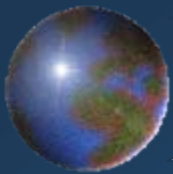


An unexplained case of elevated blood lead in a Hispanic child

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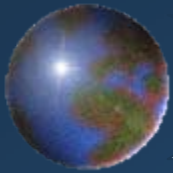


Initial contact



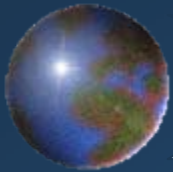
*Southwest Center
Pediatric Environmental Health*

- TDH regional office asked SWCPEH to assist a pediatrician from an east Texas town
 - 11 month old child with a history of elevated blood leads, 36-41 $\mu\text{g}/\text{dl}$ over a 4 month period
- Referred to Dr. Cherry for follow-up
 - Discussed case of Hispanic family and sources of lead in the home



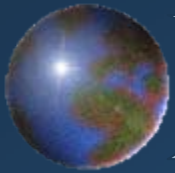
Health issues as reported by child's pediatrician

- Breast-fed child exclusively for 6 months
- Initial blood lead elevated at 6 months
- Solid foods began at 6 months
- Mild anemia, otherwise normal growth and development
- No apparent source of lead based on discussion with mom



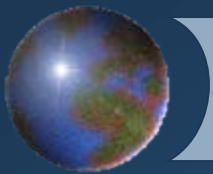
Family demographics

- Mom 2nd generation immigrant from Mexico homemaker
 - Blood lead of 14 $\mu\text{g}/\text{dL}$ in 3/14/02
- Dad employed as roofer
- Granddad, part-time roofer, caregiver
- 5-year old sister negative for blood lead



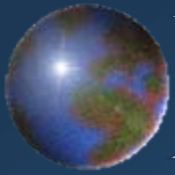
Timeline

- Child born 8/01
- First tested at 6 mo for lead on 3/14/02 (41 $\mu\text{g}/\text{dL}$)
- Repeated testing 3/22/02 (36 $\mu\text{g}/\text{dL}$)
- Oral chelation with Succimer 4/02
- Lead test No. 3, 4/30/02 (40 $\mu\text{g}/\text{dL}$)
- Initial TDH inspection, 5/02
- Repeat testing on 6/12/02 (37 $\mu\text{g}/\text{dL}$)
- SWCPEH contacted, late 7/30/02



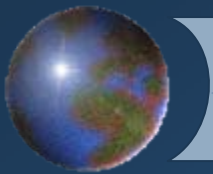
Initial visit by TDH

- First visit by TDH hygienist in May
 - No sources of lead in the home or outside
 - All items on standard 6 page questionnaire tested, all negative
 - Paint, floors, surfaces, dirt outside, mini-blinds, all negative
- Family lived in a mobile home that was immaculately clean



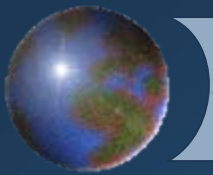
*Found in the back yard by
garbage can – positive for Pb*





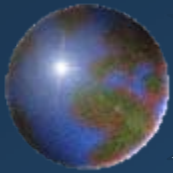
Next steps

- Early 8/02 - Case discussed with Drs. Lowry, Levin, Brady, Huggins, Cherry
 - Talk by phone with family and pediatrician regarding sources of lead and preventive steps (hand washing, high calcium diet, etc)
 - Blood level 9/02/02 – 42 $\mu\text{g}/\text{dL}$
- 10/02/02 – Revisit to home by Drs. Cherry, Brady and Mr. Frambrough, TDH



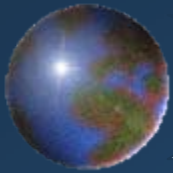
October visit by Drs Cherry & Brady

- Additional family history
- Extensive evaluation of non-traditional sources of lead
 - Toys, crib, tub, foods, pots, cosmetics, ceramics, imported foods & candies, key chains, herbal remedies, folk remedies, lead fishing sinkers, etc.
 - All negative for lead
- Broken pottery and discarded cupola + for Pb



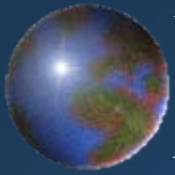
Environmental history

- Cooked beans in Pb-glazed pottery during pregnancy and until 6 mo old
 - Discontinued at 6 mo lead check
- Diet - breast milk only for 6 mo, both breast milk and baby foods until about 1 yr, then table foods, bottled water only
- Mobile home – no lead paint
 - PVC plumbing, city water, no pets, no pacifier, jewelry negative



The search for lead

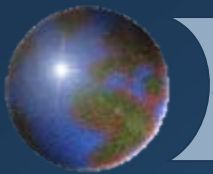
- Additional testing of carpet dust (negative)
- Dr. Brady conversed with granddad, dad and mom in Spanish
 - No specific cultural exposures identified
 - No use of Greta or Azarcon
- Food sources of lead not likely



Mexican pottery



After tracing their lead poisoning to a set of dishes, Don and Fran Wallace collected other examples of lead-contaminated tableware.



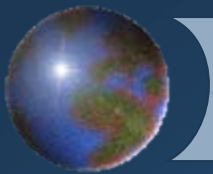
Lead-glazed Mexican pottery

● General

- Traditional use from the old country
- Contain high levels of lead
- Can be leached by acid foods (Salsa)
- Significant source of lead in diet

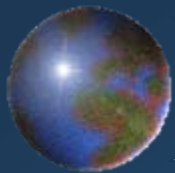
● Specifics

- Broken piece found outside by garbage can
- Not likely direct source of lead in child

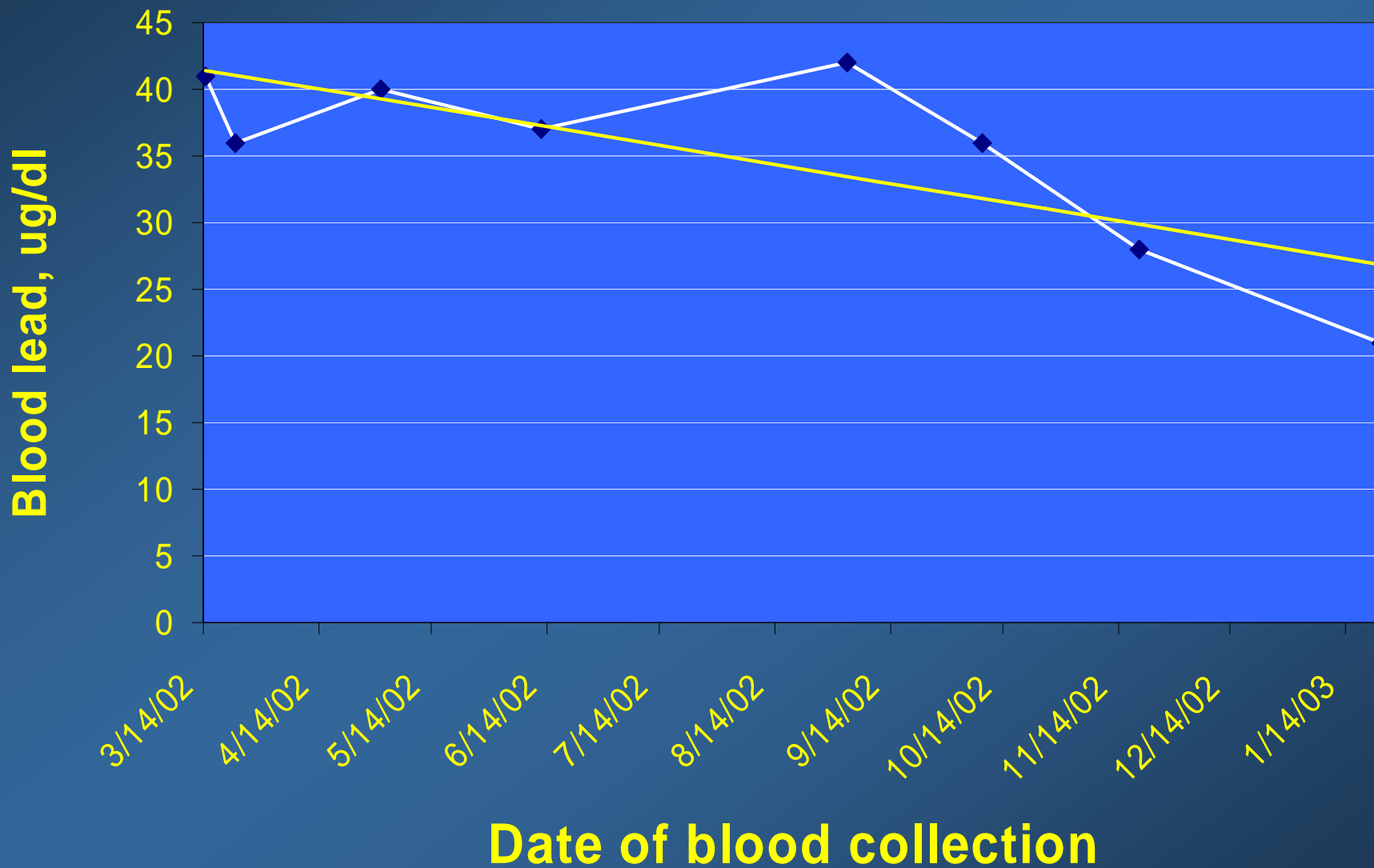


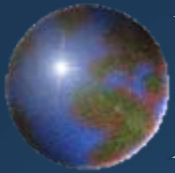
Follow up information

- Mother admits to using Mexican pottery during pregnancy
 - If Pb high, then 5 yo should have elevated PbB also
- Pb in breast milk about 30% of maternal value
 - Not expected to be a significant source of lead
- Reported cases of pica in adults among Hispanics along the border
- Could this be the case here?
- Can we reconstruct estimated blood lead levels in mom and child at birth



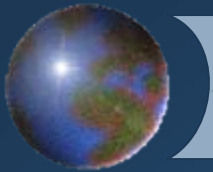
Blood lead over time





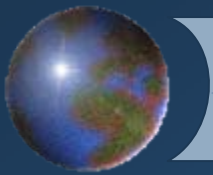
Hypothesis

- Lead exposure occurred in utero from pica activity of mom, and not from cooking in Mexican pottery



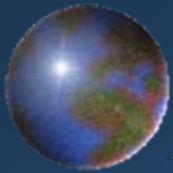
Evidence

- Presence of lead in mom and child links the two to a common source
 - ❖ Not likely to be cooking in Mexican pottery
- Lead levels in child slowly dropping for 8 months, from initial age of 6 mo to current age of 14 mo
 - Elimination half-life from blood, 27 days
 - Elimination half-life from bone, 10^5 days
- Chelation (compliance not verified) did not lower blood lead in child
 - ❖ Expected to lower blood level if major depot in body



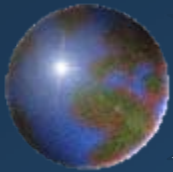
Discussion and speculation

- Mom possibly ingested some chips of pottery (pica) while pregnant, giving her and child high initial dose of lead
 - Rapid elimination of first (blood) compartment during first 6 months
 - Slow elimination from bone over years
- Most likely, 2- compartment elimination, rapid from the blood and slow from the bone
- Lead levels in child and in mom reflect washout of lead from bone stores



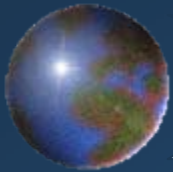
Elimination kinetics evidence

- Elimination kinetics for mom and child similar linking the possible exposure
 - k_{el} for child is $0.07 \mu\text{g/dL/day}$
 - Slope of curve with $n=7$
 - k_{el} for mom is $0.05 \mu\text{g/dL/day}$
 - Slope of curve with $n=2$
- Elimination kinetics imply slow release from bone
- Cannot calculate elimination half-life as it is likely a 2-compartment model and there is no data for the early rapid elimination phase from blood



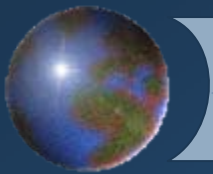
Follow-up health surveillance

- Based on elimination rate, predict drop of PbB of 2-3 $\mu\text{g}/\text{dL}$ per month
 - Monitor blood lead quarterly
- Further chelation not indicated
- Abdominal x-rays to rule out GI source, not indicated
- Enroll in early childhood intervention program
 - Monitors neuro-developmental progress to 6th grade



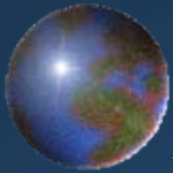
CDC recommendations

- Re-check PbB monthly if $\text{PbB} > 20 \mu\text{g/dL}$
- Surveillance for neurobehavioral effects if PbB remains above $20 \mu\text{g/dL}$
- Maintain diet high in Ca, Fe, Vitamin C
- Use dairy products regularly as source of Ca



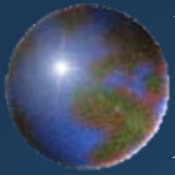
What are long term consequences?

- Children exposed to very high Pb in Idaho in 1970s (PbB 50-150 $\mu\text{g}/\text{dL}$) evaluated in mid 1990s
- Normal PbB, elevated bone lead (XRF), mild neurobehavioral decrement compared to controls



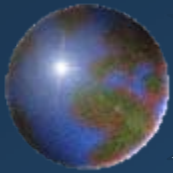
Summary

- Environmental questionnaire essential
- Possible sources of lead must be investigated and tested
- Do not neglect cultural issues
- Keep an open mind
- Its not only paint



Epilog

- Mother admitted to pica behavior with Mexican pottery



Thanks to my co-investigators

- Debra Cherry, MD
- Tim Brady, DO
- Cecil Fambrough, IH