



# Possible Solutions to Global Water Contamination

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## Water Crisis Worldwide



### Contamination Areas Most Affected

- Somalia
- Egypt
- Syria
- Haiti

### Causes

- Pollution
- Sourcing
- Regulations

### Shortage Areas Most Affected

- Libya
- Western Sahara
- Yemen
- Djibouti
- Jordan

### Causes

- Geography
- Politics
- Economy
- Violence in region

## Flint, MI Water Crisis (2013-2019)

### Course of Events

- Water source moves from Detroit to Flint River
- Residence notice dirty water
- Officials disregard claims
- Lawsuits were issued
- New governor and President Obama declared State of Emergency
- Emergency funds granted



### Contaminants Exposed

- Lead which causes developmental and cognitive issues with children
- Legionella bacteria which was responsible for at least 12 deaths

### What was/is being done so far in Flint, MI

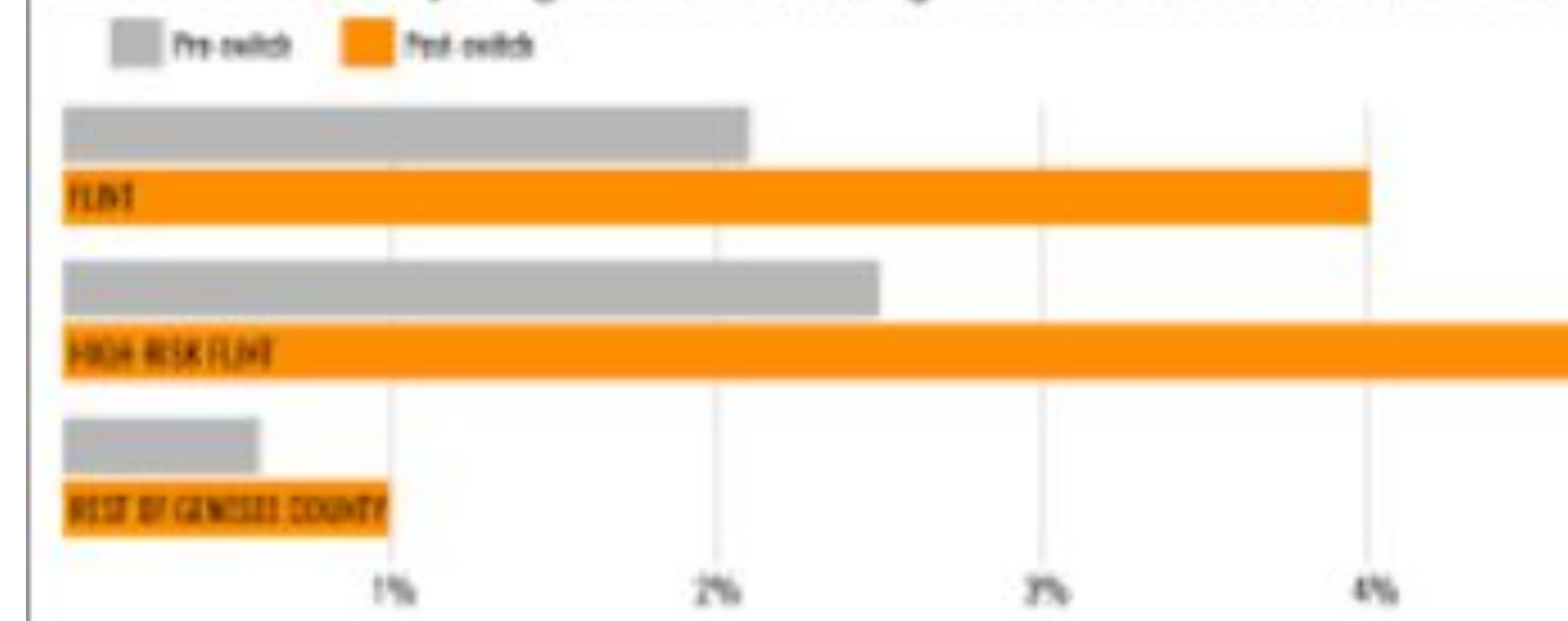
#### Replacement of lead service lines

- Since 2016, work forces have carefully inspected over 20,000 service lines and successfully replaced approximately 8,000 lead pipes.
- This was done with the help of machine learning, which was a key factor in predicting the location of these lead pipes
- In early, 2019, the water quality was brought back into question by local and neighboring residents.
- Since then, more than 25,000 excavations of water service lines had been performed, replacing 9,500 lead pipes, and confirming 15,000 copper pipes.

### One in six Flint homes has lead levels above the EPA's action level...



### ...and the rate of young children with high blood lead levels has soared.



### Government Policies

- Although lead pipes were banned from use in 1986, there remains an allowable level of lead (0.25%) across the nation.
- The Safe Drinking Water Act put in place in 1974 regulates 100 contaminants commonly found in water and requires the EPA set enforceable maximum contaminant levels in drinking water and prescribe treatment.
- The Michigan Government is currently distributing water filters to anyone who needs them

## Our Solution

### 3D printed Filters

#### Benefits

- Cheap once set up
- Can be made available to those without access to water filters and distribution centers
- Easy to use
- Customizable

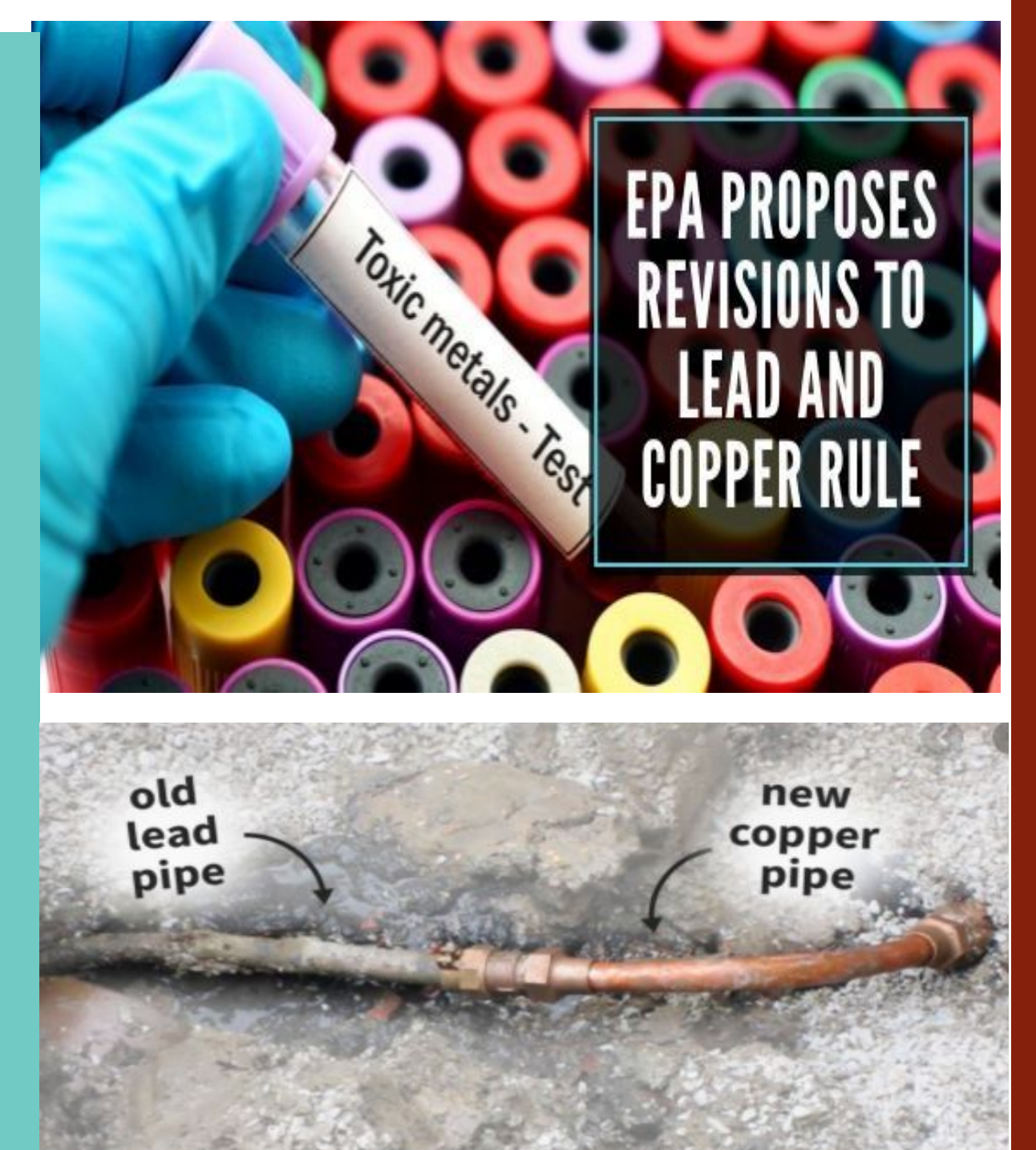
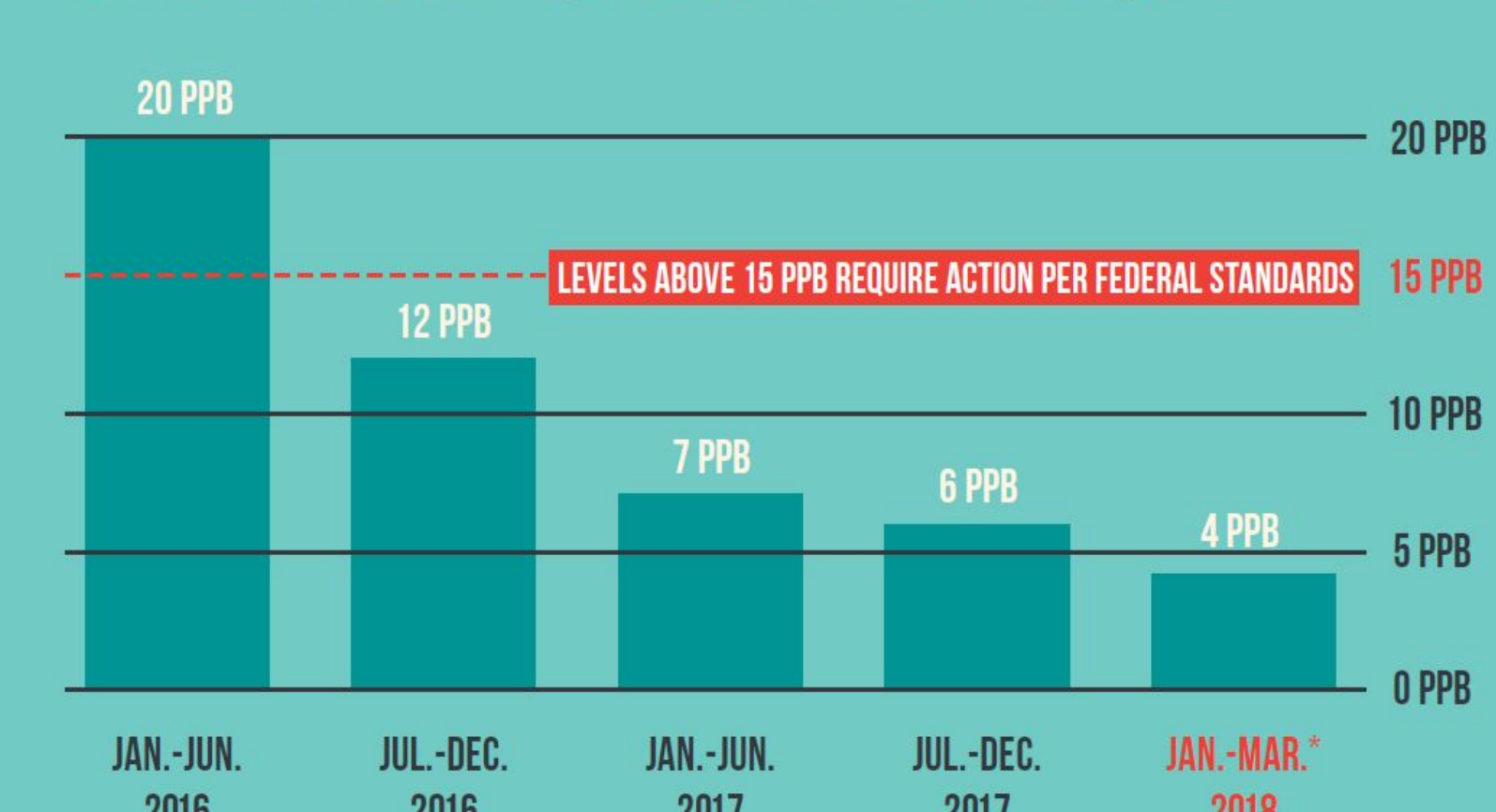
#### Challenges

- Expensive initial set-up
- Access
- Economy



## LEAD AND COPPER RULE (LCR)

6-month monitoring results in Flint, Michigan



## Preventing Flint, MI Crisis

### Policy Change

#### Safe Drinking Water Act

- Regulations often unenforced
- New contaminants appearing in water

#### Lead and Copper rule

- Proposed change to "find and fix" sources of lead and notify homeowners of contaminants
- EPA says there is no safe level of lead in water.
- Allowable level still exist

#### Sources:

- <https://www.epa.gov/sdwa>
- <https://www.epa.gov/dwreginfo/lead-and-copper-rule>
- <https://www.nrdc.org/stories/flint-water-crisis-everythin-g-you-need-know>
- <https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health>
- <https://www.cnn.com/2016/03/04/us/flint-water-crisis-fast-facts/index.html>

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