Let’s Tackle School Drinking Water Safety!

Webinar 1: Why Are We Talking About It? Drinking Water and Lead Exposure
Moderator:

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Healthy Hydration
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Why Water?

- Healthy hydration
- Water instead of SSBs
Half of the added sugar in our diet comes from beverages

% OF CALORIES FROM ADDED SUGARS, BY FOOD TYPE

- Soda, sports and energy drinks, 36%
- Cakes/cookies, 13%
- Fruit drinks, 11%
- Ice cream, 7%
- Candy, 6%
- Cereal, 4%
- Sugars/honey, 4%
- Tea, 4%

NCI: Sources of Calories from Added Sugars among the U.S. Population, 2005-06.
We eat more if our sugar comes in liquid form

Liquid Sugar
(Only 9% Compensation of Calories)

Solid Sugar
(64% Compensation of Calories)

Mattes, 1996
SSBs are the single largest sources of ...

<table>
<thead>
<tr>
<th>AGE</th>
<th>#1 added sugar</th>
<th>#2 added sugar</th>
<th>#1 calories</th>
<th>#2 calories</th>
<th>#3 calories</th>
<th>#4 calories</th>
<th>#5 calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ages</td>
<td>Soda</td>
<td>Fruit drinks</td>
<td>Grain desserts</td>
<td>Pizza</td>
<td>Soda</td>
<td>Yeast breads</td>
<td>Chicken</td>
</tr>
<tr>
<td>2-3 years</td>
<td>Fruit drinks</td>
<td>Soda</td>
<td>Whole milk</td>
<td>100% fruit juice</td>
<td>Reduced fat milk</td>
<td>Pasta</td>
<td>Grain desserts</td>
</tr>
<tr>
<td>4-8 years</td>
<td>Soda</td>
<td>Fruit drinks</td>
<td>Grain desserts</td>
<td>Yeast breads</td>
<td>Pasta</td>
<td>Reduced fat milk</td>
<td>Pizza</td>
</tr>
<tr>
<td>9-13 years</td>
<td>Soda</td>
<td>Fruit drinks</td>
<td>Grain desserts</td>
<td>Pizza</td>
<td>Chicken</td>
<td>Yeast breads</td>
<td>Soda</td>
</tr>
<tr>
<td>14-18 years</td>
<td>Soda</td>
<td>Fruit drinks</td>
<td>Soda</td>
<td>Pizza</td>
<td>Grain desserts</td>
<td>Yeast breads</td>
<td>Chicken</td>
</tr>
</tbody>
</table>

Reedy, 2010
Children who eat excess sugar have higher risk of heart disease

Vos, 2016
Soda is the #1 cause of caries

“Intake of soda was found to be the strongest predictor of the extent of *dental caries*”

Marshall, 2003
Drinking Water Reduces Daily Intake of Sugar and Calories

↓ 10 tsp sugar
↓ 235 calories

*Daily sugar recommendation for children: 6 tsp

Wang et al, Archives of Pediatrics and Adolescent Medicine, 2009
Access to Safe Tap Water –
An Equity and Environment Issue, too
Water in Schools – Required
## From Statute to Tap

<table>
<thead>
<tr>
<th><strong>Water in NLSP Regulations</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Lunch Law</strong></td>
</tr>
<tr>
<td>Schools participating in the school lunch program under this Act</td>
</tr>
<tr>
<td>shall make available to children free of charge, as nutritionally</td>
</tr>
<tr>
<td>appropriate, potable water for consumption in the place where</td>
</tr>
<tr>
<td>meals are served during meal service. S. 3307. Section 203.</td>
</tr>
<tr>
<td><strong>The Lunch Regulation</strong></td>
</tr>
<tr>
<td>Require that schools make potable water available and accessible</td>
</tr>
<tr>
<td>without restriction to children at no charge in the place where</td>
</tr>
<tr>
<td>lunches are served during the meal service. Section 210.10(a)(1)</td>
</tr>
<tr>
<td>of the Final Rule</td>
</tr>
<tr>
<td><strong>The Breakfast Regulation</strong></td>
</tr>
<tr>
<td>Requires that when breakfast is served in the cafeteria, schools</td>
</tr>
<tr>
<td>must make potable water available and accessible without</td>
</tr>
<tr>
<td>restriction to children at no charge. Section § 220.8(a)(1) of</td>
</tr>
<tr>
<td>the Final Rule</td>
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<tr>
<td><strong>Snacks</strong></td>
</tr>
<tr>
<td>Requires water to be available during afterschool snacks. The</td>
</tr>
<tr>
<td>Afterschool Snack Program falls under the jurisdiction of the</td>
</tr>
<tr>
<td>National School Lunch Program. SP 28-2011</td>
</tr>
</tbody>
</table>

Source: From Statute to Tap: Following the Water Requirements in the Healthy, Hunger-free Kids Act of 2010
Goal: Drinking Water with Confidence
School Tap Water Safety

**USDA**: “ensure that children in NSLP schools and CACFP childcare homes and centers have access to drinking water that is both free and safe”

**AAP**: “ensure that water fountains in schools do not exceed water lead concentrations of 1 ppb”

Lead in the environment, including soil, water, and consumer products, has been associated with adverse health effects. Primary prevention should be the focus of policy on childhood lead toxicity.

**OVERVIEW AND INTRODUCTION**

Primary prevention, reducing or eliminating the myriad sources of lead in the environment of children before exposure occurs, is the most reliable and cost-effective measure to protect children from lead toxicity. Very high blood lead concentrations (eg, >100 µg/dL) can cause significant overt symptoms, such as protracted vomiting and encephalopathy, and even death. Low-level lead exposure, even at blood lead concentrations below 5 µg/dL (50 ppb), is a causal risk factor for diminished intellectual and academic abilities, higher rates of neurobehavioral disorders such as hyperactivity and attention deficits, and lower birth weight in children. No effective treatments ameliorate the permanent developmental effects of lead toxicity. Reducing lead exposure from residential lead hazards, industrial sources, contaminated foods or water, and other consumer products is an effective way to prevent or control childhood lead exposure. Lead poisoning prevention education directed at hand-washing or dust control fails to reduce children’s blood lead concentrations.

The guidance in this statement does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

**FINANCIAL DISCLOSURE:** The author has indicated he does not have a financial relationship to disclose.

**CONFLICTS OF INTEREST:** The author has indicated he has no potential conflicts of interest to disclose.

**REFERENCES:**

1. American Academy of Pediatrics: “ensure that water fountains in schools do not exceed water lead concentrations of 1 ppb.”

**FUNDING:** No external funding.
Water 101
How Lead Can Enter Water

Potential lead sources in school drinking water
Fixtures such as faucets, water coolers and components containing brass (items in red can pose a risk)
Timur S. Durrani, MD, MPH, MBA

Medical Director, Lawrence Berkeley National Laboratory
Co-Director, Western States Pediatric Environmental Health Specialty Unit (PEHSU)
University of California, San Francisco
No amount of lead is normal for the body.
How can lead harm children?

How lead affects children's health

**Brain**
Any exposure is linked to lowered IQ, ADHD, hearing loss, and damaged nerves. Acute exposures can cause convulsions, loss of body movement, coma, stupor, hyperirritability, & death.

**Heart**
Studies suggest that adults who endured lead poisoning as children had significantly higher risks of high blood pressure 50 years later.

**Hormones**
Lead disrupts levels of vitamin D, which can impair cell growth, maturation, and tooth and bone development.

**Blood**
Lead inhibits the body's ability to make hemoglobin, which can lead to anemia. This reduces oxygen flow to organs, causing fatigue, lightheadedness, rapid heartbeat, dizziness, & shortness of breath.

**Stomach**
Severe lead exposure can create intense abdominal pain and cramping.

**Kidneys**
Chronic exposures can cause chronic inflammation, which can lead to kidney failure, bloody urine, fever, nausea, vomiting, drowsiness, coma, weight gain, confusion, rash, and urinary changes.

**Reproductive System**
A moderate exposure can not only lower sperm count, but also damage them. Chronic exposures can diminish the concentration, total count, and motility of sperm, though it's unclear how long these effects last after the exposure ends.

**Bones**
Lead may impair development and the health of bones, which can slow growth in children.

**Sources:** Centers for Disease Control; World Health Organization
Small effects can have large significance

Adapted from Weiss B. Neurotoxicology. 1997.
Small effects can have large significance (continued)

57% increase in “intellectual disability” population

Mean = 95

60% decrease in “gifted” population

12.5 million: “intellectual disability”

3.2 million: “gifted”

Adapted from Weiss B. Neurotoxicology. 1997.
Societal Costs

The costs of lead hazard control range from $1.2-$11.0 billion/yr. This includes the sum of the costs for medical treatment, lost earnings, tax revenue, special education, lead-linked ADHD cases, and criminal activity.

The benefits range from $192-$270 billion/yr. This includes the sum of the costs for medical treatment, lost earnings, tax revenue, special education, lead-linked ADHD cases, and criminal activity.

Gould, 2009
Where is Lead Found?
Contributions of lead exposure to children’s blood lead concentration

Source: Lanphear et al 2016
Lead in Tap Water
Potential Sources of Lead in Tap Water

Triantafyllidou, 2011
Setting a Limit on Lead in Tap Water

0 ppb
AAP for schools
“No safe level for lead”

<1 ppb
FDA for bottled water
DC schools

5 ppb
Closer to health-based
AL for schools: IL

10 ppb
AL for schools & c/c: RI

15 ppb
EPA-LCR AL for water systems
AL for schools: CA, MA, NY, OR

20 ppb
EPA-3T’s AL for schools
AL for schools: ME, WA

AL = action level
Goal: Drinking Water with Confidence
Up Next

Webinar 2
Planning for School Water Quality: Steps Schools Should Take

Thursday, November 9, 2017; 11-12 pm PT

Register: https://ucanr.zoom.us/webinar/register/WN_pipakCIGTByoaf9uYQX5-g
FIND IT and FIX IT — or — FILTER or FLUSH IT

If you find lead in the water, there are simple and affordable methods of addressing it.

- **Find** the source of the problem and **fix** it (by replacing a lead pipe, fixture, faucet, etc.)
- **Filter** the water coming out of affected taps
- **Flush** your plumbing system after periods of non-use
Questions?

For more resources on school drinking water safety, access, education, and promotion see DrinkingWaterAlliance.org
Media Reports of Tap Water Contamination Incidents since January 2015
State Actions to Prevent Lead in School Drinking Water

For more detail see drinkingwateralliance.org/new-map