

Occupational Blood Lead Surveillance Of Construction Workers

Health Programs in Twelve States

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Readers of this report may want to consult a companion report by Pierre Erville, *Implementing Lead-Safe Work Practices and Policies for Steel Structures: Transportation Agency Policies in Twelve States* (report OSH1-96).

Abbreviations

ABLES	Adult Blood Lead Epidemiology and Surveillance
BLL	Blood lead level
CDC	Centers for Disease Control and Prevention
CIH	Certified industrial hygienist
CRISP	Connecticut Road Industry Surveillance Project
DLI	Department of Labor and Industries
DOT	Department of Transportation
DPH	Department of Public Health
MIOSHA	Michigan Occupational Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
OSHA	U.S. Occupational Safety and Health Administration
SIC	Standard Industrial Classification
µg/dl	Micrograms per deciliter
ZPP	Zinc protoporphyrin

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In recent years, the United States has faced an aging transportation infrastructure in serious need of repair, rehabilitation, and replacement. This need has been particularly severe in the Northeast. In the past, lead-based paint had been applied to virtually all of these structures nationwide and much of the paint remains. As a consequence, there is growing concern about the risk of lead contamination to the environment and to construction workers during rehabilitation activities. Both nationally and state by state, departments of health, labor, and transportation have mounted efforts to control these exposures. The National Institute for Occupational Safety and Health (NIOSH) currently has a program known as Adult Blood Lead Epidemiology and Surveillance (ABLES). The program provides funding and technical support to states establishing surveillance and intervention systems to document and prevent adult lead poisoning in high-risk industries and occupations, including construction.

The Mount Sinai School of Medicine, Center for Occupational and Environmental Medicine, and the New York State Department of Health, Division of Occupational Health and Environmental Epidemiology, conducted a survey of 12 state agencies with jurisdiction over adult blood-lead surveillance, in most cases the department of health. The survey was designed to (1) examine trends in lead surveillance activities both in general and specific to construction, (2) explore the degree to which cooperative efforts have emerged among state agencies to address construction-worker lead exposures and the degree to which these efforts are a response to infrastructure work in that state, and (3) document perceived barriers to program development and implementation.

In a companion survey, the Alliance to End Childhood Lead Poisoning surveyed state departments of transportation (DOTs) in the same 12 states. The purpose of that survey was to determine the extent to which DOTs were using specifications in their contracts for worker lead protection, and to assess the factors mitigating for or against their use. These two surveys are part of a broader study being conducted by the Center to Protect Workers' Rights to assess the efficacy of using contract specifications as a tool to strengthen worker protection during industrial steel rehabilitation.

Background: Lead-Poisoning Registries

In the early 1980s, states began developing surveillance systems for adult lead poisoning. States established legal requirements mandating the reporting of elevated blood lead levels to a specific state agency, usually the department of health. (The definition of an "elevated" blood lead level varies among states.) Adult lead registries rely on laboratory and/or physician reporting of blood lead levels. In some instances, states also require employers to report blood lead levels (BLLs). For numerous states, these reporting requirements also extended to other heavy metals like arsenic, cadmium, and mercury. Among the states with heavy metal registries, lead poisoning is the most frequently reported poisoning.

Registries have a dual purpose. First, registries serve a surveillance function. They collect and analyze data to look for trends in and distribution of adult lead poisoning. Categories examined include industry, occupation, geographic location, and time period. Detecting such trends can be useful for determining programmatic priorities for research and prevention initiatives and in evaluating the effectiveness of intervention strategies. Second, registries serve a preventive and intervention function by providing lead-poisoned persons with information on the health hazards of

lead and methods to control exposures, as well as information on appropriate medical care. In addition, registry staff ascertain whether other individuals, such as coworkers or family members, are similarly exposed. Information may also be provided to the physician and/or employer, depending on the severity of the case. In some instances, an industrial hygiene investigation occurs.

Both surveillance and prevention/intervention are labor intensive, often requiring extensive telephone follow-up with the physician, employer, and lead-poisoned individual to gather appropriate information on the nature and extent of exposure and to initiate appropriate intervention activity. In addition, at times onsite visits are required. Adult lead registries report poisonings from a range of settings including hobbies, home repair, and work. However, most reports come from the workplace.

Survey Method

Currently, 23 states have blood lead registries (box 1). Nine other states are developing them. The 12 states in our sample were selected based on (1) geographic diversity (states from the Northeast, Southeast, Midwest, and West Coast were chosen), (2) diversity in program content and development, and (3) extent of infrastructure repair. Eleven of the 12 states surveyed require adult blood lead levels to be reported (see annex A).

The survey questionnaire (annex B) was developed to address the goals of the study. Trends in surveillance were examined by asking questions related to registry organization, data collection, and response protocols. The surveyed agencies were asked if they had initiated special lead-emphasis programs or programs targeting construction-related exposure. Where such programs did exist, details were elicited on interagency cooperation and enforcement, including the use of contract specifications in these programs. NIOSH and selected state department of health staff reviewed the questionnaire in order to ensure that terminology and organization were clear and correct.

Study participants were representatives from state agencies involved in lead surveillance. These representatives were identified in consultation with NIOSH's ABLES program and the Center to Protect Workers' Rights. Once the appropriate person to interview was identified, the individual was sent a copy of the questionnaire and a letter outlining the purpose of the study. The survey was then completed by telephone interview. Additional documentation, such as supporting laws and regulations, and surveillance protocols, was requested from each survey participant. The questionnaires were then summarized and forwarded to the individual interviewed for comment and clarification.

Box 1. States with blood lead registries

Alabama	New York
Arizona	North Carolina
California	Oklahoma
Connecticut	Oregon
Illinois	Pennsylvania
Iowa	South Carolina
Maine	Texas
Maryland	Utah
Massachusetts	Vermont
Michigan	Washington
New Hampshire	Wisconsin
New Jersey	n

General Findings

Trends in Surveillance

Eleven of the 12 states surveyed required blood lead levels to be reported to a state registry (table 1). (Georgia has no reporting requirement.) Eight registries are located in departments of health (or the equivalent), two in departments of labor, and one in a department of environment. Of the 11 states surveyed that collect blood lead data, most have a strong emphasis on identifying and intervening in work-related lead poisoning cases.

Reporting requirements about who must report and what must be reported affect reporting levels. Some states require that all blood lead levels be reported, while others have threshold levels or other reporting qualifications. Most states require clinical laboratories conducting blood lead analysis to report BLLs to the state registry. In many instances, physicians are also required to report. In general, laboratory compliance with reporting appears to be significantly better than physician compliance. For instance, in Connecticut where both physicians and laboratories are required to report, less than 5% of the reports received from laboratories were also received from the physicians ordering the test. Other states have reported similar experiences. In Michigan and Texas, laboratories and physicians are required to report only what they determine to be *occupationally* related poisonings. This, too, seems to adversely affect reporting levels.

Reporting and Intervention Thresholds

Mandated reporting thresholds vary from state to state, ranging from all blood lead levels (New York, Ohio, and Washington) to reporting thresholds of 40 micrograms per deciliter ($\mu\text{g}/\text{dl}$) (Texas). Several states recently lowered reporting thresholds or indicated there were efforts under way to reduce reporting thresholds. In general, there appears to be a trend toward lowering the reporting threshold. This trend is probably influenced by reductions in threshold limits for childhood lead poisoning as recommended by the U.S. Centers for Disease Control and Prevention (CDC) and by the fact that more states are moving toward electronic reporting by laboratories, enabling the states to handle large quantities of data at greater speeds. Additionally, some state agency staff have noted that some laboratories already report all BLLs rather than only those above a threshold level, presumably for reasons of administrative ease.

The trigger level at which agencies initiate intervention activities also varies from state to state. This variation seems largely dependent on staff resources. In the best circumstances, states initiate intervention activities for cases with BLLs between 20 and 25 $\mu\text{g}/\text{dl}$. These levels are in keeping with recommendations issued by the U.S. Department of Health and Human Services in *Healthy People 2000*, which lists national health promotion and disease prevention objectives.¹ In some other states,

¹U.S. Department of Health and Human Services, Public Health Service, DHHS publication # PHS 91-50212, Washington, D.C., 1990.

Table 1. Reporting of adult blood lead levels in 12 states, 1995

State	Legal requirement? ^a	Who reports to state ^b	Reporting threshold (µg/dl) ^b	Action taken?	Blood lead level (µg/dl) triggering state action
California	Y (1986)	L	25	Y	40
Connecticut	Y (1973)	L, P	10 (L); 20 (P)	Y	20
Georgia	N	—	—	—	—
Louisiana	Y (1988)	None specified	None specified	None specified	None specified
Maryland	Y (1988)	L	25	Y	Case by case
Massachusetts	Y (1990)	L	15	Y	40
Michigan	Y (1978)	C; E; P	None specified	Y	50
New Jersey	Y (1985)	L; P	25	Y	40
New Yor	Y (1981)	L	All levels reported	Y	25
Ohio	Y (1994)	L, P	All (L); 40 (P)	Y	—
Texas	Y (1985)	L, P	40	Y	60
Washington	Y (1993)	L	All levels reported	Y	25

a. Year of the law’s passage is given in parentheses.

b. C= clinic; E=employer; L=laboratory; P=physician

Note: For details, see individual state summaries (annex A).

where staff resources are more limited, follow-up intervention begins at 40µg/dl. Other states, such as Michigan and Texas, initiate intervention at much higher levels (50 - 60 µg/dl).

The nature of follow-up varies from state to state — again as a consequence of staff resources. Case follow-up is a labor-intensive activity. Depending on the severity of the case, follow-up can consist of (1) phone contact with the physician, employee, and employer; (2) provision of informational material; (3) an industrial hygiene inspection; or (4) referral of a case to state or federal OSHA for inspection. Follow-up also requires departmental expertise in data management and analysis as well as in occupational disease intervention.

Lead-in-Construction Programs

The survey identified a range of surveillance and intervention programs within departments of health

or other state agencies designed to target construction-related activities (table 2). At one end of the spectrum are states with more-developed construction-emphasis programs (Connecticut and New

Table 2. Programs for worker lead protections in construction, 12 states, 1995

State	Adult blood lead registry?	Interagency lead program?	Construction-emphasis program?	Structural steel? ^b	Contract specs used?	Special funds separate from registry?
California	Y (DHS) ^a	N	N	—	—	—
Connecticut	Y (DPH)	Y (DOT, DPH, Yale, OSHA)	Y	Y	Y	Y
Georgia	N	No	N	—	—	—
Louisiana	Pending	Pending (DEQ, OPH) ^a	N	—	—	—
Maryland	Y (MDE) ^a	N	N	—	—	—
Massachusetts	Y (DLI-DOH) ^a	Y (DLI-DOH, ^a Mass. Hwy Dept.)	Y	Y	Y	N
Michigan	Y (DPH)	Y (DOT, DPH, MIOSHA)	Y	Y	N	N
New Jersey	Y (DOH)	Y (DOT, OSHA, Dept. of Health)	Y	Y	Y	N
New York	Y (DOH)	Proposed (DOH, DOT, Mt. Sinai) ^b	Proposed	Y	Proposed	Proposed
Ohio	Y (DOH)	N	N	—	—	—
Texas	Y (DOH)	N	N	—	—	—
Washington	Y (DLI)	N	N	—	—	—

a. DHS=Department of Health Services; MDE=Maryland Department of the Environment; DEQ=Department of Environmental Quality; OPH=Office of Public Health, Department of Health and Hospitals; DLI-DOH=Division of Occupational Hygiene, Department of Labor and Industries. Other abbreviations, used throughout this report, are spelled out on the inside front cover.

b. “Structural steel” covers the range of structural-steel work in which lead exposure is possible, including construction, demolition, and rehabilitation.

Note: The scope of each program is described in the state summary (see annex A).

Jersey). At the other end of the spectrum are states that neither have programs nor are considering the development of such programs. Within this range are states that either are involved in limited programs (formal and informal) or are considering in the development of such programs. For example, California has outreach programs to educate contractors and workers through forums and

meetings and provides onsite consultation services. Discussion with registry staff revealed that most states recognize the benefits from and need for such focused programs and, given the resources, would initiate such programs.

The Northeast appears to be a seminal region for the development of construction-emphasis programs. This is likely, at least in part, to be due to the magnitude of infrastructure work under way in the region. The Connecticut Road Industry Surveillance Project (CRISP), New Jersey's lead control program for rehabilitation of steel structures, and New York's proposed centralized surveillance project are examples of ways to address the growing problem of lead exposure in construction. Each of these programs focuses on infrastructure work and is a joint interagency effort between the registry agency and DOT. These states are using contract specifications as a tool to ensure contractor compliance with features of the lead health and safety requirements, including blood lead testing and review of the results. A key feature of these programs is the collection, review, and use of blood lead data by the DOT and the registry as a tool to identify overexposures early and to initiate control measures.

Conclusions

Several conclusions can be drawn from the information gathered in this survey.

1. Officials in most of the states surveyed are aware of the problem of lead exposure in the construction trades. This awareness is undoubtedly fueled by the 1993 OSHA Lead Exposure in Construction standard² and by the renewed focus on infrastructure repair in certain areas of the country. In addition, apparently as a result of the standard, registries have noted an increase in blood lead testing for construction workers.
2. More often than not, the extent of data collection and intervention (including the levels of blood lead at which action is taken) is set on the basis of available resources, rather than on prudent public health policy. Registries and related programs tend to be underfunded, understaffed, and overextended.
3. The data collected suggest that the number of construction workers with blood lead levels ≥ 40 $\mu\text{g}/\text{dl}$ is underestimated because of poor contractor compliance with OSHA biological monitoring requirements. The data suggest also that the proportion of workers with blood levels of 40 $\mu\text{g}/\text{dl}$ and above (including greatly elevated levels of 60 $\mu\text{g}/\text{dl}$ and above) is greater in construction as compared to general industry.
4. It is difficult to determine work-relatedness of lead exposures. Accurate occupation and industry information is not often recorded on the laboratory slip or registry form. Tracking this information then becomes labor intensive, difficult, and expensive.
5. There is no direct way to account for the number of construction workers potentially exposed

² U.S. Occupational Safety and Health Administration. Lead Exposure in Construction; Interim Final Rule. 29 CFR Part 1926. Federal Register 58(84): 26590-649, May 4, 1993.

to lead and not tested. The effectiveness of laboratory-driven registry systems is dependent on individuals being tested. Clearly, these registries become more effective in tracking trends in disease where regulations requiring blood testing are enforced (for instance, by OSHA).

6. Interagency cooperative efforts appear to have been successful at controlling lead exposures at bridge rehabilitation and demolition sites by using lead-specific contract specifications. The Connecticut Road Industry Surveillance Project (CRISP), in particular, has documented a reduction in BLLs as a result of the program.
7. It is difficult to compare the prevalence of elevated blood lead levels in construction among the surveyed states. This is largely because of variations in reporting requirements and inadequate information about the occupation and industry of reported lead-exposure cases.
8. The data suggest that there is significant underreporting of blood lead levels of 25 µg/dl or greater in the construction industry. For instance, although Texas and California have construction industry workforces that are, respectively, 42% and 78% greater than that in New York, Texas reported only 7 construction-related blood leads at that level and California reported only 158. These numbers are substantially less than the 352 reports received by New York. Also, given the sheer number of people working in the construction industries in these states — 355,210 in Texas and 445,710 in California, compared with 250,140 in New York — it seems reasonable to assume that more than, say, 6 or 158 construction workers in Texas and California are being overexposed to lead. This observation does not mean to imply that there is no underreporting in New York. Registry staff from several of the states, including New York, suspect there is substantial undertesting and underreporting of blood lead levels among construction workers. However, we believe that reporting levels are increasing with greater rates of compliance with the lead standard.

Recommendations

Uniform Data Collection

In order to develop a better system for tracking blood lead levels from state to state and nationwide, given the limited resources presently available, NIOSH should intensify its efforts to develop a uniform data collection system. Specifically:

- All blood lead test results should be reported, regardless of level or work-relatedness.
- Actions should be taken to increase the reporting of occupation and industry with blood lead level results.
- Registries — not physicians, employers, or laboratories — should be charged with determining work-relatedness of a blood lead level. Additionally, registries, and not the reporters, should assign standard industrial classification (SIC) codes, to improve the completeness and accuracy of the data.

Increased Funding

Because of the significance of their public health function, the surveillance and intervention activities of the registries should be funded at much higher levels. NIOSH support and development funding through the ABLES program should be maintained (and even increased). Additionally, state government resources must be sought. For instance, interagency cooperative efforts can help fund registries. California has developed a unique user-fee assessed on industries within specifically identified standard industrial classification codes where lead poisoning cases have previously occurred. This fee supports California's entire occupational lead registry program.

Interagency Cooperation

State governments should foster interagency cooperation between transportation agencies and agencies involved in worker safety and health to develop joint programs aimed at protecting workers from lead exposure. Because health agencies appear to be more proactive as far as worker protection is concerned, they should initiate interagency cooperative efforts. Building and construction trade unions should be called upon to participate in such efforts.

Annex A. State Summaries

California

Occupational Blood Lead Registry

In 1986 California passed legislation requiring all laboratories to report blood lead levels for adults and children to the Department of Health Services. The adult occupational blood-lead reports are entered into the Occupational Blood Lead Registry, which is managed by the Occupational Lead Poisoning Prevention Program in the Department of Health Services. The current reporting threshold is 25 µg/dl, but regulations are in development to require reporting at all blood lead levels.

Blood Lead Levels

In 1993, the Occupational Lead Poisoning Prevention Program received 3,498 reports ≥ 25 µg/dl in 1,688 individuals; in 1994 there were 3,114 reports in 1,337 individuals. These individuals were all occupationally exposed; cases identified as non-occupational are not entered into the registry.

Follow-up Protocol

BLL 40 µg/dl - 59 µg/dl

1. An educational packet is sent to the workers and permission is requested to send educational materials to the employer. The phone number for the Occupational Lead Poisoning Prevention Program and other resources are provided if there are unanswered questions.

BLL 60 µg/dl and above

1. Telephone interviews are conducted with workers, employers, and physicians, and educational packets provided to all.
2. Employers are provided with recommendations and put on a time line to correct identified hazards. They must report, in writing, what has been accomplished, and BLLs are reviewed periodically.
3. Employers who do not correct significant hazards are referred to CalOSHA for enforcement.

Referrals to OSHA

The Occupational Lead Poisoning Prevention Program does not routinely report blood lead levels to OSHA. However, employers are reported to CalOSHA who have refused to cooperate b correcting significant hazards identified through follow-up of B ≥ 60 µg/dl. Fewer than five employers are referred per year.

Special Construction Lead Initiatives

The current major activity of the Occupational Lead Poisoning Prevention Program that focuses on the construction industry is the California Painters Project, an intervention research effort jointly funded by the Department of Health Services and NIOSH. The project involves 21 residential and commercial painting contractors and about 130 employees, union and non-union. The project was initiated in June 1994 with pre-intervention blood lead level and zinc protoporphyrin (BLL/ZPP) testing and interviews to assess exposure potential and existing practices (the companies did not have lead safety programs in place). Intervention activities during the 1994 summer painting season included 3½ days of employer training, 8-hour worker training, and onsite demonstrations of paint-chip and air sampling. The Occupational Lead Poisoning Prevention Program completed 11 site visits, which included air monitoring workers using different surface preparation techniques and paint-chip sampling. Follow-up BLL/ZPP testing was conducted in November 1994 and a final evaluation phase was conducted during summer 1995 to determine the lasting effects of the intervention.

Work-related blood lead cases, California, 1993

(number)

Blood lead level (µg/dl)	Construction	General industry
25-39	107	1,167
40-59	42	311
60-79	8	31
80+	1	4
Total	158	1,513

Note: The Occupational Lead Prevention Program received 3,498 reports involving 1,688 individuals.

Connecticut

Adult Blood Lead Epidemiology and Surveillance Program

Connecticut legislation, originally passed in 1973 and revised most recently in 1992, requires reporting of all adult and child blood lead levels of 10 µg/dl and above. Blood lead levels are reported to and tracked by the Adult Blood Lead Epidemiology and Surveillance (ABLES) program, located in the Connecticut Department of Public Health. All clinical laboratories are required to report blood lead levels above 10 µg/dl in order to maintain their state license. Separate legislation mandates that physicians report blood lead levels of 20 µg/dl and above.

Blood Lead Levels

In 1994, 1,583 cases of adult blood lead levels over 10 µg/dl were reported. Because many of these cases were not identified by SIC code and data on occupation were incomplete, it was not possible to accurately determine how many of these were occupationally related. However, of the 50 blood lead levels of 40 µg/dl and above that were identified as construction or industry related, 35 (70%) represented individuals working in construction.

Follow-up Protocol

Below is a description of the protocol, based on blood lead level:

BLL 10-19 µg/dl - entered into ABLES data base

BLL 20 µg/dl and above - employee letter and survey

1. A letter and a lead factsheet are mailed to the individual. The individual is also requested to complete a one-page survey with questions on occupation, hobbies, children, and so on, and to return the survey to the registry. About 35% of the survey forms are returned.
2. If a survey is not returned in 30 days, a follow-up survey is mailed.

BLL 40 µg/dl and above - employer letter/employee phone interview

1. The registry sends the employer one of two standard letters, depending on whether the employer is in industry or is a construction participant in the Connecticut Road Industry Surveillance Project (see *Structural Steel*, below).
2. The registry conducts a phone interview with the employee if demographic information is available.
3. If the registry is unable to contact the employee and the cause of exposure is unknown, the local health department director is notified and the local health department conducts an epidemiological investigation.

Referrals to OSHA

If an employer does not respond to notification from the registry, the employer is referred to federal OSHA in accordance with a memorandum of understanding. Connecticut provides OSHA with aggregate data on blood lead levels, but individual blood lead levels are not reported.

Special Construction Lead Initiatives

Residential deleading. Since 1992, Connecticut has had regulations regarding lead abatement and inspection for residential projects. Certification for individuals doing lead abatement and licensure for companies and entities contracting to do abatement in residential buildings and buildings frequented by young children are voluntary. Legislation to make these regulations mandatory has been submitted. Under this legislation, licensure and certification would come under

the auspices of the Connecticut Department of Public Health, Childhood Lead Poisoning Prevention Program. The Department of Public Health would continue to approve all training courses, process licensure and certification applications, audit training providers and abatement contractors, and provide enforcement.

*Structural steel.*³ In 1990, Connecticut began the Connecticut Road Industry Surveillance Project (CRISP), a state-wide medical surveillance program designed to prevent lead toxicity in bridge workers. The program focuses on bridge steel structure construction and rehabilitation and involves the Connecticut Department of Transportation, the Connecticut Department of Public Health, and Yale University.

The program has two basic components: (1) contract language requiring contractors to institute a lead health protection program and (2) a centralized medical data management system designed and run by health professionals, including a medical director and a certified industrial hygienist (CIH). This specialized registry monitors the blood lead levels of all enrolled bridge workers to permit quick identification of workers with high blood lead levels. The program also includes a quality assurance program to ensure that the companies involved act to reduce exposures.

As part of the lead health protection program, contractors must implement comprehensive lead control measures where lead exposure is likely. A CIH or an individual under the supervision of a CIH must be on site on a day to day basis to enforce these measures. The cost of the CIH is funded by the Connecticut Department of Transportation and passed through the contractor. Contractors participating in CRISP are required to send their employees to CRISP-authorized clinics for medical examinations and evaluations. Workers are tested monthly for blood lead and zinc protoporphyrin levels. Blood test results are sent to the Department of Public Health blood lead registry.

The Department of Public Health tracks blood lead levels reported as part of CRISP and informs the CRISP CIH when a blood lead level of 20 µg/dl or above is reported. The CRISP CIH investigates all such cases via telephone interview with the onsite industrial hygienist and occasionally conducts an industrial hygiene investigation of the worksite. The steps taken by the company to deal with the problems are evaluated by the CRISP CIH and CRISP medical director. The CRISP CIH also reviews the monthly reports that must be submitted by the industrial hygienists working on CRISP job sites.

The Connecticut Department of Transportation is primarily responsible for enforcement via the onsite industrial hygienist. Assistance is provided by the Department of Public Health and CRISP through in-kind staff for data collection and/or intervention. Medical surveillance and intervention protocols are agreed upon by the Department of Public Health and CRISP. If a company does not respond to inquiries or suggestions made by the CRISP CIH, the company is referred to federal OSHA as outlined in a memorandum of understanding between OSHA, CRISP, and the Connecticut

³“Structural steel” covers the range of structural-steel work in which lead exposure is possible, including construction, demolition, and rehabilitation.

Department of Transportation.

CRISP was funded by NIOSH through Yale University on a 5-year grant which ended in June 1995. Although this funding is no longer available, the core functions of CRISP have been maintained by the Connecticut Department of Transportation and Public Health. Yale University has received funding through 1996 to assess the prevention effectiveness of this program.

Work-related adult blood lead cases, Connecticut, 1994

(number)

Blood lead level (µg/dl)	Construction, SIC 15-17	General industry
Less than 25 µg/dl	141	176
25-39	75	76
40-59	25	11
60-79	9	3
80+	1	1
Total	266	267

Note: Of the 3,018 adult blood level reports received in 1994, 1,583 were separate cases. Thirty-three percent of these cases were identified as occupationally related. This number is low because if a case is not identified by standard industrial classification (SIC) code, as many are not, it is not recorded as occupationally related. Out-of-state laboratories are requested, but not required, to report blood lead levels and are sent a copy of the Connecticut legislation.

Louisiana

Adult Blood Lead Level Reporting

In 1988, Louisiana adopted legislation defining lead poisoning as a reportable disease. After this legislation was unintentionally deleted, lead poisoning was reinstated as a reportable disease in 1995 when House Bill 1838 was passed. No age limit, blood lead level, or reporting entity was specified in the original or the current legislation. The Office of Public Health (OPH) within the Department of Health and Hospitals receives all blood lead level reports, most of which involve children. Few adult blood lead levels have ever been reported. OPH staff do not know if the low number of blood lead level reports they receive for adults is the result of a lack of work-related activities involving lead exposure, underreporting, or a combination of the two.

Blood Lead Cases

The Office of Public Health is notified of fewer than 200 lead-related cases per year. Most of these cases are children.

Follow-up Protocol

Office of Public Health activities involving lead poisoning involve mainly providing information on lead and the names of resources (such as laboratories that perform lead testing) to concerned parties. OPH has occasionally made phone inquiries to reporting entities to determine if an exposure is work-related.

Referrals to OSHA

Blood lead levels are not reported to OSHA.

Planned Construction Lead Initiatives

Legislation (House Bill 1442) mandating blood lead level reporting for those engaged in lead hazard reduction activities for all structures — residential and structural steel — was passed in 1995. This legislation requires any health care provider to report the identity of persons engaged in lead abatement activities whose blood test results are positive for the presence of lead. The definitions for health care provider and the blood lead level considered positive for the presence of lead have yet to be defined, however. The rulemaking to establish these definitions is in process.

The Department of Environmental Quality (DEQ) and the Office of Public Health are cooperating to work out the details. DEQ will be responsible for training, certification, licensing, and enforcement and has a memorandum of understanding with the Department of Health and Hospitals-Office of Public Health for laboratory services to analyze environmental lead samples. The Office of Public Health will provide advice on medical guidelines and the blood lead-level reporting threshold. The OPH director anticipates that this rulemaking will be consistent with the OSHA regulations (see footnote 2). Contractors and laboratories will be required to report to both DEQ and OPH. A computerized occupational blood lead registry will be maintained by the OPH for blood lead level reports mandated by the legislation.

Maryland

Heavy Metal Poisoning Registry

In February 1988, Maryland adopted regulations (COMAR 26.02.06) requiring laboratories to report the results of tests showing elevated levels of arsenic, cadmium, lead, or mercury in the blood or urine of adults (individuals 18 years old and above) to the Maryland Department of the Environment. All laboratories licensed by the Maryland Laboratory Administration to conduct lead testing in the state must report the results of tests showing blood lead levels equal to or greater than 25 µg/dl.

The registry is primarily responsible for data collection and referral. Cases involving occupational

exposure in a worksite in the state are referred to Maryland OSHA. Other cases are referred to the Environmental Lead Division of the state Department of the Environment or to the U.S. Occupational Safety and Health Administration. The registry also contacts health care providers to obtain case-related information and provide technical and educational assistance.

The registry is state funded. Through a cooperative agreement, the registry receives a small grant from NIOSH, which is used primarily for the production and distribution of educational materials. The registry is staffed by an epidemiologist/program manager and a statistical assistant. These two staff divide their time between the adult lead registry (50%), the childhood lead registry (30%), and other duties (20%).

Blood Lead Levels

In 1993, the adult registry received 557 blood lead levels of 25 µg/dl and above representing 197 cases. Of these, 189 cases were identified as occupational related and 8 as non-occupational. A total of 107 (56.6%) were related to construction.

Follow-up Protocol

Action for follow-up and case management is taken case by case, depending on blood lead levels, source of exposure, potential exposure to other workers, and possibility of environmental contamination. Cases involving occupational exposure in a worksite within Maryland are referred to Maryland OSHA. Cases with potential environmental contamination are sent to both Maryland OSHA and the Environmental Lead Division of the state Department of the Environment. Cases involving out-of-state worksites or those on federal government properties are referred to federal OSHA for possible worksite inspection and/or investigation. These agencies inform the registry if any actions are taken and provide the registry with a final report.

In all cases, the registry attempts by telephone to contact the individual involved to obtain additional information on sources of exposure, work practices, personal hygiene, and possibility of take-home lead exposure. During the discussion, the registry provides information about lead exposure reduction at work or at home and answers any lead-related questions. The individual is encouraged to have family members, especially children under the age of six years and pregnant relatives, tested for lead. In addition, an educational pamphlet on lead is mailed to the individual. On occasion, individuals are contacted more than once to check on their health status and that of their family members.

Referrals to OSHA

Referrals are handled case by case.

Special Construction Lead Initiatives

The Maryland Department of the Environment, in collaboration with the University of Maryland's Occupational Health Center, has requested a grant from NIOSH to develop an intervention model to

reduce lead exposure among construction workers, particularly minority workers.

Residential deleading. The Environmental Lead Division has regulatory authority for lead abatement in residential property under COMAR 26.02.07. Referrals from the registry bring improperly abated properties to the attention of Environmental Lead Division for investigation and therefore broaden the base for Environmental Lead Division compliance activities.

Structural steel. In the early 1980s, Maryland OSHA began what they term a local-emphasis program. Although this program covers all construction work where there is occupational exposure to lead, the chief concerns are demolition and bridge rehabilitation. Maryland OSHA identifies cases using OSHA definitions and tracks them by employer name. Early in the history of the Maryland lead standard, Maryland OSHA used this tag list to develop a scheduled general investigation program. This aspect of the program has been discontinued because of limited resources. Now the program is mainly for information gathering. Current investigations are instigated for the most part in response to employee complaints.

Work-related blood lead cases, Maryland, 1993

(number)

Blood lead level (µg/dl)	Construction	General industry
25-39	60	60
40-59	34	16
60-79	8	4
80+	5	2
Total	107	82

Massachusetts

Occupational Lead Poisoning Registry

In 1990, Massachusetts passed a law mandating that all clinical laboratories report blood lead levels of 15 µg/dl or greater to the Massachusetts Department of Labor and Industries. This applies to all cases involving individuals older than 15 years. The Occupational Lead Poisoning Registry is located in the DLI's Division of Occupational Hygiene. The Department of Labor and Industries has primary responsibility for data collection and follow-up activities. In addition, the Massachusetts Department of Public Health works with the Department of Labor and Industries, assisting with data analysis and issuance of periodic statistical reports.

The reporting requirement applies to Massachusetts labs that perform onsite analysis of blood lead samples as well as in-state laboratories that send blood lead specimens out of state for processing.

The law also requires health care providers, upon written or telephone request, to help the DLI Division of Occupational Hygiene to complete information that might be omitted from the laborator report. This includes information on the patient's address and phone number, race/ethnicity, date of birth, exposure circumstances, occupation, and employer. The law also has a confidentiality requirement, specifying that clinical laboratory reports and provider information be kept confidential and not part of the public record. The one exception to this confidentiality clause is that the Department of Public Health has full access to reports and provider information for research and analysis.

Blood Lead Levels

In 1991-93, 1,320 cases of adult lead poisoning (25µg/dl and above) were reported to the registry. Of these cases, 381 had blood lead levels 40 µg/dl and above, with 86% determined to be occupationally related. Almost two-thirds (63%) of the work-related cases (40µg/dl and above) occurred in construction.

Follow-up Protocol

Although the Massachusetts law requires reporting of all blood lead levels at 15 µg/dl or above, staffing limitations permit follow-up activities only for cases at 40µg/dl or above. Below is a description of the protocol, based on blood lead level:

BLL 40 µg/dl and above - phone interview/information sent

1. The physician ordering the blood test is called and additional information is gathered about the patient's address/phone, work-relatedness of the blood lead level, and the employer. The physician is sent information on lead poisoning.
2. The patient is called. If the blood lead level is believed to be work related, the Department of Labor and Industries gathers more information on the exposure circumstance and determines if co-workers might be exposed. Information is sent on lead poisoning.
3. Unless the Department of Labor and Industries is considering doing an inspection, the employer is not called.

BLL 50 µg/dl and above - case considered for inspection

Multiple cases at a BLL 40 µg/dl and above - considered for inspection

House painters - information sent

In the case of house painters, the Department of Labor and Industries sends a letter and educational material, along with information on the OSHA 7(c)1 Consultation Program.

Referrals to OSHA

In general, the Division of Occupational Hygiene does not report blood leads to OSHA, because of confidentiality requirements specified in the law.

Special Construction Lead Initiatives

Massachusetts has two construction-emphasis initiatives, one focusing on residential deleading and the other on structural steel projects.

Residential deleading. In 1988, regulations governing residential lead abatement took effect. The Massachusetts Department of Labor and Industries, Division of Asbestos and Lead Inspection, is responsible for licensing contractors involved in lead abatement, certifying training providers, and enforcing minimum work standards to protect inspectors, deleaders, renovators, rehabilitators, and the general public. The regulations also established medical monitoring requirements for workers employed on deleading sites and required reporting of all blood leads to the DLI Division of Asbestos and Lead Inspection. A blood lead level of 40µg/dl or greater triggers an inspection by DLI staff, as does a complaint. Blood lead levels 15µg/dl and above are also reported to the Occupational Lead Poisoning Registry as a result of the 1990 laboratory reporting requirement described above.

Structural steel. In 1994 the Massachusetts Highway Department incorporated a requirement in contract specifications requiring all contractors to report blood leads to the Occupational Lead Poisoning Registry. Blood lead levels are reported indicating the name of the worker and contractor. Although the work site is not reported, this can be determined through a follow-up phone call. The program focuses on structural steel projects, such as bridges and overpasses.

In this interagency initiative, the Massachusetts Highway Department enforces the contract and the Division of Occupational Hygiene lead registry tracks lead levels. The Division of Occupational Hygiene enters the blood lead levels and keeps a running list of blood lead levels, by company and person. If blood leads are not reported at expected intervals, the Division of Occupational Hygiene calls a Highway Department staffer responsible for that particular project.

There is no special staff funding associated with this project.

Proposed initiative. A memorandum of agreement is being discussed involving the Division of Occupational Hygiene, the Massachusetts Highway Department, and OSHA. The memorandum of agreement would lay out a framework in which the Highway Department automatically would refer blood leads of 50 µg/dl and above to OSHA. For blood lead levels below 50 µg/dl, cases would be referred to the Division of Occupational Hygiene.

Michigan

Occupational Disease Reporting

The Michigan Occupational Disease Reporting Law, passed in 1978, requires physicians, clinics, and employers to report all known or suspected cases of occupational disease to the Department of Public Health, Division of Occupational Health. The reporting of work-related lead poisoning falls under this requirement. Laboratories, however, are not required to report. The Bureau of Child and Family Health, which maintains a child and adult lead-poisoning registry, also refers cases determined to be work-related to the Division of Occupational Health. The Occupational Disease Reporting Law does not specify a threshold for reporting blood lead levels.

Michigan has a state-run OSHA, known as MIOSHA. The Department of Public Health-Division of Occupational Health and the Department of Labor share responsibility for MIOSHA. The Division of Occupational Health handles health investigations and the Department of Labor handles safety investigations.

Blood Lead Levels

In 1994, the Division of Occupational Health received 60 reports of occupationally related lead poisoning. Although these numbers are small, 60% of the cases occurred in construction, with more than 94% of the construction reports at 40 µg/dl and above.

Follow-up Protocol

Blood lead reports of 50 µg/dl or greater trigger a MIOSHA compliance investigation by the Division of Occupational Health.

Special Construction Lead Initiative

Beginning in the summer of 1994, the Division of Occupational Health initiated a program with the Michigan Department of Transportation (DOT) to target steel structure rehabilitation on highways and bridges. DOT provides a list of projects occurring in the summer. The Division of Occupational Health, acting in its capacity as MIOSHA, does random compliance inspections looking for a range of problems in addition to lead, such as violations of the OSHA hazard communication standard and excess noise. Safety problems are referred to the Department of Labor. This program is based on an informal agreement with the state DOT and was repeated during the summer of 1995.

Proposed Initiative

The Michigan Department of Public Health is proposing a change in administrative rules that would require clinical laboratories to report all venous blood lead levels 15 µg/dl or greater for children up to 15 years of age to the Department of Public Health within 48 hours. In addition, the rule change

would require clinical laboratories to report blood lead levels 30 µg/dl or greater for individuals 15 years or older within five days of analysis. In the case of adults, the physician ordering the test would be required to provide basic patient information (name, address, phone, social security number, and so on), including employer and occupation.

New Jersey

Occupational Lead Registry

In October 1985, New Jersey passed a law requiring all laboratories to report elevated blood lead levels to the New Jersey Department of Health. The law was amended in 1990 to require that physicians also report. Laboratories and physicians are required to report all blood lead levels 25 µg/dl or greater. The registry is administered by the Department of Health, Occupational Health Surveillance Program.

Blood Lead Levels

In 1994, the registry received 1,906 reports on blood lead levels of 25 µg/dl or above for 741 individuals. Eighty-eight percent of the cases were identified as occupationally related.

Follow-up Protocol

Because of staffing limitations, New Jersey is able to follow up only on blood lead levels of 40 µg/dl or greater. However, data collection and analysis begin at 25 µg/dl. Below is a description of the follow-up protocol, based on blood lead levels:

BLL 40 µg/dl and under - for new cases to the registry only

1. The laboratory or referring physician is called to determine if the case is work-related. If it is, staff identifies the employer and workplace for follow-up.

BLL 40 µg/dl and above

1. Employee is interviewed by telephone to learn about exposure circumstances and to discuss prevention. In addition, the employer is contacted. The employee's name is not identified to the employer. The employer is reported to OSHA if certain criteria are met.

BLL 50 µg/dl and above

1. The physician is sent a self-administered questionnaire to gather information about medical management.
2. The employer is reported to OSHA for possible investigation.

Referrals to OSHA

In 1991, the New Jersey Department of Health signed a memorandum of agreement with OSHA - Region II, in which the Department of Health agreed to report blood lead levels of 50 µg/dl and

above to OSHA for possible investigation. Recently, the agreement was amended to lower the trigger level for automatic referral to 40 µg/dl and above.

Special Construction Lead Initiative

In 1992, the New Jersey Department of Health, the New Jersey Department of Transportation, and OSHA initiated a lead control program focusing on the rehabilitation of steel structures (such as bridges and overpasses) owned by the state DOT. The initiative involves rehabilitation projects with more than 500 tons of steel. In general, this includes all projects except small repair and maintenance projects.

The lead control program is established and enforced through state DOT contract specifications. The New Jersey Department of Transportation requires all contractors to submit a lead health and safety plan to the agency for approval before work can start. DOT requirements for the lead health and safety plan reflect requirements of the OSHA standard for lead exposure in construction, although there are some differences. First, contractors must perform monthly blood lead testing and use a New Jersey laboratory. Second, there are specific requirements related to the industrial hygiene consultant and the health and safety officer (usually this means the “competent person”).⁴ Third, contractors must submit monthly industrial hygiene reports to the state Departments of Transportation and Health and to OSHA for review. Each monthly report should detail the nature of the work for that period, identify exposure circumstances, and describe changes initiated to control exposures. The report also includes blood lead results and reports on training activities.

Work-related blood lead cases, New Jersey, 1994 (number)

Peak blood lead level (µg/dl)	Construction	General industry
25-39	102	372
40-59	37	127
60-79	5	8
80+	2	1
Total	146	508

⁴OSHA defines a “competent person” as someone “who is capable of identifying existing hazards... and has the authority to take prompt corrective measures to eliminate them.”

New York

New York State Heavy Metals Registry

In 1980, New York State promulgated regulations requiring clinical laboratories to report cases of heavy metals poisoning to the New York State Department of Health - Heavy Metals Registry. The registry receives reports on four heavy metals — arsenic, cadmium, lead, and mercury — with lead being the most commonly reported of the four metals.

For lead, the regulations require in-state and out-of-state laboratories to report blood lead test results for specimens collected on New York State residents. In 1986, the reporting threshold was lowered from 40 µg/dl to 25 µg/dl. In 1992, as part of a major childhood lead poisoning prevention initiative, legislation was enacted which required the reporting of *all* blood lead levels.

Blood Lead Levels

In 1994, of the 1,136 cases of adult blood leads of 25 µg/dl and above reported to the registry, 1,017 (89.5%) were occupationally related.

Follow-up Protocol

Under optimal circumstances, each person reported to the Heavy Metals Registry would be interviewed when the initial report is received. This would enable registry staff to characterize the nature and source(s) of exposures and advise individuals on methods to minimize exposures. However, to focus limited staff on the most serious poisonings, follow-up activities are initiated only for blood leads of 25 µg/dl or greater. Below is a description of the follow-up protocol:

Telephone interview. The individual is interviewed by telephone to determine the source of the lead exposure, is advised about health effects of lead, and is told about appropriate control measures. In cases of work-related exposures, information is gathered on the employer, work location, lead protection measures in place, and whether co-workers are similarly exposed.

Employer contact. In cases involving work-related exposures, the employer is contacted. If *an employer has not previously been reported to the registry*, an industrial hygienist contacts the company by telephone to determine exposure circumstances, whether other workers are at risk, and whether appropriate lead control measures are in place. The industrial hygienist makes all attempts to protect the confidentiality of the individual reported to the registry. Where *an employer previously has been reported to the registry*, the case is reviewed to determine whether recommended controls have been instituted and whether blood lead levels are declining.

Site visit. Site visits are arranged, based on these factors: (1) the elevation of the worker's blood lead level, (2) risk to co-workers, (3) if the health and safety plan appears to be inadequate, and (4) if there is inadequate exposure information about the work process in general.

Follow-up employer contact. Following a telephone contact or site visit, the Department of Health sends a letter or report to the employer describing the findings and recommendations to reduce exposures.

Referrals to OSHA

Although there is no formal memorandum of agreement with OSHA, the state Department of Health refers cases to OSHA in instances of persistent and serious lead poisoning of employees, in which an employer has failed to initiate recommended control measures to protect employees from work-related lead poisoning.

Special Construction Lead Initiatives

Residential painters. As a result of the increasing number of residential painters reported to the Heavy Metals Registry, the Department of Health initiated an industrial hygiene study of lead exposure among painters doing residential lead abatement work. The study included industrial hygiene assessments using air, wipe, and bulk sampling. Control measures were reviewed and free blood lead testing was offered to all workers in the study. (Seven contractors participated in the study.) A report was distributed to participants in the study, half-day training programs were offered at various locations across the state, and an educational fact sheet — *Residential Painters and Lead Exposure* — was distributed.

Structural steel. The state Department of Health is working with the New York State Department of Transportation and the Mount Sinai Center for Occupational and Environmental Medicine to develop a pilot project for centralized surveillance of state DOT construction sites (steel structures, primarily bridges) in order to monitor lead safety and health efforts among contractors on state transportation projects. The general safety and health specifications state DOT contracts would be amended to include participation in the pilot program. The specifications would require adherence to program protocols for medical surveillance, industrial hygiene monitoring, and submission of data. In addition, a centralized blood lead data bank would be developed in cooperation with the Heavy Metals Registry. The pilot project would be funded through the state Department of Transportation.

Adult blood lead cases of 25 µg/dl or greater, New York State, 1994

(number)

Blood lead level (µg/dl)	Total cases	Work-related	Non-work-related	Not categorized
25-39	902	817	49	36
40-59	217	190	21	6
60 and above	17	10	5	2

Total	1136	1017	75	44
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**Work-related adult blood lead cases of 25 µg/dl or greater,
New York, 1994**
(number)

Blood lead level (µg/dl)	Construction	General industry
25-39	274	543
40-59	74	116
60 and above	4	6
Total	352	665

Ohio

Occupational Lead Poisoning Registry

Ohio's Heavy Metal Registry became law in March 1994 and took effect on December 31, 1994. Consequently, there is little experience to sum up at this point. All laboratories performing testing on a Ohio resident and any physician diagnosing lead poisoning must report results to the Ohio Department of Health where the registry is located. The reporting level for labs is any level over 1 µg/dl or the lowest detectable level for the analytical method used. The level for physicians is any case over 40 µg/dl.

The Bureau of Occupational Health administers the registry and has very limited resources. Responsibility is largely in the hands of the one industrial hygienist in the unit. This individual's primary task is the NIOSH-funded Silicosis/Dermatitis Program which pays his salary. Lead is only a secondary responsibility.

Blood Lead Levels

To date, collected data have not been summarized.

Follow-up Protocol

The Department of Health is implementing a protocol modeled after Massachusetts's. The goal is to mail educational information to those having levels over 40 µg/dl and conduct site visits of facilities that have several cases in that range or one case over 50 µg/dl.

Referrals to OSHA

The Department of Health does not routinely report elevated blood lead levels to OSHA. However, if extremely high cases are reported over an extended period of time and the employer can be located, OSHA will be notified. This has happened once or twice.

Texas

Adult Blood Lead Epidemiology and Surveillance Registry

As of 1985, Texas law requires physicians and laboratories to report blood lead levels of 40 µg/dl and above to the Texas Department of Health Blood Lead Registry, if the reporting source determines that the blood lead exposure was occupationally related. The registry is in the Bureau of Epidemiology and is funded through the Adult Blood Lead Epidemiology and Surveillance (ABLES) program. The registry is responsible for data collection and follow-up and also mails lead information to employers in industries where employees are at risk for exposure to lead. The registry staff comprises 10% of two office personnel and 10% of an industrial hygienist.

Follow-up Protocol

Follow-up begins when a blood lead level of 60 µg/dl or above is reported. New cases are given special attention. The registry contacts the employer within two days and the industrial hygienist conducts an investigation within a week. The employee is also interviewed. In an effort to find cases of unreported elevated blood lead levels, the registry is beginning to work with the workers' compensation agency to track cases identified by specific standard industrial classification codes.

Referrals to OSHA

Any employer who is uncooperative in abating a lead hazard is referred to OSHA according to a memorandum of understanding established in 1994. Only the name of the employer is given to OSHA because individual blood lead levels are considered confidential information.

Special Construction-Lead Initiatives

Texas has no construction initiative specific to lead nor is one under consideration. Underreporting of construction-related blood lead levels is suspected by registry staff, however.

Work-related blood lead reports and cases, Texas, 1993
(number)

Blood lead level (µg/dl)	Construction		General industry	
	Reports	Cases	Reports	Cases
Less than 25 µg/dl	16	15	176	161
25-39	3	2	96	82
40-59	4	4	782	92
60-79	0	0	31	7
80 and above	0	0	2	2
Total	23	21	1087	344

Note: Levels below 40 µg/dl are reported voluntarily and thus such reports are not considered a true representation of the number of people with these blood lead levels. Out-of-state laboratories are not required to report blood lead levels of individuals who reside in Texas, although some do.

Washington

Safety and Health Assessment and Research for Prevention

In 1993, Washington State promulgated legislation requiring all laboratories, as well as any entity in Washington sending samples out of state for analysis, to report all blood lead test results to the Washington Department of Health. Adult blood lead levels are then forwarded to the Safety and Health Assessment and Research for Prevention (SHARP) program in the state Department of Labor and Industries (DLI) as part of an agreement established between the Department of Health and DLI. SHARP is responsible for gathering information and limited follow-up, but is not involved in regulatory compliance. Lead surveillance comprises roughly 40% of all SHARP surveillance activities, the balance of which are devoted to dermatitis and analysis of workers' compensation and other existing data. Staffing is limited to 50% of an epidemiologist and part of a physician/epidemiologist. Industrial hygienists are also available for follow-up of lead surveillance activities.

Blood Lead Levels

In 1994, SHARP received 3,526 blood lead level reports representing 2,987 cases. Of the 84 cases received with blood lead levels at 39 µg/dl or above, 20 individuals were interviewed. Nineteen of these cases were occupationally related.

Follow-up Protocol

Below is a description of the current follow-up protocol, based on blood lead level. However, protocols are being revisited in conjunction with agency reorganization:

BLL less than 25 µg/dl - no action taken

BLL 25 µg/dl and above - letter sent/interview

1. Physician/ provider ordering the blood lead test is contacted and additional information is gathered regarding patient's address and employer.
2. The patient is sent a letter providing blood-test results (often this is the only way the patient receives the results) and educational information, including information on the health effects of lead.
3. The employer is not contacted.

BLL 40 µg/dl and above - phone interview/letter to employer, with employee's consent

1. Actions 1 and 2 above.
2. Physician/ provider ordering the blood lead test is contacted and additional information is gathered regarding patient's address, phone number, and employer.
3. The patient is called and interviewed and his/her employment status and local are verified. The patient is sent a letter providing blood-test results (often this is the only way the patient receives the results) and educational information, including job-specific information on the health effects of lead.
4. With the explicit consent of the patient, SHARP sends a letter to the employer stating that he/she has an employee with a blood lead level of at least 40 µg/dl. The employer is sent a pamphlet on lead hazards, health effects, and controls in addition to a copy of the state lead legislation.
5. Employers receive a follow-up phone call and are strongly encouraged to have an industrial hygiene survey/consultation.

BLL 60 µg/dl and above - health care provider contacted

1. All of the above
2. The SHARP physician contacts the employee's health care provider to confirm that the provider knows how to treat lead poisoning.

Referrals to OSHA

Although the Washington State DLI protocol suggests that SHARP report blood lead levels over 80µg/dl to Washington OSHA, it has not done so. However, if an employer does not respond to a written request for a consultation and take action to correct the problem, SHARP would refer the matter to Washington OSHA's industrial hygiene compliance program.

Special Construction Lead Initiatives

Washington State has no program for lead that is specific to construction and none is under consideration. Elevated blood lead levels from a construction setting are not handled differently from other occupationally related elevated blood lead levels.

Work-related blood lead level reports and cases, Washington State, 1994

(number)

Blood lead level ($\mu\text{g}/\text{dl}$)	Construction		General industry		Not categorized	
	Reports	Cases	Reports	Cases	Reports	Cases
Less than 25 $\mu\text{g}/\text{dl}$	455	301	481	442	2195	2056
25-39	96	57	118	94	46	42
40-59	31	19	80	45	8	7
60-79	1	1	8	6	2	2
80 and above	0	0	4	3	1	1
Total	583	378	691	590	2252	2108

Note: Out-of-state laboratories are not required to report blood lead levels of Washington State residents, although some do so voluntarily. However, if an in-state organization sends samples out of state, it is required to report.

Annex B: Questionnaire Sent to States

Your name and title:

Phone number:

Fax number:

Construction Lead Surveillance Survey

I. Is there a legal requirement for adult blood leads to be reported to the DOH? If so,

1. When was the law passed?

2. Who is required to report?

3. Do you require out-of-state laboratories to report blood lead levels of individuals who reside in your State?

a. If so, how is this enforced?

4. Is it a requirement to report all blood lead levels or is there a threshold below which labs/physicians are not required to report blood lead levels?

a. If so, what is the threshold?

5. Does your department report elevated blood lead levels to OSHA? Is it done routinely or is it done on a case by case basis?

a. If reporting to OSHA is done, what year did this go into effect?

6. What is the total number of cases of adult blood leads reported for the most recent year for which you have complete data? What percentage of these are occupationally related?

7. What kind of action is taken by DOH upon receipt of reports of elevated adult blood leads (eg. none, phone interviews, industrial hygiene evaluations, inspections)?

a. What triggers action?

II. We are particularly interested in blood lead levels reported for workers employed in the construction industry and special initiatives which have been developed to target this industry.

1. Do you know the number (n) of occupational blood lead cases reported from construction vs. all other industries? Please fill out the following table for the most recent complete year for which you have information. For that year, please identify the peak blood lead level (ug/dl) for each reported case.

Month to Month

<u>Blood lead level (ug/dl)</u>	<u>Construction (n)</u>	<u>General Industry (n)</u>
<u>less than 25 ug/dl</u>		
25-39		
40-59		
60-79		
80+		

2. Is there any centralized surveillance for lead specific to construction?

If yes, please answer the following questions. If no, please go to question 3.

a. When was the program started?

b. Does the program have a special focus on steel structures, residential settings, commercial buildings or other settings?

c. What agencies and/or institutions are involved (such as Department of Transportation, Department of Health, Occupational Safety and Health Administration, Department of Environmental Protection)?

- Describe the responsibilities of the agencies/institutions involved.

d. How is the program funded and what is the annual funding amount?

e. Does your department have staff dedicated to this construction emphasis program? Please specify job title and time allocated (i.e. clerk - part-time, industrial hygienist full time, etc.)

f. Describe the reporting protocol for this program..

- What triggers action?

- What kind of action is taken, eg. none, phone interviews, industrial hygiene evaluations, inspections?

g. Are contract specifications used to enforce the program or is some other mechanism such as a Memorandum of Agreement used? Please specify.

If your State does use contract specifications to enforce lead health and safety programs, please answer the following:

- What type of work is covered?

- What agency is responsible for enforcement?

- How does this program interface with the DOH registry? for example:

- in-kind staff for data collection and/or intervention
- agreement on protocols for medical surveillance and intervention
- special reporting requirements to DOH
- use of DOH industrial hygiene staff

h. In Part I you described the legal requirements mandating the reporting of occupational blood lead levels. Has your State developed any additional mechanisms to enhance both reporting and control measures in the construction industry?

If so, please specify which mechanism eg.

- Contract specifications
- Memorandum of Agreement with OSHA
- Other

3. Are elevated blood lead levels from a construction setting handled differently from other occupationally related elevated blood lead levels?

- If yes, how are they handled?

4. If the DOH does not have a construction emphasis program for blood lead level surveillance and intervention:

- Is one under consideration?

- What kinds of problems are you facing in starting such a program?

5. Did your State have a lead in construction standard which preceded the federal OSHA Interim Standard of April, 1993?

- If yes, could you please send us a copy?

6. Do you have medical questionnaires and/or lead exposure occupational history questionnaires used as part of your medical surveillance program? Could you send a copy to us?

7. Would you be interested in reviewing the report summarizing the information we collect from this survey?

Annex C: State Agency Contacts

California

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