

Intern Morning Report

March 28, 2008

Stats

- > 500,000 with elevated BLLs in USA
- Between 1976 and 1980, > 85% of pre-school aged kids had elevated BLL
- 1. Elimination of lead from gasoline
- 2. Banning of lead-containing solder to seal food and beverage containing cans
- 3. Limiting the amount of lead in paint to < 0.07% by weight
- Elevated BLL prevalence is < 10% pre-schoolers and less than 10% have BLLs > 20

High Risk groups

- Preschool age
- Low socioeconomic status
- Living in older housing
- Urban location
- African-American race
- Recent immigrants

County FIPS	County Name	# of Children Tested	Screening Rate (# tested / population)	Total # of Confirmed Cases	# of Addresses-Multiple Children w/ Confirmed EBLLs *	Census 2000 Data			Estimated Population of Children < 6, 2005
						Total Housing Units	Pre-1950 Housing Units	% of Children < 6 Under Poverty	
001	Atlantic County	4,424	22.3%	46	18	114,090	24,868	12.0%	19,816
003	Bergen County	13,568	20.5%	74	18	339,820	126,125	4.0%	66,033
005	Burlington County	3,514	10.8%	30	7	161,311	26,363	5.0%	32,548
007	Camden County	7,793	18.8%	96	47	199,679	57,949	15.0%	41,463
009	Cape May County	906	14.4%	10	4	91,047	20,248	12.0%	6,300
011	Cumberland County	3,366	31.0%	180	93	52,863	16,316	23.0%	10,844
013	Essex County	24,283	35.1%	916	472	301,011	142,297	21.0%	69,149
015	Gloucester County	2,608	13.2%	18	8	95,054	19,029	6.0%	19,779
017	Hudson County	12,952	28.3%	128	47	240,618	125,180	21.0%	45,726
019	Hunterdon County	1,595	15.9%	10	4	45,032	11,720	1.0%	10,018
021	Mercer County	5,755	21.5%	154	37	133,280	44,117	12.0%	26,828
023	Middlesex County	13,323	22.6%	94	43	273,637	52,430	7.0%	59,037
025	Monmouth County	8,298	16.2%	114	35	240,884	56,969	8.0%	51,300
027	Morris County	6,845	17.3%	52	7	174,379	40,039	3.0%	39,553
029	Ocean County	6,522	16.8%	79	30	248,711	24,076	13.0%	38,936
031	Passaic County	14,352	32.4%	341	151	170,048	70,979	18.0%	44,231
033	Salem County	600	13.1%	19	6	26,158	9,623	15.0%	4,581
035	Somerset County	3,636	13.6%	43	10	112,023	21,286	4.0%	26,787
037	Sussex County	1,377	11.7%	7	3	56,528	12,221	4.0%	11,770
039	Union County	12,009	27.7%	227	78	192,945	82,231	10.0%	43,376
041	Warren County	1,534	17.9%	9	5	41,157	14,786	5.0%	8,588

* Based on most recent five years of data, 2001-2005

Risk Assessment

- **Primary care providers should periodically review lead exposure risk for all children, beginning at age 6 months**
- Child lives in or regularly visits a house that was built before 1950
- Is the house being remodeled or recently been remodeled during last 6 months
- Child has a sibling or a playmate who has or had an elevated blood lead level

Questions to Ask

- Condition of old paint
- Occupational exposure
- Proximity to an industrial source of pollution

Products

- Batteries
- Cable sheathing
- Cosmetics
- Mineral supplements
- Plastics
- Toys
- Ceramic ware
- Lead pipes
- **Lead-based paint (ingested or inhaled)**

Pathophysiology

- Iron and calcium deficiency increase lead absorption
- Disseminated throughout body via blood
- Bind to RBCs
- Levels > 35 of protoporphyrin are abnormal indicating lead poisoning, iron def, recent inflam disease
- Levels of FEP start rising few weeks after BLL > 20
- Many ca-binding proteins have high affinity for lead
- May affect the development of normal tertiary structure in brain

Clinical effects

- Variable
- Hearing and height are inversely related to BLLs
- Early Exposure adversely affects later cognitive development
- Early aggressive management may reverse these effects
- Aggressive behavior
- GI: anorexia, abdominal pain, vomiting, constipation
- CNS: increased ICP generally with BLL > 100
- Reversible Fanconi syndrome with BLL > 100
- Decrease RBC survival time leading to anemia

Screening

- Most children are identified by screening procedures
- Test all children at 12 and 24 months of age
- Guidelines for testing based on local prevalence of lead poisoning and % of houses built before 1950

Chelating agents

- **Oral:** DMSA (succimer) and penicillamine
- **Parenteral:** CaNa₂EDTA (versenate) and BAL (dimercaprol)
- Toxicity: GI distress, elevated LFTs, neutropenia
- Rebound lead levels from bone release
- Repeat courses may be needed
- BLL decline in 1st 2 months
- Children with very high BLL may take years to reach levels < 10

Follow up of Screening Test

BLL (mcg/dL)	CDC Repeat	AAP Repeat
10-19	3 mo	1 mo
20-44	1mo-1wk	1 wk
45-59	48 hr	48 hr
60-69	24 hr	48 hr
≥70	Immediately	Immediately

Follow Up of Diagnostic Test

BLL (mcg/DL)	Action
10-14	Repeat w/in 3 mo. Evaluate sources. Education: cleaning, hand-mouth
15-19	Repeat w/in 2mo. Ed/evl Dept of health referral
20-44	Repeat w/in 1 mo. Ev/ed. Dept of health
≥ 45	Chelation therapy in addition to above
≥ 70	Immediate hospitalization and 2-drug chelation in additon to eval/edu/referral

Xrays

- Dense bands at metaphyses (months to years of exposure)
- Radio-opaque flecks in GI tract indicative of recent ingestion

- **Prevention is the key**
- Identification of potential sources and their removal
- Behavioral modification
- Dietary counseling to improve iron and calcium intake

Website

- The U.S. Consumer Product Safety Commission (CPSC)
- <http://www.cpsc.gov/>.
- <http://www.cdc.gov/nceh/lead/Recalls/allha>
- Healthy People by 2010 to eliminate lead poisoning in children

Review Article

- Treatment Guidelines for Lead Exposure in Children Pediatrics 1995 96(1):155-159

- Constipation
- Encephalopathy/Guillain-Barre syndrome
- ARF

- Intention tremor
- Corrosive esophagitis
- Hematochezia
- Gingivitis/stomatitis/salivation

- Hepatitis
- Ataxia
- Psychosis

Thank You

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