



Occupation/hobby-related lead exposures in adults:

Implications for take-home lead exposures among children in Florida

Florida Department of Health
Lead Poisoning Prevention Program
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Presentation Outline

- Project Description
- Background
- Introduction
- Data Processing
- Results & Interpretations
- Limitations
- Conclusions & Recommendations
- Actions taken/In Progress
- Future Plans



Project Description:

Project Goal & Objective

- **Goal:** Evaluate the risk of take-home lead as a source of exposure among children in Florida
- **Objective:** Determine the number of lead poisoned children for 2008 who reside in homes of adults who have an occupation/hobby that involves lead in Florida
 - Identify the number of lead poisoned children (<6 yrs old) with same home address as adults (≥16 yrs old) who received a lead poisoning screening test
 - Identify potential sources of lead exposure among children matched with screened adults
 - Identify industries and occupations of adults who received a lead screening test that were matched with lead poisoned children



Project Description: Terms & Definitions

- Lead-related occupation/hobbies
 - Work that involves use of lead and/or materials containing lead
 - Battery recycling/manufacturing
 - Bridge construction/painting
 - Home renovation/remodeling
 - Smelting/soldering/casting
 - Ceramic, plastic, and fishing sinker manufacturing
 - Stain glass making/ furniture refinishing
 - Firing range instructors/maintenance workers
 - Radiator repair
- Take Home Lead
 - Lead carried home from work on clothing, shoes, skin, hair, equipment, vehicle and other materials e.g. work scraps
- Lead poisoned person – individual with a confirmed blood lead level (BLL) $\geq 10\mu\text{g/dL}$

Background: Florida's Reporting Rule

- Lead poisoning reportable in Florida since 1992

- Requires reporting of all blood lead levels by the end of the next business day following laboratory testing
- Recommends electronic reporting

Reportable Diseases/Conditions in Florida

Practitioner* List 11/24/08

Did you know that you are required by Florida statute** to report certain diseases to your local county health department?

*Reporting requirements for laboratories differ. For specific information on disease reporting, consult Rule 54D-3, Florida Administrative Code (FAC).

- ! - Report immediately 24/7 by phone upon verbal suspicion or laboratory test order
- ☎ - Report immediately 24/7 by phone
- - Report next business day
- + - Other reporting timeframe

Any disease outbreak Any case, cluster of cases, or outbreak of a disease or condition found in the general community or any defined setting such as a hospital, school or other institution, not listed below that is of urgent public health significance. This includes those indicative of person to person spread, zoonotic spread, the presence of an environmental, food or waterborne source of exposure and those that result from a deliberate act of terrorism. Acquired Immune Deficiency Syndrome (AIDS)* Amebic encephalitis* Anaplasmosis* Antitoxin Arsenic poisoning* Botulism (foodborne, wound, unspecified, infant)* Botulism (infant)* Brucellosis California sarcoptosis virus (neuroinvasive and non-neuroinvasive disease)* Campylobacteriosis* Cancer (except non-melanoma skin cancer and including benign and borderline intracranial and CNS tumors)+ Carbon monoxide poisoning* Chancroid* Chlamydia* Cholera Ciguatera fish poisoning (Ciguatera)* Congenital anomalies* Conjunctivitis (in neonates ≤ 14 days old)* Creutzfeldt-Jakob disease (CJD)* Cryptosporidiosis* Cyclosporiasis* Dengue* Diphtheria Eastern equine encephalitis virus disease (neuroinvasive and non-neuroinvasive)* Ehrlichiosis* Encephalitis, other (non-arboviral)* Enteric disease due to: Escherichia coli, O157:H7 Escherichia coli, other pathogenic E. coli including enterotoxigenic, invasive, pathogenic, hemolytic, aggregative strains and shiga toxin positive strains Giardiasis* Glanders Gonorrhea*	Granuloma inguinale* Hansen's disease (Leprosy)* Hantavirus infection Hemolytic uremic syndrome Hepatitis A Hepatitis B, C, D, E, and G+ Hepatitis B surface antigen (HBsAg) positive in a pregnant woman or a child up to 24 months old)* Herpes simplex virus (HSV) (in infants up to 60 days old with disseminated infection with involvement of liver, encephalitis and infections limited to skin, eyes and mouth; anogenital in children ≤ 12 yrs)* Human Immunodeficiency Virus (HIV) infection (all, and including neonates born to an infected woman, exposed newborn)+ Human papillomavirus (HPV) (associated laryngeal papillomas or recurrent respiratory papillomatosis in children ≤ 6 years of age; anogenital in children ≤ 12 yrs)* Influenza due to novel or pandemic strains Influenza-associated pediatric mortality (in persons aged < 18 yrs) Lead poisoning (blood lead level ≥ 10µg/dL; additional reporting requirements exist for hand held and/or on-site blood lead testing technology, see 54D-3 FAC*) Legionnaires* Leptospirosis* Listeriosis Lyme disease* Lymphogranuloma venereum (LGV)* Malaria* Measles (Rubella) Melioidosis Meningitis (bacterial, cryptococcal, mycotic)* Meningococcal disease (includes meningitis and meningococemia)* Mercury poisoning* Mumps* Neurotoxic shellfish poisoning Pertussis Pesticide-related illness and injury* Plague Polioomyelitis, paralytic and non-paralytic Psittacosis (Ornithosis)* Q Fever* Rabies (human, animal)	Rabies (possible exposure) Ricin toxicity Rocky Mountain spotted fever* Rubella (including congenital) St. Louis encephalitis (SLE) virus disease (neuroinvasive and non-neuroinvasive)* Salmonellosis* Saxitoxin poisoning including paralytic shellfish poisoning (PSP)* Severe Acute Respiratory Syndrome-associated Coronavirus (SARS-CoV) disease Shigellosis* Smallpox Staphylococcus aureus, community associated mortality* Staphylococcus aureus (infection with intermediate or full resistance to vancomycin, VISA, VRSA) Staphylococcal enterotoxin B (disease due to) Streptococcal disease (invasive, Group A)* Streptococcus pneumoniae (invasive disease)* Syphilis* Syphilis (in pregnant women and neonates) Tetanus* Toxoplasmosis (acute)* Trichinellosis (Trichinosis)* Tuberculosis (TB)* Tularemia Typhoid fever Typhus fever (disease due to Rickettsia prowazekii infection) Typhus fever (disease due to Rickettsia typhi, R. felis infection)* Vaccinia disease Varicella (Chickenpox)* Varicella mortality* Venezuelan equine encephalitis virus disease (neuroinvasive and non-neuroinvasive) Vibriosis (Vibrio infections)* Viral hemorrhagic fevers (Ebola, Marburg, Lassa, Machupo) West Nile virus disease (neuroinvasive and non-neuroinvasive)* Western equine encephalitis virus disease (neuroinvasive and non-neuroinvasive)* Yellow fever
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You are an invaluable part of Florida's disease surveillance system.

For more information, please call the epidemiology unit at your local county health department or the Bureau of Epidemiology, Florida Department of Health (FDOH): 850-245-4401 or visit http://www.doh.state.fl.us/disease_csr/epi/topics/lead.htm

**Section 381.001(2), Florida Statute provides that "any practitioner licensed in Florida to practice medicine, osteopathic medicine, chiropractic, naturopathy or veterinary medicine who diagnoses or suspects the existence of a disease of public health significance shall immediately report the fact to the Department of Health." The FDOH colony health department serves as the Department representative in this reporting requirement. Furthermore, the Section provides that "the Department shall issue a list of diseases determined by it to be of public health significance... and shall furnish a copy of said list to the practitioners..."





Background:

Florida's Reporting Requirements

- Reportable variables:
 - **Patient Information**
 - Name (last, first, and middle initial)
 - Address (street, city, zip code), telephone number
 - Date of birth
 - Sex
 - Race & Ethnicity (Hispanic / non-Hispanic)
 - Pregnancy status (if applicable)
 - Social Security number
 - **Disease/testing Information**
 - Date of onset of symptoms (if applicable)
 - Diagnosis and type of diagnostic test (s)
 - Type of specimen (blood venous vs. blood capillary)
 - Date of specimen collection
 - Diagnostic test results (blood lead level and units of measure)
 - **Attending practitioner** - name, address and telephone number



Background:

Program Structure/Function

- **Adult Blood Lead Epidemiology Surveillance (ABLES)**: funded by NIOSH, 2002 - present
 - Monitors poisoning among persons ≥ 16 yrs old
 - Investigates BLLs $\geq 25\mu\text{g/dL}$ (2002 -2008); BLLs $\geq 10\mu\text{g/dL}$ (2009)
 - Approx. 80% of all lead poisoning cases related to occupations

- **FL Childhood Lead Poisoning Prevention Program (FL CLPPP)**: funded by CDC, 1992 - present
 - Monitors lead poisoning among persons 0-16 yrs old
 - Investigates BLL $\geq 10\mu\text{g/dL}$
 - Conducts case management and service referrals for children < 6 yrs old
 - Environmental investigations required for persistent BLL $\geq 15\mu\text{g/dL}$

Background:

Lead Industries in Florida

- Battery manufacturing & battery recycling plants

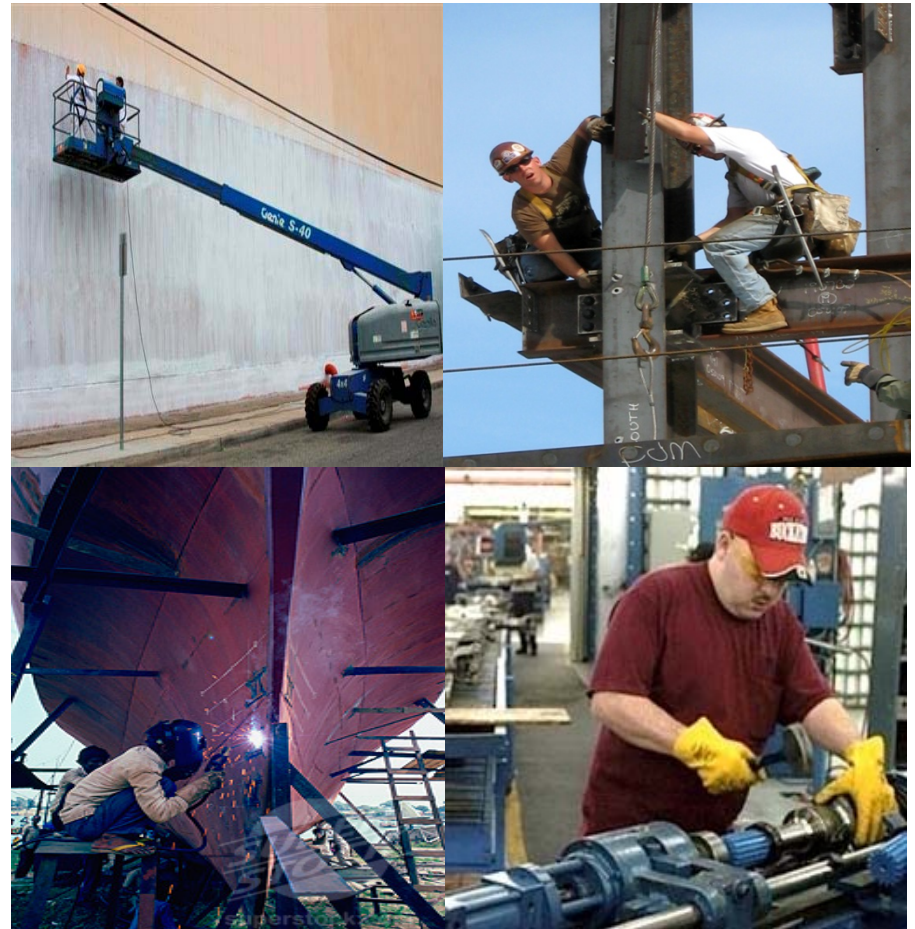


- 2 plants located in Central Florida
 - Manufacture and recycle lead acid (storage) batteries
 - Workers (BLL $\geq 10\mu\text{g/dL}$) make up approx. 50% of the ABLES database
 - Job duties – battery handlers, production workers, welders, engineers, laborers and maintenance workers.

Background:

Florida Lead-related Occupations

- Construction workers
- Boat/ship builders
- Home repair/renovation
- Heating/air conditioning and maintenance
- Industrial painters
 - Bridge
 - Machinery
 - Building
- Factory workers
 - General laborers
 - Technicians
 - Hygiene specialists
 - Loaders/Off loaders



Background: Other Lead Sources in Florida

- Shooting Ranges
 - Shooters
 - Instructors
 - Janitors
- Hobbies
 - Home repair/renovating
 - Automobile repairs
 - Stained glass making
 - Making of bullets
 - Lead smelting- making of fishing sinkers





Method - Data Processing: Address Information

- Standardize/geocode lab reported addresses:
 - Complete addresses: street, city, zip code, and county
 - Children: 299 cases
 - 280 (94%) with complete address
 - 19 (6%) without complete address
 - Adults: 11351 screened adults
 - 9748 (86%) with complete address
 - 1910 (14%) without complete address



Method - Data Processing: Generating Matches

- Data matching process:
 - Linked addresses of 280 lead poisoned children and 9748 screened adults
 - Address components - street, city, zip code and county
 - Obtained information on matched child and adult
 - Patient first and last name
 - Patient date of birth
 - Patient address (incl. apt# when reported)
 - Patient BLL
- Verification of matches:
 - Exactly matched address – no variation
 - Matched address with no corresponding apt. # – checked last name of adult and child for possible match



Method - Data Processing: Identifying Lead Sources

- Reviewed child investigation file in the Florida Reportable Disease Surveillance Database (Merlin)
 - Verified child's demographic information
 - Reviewed child's investigation records and case notes:
 - Identified potential lead exposure sources
 - Determined if lead exposure source could be related to take-home lead (i.e. exact or key words)
 - Verified undocumented/unknown lead exposure sources (i.e. investigation records vs. case notes)



Results & Interpretations

- Matching results of 280 lead poisoned children and 9748 screened adults:
 - 18 (6.4%) children matched with 22 (0.23%) adults on street, city, and zip code
 - 6 children and 4 adults excluded – unmatched Apt#s
 - 12 children selected – matched
 - 12 (4.3%) children matched with 18 (0.18%) adults
 - 10 by exact addresses
 - 2 by addresses with no corresponding apt. # and matched last name
 - Of the 12 children, 7 (58%) linked to lead poisoned ($BLL \geq 10\mu\text{g/dL}$) adult workers

Results & Interpretations

- Identification of child lead exposure source in Merlin

Child #	Age (year old)	Child BLL (µg / dL)	Exposure Source
1¥	1	22	Unknown
2	newborn	15	Possible maternal
3	4	15	Lead paint - home / daycare
4¥	2	11	Take-home lead
5	2	26	Take-home lead
6	1	11	Take-home lead
7	1	21	Lead paint-mini blinds
8	1	21	Unknown
9	1	25	Take-home lead
10¥	1	13	Unknown
11	5	10	Take-home lead
12	1	13	Outside FL-Burmese

¥ Linked to 2 adults

Results & Interpretations

- Merlin: 5 occupational-related child lead exposures
 - ABLES: 4 children linked to adults with known lead occupations
 - * Investigations not conducted for adults with BLL <10µg/dL

Child #	Industry	Occupation	Adult age (years old)	Adult sex	Adult BLL (µg / dL)
4	Battery Manufacturing	Loader / Group Leader	32	Male	22
5	Unknown	Cable repair worker	29	Male	23
6	Battery Recycling	General Laborer	43	Male	10
9	Unknown	unknown	30	Female	4 *
11	Unknown	Welder / Metal worker	35	Male	25

Newborn – mother (ABLES): BLL = 25 µg/dL; maternal screening in 03/2008

Results & Interpretations

- Merlin: 3 children with unknown Florida acquired lead exposure sources
 - ABLES: 2 children linked to adults with known lead occupations
 - * Investigations not conducted for adults with BLL <10µg/dL

Child #	Industry	Occupation	Adult age (years old)	Adult sex	Adult BLL (µg / dL)
1	Battery Manufacturing	Envelope Stacker	21	Male	25
8	Unknown	Unknown	32	Female	3 *
10	Unknown – possible self employed	Welder / Metal worker	16	Male	1 *



Limitations

- Incomplete address information
 - 1910 (14%) lead screened adults
 - 19 (6%) child lead poisoning cases
- Unknown lead exposure source information for children
 - Loss to follow up – no response, contact information incomplete/incorrect, etc.
 - Lack of participation - parent/guardian refusal for follow-up on child lead exposure investigation
- Childhood lead poisoning surveillance data do not capture information on parent/guardian
- Children whose parents/guardians have high risk lead occupations/hobbies may not have been screened for lead



Conclusion & Recommendations

- Take-home lead may not be a major source of lead exposure among children in Florida based on the population examined
- Take-home lead exposure should be considered when:
 - Children are in household of adult lead workers/hobbyists
 - Unidentified sources of lead exposure among children that can be linked to workers in lead occupations/hobbies

Actions taken/In progress: Educational Outreach

- Continue to increase awareness about the risk of take-home lead
 - Identifying children who reside in homes with adult in lead-related occupations and/or hobbies
 - Identifying occupational & hobby-related lead exposure sources
 - Promoting testing of children that can be linked to lead poisoned workers and hobbyists



Lead free at work and home.

Protect yourself and your family from lead poisoning. Lead poisoning can occur by swallowing or breathing lead dust or vapors. Exposure can occur at work and at home. It can be a serious condition for children and adults.

LEAD IN THE WORKPLACE
Lead in the form of dust, mist or fumes can be inhaled or swallowed in the workplace. The dust can settle on hands, foods, drinks and cigarettes where it can be swallowed while eating, drinking or smoking.

LEAD AT HOME
Parents who work in occupations that involve lead should be aware that lead dust can be carried home from work on clothes, shoes, or equipment. Other sources of lead in the home that pose a threat to children include dust from old paint or contaminated soil. Some imported candies, toy jewelry, spices, mini blinds and home remedies also contain lead.

LEAD'S EFFECTS ON ADULTS
If you may have been exposed to lead at work, you should pay attention to warning signs from your body. Look for these common symptoms for lead poisoning:

- Mild fatigue
- Irritability
- Sleep disturbance
- Muscular exhaustion
- Loss of appetite
- Weakness in hands, wrists or ankles
- Difficulty concentrating
- Headache
- Tremor
- Nausea
- Diarrhea or constipation

COMMON OCCUPATIONAL ACTIVITIES THAT INVOLVE LEAD

- Battery recycling or manufacturing
- Ammunition manufacturing
- Boat building
- Painting, bridge painting/repairing
- Heating/air conditioning/ventilation maintenance
- Construction and demolition
- Firing range training and cleaning
- Home repair and renovation

HOW SHOULD I PROTECT MYSELF AT WORK?

- Wash your hands and face before taking breaks to eat or smoke.
- Do not eat or smoke in the work area.
- Eat foods high in iron, calcium and vitamin C every day. These foods make it harder for your body to absorb lead.
- If Personal Protective Equipment (PPE) is required, wear this protection at all times.
- Properly care for PPE and report any wear and tear that may cause equipment failure.
- Always be aware of when you may be exposed to lead. When in doubt, consult your employer.
- Know your rights. Federal law requires employers to monitor airborne lead in the workplace. If levels are high they are required to conduct blood testing of employees.
- Always let your doctor be aware of your lead exposure, even if you do not have any symptoms. At high levels of lead, your doctor may prescribe chelation therapy, which is a treatment that helps your body rid itself of lead at a faster rate.

LEAD'S EFFECTS ON CHILDREN
Children are at greater risk than adults for lead poisoning. Lead poisoning can cause irreversible damage to a child's brain, kidneys, and other organs. Exposure can lead to behavior problems, increased aggression and learning difficulties.

HOW SHOULD I PROTECT MY CHILDREN FROM "TAKE HOME" LEAD?

- Change and leave work clothes and shoes at work. If possible, shower at the workplace before going home.
- Wash and dry work clothes separately from other laundry.
- Wipe your car or truck out with a damp cloth frequently.
- Wash your children's hands often, especially before meals and bedtime.
- Provide your children with healthy meals and snacks. Make sure they eat foods high in iron, calcium and vitamin C every day.
- A quick and simple blood test is the only way to tell for sure if your child has lead poisoning. Ask your doctor or health department to test your child for lead.

For more information about lead poisoning, visit the following sites:

- Occupational Safety and Health Administration: www.osha.gov/
- Centers for Disease Control and Prevention: www.cdc.gov
- National Safety Council: www.nsc.org/issues/lead/
- U.S. Department of Housing and Urban Development Office of Healthy Homes and Lead Hazard Control: www.hud.gov/offices/lead/index.cfm
- U.S. Environmental Protection Agency: www.epa.gov/lead/
- Florida Department of Health Lead Poisoning Prevention Program: www.doh.state.fl.us/environment/medicine/Lead/education.htm

3-2009



Actions taken/In progress: Adult case investigations

- Developing Adult Lead Poisoning Investigation Guidelines & Case Investigation Questionnaire for County Health Depts.:
 - Establishing guidelines on how to investigate adult lead poisoning cases
 - Developing screens for electronic reporting of investigation outcomes

Florida Department of Health
Division of Environmental Health
Lead Poisoning Prevention and Healthy Homes Program
Adult Blood Lead Surveillance Program (ABLES)

Adult Lead Poisoning
Investigation Guidelines
&
Case Investigation Questionnaire
(For investigating lead poisoning cases in individuals 18 years of age and greater)

DRAFT: May 14, 2010

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Future Plans:

Recommended Activities

- Continue to encourage reporting entities to report complete client information e.g. address
- Enhance investigation of children who are linked to lead workers with unidentified lead exposure sources
 - 3 unknowns among 12 matched pairs
- Determine lead poisoning screening rate among children of workers with lead-related occupations
 - Collect information on child's parent/guardian
 - Explore data matching with vital statistics/birth records

Questions & Answers

**GET
THE
LEAD
OUT**

GET THE LEAD OUT **OF YOUR HOME.**



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Florida Department of
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Tel. #: 850-245-4299

Website:
<http://www.myfloridaeh.com/medicine/lead/index.html>