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ABSTRACT

Between January 1986 and June 1989, 1916 New Jersey workers were identified through a surveillance system for occupational lead exposure. The average annual proportion of workers with a blood lead level above 2.42 μmol/L was 12%. Industries with the highest proportion of workers with blood lead levels above 2.42 μmol/L were special trade construction (35%) and industries dealing with scrap and waste materials (27%). (*Am J Public Health.* 1992;82:275–277)

Surveillance of Occupational Lead Exposure in New Jersey: 1986 to 1989

Allison Tepper, PhD

Introduction

Public health agencies in several states have described surveillance programs for occupational lead exposure using biological monitoring data.[1–3] The experience in these states provides useful lessons about program design and operation for others beginning to implement lead surveillance activities. Ongoing reporting of findings helps promote the use of surveillance data for targeting and evaluating lead poisoning prevention efforts. This paper examines the results obtained by the New Jersey Department of Health (NJDOH) occupational lead exposure surveillance project between January 1986 and June 1989.

Methods

A passive surveillance system for occupational lead exposure was begun by the NJDOH in October 1985. In-state clinical laboratories are required to report test results and identifying information for adults (aged 16 and above) with blood lead levels above 1.21 μmol/L* (New Jersey Administrative Code 8:44–2.11).

The NJDOH provides educational materials to physicians and reported individuals by mail and conducts telephone interviews to ascertain the source of exposure. When a work-related exposure is

*1 μmol/L = 20.7 μg/dL.

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TABLE 1—Reports Received and Workers Identified by the New Jersey Department of Health, by Date of Blood Test: January 1986–June 1989

Test Date	Reports Received n	Reports Received %	New Workers Identified n	New Workers Identified %
1986				
Jan–June	735	10	433	23
July–Dec	519	7	223	12
1987				
Jan–June	411	6	116	6
July–Dec	443	6	108	6
1988				
Jan–June	1020	14	378	20
July–Dec	1651	23	250	13
1989				
Jan–June	2292	32	236	12
Total	7071	100	1916[a]	100[a]

[a]86 workers (4%) were first reported in 1985; the date of first report was missing for 86 workers (4%).

identified, a NJDOH representative visits the workplace or refers the matter to OSHA.

Results

Surveillance Findings

Of 2487 reported individuals, 1916 (77%) were exposed to lead in their New Jersey workplaces. The number of reports increased after the first 2 years, but there was no discernible trend in the number of new workers reported (Table 1).

The distribution of blood lead levels was consistent from year to year. On average, 27% of those reported had an annual peak blood lead level from 1.21 to 1.44 μmol/L; 43%, from 1.45 to 1.92 μmol/L; 19%, from 1.93 to 2.41 μmol/L; 7%, from 2.42 to 2.89 μmol/L; 3%, from 2.90 to 3.37 μmol/L; and 2%, above 3.38 μmol/L.

Nine facilities in four industries (cyclic crudes and intermediates, storage batteries, primary copper, and vitreous china tableware and kitchenware) accounted for 959 workers (51%) (Table 2). Forty-three facilities in 11 other industries accounted for 486 workers (26%), including 210 workers (11 percent) in metal-related industries and 143 workers (8%) in plastics-related industries. One hundred twenty-seven facilities in 77 industries accounted for the remaining 425 workers (23%), including 89 workers (5%) in the construction industry.

Blood lead levels above 2.42 μmol/L were reported for 246 workers (13%) (Table 3). Thirty-three percent of construction workers (84% of whom were special trade contractors) and 26% of wholesale trade workers (82% of whom worked in scrap and waste materials facilities) had blood lead levels above 2.42 μmol/L.

Characteristics of the Surveillance System

Ten in-state and three out-of-state laboratories provided reports to the NJDOH. Blood lead levels below 1.93 μmol/L were reported within an average of 17.9 days, compared with 19.8 days for higher levels ($P = .08$). Although laboratories nearly always provided the workers' names, blood lead levels, and test dates, most reports did not provide age (54%), address (61%), and telephone number (84%).

Discussion

The New Jersey experience demonstrates the utility of laboratory-based surveillance systems for occupational lead exposure. Positive features include clear reporting criteria, small numbers of reporting units, high specificity for detecting cases of interest, and the identification of workplaces that can be targeted for intervention. Although some high-risk industries, such as secondary smelting and battery manufacturing, are common to many states,[3] state specific, laboratory based surveillance systems identify industries important in one state but not in others, such as cyclic crudes and intermediates (which includes organic lead production) in New Jersey. Improvements are needed if these surveillance systems are to provide accurate data for assessing progress toward the Public Health Service objective of eliminating blood lead levels above 2.42 μmol/L by the year 2000.[4]

Failure to capture test results from out-of-state laboratories contributes to underestimation of the number of overexposed workers. A large increase in the number of new cases in New Jersey resulted from the initiation of voluntary reporting by an employer using an out-of-state laboratory. A California survey showed that 47% of lead-using facilities sent their specimens to out-of-state laboratories. Fifty-three percent of reports to the New York heavy metals registry were from out-of-state laboratories.[1] The feasibility of using state licensing authority to cover out-of-state laboratories (this authority is present in New York but not in New Jersey) should be considered by all states interested in lead surveillance. If possible, laboratory certification requirements of the OSHA lead standard should be modified to include provisions for reporting to states. The sensitivity of sur-

TABLE 2—Workers and Facilities Reported to the New Jersey Department of Health, by Standard Industrial Classification (SIC) Code: January 1986–June 1989

SIC	Workers n	Workers %	Facilities n	Facilities %
2865—Organic chemicals	324	17.3	5	2.8
3691—Storage batteries	263	14.1	2	1.1
3331—Primary nonferrous metals	213	11.4	1[a]	.6
3262—Vitreous china food utensils	159	8.5	1	.6
3079—Miscellaneous plastics products	93	5.0	7	3.9
3341—Secondary smelting of nonferrous metals	59	3.2	4	2.2
2821—Plastics materials and resins	50	2.7	2	1.1
3312—Blast furnaces and steel mills	50	2.7	2	1.1
3356—Nonferrous rolling and drawing	48	2.6	4	2.2
5093—Scrap and waste materials	41	2.2	11	6.1
3679—Electronic components	37	2.0	1	0.6
3362—Brass foundry	32	1.7	4	2.2
2816—Inorganic pigment	28	1.5	5	2.8
3999—Miscellaneous manufacturing	27	1.4	1	0.6
3443—Fabricated plate work	21	1.1	2	1.1
All others[b]	425	22.7	127	70.9
Total	1870[c]	100.0	179[c]	100.0

[a]This facility is no longer operating.
[b]Includes 77 four-digit SIC codes, each with less than 20 workers.
[c]Forty-six workers and 21 facilities with unknown SIC codes are excluded from the table.

veillance systems would be improved by capturing all workers with workplace biological monitoring programs, but would still be limited by the lack of monitoring in a large percentage of lead-using workplaces.[5]

The absence of complete identifying information on many reports hinders follow-up. This problem could be ameliorated by the strengthening of reporting regulations and enforcement policies. Alternate sources of information for surveillance also should be considered. For example, new reporting requirements in New Jersey allow the state to obtain information directly from physicians (New Jersey Administrative Code 8:57–3.2).

Workers in New Jersey are being exposed to lead at levels above limits in the OSHA lead standard. The proportion of New Jersey workers with the highest blood lead levels (above 2.42 μmol/L) was 12%, which is consistent with the findings from California.[2] In the absence of accurate denominator data, however, the true prevalence of overexposure among all lead-exposed workers cannot be determined. Moreover, the distribution of blood lead levels is distorted by the absence of information about blood lead levels below the reporting level.

The most severe lead exposure problems in New Jersey appear to be in the construction and scrap metal industries. In several reports of outbreaks of lead poisoning, exclusion of the construction industry from the OSHA lead standard has been recognized as a problem.[6,7] Additionally, intermittent lead exposure and a mobile work force (particularly in construction) complicate the development of adequate health and safety programs. Finally, many workers in these industries are employed in small businesses, where health and safety programs are less common.[8] In New Jersey, 92% of employers in special trade construction and 86% of employers in scrap metal industries employ fewer than 20 workers. In contrast, only 62% of employers in the manufacturing sector are in this category.[9] □

TABLE 3—Workers Reported to the New Jersey Department of Health with Blood Lead Levels above 2.42 μmol/L, by Standard Industrial Classification (SIC) Code: January 1986–June 1989

SIC	Workers		
		Blood Lead > 2.42 μmol/L	
	Total n	n	%
Construction (15–17)	89	33	37.1
17—Special trade contractors	75	26	34.7
Manufacturing (20–39)	1646	192	11.7
28—Chemicals and allied products	475	58	12.2
30—Rubber & miscellaneous plastics products	98	13	13.3
32—Stone, clay, & glass products	172	12	7.0
33—Primary metal industries	483	62	12.8
34—Fabricated metal products	43	4	9.3
36—Electronic & other electric equipment	312	32	10.3
39—Miscellaneous manufacturing	33	6	18.2
Transportation (40–49)	9	1	11.1
Wholesale Trade (50–51)	50	13	26.0
50—Durable goods	41	11	26.8
Services (70–79)	44	4	9.1
75—Auto repair, services, & parking	20	0	0.0
Public Adminstration (90–97)	32	3	9.8
Total	1870	246	13.2

Note. Date are presented for each major SIC division and for two-digit SIC codes with 20 or more reported workers.

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