

Public Health Brief

March 2011

Lead-contaminated spices associated with elevated blood lead levels in Tri-County area

By Nancy Williams, MD, MPH

Tri-County Health Department (TCHD) is alerting medical providers about the identification of four confirmed cases in 2010 with elevated blood lead levels (BLL) that appear to have been caused by consuming tainted Indian spices. The cases included **both children and adults**, and came from two separate households in Adams and Arapahoe Counties – members of one household purchased spices in India while the other family purchased spices from a market in the metro-Denver area. Spices from both households were tested and lead was found to be present in several of them.¹ TCHD will be working with South Asian markets in the area for further spice testing.

The findings in our counties are consistent with previous reports in the literature. A recent study in Boston, published in *Pediatrics* in March 2010 and featured by ABC News, identified children who developed lead poisoning following long-term consumption of contaminated Indian spices.^{i,ii} In addition to spices, the researchers identified cases where children as young as 9 months of age had developed lead poisoning from Indian religious powders containing lead that were applied directly to their skin.

Incidental to our investigation of the above mentioned cases, TCHD recently discovered packages of turmeric from a national retail chain that contained unsafe levels of lead. The store immediately removed the contaminated turmeric from sale. The Food and Drug Administration (FDA) worked with the supplier of the contaminated turmeric to issue a voluntary nationwide recall on March 24, 2011.

Recommendations

Based on the above information, TCHD recommends the following for health care providers:

- 1) **Ask patients about foods and spices** they eat regularly. Consider blood lead testing when children or adults have signs or symptoms consistent with lead poisoning. If these patients are of South Asian descent, consider asking about exposure to religious or cultural powders as well.
- 2) **Perform targeted BLL screening on new immigrants from South Asia** (India, Pakistan, Nepal, Bangladesh, etc) and **routinely administer lead-exposure risk assessment questionnaires** in South Asian patients, as recommended by the Pediatrics article². A lead assessment questionnaire modified to include these hazards can be found at the end of this update.

Risk Factors to Consider for Lead Screening

- Living in **older homes**
- Presence of **lead hazards**
- **Cultural** practices and **traditional** medicines
- **Lack of awareness** about the dangers of lead
- Compromised **nutritional status**

¹ curry, turmeric, coriander powder, garam masala, and chili powder

About Lead Poisoning:

Elevated BLL in children, particularly those under age 6, can result in permanent damage, including behavior or attention problems, reduced IQ, difficulty in school, hearing problems, kidney damage, and growth retardation.^{iii,iv} Although BLL >10 mcg/dL whole blood in children are reportable illnesses in Colorado, surveillance of children for elevated BLL is very limited in scope and many cases like these are identified only because medical providers had a clinical suspicion of the condition. A limited amount of adult surveillance for lead poisoning exists. OSHA regulations mandate medical surveillance, including BLL testing, for employees at risk of lead exposure, with action required for levels above 40 mcg/100 g whole blood.^v

Clinical presentation:

It is most common for lead poisoning to build up slowly over time from repeated exposure to small amounts of lead. Symptoms of lead poisoning are often variable and nonspecific or can even be absent, but can include the following.^{vi,vii}

Children with lead poisoning can present with neurological symptoms, abdominal pain and cramping (often an early sign of high-dose lead poisoning), constipation, difficulty sleeping, decreased appetite and energy, headaches, irritability, developmental delay, attention deficit, hyperactivity, aggression, other behavior disorders, school problems, hearing loss, or anemia. Vomiting, ataxia, muscle weakness, seizures, or coma can occur with severe cases.

Adults with lead poisoning can experience abdominal pain, fatigue, decreased libido, headache, irritability, arthralgias, myalgias, and neurologic dysfunction, including mild neurocognitive deficits, a predominantly motor peripheral neuropathy, and, in serious cases, encephalopathy

Diagnosis:

Clinical diagnosis requires awareness of the symptoms of lead poisoning in children or adults and sufficient index of suspicion. Completing a lead screening questionnaire such as the one provided with this Public Health Brief,² can help determine the need for BLL testing of whole blood. Although the currently accepted threshold for considering BLL to be elevated is 10 mcg/dL, lower concentrations can still result in intellectual impairment.^{viii}

Reporting to Public Health Agencies:

Laboratories are required to report any BLL for persons ≤18 years of age regardless of results within 30 days. Levels in persons ≤18 years of age found to be above 10 mcg/dL must be reported within 7 days. For persons >18 years of age, BLL above 25 mcg/dL must be reported within 30 days.

Also, although it is not mandatory, we recommend that medical providers also report these findings. The sooner a health department receives the report, the sooner health department staff can investigate cases to try to identify and remediate the sources of lead that have caused the elevated BLL, which, in the case of lead-contaminated spices, could expedite the removal of any tainted foods from retail market shelves.

A standard disease-reporting form can be used, such as the one included in this report, and faxed to Tri-County Health Department's secure fax line: 303-846-6295, or the report can be made by phone to 303-220-9200.

² The attached screening questionnaire was adapted from similar forms developed by the New Mexico and New York state health departments.

Please report elevated blood lead levels,

≥10 mcg/dL for children up to age 18

or

≥25 mcg/dL for adults 18 years and older

to: **Tri-County Health Department**

Fax: 303-846-6295 (any time)

Telephone: 303-220-9200 (8 am – 5 pm)

For more information or questions, please contact:

Colorado Department of Public Health and Environment:

(303) 692-2700 / (303) 370-9395 (after hours)

Fax: (303) 782-0338

or

Tri-County Health Department:

(303) 220-9200 / (303) 461-2342 (after hours)

Fax: (303) 220-9208

Table 1: Reported Cases of Notifiable Disease in Adams, Arapahoe and Douglas Counties, Year to Date 2011.*

Diagnosis	ADAMS	ARAPAHOE	DOUGLAS	Row Total
ANIMAL BITES	10	7	8	25
CAMPYLOBACTER	7	9	9	25
CRYPTOSPORIDIOSIS	.	3	.	3
GIARDIASIS	10	18	1	29
HAEMOPHILUS INFLUENZAE	2	1	.	3
HEPATITIS A	1	.	.	1
HEPATITIS B, ACUTE	.	1	.	1
HEPATITIS B, CHRONIC	12	22	6	40
HEPATITIS C, CHRONIC	38	32	10	80
INFLUENZA-hospitalized	80	115	31	226
LEGIONELLOSIS	.	1	.	1
MENINGOCOCCAL DISEASE	1	.	.	1
PERTUSSIS	20	28	8	56
SALMONELLOSIS	10	12	13	35
SHIGELLOSIS	1	.	.	1
STEC (shiga toxin producing E.coli)	2	3	1	6
VARICELLA(CHICKEN POX)	12	8	4	24
YERSINIOSIS	2	.	.	2
Column Totals	208	260	91	559

*Please note that TCHD does not follow up on all diseases listed.

Lead Exposure Risk Assessment Questionnaire for Children³

Ask all questions on this page.

Circle Answers

1. Is your family/child enrolled in or eligible for any of the following programs ⁴ ...Medicaid? 1a. ...CICP, WIC, or TANF? ⁵	Yes	No	Unsure
2. Does your child <u>live in or regularly visit</u> a building built... ⁶ before 1950? (Including your home, a day care center, preschool, or home of a babysitter or a relative, etc.)	Yes	No	Unsure
2a. before 1978?	Yes	No	Unsure
[If yes to either...] Does the building have peeling or chipping paint or has it recently been recently renovated or remodeled?	Yes	No	Unsure
3. Do the windows in the building have plastic mini blinds? ⁷	Yes	No	Unsure
4. Has your family/child ever lived outside the United States?	Yes	No	Unsure
4a. [If yes...] Has your family/child arrived from a foreign country in the past year?	Yes	No	Unsure
5. Does your child have a sibling, housemate, friend, or playmate who has been diagnosed with or treated for lead poisoning or for a high blood lead level?	Yes	No	Unsure
6. Does your child frequently put things in his/her mouth such as toys or jewelry? ⁸	Yes	No	Unsure
7. Does your child play with keys or put keys in his/her mouth? ⁹	Yes	No	Unsure
8. Does your child eat non-food items (like dirt)? ¹⁰	Yes	No	Unsure
9. Does your child frequently come in contact with anyone whose job or hobby involves exposure to lead? (Jobs include house painting, plumbing, renovation, construction, auto repair, welding, electronics repair, jewelry or pottery making. Hobby examples are making stained glass or pottery, fishing, making or shooting firearms, and collecting lead or pewter figurines.)	Yes	No	Unsure
10. Does your family/child live near a lead smelter, battery recycling plant, mine, junkyard, dump, busy freeway/highway, or an industrial site? ¹¹	Yes	No	Unsure
11. Does your family use products from other countries such as health remedies, spices, or food, or store or serve food in leaded crystal, pottery or pewter?	Yes	No	Unsure
11a. [If yes...] Continue by answering the questions on the back of this page	Yes	No	Unsure

CLINICIAN INSTRUCTIONS

Review answers on both sides of this sheet. If the parent marked any of the shaded 'Yes' answers, the child is considered to be at risk for lead exposure and should receive a blood lead test. If you identify elevated blood lead level in a child (>10 mcg/dL), please fax a copy of this questionnaire with a completed disease report form¹² to Tri-County Health Department to 303-846-2005.

If only un-shaded 'yes' boxes or 'unknown' answers were marked or you identify other possible risk factors for lead exposure, blood testing could be considered. The supplemental questions on the following page may be useful in making that determination.

For information on Colorado clinics offering low-cost lead screening please visit:

www.cdphe.state.co.us/dc/ehs/Clinicslowcost.pdf

³ Adapted from New Mexico Department of Health (<http://www.health.state.nm.us/ehsb/lead.shtml>) and New York State Department of Health (http://www.health.state.ny.us/environmental/lead/exposure/childhood/risk_assessment.htm)

⁴ Medicaid eligibility used to be a much higher risk for lead exposure than Medicaid ineligibility, although the discrepancy has lessened in recent years.

⁵ It is unknown whether being eligible for any of these programs in Colorado is a risk factor for lead exposure.

⁶ Homes built before 1950 are relatively likely to contain lead paint. Lead paint was not banned until 1978 but was rarely used by that time.

⁷ Some imported plastic mini blinds manufactured prior to 1996 contain lead.

⁸ Note: Poorly made toys or jewelry products can contain lead. Products identified as containing lead are recalled by the Consumer Products Safety Commission (CPSC) due to unsafe lead levels. See <http://www.cdc.gov/nceh/lead/Recalls/allhazards.htm> for all CPSC lead toy recalls.

⁹ Brass keys (gold color) usually contain lead and children should not be allowed to play with them or to put them in their mouths.

¹⁰ A condition called "pica"

¹¹ Clinician should alert parent/caregiver if aware that such an industry exists locally.

¹² Available online: http://www.tchd.org/pdfs/tchd_disease_rprt_form.pdf

Supplemental Questions: Examples of imported foods, cosmetics, cultural powders, and containers found to have been associated with elevated blood lead levels in children¹³

Exposure	Origin	Reported Uses	Description	Possible Exposure?		
Indian Spices	India	Food	Various whole or ground spices, which could include turmeric, coriander powder, or mixtures of spices like garam masala, curry, or chili powder.	Yes	No	Unsure
Suma	India	Improve eyesight	Black powder administered to inner lower eyelid.	Yes	No	Unsure
Jambrulin	India	Treatment of diabetes		Yes	No	Unsure
'Pay-loo-ah'	Southeast Asia	Treatment of fever and rash	Orange-red powder. Administered alone or mixed in tea.	Yes	No	Unsure
Tibetan ayurvedic	Tibet	Treatment for slow development	Small gray-brown balls administered several times a day.	Yes	No	Unsure
Chuifong tokuwan, bali goli, ghasard, kandu, ba-baw-san, and tokuwan	Asian	Medicinal treatments		Yes	No	Unsure
Greta or Azarcon (also known as liga, Maria Luisa, alarcon, coral, and rueda)	Mexico	Treatment of digestive problems	Yellow-orange powders. Administered with oil, milk, sugar or tea. Sometimes added to baby bottles and/or tortilla dough.	Yes	No	Unsure
Tamarind and other candies & seasonings	Mexico	Lollipops, fruit rolls, candied jams	Bolirindo, lucas limon, lucas acidito, super lucas, chaca-chaca, brinquitos, vero rebanaditas, vero mango, vero elotes, picarindo, tama roca, licona tamarindo, jarrita chonita tejocote, tamarinda pulpo, pelon pelo rico, tablarindo, serpetntinas, rollito de tamarindo, pica limon.	Yes	No	Unsure
Lead-glazed ceramics	Latin America	Beanpots, water jugs		Yes	No	Unsure
Litargirio	Dominican Republic	Deodorant / antiperspirant. Treatment of burns and foot fungus	Yellow or peach-colored powder. Contains nearly 80% lead.	Yes	No	Unsure
Lozena	Iraq	Added to rice and meat dishes for flavor	Bright orange spice.	Yes	No	Unsure
Kohl, alkoohl, saoott, and cebagin	Middle Eastern	Applied to skin, gums		Yes	No	Unsure
Other imported cosmetic, religious, and medicinal products	Multiple cultures	Varies	Examples: Navajo clay	Yes	No	Unsure

Note: use or consumption of the above products does not necessarily mean the child has been exposed to lead because not all products within these categories are contaminated.

We are piloting this form and welcome your feedback to help us improve its usefulness: njwilliams@tchd.org

¹³ Sources:

- Centers for Disease Control & Prevention, Screening for Lead at the Domestic Refugee Medical Examination (<http://www.cdc.gov/immigrantrefugeehealth/pdf/lead.pdf>)
- Lin CG et al, Pediatric Lead Exposure From Imported Indian Spices and Cultural Powders (PEDIATRICS 2010;125(4):e828–35)
- New Mexico Dept. of Health (www.health.state.nm.us/ehb/documents/Lead/Appendix_4_%20lead_risk_questionnaire.pdf)
- Agency for Toxic Substances and Disease Registry (http://www.atsdr.cdc.gov/csem/lead/pbwhere_found2.html)

References:

- ⁱ James SD. Indian Spices, Powders Linked to Lead Poisoning: Boston Study Reveals Religious Powder Sindoor Can Have 50 Percent Lead Content. ABC News, 2010. Available at: <http://abcnews.go.com/Health/indian-spice-religious-powders-lead-poisoning-children-study/story?id=10099654>. Accessed January 24, 2011.
- ⁱⁱ Lin CG, Schaider LA, Brabander DJ, Woolf AD. Pediatric lead exposures from imported Indian spices and cultural powders, *Pediatrics* 2010;125:3828–3835.
- ⁱⁱⁱ ATSDR, ToxProfile: Lead. Available at: <http://www.atsdr.cdc.gov/toxprofiles/tp13.pdf>. Accessed January 24, 2011.
- ^{iv} National Institutes of Health. MedLine Plus, Health Topics: Lead Poisoning. Available at: <http://www.nlm.nih.gov/medlineplus/ency/article/002473.htm>. Accessed January 24, 2011
- ^v OSHA. Occupational Safety and Health Standards: Toxic and Hazardous Substances: Lead, Standard Number: 1910.1025. Available at: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=10030. Accessed January 24, 2011.
- ^{vi} Jackson JA, Falk H, Hershovitz J. Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials, Centers for Disease Control and Prevention, November 1997.
- ^{vii} Kosnett MJ. Lead. In: *Clinical Toxicology*. New York, New York: W.B. Saunders, 2001:723–36.
- ^{viii} Canfield RL et al. Intellectual impairment in children with blood lead concentrations below 10 mcg per deciliter. *New England Journal of Medicine* 2003;348(16):1517