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Dear Dr. Niemeier:

Per your request of January 20, 1994, I enclose the document "TAKE HOME LEAD EXPOSURE: Maryland Experience". The document describes two cases of take home lead exposure, and explains the State of Maryland Adult Lead Registry's procedures to locate and follow up of take home lead exposure cases.

If you have any questions, please call me at (410) 631-3987.

Sincerely,

Shirin R. de Silva, M.D., M.P.H.
Acting Director
Environmental Health Coordination

Enclosure

cc: David A.C. Carroll

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Environmental Health Coordination

TAKE-HOME LEAD EXPOSURE: Maryland Experience

Lead poisoning is one the most common and preventable health problems today. Children are more likely to suffer from adverse effects of lead exposure than adults. One of the less recognized source of lead exposure among children is take-home lead from adult workers.

A literature review reveals few documented cases of take-home lead exposure. Adult occupational lead exposure is not well appreciated by general practitioners and "take-home" lead exposure to their family members has been frequently missed.

Occupations that expose workers to lead are:

- Lead Production or Smelting
- Battery Manufacturing
- Brass, Copper, or Lead Foundries
- Scrap Handling
- Demolition/Painting of Bridges
- Residential Lead Paint Abatement
- Ceramics
- Repairing Radiators

Lead dust is carried home on equipment, clothing, and the worker's person. It is important to include the worker's family/household members in case follow-up.

The Maryland Adult Lead Poisoning Registry attempts to contact every adult whose blood lead is reported to registry, and to encourage them to have their children tested for lead if they have not done so, and to repeat the test if the test was done more than a year ago.

So far the Registry was able to identify two cases of take-home lead exposure in children.

CASE # 1

In late October and early November of 1992, the Registry received reports of elevated blood lead level (BLL) in six construction workers who were removing lead paint from the steel roof at the Old Executive Office Building in Washington, DC. The initial blood lead levels were:

<u>Worker</u>	<u>BLL ($\mu\text{g}/\text{dL}$)</u>
1	110
2	63

3	56
4	86
5	127
6	36

Based on the very high BLL reported, and the fact that the worksite was outside Maryland jurisdiction, the case was referred to the federal Occupational Safety and Health Administration (OSHA) for a worksite investigation. Four workers were from Maryland, one was from Washington, DC, and one was from Virginia. The Registry staff contacted all the workers to determine if there was risk of take-home lead exposure in family/household members. The status of the family members were as follow:

<u>Worker</u>	<u>State of residence</u>	<u>No. of family members at risk</u>	
		<u>Children</u>	<u>Adult*</u>
1	MD	No	No
2	MD	No	No
3	MD	No	No
4	MD	2	1
5	VA	1	1
6	DC	No	No

* Pregnant female

Workers with family member at risk were referred to their family physician or pediatrician for blood lead testing. Based on the verbal report from the worker from VA, his child's and spouse's BLLs were within normal range. One of the MD worker's children (a two year old girl) had a BLL of 26 $\mu\text{g}/\text{dL}$; his other child, and his spouse had BLL within normal limits. Educational materials on lead were sent to all workers with a known address. The child with the BLL of 26 $\mu\text{g}/\text{dL}$ was referred to the local health department for consultation and follow up.

CASE # 2

In late July 1993, the Registry received a report of a blood lead level of 35 $\mu\text{g}/\text{dL}$ from a 29 years old man. Upon inquiry the Registry found that the test was requested by a practicing pediatrician. Further inquiry revealed that in a routine annual check up of this worker's two children (2 years and 7 months old) the pediatrician included blood lead test. The BLL of the 2 year old child was 17 $\mu\text{g}/\text{dL}$. Looking for possible sources of lead in the children's environment, the pediatrician learned that the father has a lead related occupation. He requested for his blood lead test which was reported 35 $\mu\text{g}/\text{dL}$. The pediatrician advised the family on how to reduce their exposure to lead, referred the father to an internist, and reported the case to the local health department for further follow up. The second BLL of the 2 year old child was later reported 12 $\mu\text{g}/\text{dL}$. The BLL of the 7 months old child was 7 $\mu\text{g}/\text{dL}$.

The Registry contacted the family, and learned that at the time of the test, the father was working as a sandblaster for a construction company. The worksite was a bridge near the Dulles International Airport in Virginia. The registry further learned that the internist who examined the worker, informed the employer of the worker's BLL, upon which preventive actions at the worksite were implemented. The worker's second BLL test, done 3 weeks after the first one, was reported 32 $\mu\text{g}/\text{dL}$.

* * *

As long as occupational lead exposure exists, so does potential take home lead exposure. This is because:

- 1) Not all occupations with potential exposure to lead (e.g., construction workers) are covered by General Industry Lead Standard (29 CFR 1910.1025)
- 2) Compliance with the OSHA comprehensive lead standard is inadequate.
- 3) Current OSHA standard may not adequately protect the health of the workers.

There are several approaches to reduce the risk of take-home lead exposure:

- 1) Direct approach: educational efforts aimed at lead poisoned adults (workers);
- 2) Indirect approach: educational initiatives aimed at physicians and health care provider in general and pediatricians in particular; and
- 3) Agency approach: concerted efforts between adult and childhood lead registries to locate families with possible cases of the take-home lead exposure.

* * *

As more and more states are developing adult and childhood lead registries, they can arrange for inter-registry referral to identify possible cases of take-home lead exposure.

In Maryland, the childhood lead registry reports to the adult lead registry those children with BLL $\geq 20 \mu\text{g}/\text{dL}$ and are known to have an adult housemate with occupational or recreational exposure to lead. The adult lead registry reports adult cases to the childhood lead registry where the adult is engaged in activities that may result in environmental lead contamination. Self-employed workers and adults engaging in lead-related hobbies such as gunnery or stained glass manufacture are likely to cause environmental lead

contamination.

In addition to inter-registry referral, annual or semi-annual cross matching of records further identifies cases of take-home lead exposure.

The Maryland's adult and childhood lead registries conducted two cross match on October 1992, and August 1993. The items for matching were in the order of zip code, and street address. (The last name is not a suitable matching criteria due to errors in spelling and the likelihood that children and adults living in the same address may have different last names.) In the first try one adult and one child were matched, and the child's BLL was <5 µg/dL.

The second try was more refined. In that, a computer program was developed which first standardized street addresses, i.e., spelled out all prefix and suffix abbreviations on street address regardless how they were abbreviated, and then created a new unique variable composed of zip code and street address. The program then cross-matched a file of 80 adults lead registry reports against a file of more than 26,000 childhood lead registry reports using the new variable as the identifier. Six adults matched with a total of nine children. Table 1 demonstrates the status of the matched adults and children.

Table 1
Adult-Children Matching Status (August, 1993)
Matching criteria: zip code and street address

Adult Status			Matched Children		
Case	BLL (µg/dL)	Exposure status	No.	Age (Yr.) (m=month)	BLL (µg/dL)
#1, #2*	86 96	Lead Burner Lead Burner	1	5	5
#3	27	Bullet Wound	2	3, 10	8, 6
#4	42	Cupola Tapper	2	4, 5	9, 12
#5	34	Pipefitter	2	5, 2	<5, <5
#6**	35	Sand blaster	2	7m, 2	7, 17

* Case #2 was a temporary resident at Case #1's address.

** Case was reported by the pediatrician before matching was performed.

Except for the last case (which was reported to the local health department for further investigation), no action was found necessary.