

# MNWR

## MORBIDITY AND MORTALITY WEEKLY REPORT

	<b>Epidemiologic Notes and Reports</b>
61	Increased Lead Absorption in Children of Lead Workers — Vermont
	<b>Current Trends</b>
62	Surveillance of Maternal Deaths — New Jersey
67	Tuberculosis — United States, 1976
67	Reye Syndrome — United States
68	Influenza — Worldwide

### Epidemiologic Notes and Reports

#### Increased Lead Absorption in Children of Lead Workers — Vermont

Fifteen (56%) of 27 children of employees at a lead storage battery plant in Bennington, Vermont, were found in September 1976 to have elevated lead levels.\* Household dust, contaminated with lead carried home on workers' clothing, was the apparent source of exposure. Elevated erythrocyte protoporphyrin (EP) levels ( $\geq 60 \mu\text{g}/100\text{ml}$  whole blood\*) were noted in 5 (18.5%) of the children. Age-matched neighborhood control children had significantly lower lead and EP levels than workers' children. Some workers also were found to have elevated blood lead levels and symptoms and signs of lead toxicity; lead oxide powder used on battery grids was the probable contamination source.

Twenty-two families of lead workers having children 1-6 years of age were matched with 22 neighborhood families with children of the same age. Mean blood lead and EP levels in the 27 workers' children were significantly higher ( $p < 0.003$ ) than levels in the 32 control children (mean lead levels: 31.8 vs. 21.4  $\mu\text{g}/100\text{ml}$ ; EP level: 42.2 vs. 28.2  $\mu\text{g}/100\text{ml}$ ).

Presence of lead-based paint was not different between workers' and control homes: 12 workers' houses and 12 control houses had elevated concentrations\*\* of lead in paint. Elevated levels of lead in water ( $\geq 0.05 \text{ mg/l}$ ) were noted in 3 of 22 control houses and 2 of 22 workers' houses. In contrast, lead concentrations in household dust were significantly higher ( $p < 0.001$ ) in workers' homes than in control homes (mean: 2,239 vs. 718 ppm). House dust lead concentrations were positively correlated with children's EP levels (Kendall's Tau = 0.38, [3]  $p < 0.01$ ) and blood lead levels (Tau = 0.244,  $p = .08$ ).

Thirty-six workers who were selected as having significant lead exposure were found to have a mean blood lead level of 61.6  $\mu\text{g}/100\text{ml}$ ; 5 (14%) workers tested had possible lead neuropathy (decreased wrist or ankle strength); symptoms consistent with lead toxicity—including fatigue (39%), joint pains (27%), anorexia (25%), and abdominal pain (19%)—had been noted over the past year. Blood lead levels of workers were correlated with blood levels of their

\*A lead level  $\geq 30 \mu\text{g}/100\text{ml}$  with an erythrocyte protoporphyrin (EP) level  $\geq 60 \mu\text{g}/100\text{ml}$  whole blood in children is indicative of increased lead absorption (1).

\*\*2 or more surfaces with lead concentrations of 2  $\text{mg}/\text{cm}^2$  or greater as measured by X-ray fluorescence (2).

children (Tau = 0.32,  $p < .02$ ). All workers interviewed reported changing clothes before leaving work, but 87% washed these clothes at home. Ninety percent showered daily before leaving work.

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**Editorial Note:** This report represents the first documentation in the United States of increased lead absorption in children of lead storage battery workers. There are approximately 250 such plants in the United States, which employ from 50 to 250 workers each (4). The findings of this study are quite similar to a previous investigation (5) of children of workers employed at a secondary lead smelter in Memphis, Tennessee. In that study, children's and workers' blood lead levels were higher, and 8 children required hospitalization and chelation therapy; no children in the Vermont study were hospitalized. The difference in severity between these outbreaks may be attributable to differences in work practices: All the workers in Vermont changed work clothes before going home whereas very few did so in Tennessee.

Other occupationally-related diseases have been reported in families of workers (6-8) related to contamination of the home environment by soiled work clothing. These outbreaks indicate the need for improved work practices in industries with exposure to dusts containing toxic materials. Provision of work clothing and washing facilities by the Tennessee plant following the investigation essentially eliminated excessive lead exposure for that group of children (5).

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*Lead Absorption — Continued*

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Current Trends**Surveillance of Maternal Deaths — New Jersey**

Upon instituting a new method of surveillance of maternal deaths\* in late 1974, the New Jersey State Department of Health learned of 13 more 1974 maternal deaths than the 16 enumerated by the traditional reporting method. This resulted in an apparent 82% increase in the reported maternal mortality rate from 1.7 deaths per 10,000 live births to 3.1 per 10,000. Application of the same methods in 1975 disclosed a total of 27 resident maternal deaths, compared to 14 reported through the traditional system.

Until late 1974, the Maternal and Child Health Program used the following method of identifying maternal deaths: Death certificates were forwarded from the Vital Statistics Program to the Maternal and Child Health Program when these certificates contained key words referring to pregnancy, delivery, and puerperium. Now, in addition to the traditional method, the health department reviews 2 more sources:

1. Annual Maternity Services Reports, routinely received by the Maternal and Child Health Program from all New Jersey hospitals with obstetric services, are studied to find deaths reported by hospitals which are not already known through the death certificate mechanism.

2. Individual reports of possible maternal deaths from medical examiners, physicians, and hospitals are followed up and verified.

Any case enumerated by 1 of these 3 methods is reviewed by the obstetric consultant to the Maternal and Child Health Program.

**Editorial Note:** It is generally accepted that maternal mortality has decreased nationwide in the last several years. (New Jersey's declined from a mean rate of 3.3 per 10,000 from 1965-1969 to 1.7 in 1973 and 1974, as calculated by the traditional surveillance method.) This study indicates that reliance on death certificates alone as a source of reporting of maternal deaths may be incomplete and that

(Continued on Page 67)

\*A maternal death is one which occurs while the woman is pregnant or within 42 days after the pregnancy is terminated.

**Table I. Summary—Cases of Specified Notifiable Diseases: United States**

[Cumulative totals include revised and delayed reports through previous weeks]

DISEASE	7th WEEK ENDING		MEDIAN 1972-1976	CUMULATIVE, FIRST 7 WEEKS		
	February 19, 1977	February 21, 1976		February 19, 1977	February 21, 1976	MEDIAN 1972-1976
Aseptic meningitis	20	34	34	239	273	265
Brucellosis	1	14	1	20	34	13
Chickenpox	4,844	5,582	---	35,316	33,547	---
Diphtheria	-	15	5	2	58	16
Encephalitis	Primary	8	20	81	120	107
	Post-Infectious	2	5	9	29	29
Hepatitis, Viral	Type B	218	212	1,905	1,694	1,284
	Type A	524	647	922	4,677	5,863
	Type unspecified	176	157	---	1,200	1,232
Malaria	5	7	7	33	41	36
Measles (rubeola)	1,139	776	684	6,927	3,707	3,707
Meningococcal infections, total	Civilian	36	33	33	265	216
	Military	36	33	33	263	213
Mumps	521	1,247	1,929	3,800	8,001	11,107
Pertussis	8	14	---	87	173	---
Rubella (German measles)	487	381	389	1,763	1,570	1,570
Tetanus	-	-	1	5	4	7
Tuberculosis	491	558	---	3,449	3,929	---
Tularemia	-	-	2	10	19	13
Typhoid fever	7	3	3	40	55	29
Typhus, tick-borne (Rky. Mt. spotted fever)	4	-	-	13	3	9
<b>Venereal Diseases:</b>						
Gonorrhea	Civilian	14,468	17,557	---	124,918	133,444
	Military	328	711	---	3,783	4,144
Syphilis, primary and secondary	Civilian	336	490	---	3,014	3,561
	Military	2	5	---	42	55
Rabies in animals	15	33	41	263	216	324

**Table II. Notifiable Diseases of Low Frequency: United States**

	CUM.		CUM.
Anthrax:	-	Poliomyelitis, total:	2
Botulism:	2	Paralytic:	2
Congenital rubella syndrome:	1	Psittacosis:	4
Leprosy:	12	Rabies in man:	-
Leptospirosis: NY St. 1:	6	Trichinosis: *Ohio 1, Pa. 1:	16
Plague:	-	Typhus, murine: Tex. 3:	6

\*Delayed report: Trichinosis: Pa. 2 (1976)