



ifpti

INTERNATIONAL
FOOD PROTECTION
TRAINING INSTITUTE



IFPTI Fellowship Cohort VI: Research Presentation

Kyle Shannon, L.E.H.S

2016-2017



Spice Lead Levels and Blood Lead Levels in Maryland Children

Kyle Shannon, L.E.H.S

IFPTI 2016-2017 Fellow

Maryland Department of Health and
Mental Hygiene

Funding for this program was made possible, in part, by the Food and Drug Administration through grant 1U18FD005964-01; views expressed in written materials or publications and by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services; nor does any mention of trade names, commercial practices, or organization imply endorsement by the United States Government.

- Lead naturally occurs in the environment as well as being released by human activities.
- Common recognized sources of lead exposure: paint/dust from deteriorated lead-based paint and lead contaminated soil.
- Dietary lead exposure has received less attention.



Image source: <http://abakinglife.thedailymeal.com>
(Creative Commons license)

“Spice Lead Levels and Blood Lead Levels in Maryland Children”

- The main target for lead toxicity is the central nervous system in children and adults.
- In children, chronic exposure, even at low levels, is also associated with **impaired cognitive function.**



Image source: <http://people.csail.mit.edu/>
(Creative Commons license)

“Spice Lead Levels and Blood Lead Levels in Maryland Children”

- Current U.S. Food & Drug Administration (FDA) guidance for lead in food:
 - Lead in candy is 0.1 ppm
- FDA Provisional Tolerable Total Intake Level (PTTIL) is 6ug of lead per day from all sources

- Maryland investigations **suggest that lead levels in spices are associated with elevated blood lead levels (EBLL) in Maryland children.**
- Samples of these spices show elevated lead levels.
- Maryland Department of Health and Mental Hygiene (MDHMH) and the Maryland Department of the Environment (MDE) was concerned and began a collaborative partnership.

The relationship between EBLL in the blood of Maryland children and their consumption of certain spices is unknown.

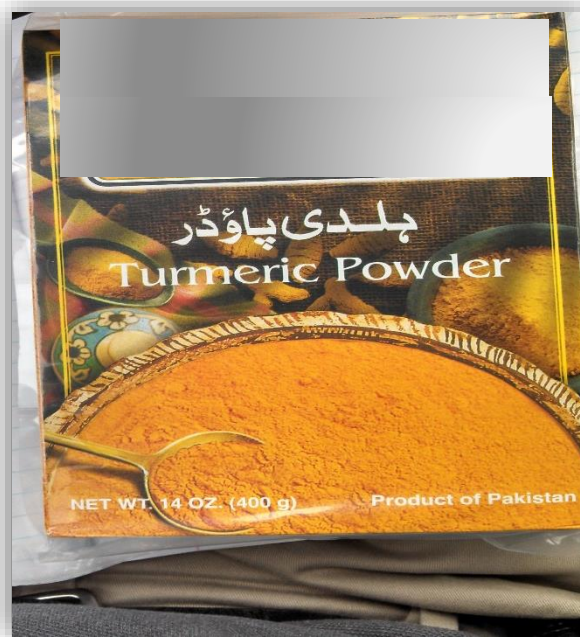


Image source: MDHMH

1. What are the common lead contaminants found in the MDE Investigations?
2. What are the lead levels found in certain spices consumed by children in Maryland?
3. What is the relationship between dietary intake of certain spices by Maryland children and elevated blood lead levels?

Data Collection:

- Retrospective review of MDE Childhood Lead Cases between January 1, 2013-December 31, 2016
- Spice sample results from MDE case investigations and spice surveillance data from MDHMH and New York State Department of Agriculture and Markets (NYSDAM)

Analysis

- Detailed review of lead cases in which MDE considered spices an antecedent
- Comparison of spice sample data from MDE, MDHMH, and NYSDAM
- Comparison of spice lead levels with FDA's Recommended Daily Provisional Tolerable Total Intake Levels (PTTIL) for lead in Children

- Children (ages 6 and under) with elevated blood lead levels (greater than 10 ug/dL) in which the MDE Lead Prevention Program has initiated an investigation.



Image source: Public domain, via Wikimedia Commons

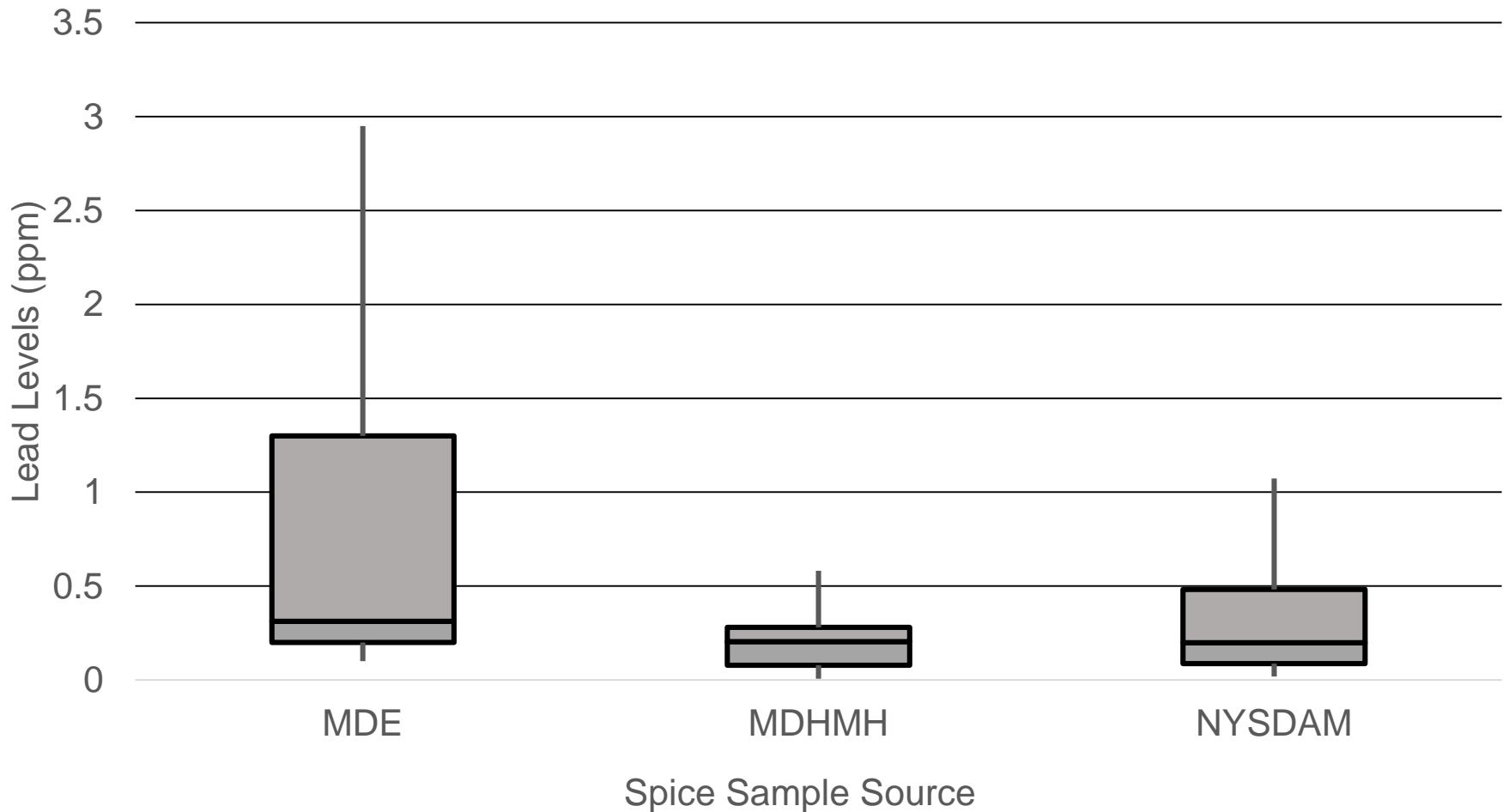
-
- From January 1, 2013, through December 31, 2016, MDE performed 534 investigations related to children with elevated blood lead levels.
 - Spices were considered contributing factors in 52 (9.7%) of those cases.
 - In seven (1.3%) of the 534 cases only spices were found to be an antecedent.

- Sample data for 42 cases were available for review in which 202 samples were collected and tested consisting of 52 types of spices:
 - Lead levels in spices ranged from non-detectable(ND) to 2000 ppm
 - The mean lead level was 0.548 ppm when removing outliers

Comparison of Spice Sample Analysis Results (in ppm) by Sample Source

<u>Sample Source</u>	<u>No. of Samples</u>	<u>Range</u>	<u>*Mean Lead Level</u>
MDE	202	0.1-2000	0.548
MDHMH	45	0.0072-3.14	0.176
NYSDAM	253	0.0188-146	0.229

***Values that were outliers were removed when calculating the Mean**

Comparison of Median and Interquartile Range of
Spices Samples by Source

- In 39 of the 52 cases a Country of Origin (CoO) was identified:
 - India (14)
 - Pakistan (7)
 - Afghanistan (5)
 - Nepal and El Salvador (3 each)
 - Zimbabwe, the United States, the Republic of Congo, Uganda, Saudi Arabia, Liberia, and Iran (1 each)

- When comparing the mean lead level of lead in spices collected by MDE (0.548 ppm) to the FDA PTTIL, the estimated amount of spices needed to be consumed to reach the PTTIL is approximately 3/4 of a tablespoon.



Image source: MDHMH

- A large proportion of spice samples showed detectable levels of lead.
- Mean lead levels in Surveillance Samples from MDHMH and NYSDAM were above 0.1 ppm (FDA Guidance Level for Candy).
- Laboratories conducting lead analysis use different methods which made comparison of results difficult.
- Daily consumption of spices in small amounts with lead levels found in case investigations would exceed the FDA PPTIL for lead in Children.

1. Evaluate and record the consumption levels of spices if there is a suspect lead risk found during childhood lead investigations.
2. Create a national regulatory or guidance level for lead in spices.
3. Expand educational outreach to populations at greater risk.
4. Analytical testing of lead in food should use a method appropriate for solid matrices with a low limit of detection.
5. The methodology used in this study should be applied in a follow-on study at some point in the future.

Maryland Department of Health and Mental Hygiene (MDHMH)

Dr. D'Ann Williams

Dr. Alan Brench

Dr. Clifford Mitchel

Alan Taylor

Dr. Ann Liu

Subha Chandar

Dr. Yingtoa Chai

Maryland Department of the Environment (MDE)

Wade McCord

John Krupinsky

Kristen Held

Jonathan Klanderud

Nick Kyriacou

Paula Montgomery

New York State Department of Agriculture & Markets (NYSDAM)

Erin Sawyer

International Food Protection Training Institute (IFPTI)

Joseph Corby

Dr. Paul Dezenorf

Questions?

Kyle Shannon, L.E.H.S
kyle.shannon@maryland.gov
(410) 767-8709

- [Lead Levels Found in Spices Compared to the FDA PTTIL](#)
- [Mean Lead Levels of the Ten Most Commonly Observed Spices and Percentage of Those Purchased in the U.S.](#)