facilities, only four were recorded as SIC 8331. One business inspected three times in seven years was classified as SIC 2499 (wood products), SIC 3999 (miscellaneous manufacturing), and SIC 8331.

TABLE I
Incidence rates[A] of nonfatal occupational injuries and illnesses, 1997[32]

Industry	SIC	Injuries and illnesses	
		Total cases	Lost workday incidence[B]
Private industry	—	7.1	3.3
Manufacturing	20	10.3	4.8
Individual and family svcs.	8320	4.7	2.1
Job training and related svcs.	8330	9.7	4.8
Child day care svcs.	8350	3.0	1.1
Residential care	8360	9.9	4.8
Social svcs. (nec)	8390	3.8	1.6

nec: not elsewhere classified

[A]Incidence rates represent the number of injuries and illnesses per 100 full-time workers and are calculated as (N/EH) × 200,000, where

N = number of injuries and illnesses
EH = total hours worked by all employees during the calendar year
200,000 = base for 100 equivalent full-time workers (working 40 hours/week, 50 weeks/year)

[B]Total lost workday cases involve days away from work, or days of restricted work activity, or both.

TABLE II
SIC codes other than 8331 of businesses with "sheltered workshop" in their names inspected by OSHA between April 1991 and January 1998

	OSHA 200 required?
24—Lumber and wood products except furniture	Yes
2448—wood pallets and skids	
2491—wood preserving	
2499—wood products not elsewhere classified	
25—Furniture and fixtures	Yes
2522—office furniture except wood	
39—Miscellaneous manufacturing industries	Yes
3949—sporting and athletic goods not elsewhere classified	
3999—manufacturing industries not elsewhere classified	
73—Business services	No
7361—employment agencies	
80—Health services	Yes
8051—skilled nursing care facilities	
83—Social services	No
8361—residential care	
86—Membership organizations	No
8661—religious organizations	

A problem that may affect the recording of injuries and illnesses is whether a sheltered workshop manager considered workers as employees or as clients receiving services. If workers are considered clients, then their injuries and illnesses may not be included in the OSHA form 200 or reported to worker's compensation. Also, sheltered workshop staff volunteers are not legally employees, and their injuries and illnesses may also be underreported.

Recommendations. Whatever the SIC code assigned to a sheltered workshop, an OSHA form 200 should be maintained to document the injuries and illnesses of all workers. Injury and illness incidence rates for sheltered workshops and other job training and related services suggest that keeping OSHA form 200 would help identify hazardous activities. However, because many sheltered workshops have a small number of employees, injury or illness trends may not always be easily discerned. Workers may benefit if OSHA 200 logs from all sheltered workshops in a region or a state were combined for analysis.

Warning Devices and Alarms

Warning devices alert workers when machinery is being used nearby and when a piece of equipment malfunctions. Alarms warn workers when they should evacuate a building in case of a fire or go to a safe area within a building in case of a tornado. However, for some workers with developmental disabilities, warning devices and alarms may cause adverse effects.

For example, when powered industrial trucks or forklifts are used, warning devices (e.g., flashing lights and automatic backup alarms) alert workers that a forklift is nearby. However, at two sheltered workshops, NIOSH researchers found that the backup alarms of forklifts had been intentionally disconnected because the noise caused one or two workers to have epileptic seizures.

OSHA's general industry standards concerning powered industrial trucks do not require warning devices. However, some state OSHA programs have standards for industrial trucks that do require these devices. For example, Michigan's standard (Part 21 R408.12131) requires that "a truck, except a motorized hand truck, shall be equipped with an audible device to warn of approach."

Recommendations. When a forklift without a warning device is in use, a signal person should help the driver warn nearby workers. Fire and tornado alarms should be selected that will not cause workers to have seizures. In an emergency, staff members should be prepared to warn workers who are blind, deaf, or both blind and deaf for whom visual or audible warnings would be ineffective.

Warning Signs

Many sheltered workshop employees cannot read or understand warning signs. For example, posting a sign that reads "Authorized Personnel Only" near an off-limits area would be meaningless to some workers with developmental disabilities. Sheltered workshop managers said that they occasionally developed signs for their workers with cognitive impairments.

Recommendations. Employers should ensure that employees with developmental disabilities understand warning signs. The following guidelines for

selecting warning signs were developed from discussions with people who have had experience communicating with workers with moderate and severe mental retardation. Research is needed to evaluate the applicability and relative importance of these guidelines.

- Select signs with uncomplicated, easy-to-understand figures instead of words. Figure 4 shows a sign used at a sheltered workshop to direct workers to a tornado shelter.
- Use signs conforming to community standards whenever possible. For example, a stop sign may keep workers from entering an off-limits area.
- Do not combine words and pictures on the same sign. Putting these communication methods together may be confusing for some workers.
- Show desired behaviors. Using a slash to show an activity that is not allowed may not be understood. For example, a no smoking sign showing a line across a cigarette may be interpreted as identifying the place to smoke.
- Use attention-getting colors over black-on-white signs.

Workplace Violence

According to 1997 BLS data, assaults caused 6 percent of the nonfatal injuries resulting in days away from work in job-training businesses or related services. Percentages of such injuries for the five previous years (1992–1996) ranged from 4.4 percent to 9 percent. No information was provided on whether workers or staff members were assaulted more often. By comparison, for private industry as a whole in 1997, assaults caused 1.5 percent of all nonfatal injuries involving days away from work.[34]

Little other information was found concerning assaults against workers with developmental disabilities or their supervisors. One author reported that people with disabilities were likely to be victimized by paid caregivers in disability-specific health, education, rehabilitation, or social services. This author also suggested that people with disabilities were often victimized by others with disabilities in segregated services, particularly those in institutions.[2]

Aggressive and violent behaviors may be manifested by people with some systemic disorders or with some neurological disorders (e.g., head trauma, degenerative dementias, and some forms of epilepsy).[37] In addition, toxic levels of some medications and chemicals are associated with mental confusion and fighting.[37]

People with Tourette syndrome may exhibit disruptive behaviors. Tourette syndrome is a neurological disorder characterized by tics (involuntary, rapid, sudden, repeated movements or vocalizations).[38–40] It can occur in association with autism and mental retardation.[39]

Tourette syndrome is popularly associated with uncontrollable utterances of obscenities or profanities, although this manifestation affects a minority of those with the disorder. Also, a small minority of people with Tourette syndrome exhibit sudden, unprovoked episodes of rage, which may be threatening to others. Often, their behavior is complicated because they also have attention deficit hyperactivity disorder.[39]

Recommendations. Like many other workplaces, sheltered workshops should develop violence prevention programs. Specifically, staff members should be trained as to how to manage aggressive behaviors so that they can respond appropriately if they or someone under their supervision is assaulted. These programs should include procedures for reporting assaults and describing the types of incidents to be reported. After an assault occurs, staff members should review the measures taken in response to the incident and identify any mistakes that may have been made and changes needed to prevent similar incidents from reoccurring.[41]

Workers with developmental disabilities should receive violence-prevention training in personal safety skills and assertiveness. Also, background checks of staff-member applicants are essential to prevent hiring someone who has committed an assault.[2]

FIGURE 4
A sign used at sheltered workshop to direct workers to a tornado shelter.

Conclusion

Issues needing research are described in this report. However, obtaining the consent of prospective study participants may be necessary for some studies. An employer of workers with developmental

disabilities who is asked to collaborate in a research study, should remember that the capability of such workers to make competent and informed decisions about participation will vary considerably. Thus, an inquiry into each prospective subject's decision-making ability will be necessary to determine the people able to make decisions independently and those needing assistance from a family member or legal guardian.[42]

The United States had no specific policy concerning research involving people with mental disabilities when the National Bioethics Advisory Committee (NBAC) was established in 1995. In 1998, this committee completed a report, *Research Involving Persons with Mental Disorders That May Affect Decisionmaking Capacity.*[43] The NBAC report contains recommendations concerning informed consent that should be reviewed when a study that will involve people with developmental disabilities is proposed.

This report is meant to increase awareness of health and safety issues affecting workers with developmental disabilities. Awareness of such issues by sheltered workshop managers and staff members may be especially important because no group of workers is likely more dependent on others for protection than people with developmental disabilities. This report will hopefully prompt employers of people with developmental disabilities to review their health and safety programs and ensure that their employees are well protected.

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Appendix: Defining Handicap, Disability, and Impairment

Of the terminology used to discuss issues concerning people with disabilities, *handicap, disability*, and *impairment* may cause the most confusion. Thus, the following definitions should clarify the differences among these terms.

Disability

> A disability is any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being (*The International Classification of Impairments, Disabilities, and Handicaps* [WHO 1980]).
>
> A disability is a condition that impairs or imposes restrictions on a person's ability to function at normal or expected levels of mental or physical activity (*Encyclopedia of Disability and Rehabilitation* [1995]).

While these definitions are not inappropriate, they tend to describe disability in a negative way, as a reduction or deviation from "normal." A person having a disability may therefore be viewed incorrectly as someone of less value or ability, or who is restricted, deprived, or deviant.

The meaning of disability changes depending on whether the environment and public attitudes accommodate a disability. The following definition describes disability in a way that reflects the social component.

> A disability is the environmentally determined effect of an impairment that, in interaction with other factors and within a specific social context, is likely to cause an individual to experience an undue disadvantage in his or her personal, social, or professional life. (*ILO Encyclopaedia of Occupational Health and Safety* [1998]).

While this definition is less negative and less discriminatory than the first two, some people with severe impairments would still experience substantial limitations even in an ideal and understanding environment. In such cases, the disability is primarily based in the impairment and not in the environment.

Handicap

A handicap is a problem or barrier for a person imposed by society, the environment, or by one's own self. Thus, disability and handicap are not

synonymous. For example, the misconception that someone with mental retardation is unable to work is a handicap that hinders the person from achieving his or her full potential.

Impairment

An injury, loss, or abnormality of psychological, physiological, or anatomical structure or function. An impairment can be temporary or permanent.

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