Get the Lead Out! – Student Instructions

Examine Historical Lead Data

The National Health and Nutrition Examination Survey (NHANES) is a program of studies designed to assess the health and nutritional status of adults and children in the United States. The survey is unique in that it combines interviews and physical examinations. The survey is a major program of the National Center for Health Statistics (NCHS), which is part of CDC. It has the responsibility for producing vital and health statistics for the Nation.

Examine the two data sets provided (Data Set 1: Blood Lead Levels, 1976-1980 and Data Set 2: Blood Lead Levels, 1999-2016). Use the data collection sheet to view the graphs and record your answers.

Develop a Plan to Address a Public Health Emergency

During April 25, 2014–October 15, 2015, approximately 99,000 residents of the City of Flint, Michigan, were exposed to lead when the drinking water source was switched from the Detroit Water Authority to the Flint Water System (FWS). The levels of lead in Flint tap water increased over time as the lead pipes slowly corroded and lead dissolved into the water. CDC – led by the U.S. Department of Health and Human Services (HHS) – assisted the City of Flint and the State of Michigan to develop a response and recovery plan. Here is a brief timeline of events:

Apr 2014	Water in Flint, Michigan is switched from Detroit Water Authority to Flint Water System (FWS) as a cost-saving measure. Residents notice water smells, tastes, and looks funny. Normally, **corrosion** control chemicals are added to the water, but Flint did not have a proper plan in place when the switch occurred.
Jun 2014	An outbreak of Legionnaires' disease kills 12 and sickens 87. Legionnaire's disease is caused by *Legionella* bacteria and is a symptom of inadequately treated water.
Aug 2014	Fecal coliform bacteria are detected in the water system, and a boil water advisory is issued. This is another sign of poorly treated water. FWS increases the chlorine levels in the water to correct the bacterial contamination.
Oct 2014	General Motors stops using Flint water, as it is corroding engine parts in their factory.
Jan 2015	Flint officials announce the level of trihalomethanes (TTHM) is too high in the water system due to overchlorination, putting them in violation of the Safe Drinking Water Act. The state starts buying bottled water for its government offices.
Apr 2015	Michigan's Department of Environmental Quality (MDEQ) notifies EPA that FWS did not have **corrosion** controls in place. EPA warns Flint that its anti-**corrosion** methods are not sufficient and that they may be underestimating lead levels in the water due to poor sampling methods.
Jul 2015	MDEQ spokesperson says, "Let me start here — anyone who is concerned about lead in the drinking water in Flint can relax" in response to growing concern. Officials deny the water is unsafe to drink.

Sep 2015 A team of researchers from Virginia Tech examines water samples from around Flint and finds 17% are above the federal maximum standard of 15 **ppb** (parts per billion). They also find the water to be 19 times more corrosive than Detroit water. Dr. Mona Hanna-Attisha, working with the researchers from Virginia Tech, examines 1,700 blood samples from Flint children and finds nearly double the numbers of high **blood lead levels** since the switch to Flint River water. The city recommends use of water filters and begins offering lead tests.

Oct 2015 Further testing shows elevated lead levels in Flint, and the governor offers funding to help address the issues. The city is reconnected to Detroit water. However, the damage to the pipes is done, and they continue to leech metals into the water.

Dec 2015 A state of emergency is declared in Flint by the mayor, governor, and president. Federal agencies can now begin to offer support in the area.

Jan 2016 Bottled water and filters are distributed to all city residents to remove lead and other contaminants.

Jul 2016 Flint's water tests below the federal action level of 15 **ppb** for the first time.

Dec 2016 The U.S. Senate authorizes $100 million to address lead contamination in Flint.

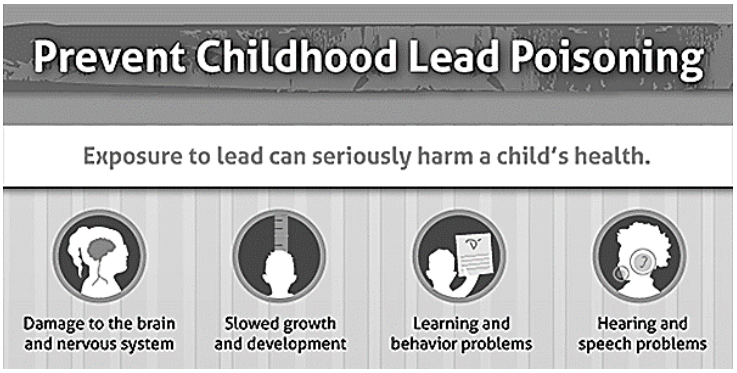
After the water crisis, the City of Flint started a program to replace all lead **service lines** with new copper pipes at no cost to residents using $97 million in funding from state and federal governments. They also continued to supply water and filters to buildings awaiting replacement. Between the improved water quality and repairs to the plumbing infrastructure, the source of lead in Flint's water has been addressed. However, the problem is not over.

There is evidence that childhood exposure to lead can cause long-term harm. The effects of lead poisoning may be permanent. No safe level of lead exposure in children has been identified. Exposure to lead can seriously harm a child's health and cause adverse effects such as:

- Damage to the brain and nervous system
- Slowed growth and development
- Learning and behavior problems
- Hearing and speech problems

This can cause:

- Lower IQ
- Decreased ability to pay attention
- Underperformance in school



Develop a Plan

Given what occurred with the water in Flint, Michigan, what support does the community need to address the issues brought about by the elevated lead levels in the water? Design a **public health** intervention strategy that would address the long-term effects of elevated lead levels in Flint's water. You may find useful resources here: https://www.cdc.gov/nceh/lead

- Surveillance (What is the problem?)
  What type of data would you like to collect? How will you collect it?
  Example: You could conduct phone interviews with people in Flint to assess their needs.
- Risk Factor Identification (What is the cause?)
  What group would you want to address with your intervention?
  Example: You could design an intervention for third graders with low reading or math test scores.
- Intervention Evaluation (What works?)
  Propose 3-5 intervention strategies that you think could address the issue you have identified.
  Example: Provide increased Medicare benefits so that residents of Flint can get medical care.
- Implementation (How do we do it?)
  Come up with a plan to implement the intervention that you think would be most effective.
  Ex: You could secure government funding to open free preschool for all Flint kids.

Success Story: Newark, New Jersey
After elevated levels of lead were found across 30 public schools in Newark, New Jersey, the city began evaluating its water system. The threat of lawsuits and warnings from the EPA pushed the project into quick action. Between March 2019 and August 2021, the city replaced all 23,000 **service lines** with copper at no cost to homeowners. Listen to Kareem Adeem, the Acting Director of the Newark Department of Water and Sewer, explain the process and how this monumental feat was accomplished so quickly. https://youtu.be/V8hEYFpYsv4

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