

Flint Water Press Conference

September 15, 2017



Virginia Tech
Invent the Future

1) Five rounds of lead in water testing
(led by Ms. LeeAnne Walters and Flint residents)

Round 1 and 5 Funded by Virginia Tech.

Rounds 2-4 Funded by U.S. EPA R5

2) A special study of Legionella testing

Initial data funded by the State of Michigan;

Follow-up sampling funded by Virginia Tech

Flint resident sampling: August 2015 - August 2017

Min Tang, Kelsey Pieper, Sid Roy,
Jeffrey Parks, and Marc Edwards



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Sampling in August 2017

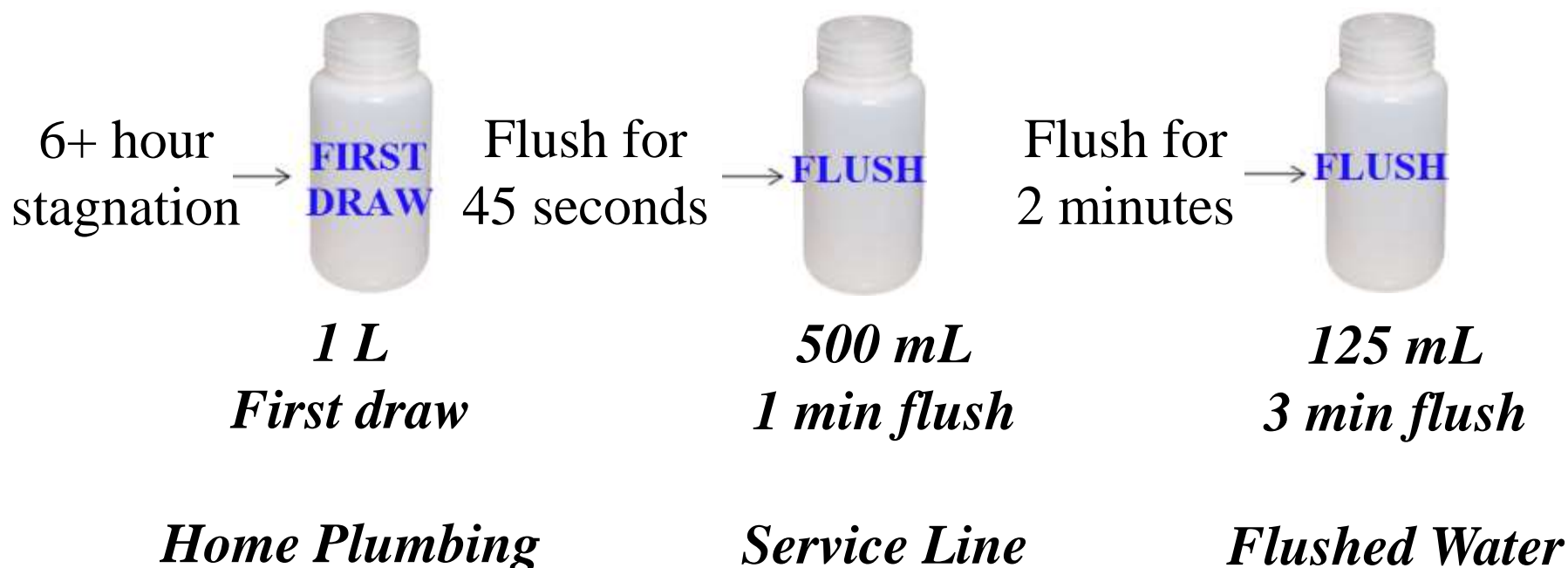
Sampling organized by LeeAnne Walters and the Flint citizen science team

Flint Citizen Science Team Leaders: LeeAnne Walters, Dennis Walters, Matt Smith, Tracy Hacker, Tonya Williams, Kaylie Mosteller, Carrie Nelson, Claire McClinton, Keri Webber, Jessica Owens

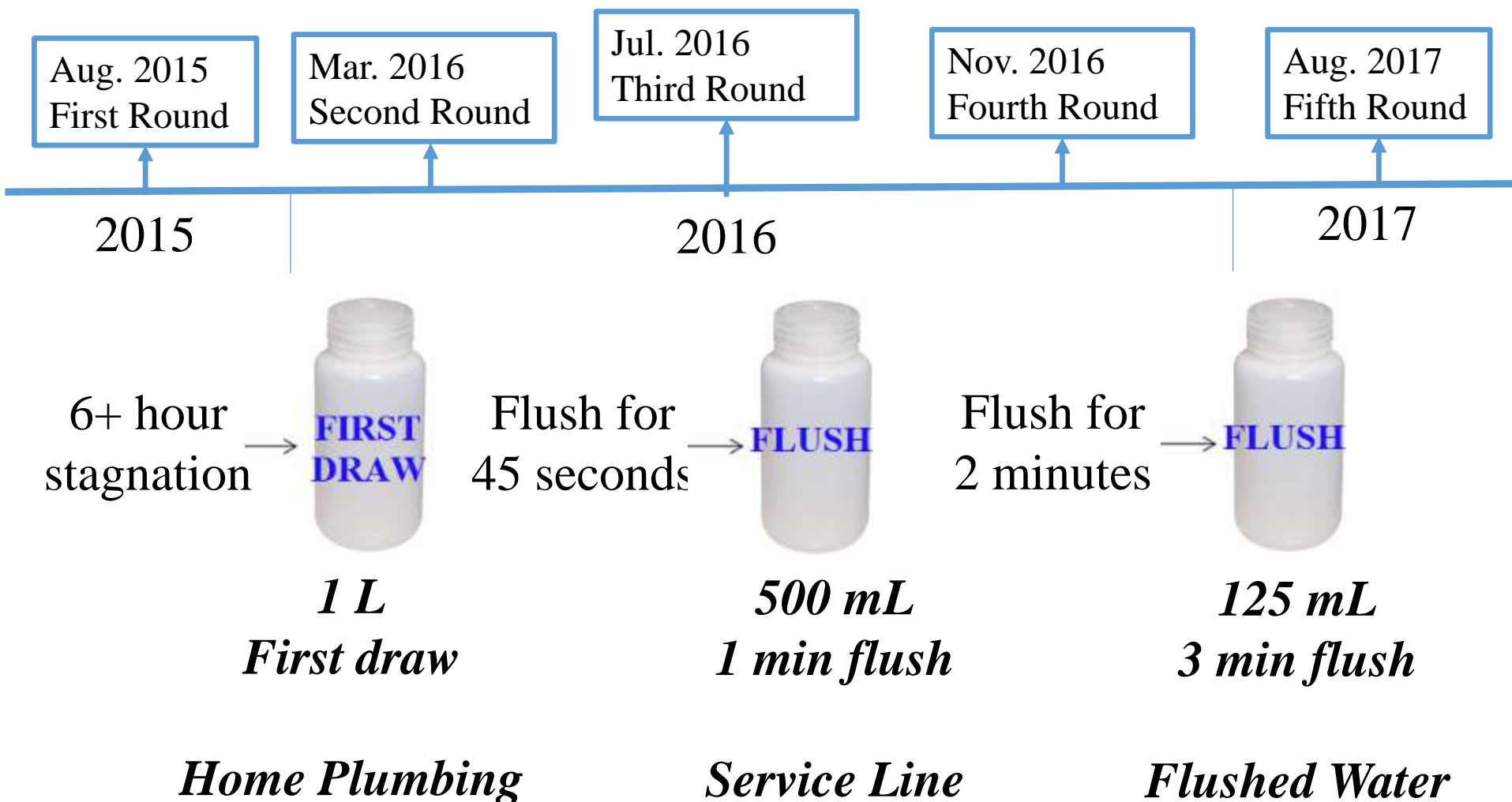


Sampling protocol

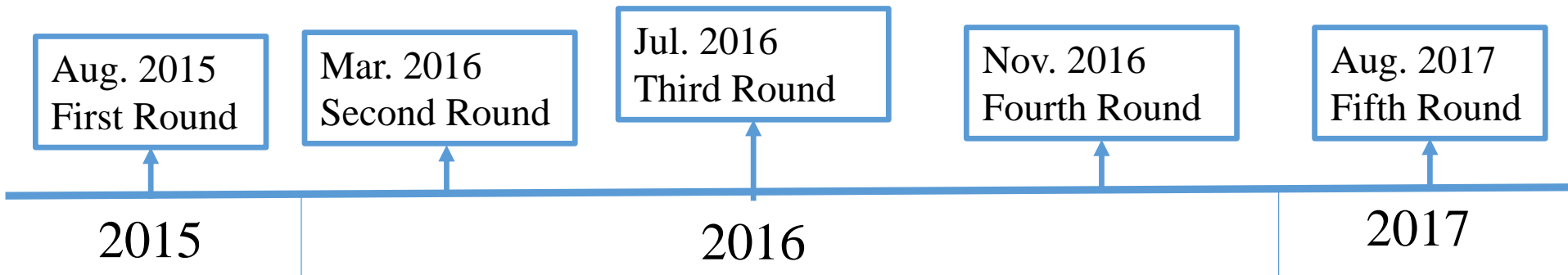
Collected water samples from a cold water tap that is **used for drinking water**



Sampling protocol



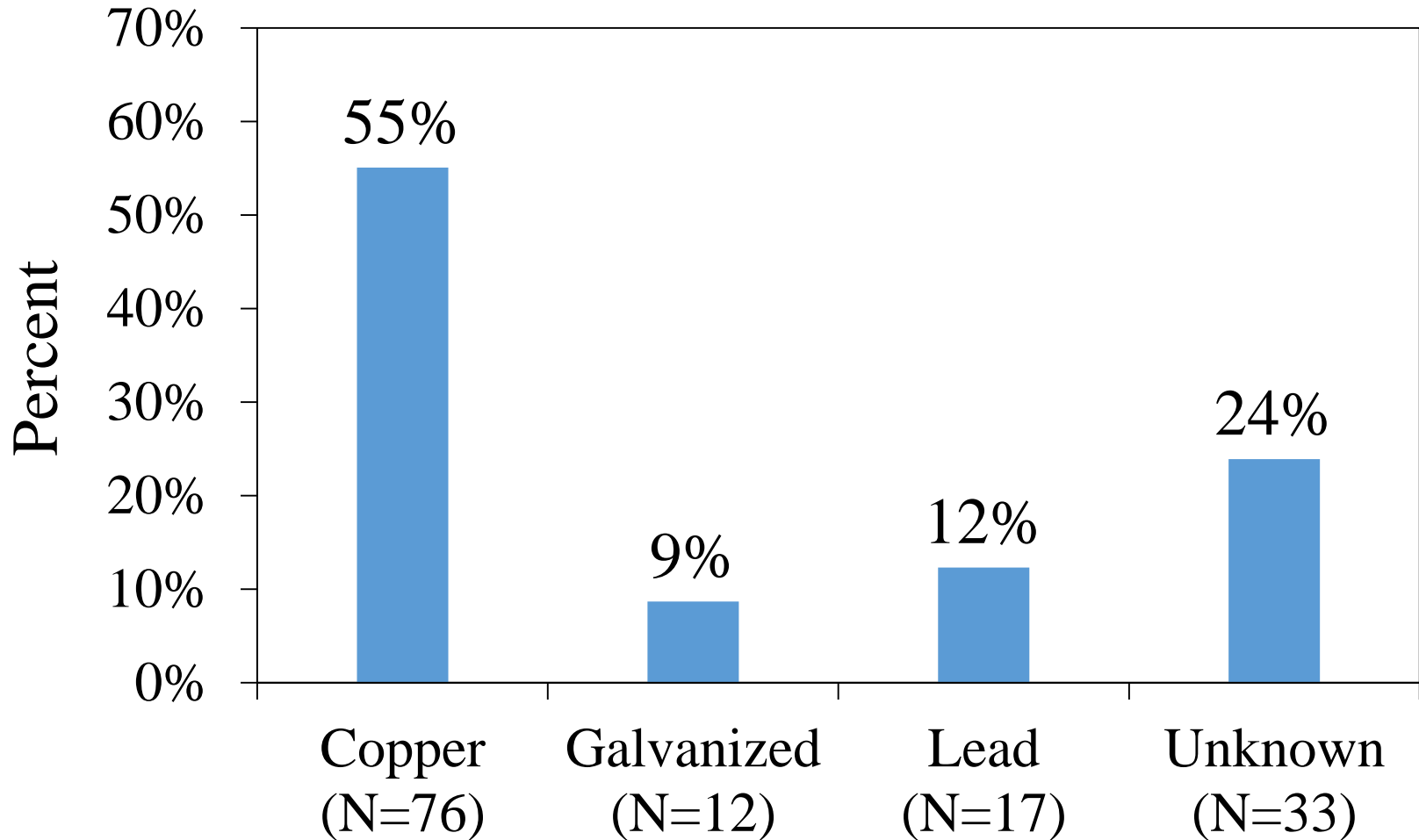
Sampling protocol



*138 homes participated
in all 5 sampling efforts*

*Only data from those homes is
presented herein*

Service Line Material- Flint Records for the 138 Participants

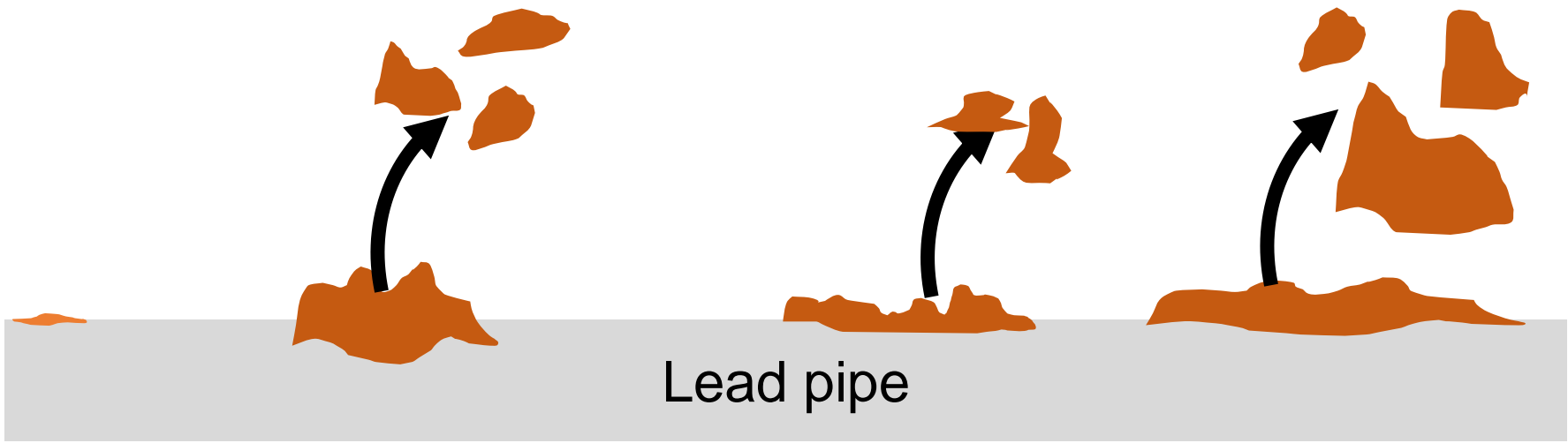


April 2014: Flint discontinued corrosion control

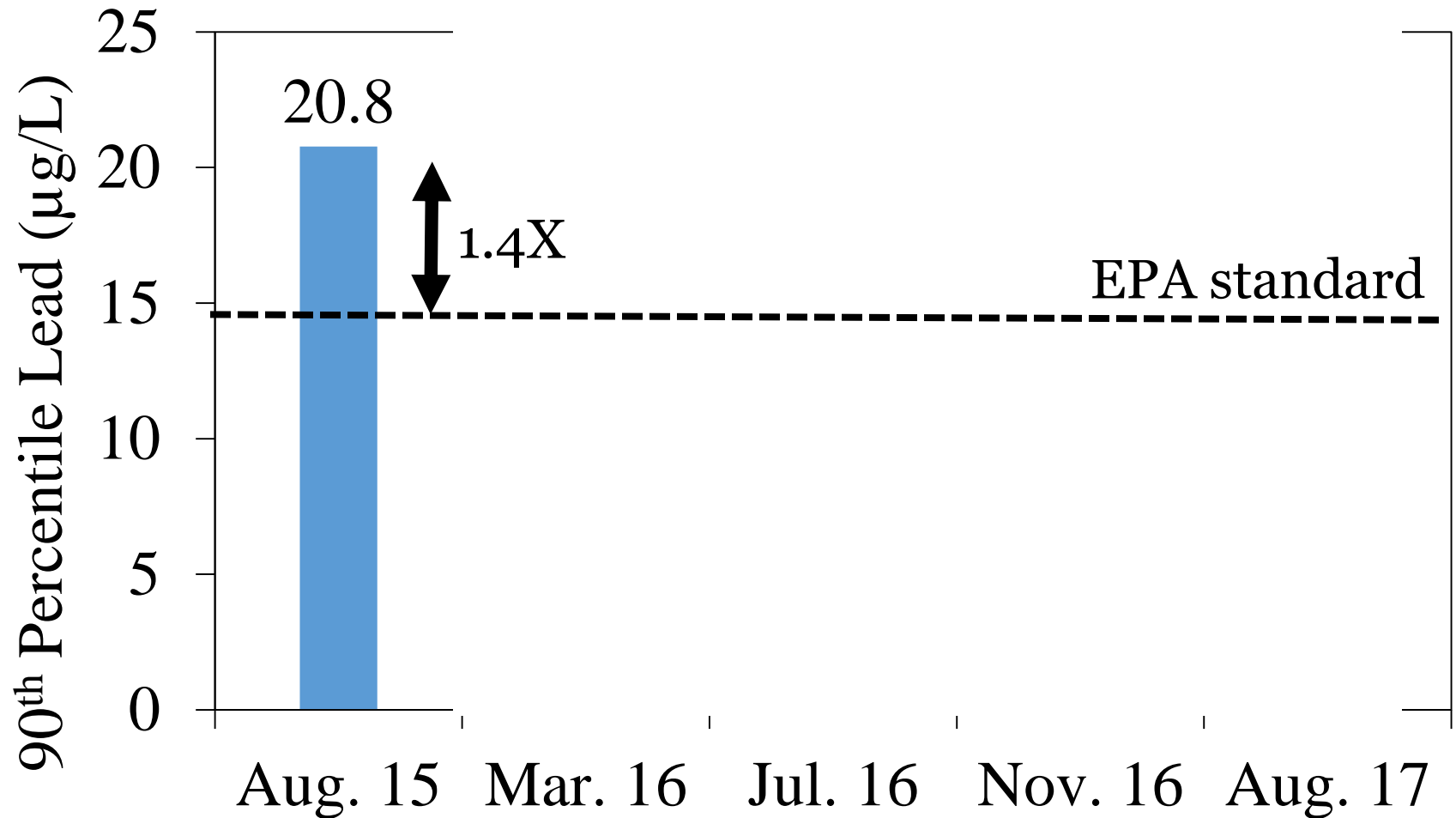
Water flow without corrosion inhibitors



Mobilization of corrosion rust layers



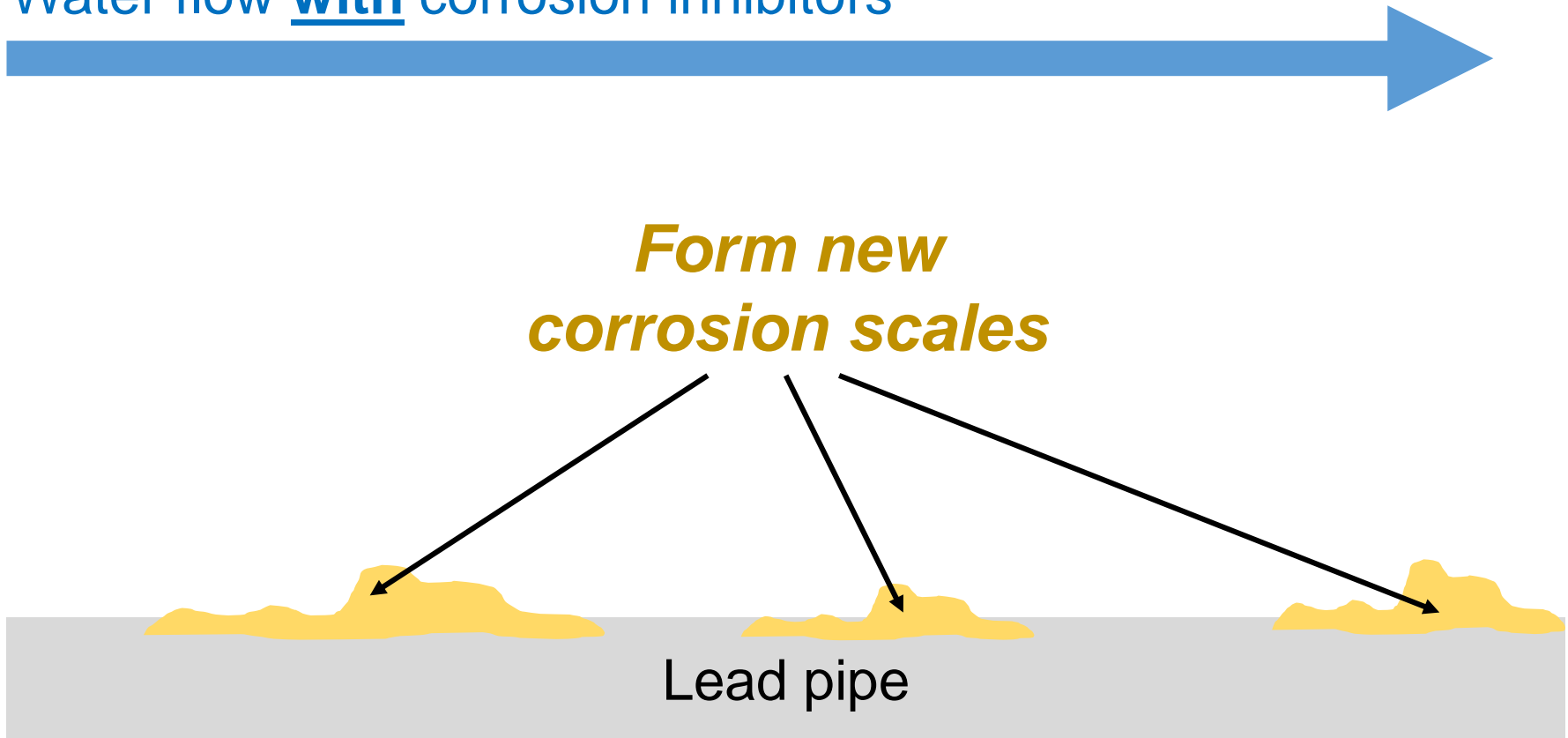
First draw lead in August 2015 (138 homes participating in all 5 rounds)



N=138

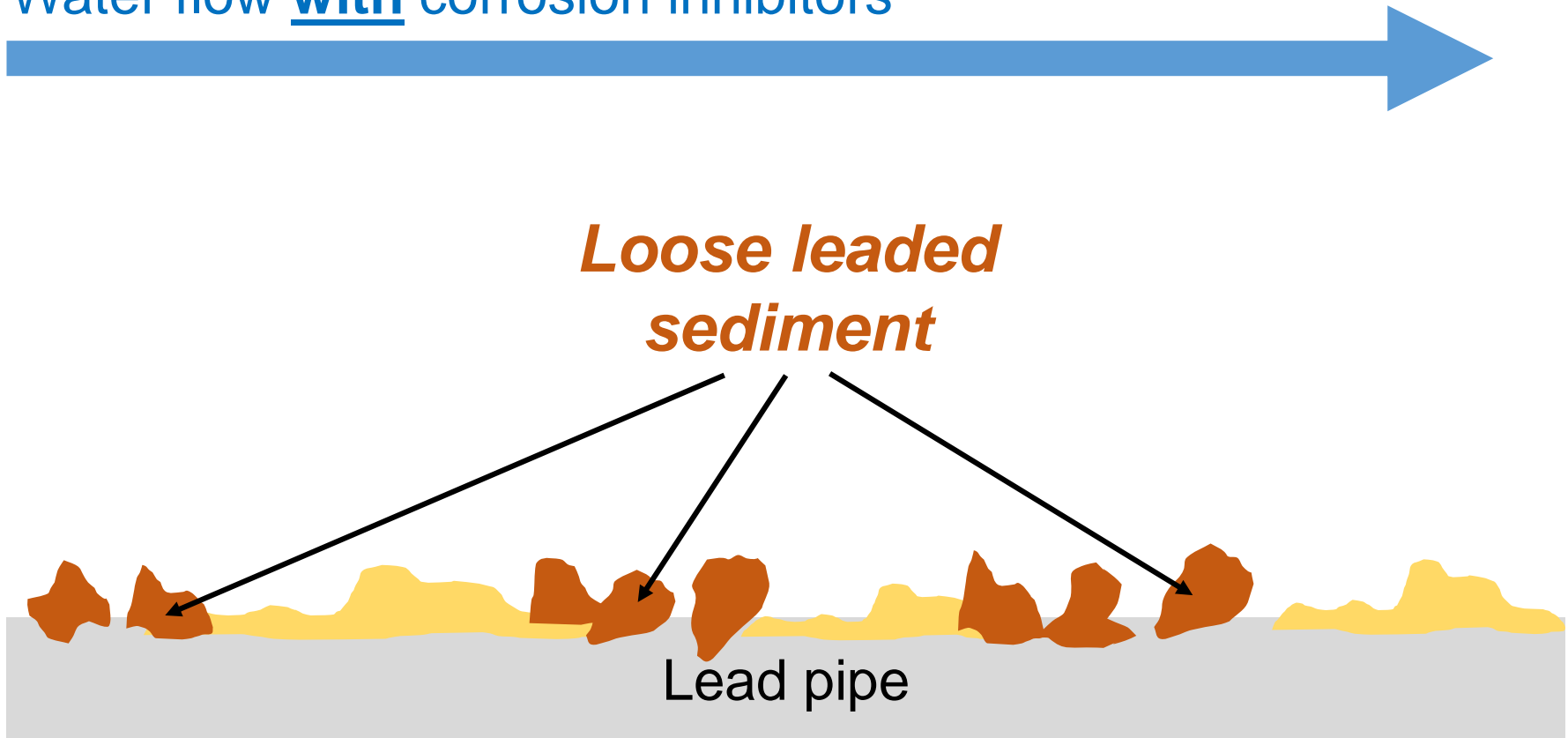
Oct-Dec 2015: Connected to DWSD and added extra corrosion treatment

Water flow with corrosion inhibitors

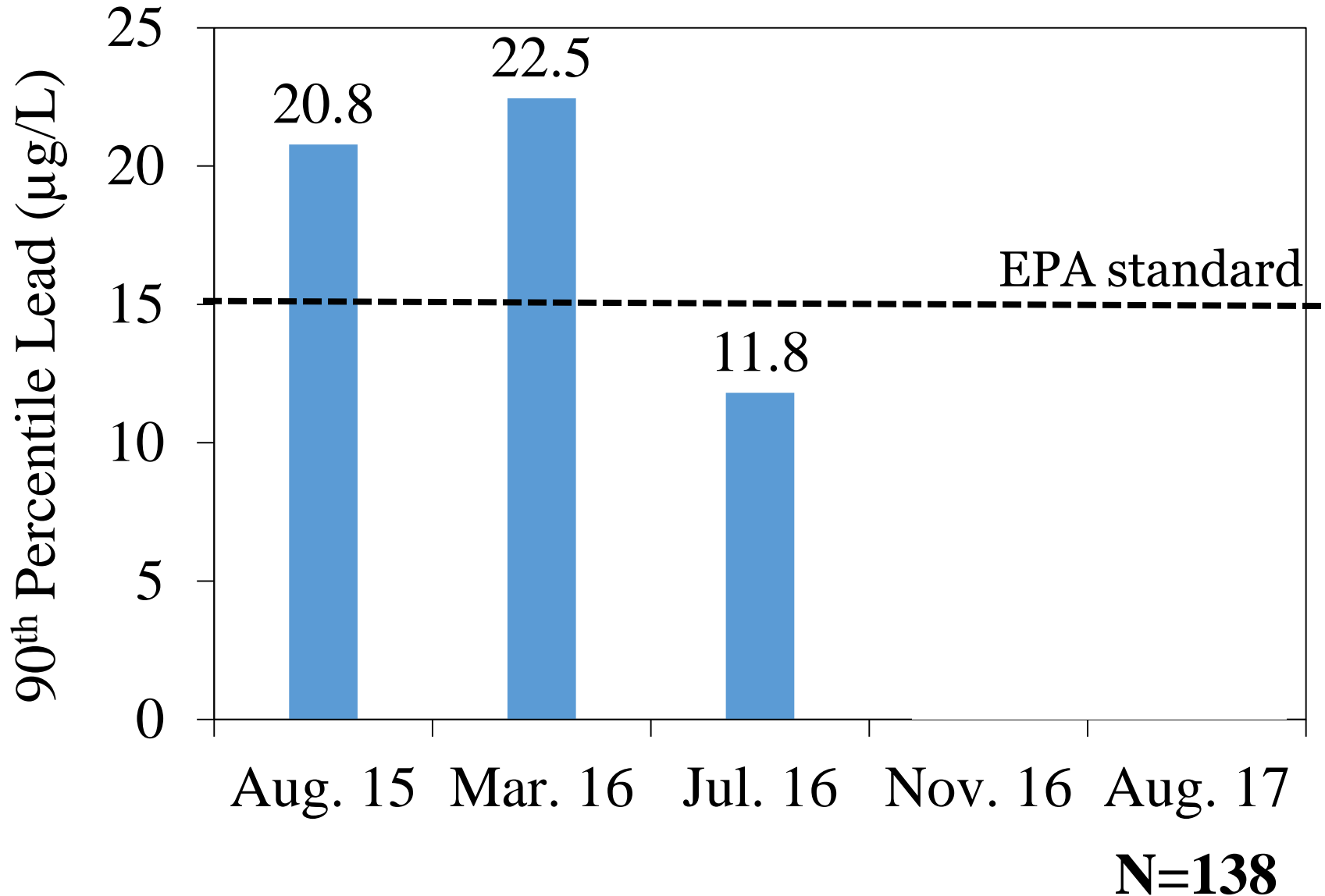


May 2016: Promoted high-flow flushing to remove loose sediment

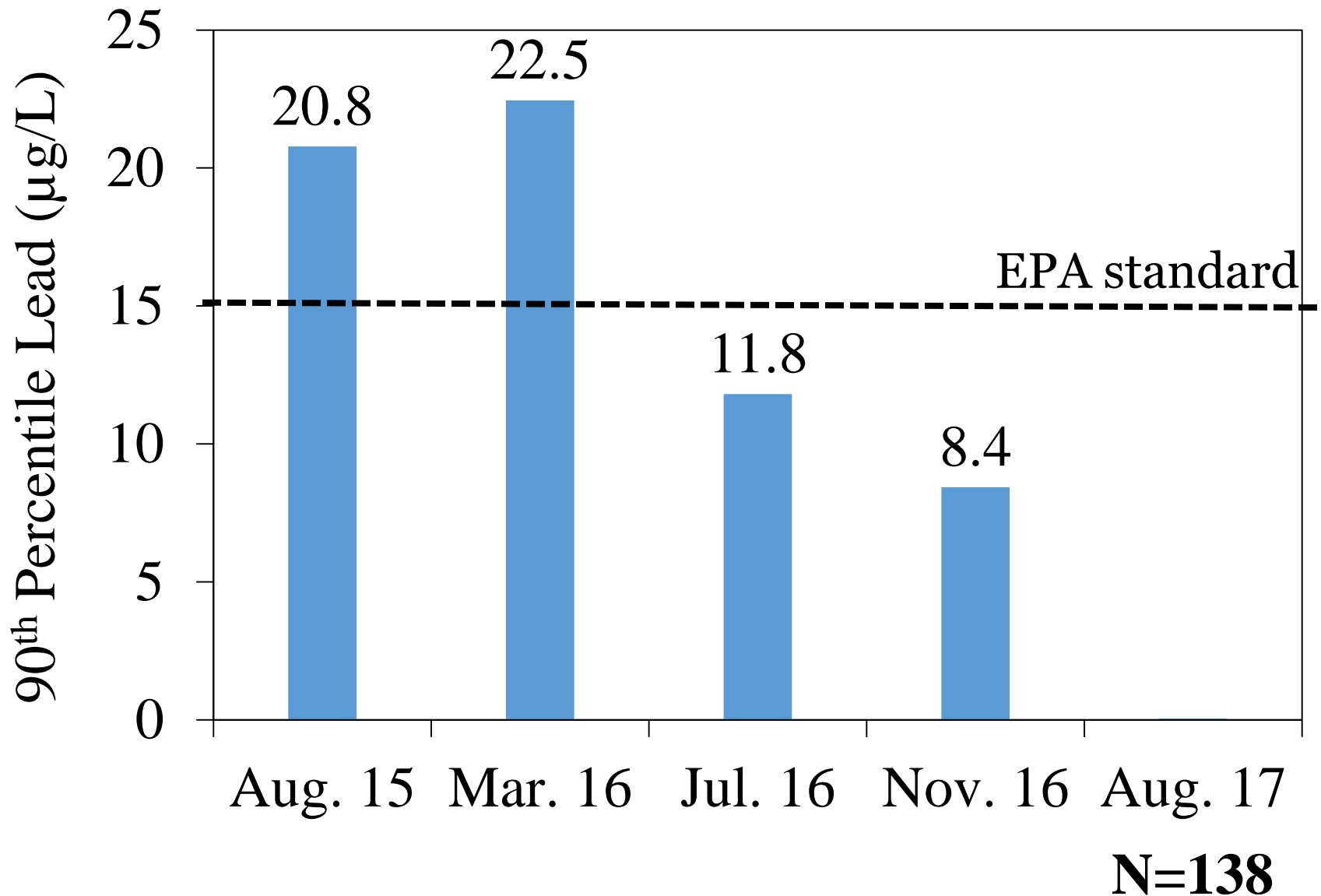
Water flow with corrosion inhibitors



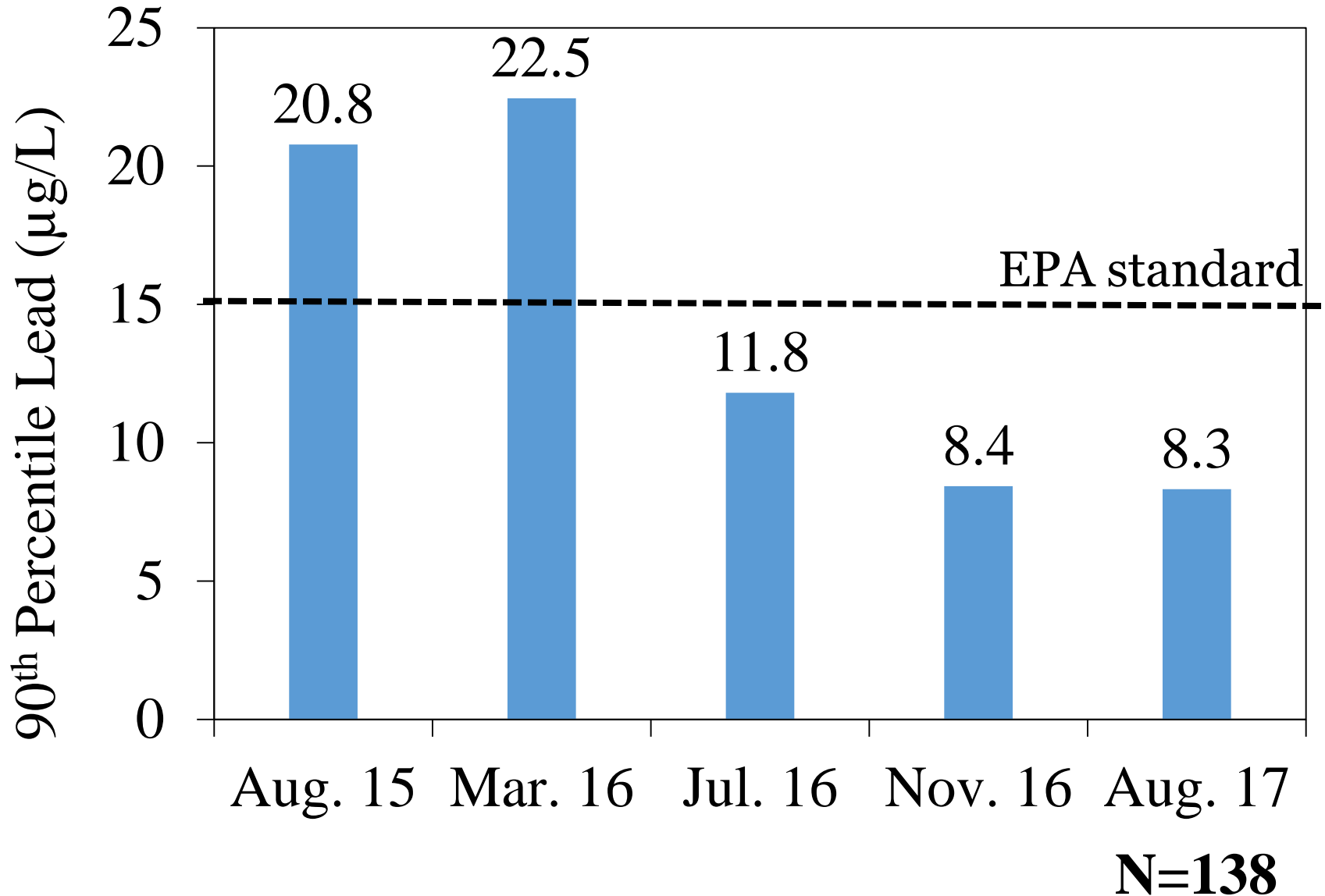
First draw lead in March and July 2016



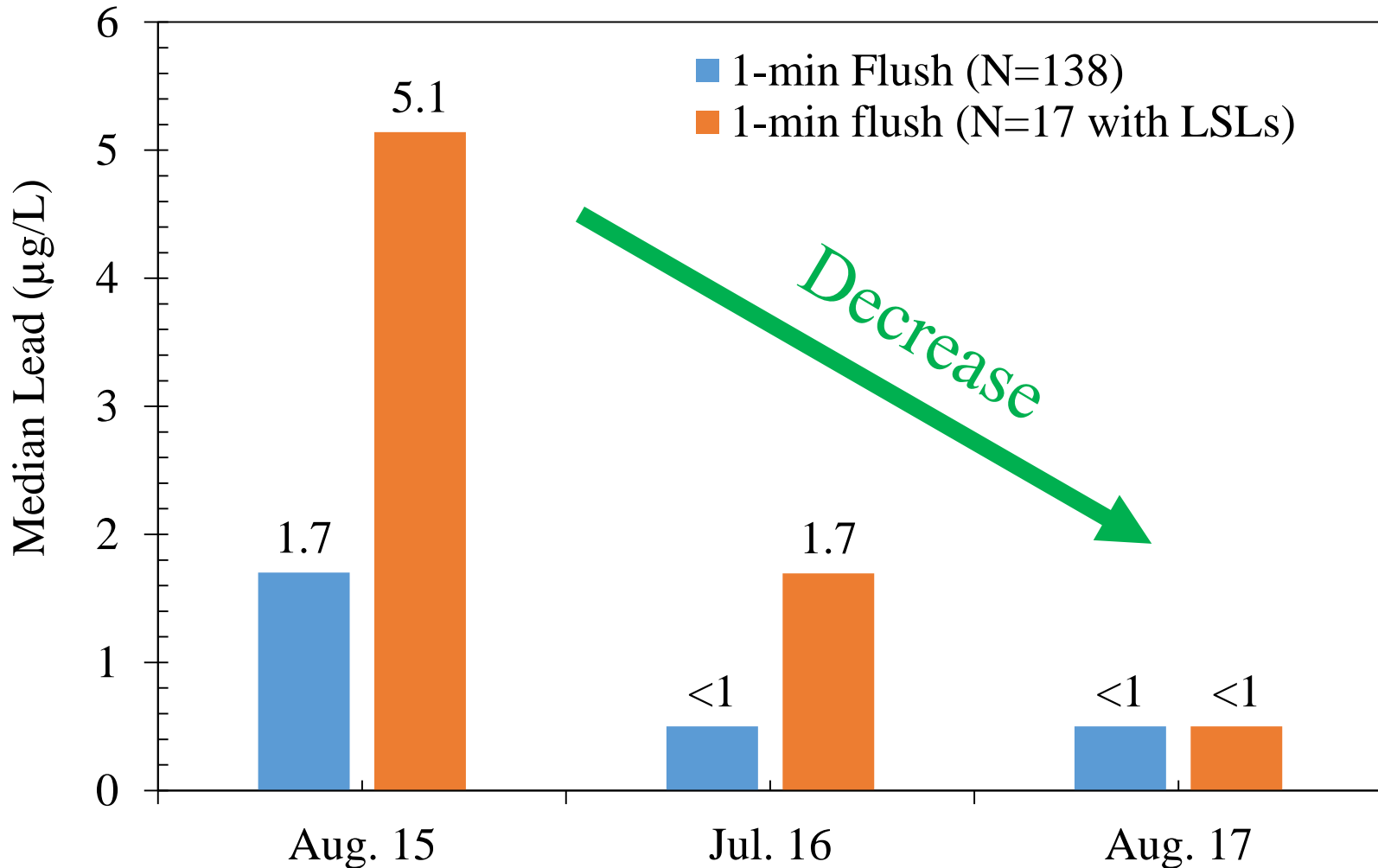
First draw lead in November 2016



First draw lead in August 2017

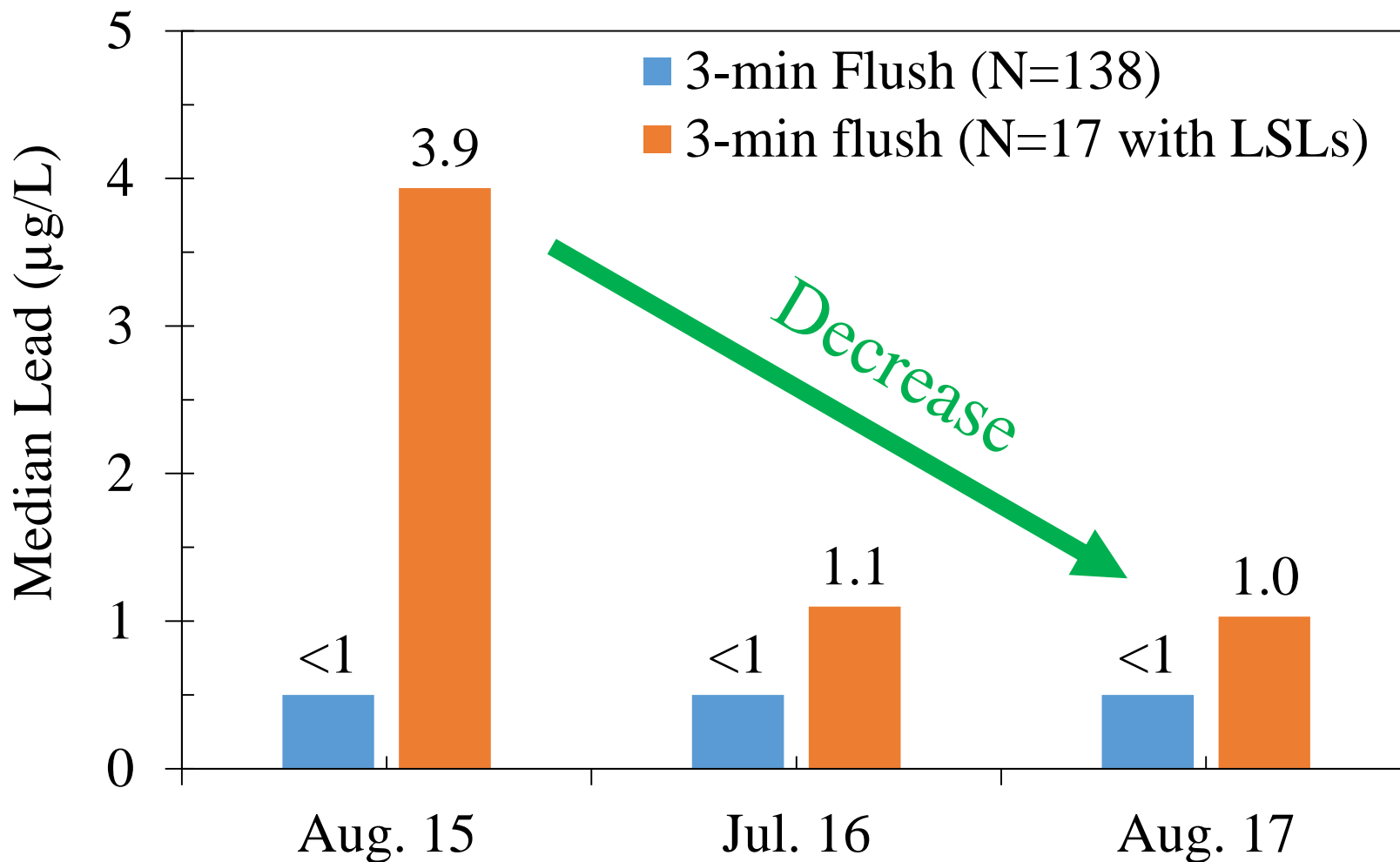


1-min Flush Sample: Service Line

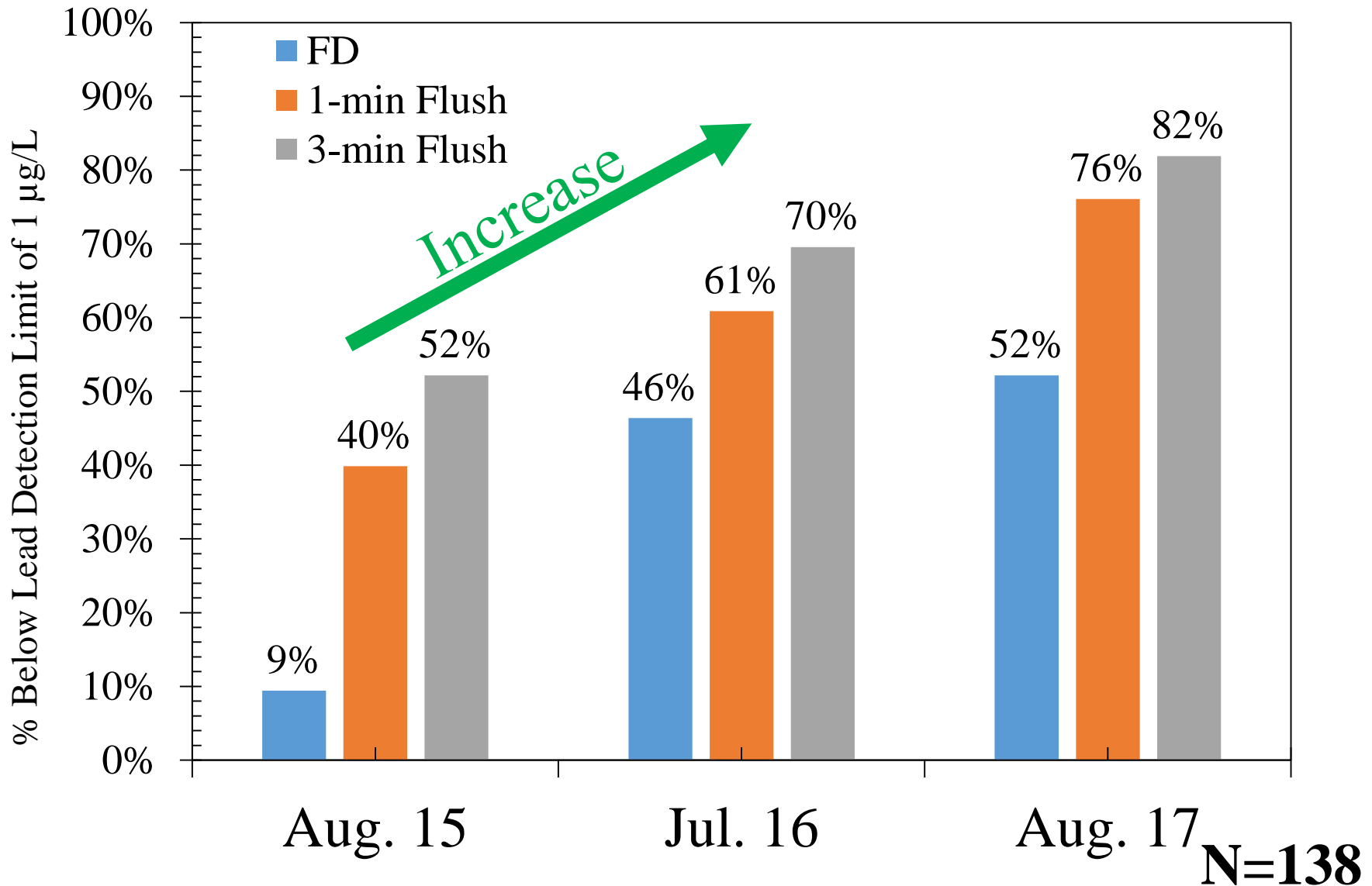


LSLs=Lead Service Lines

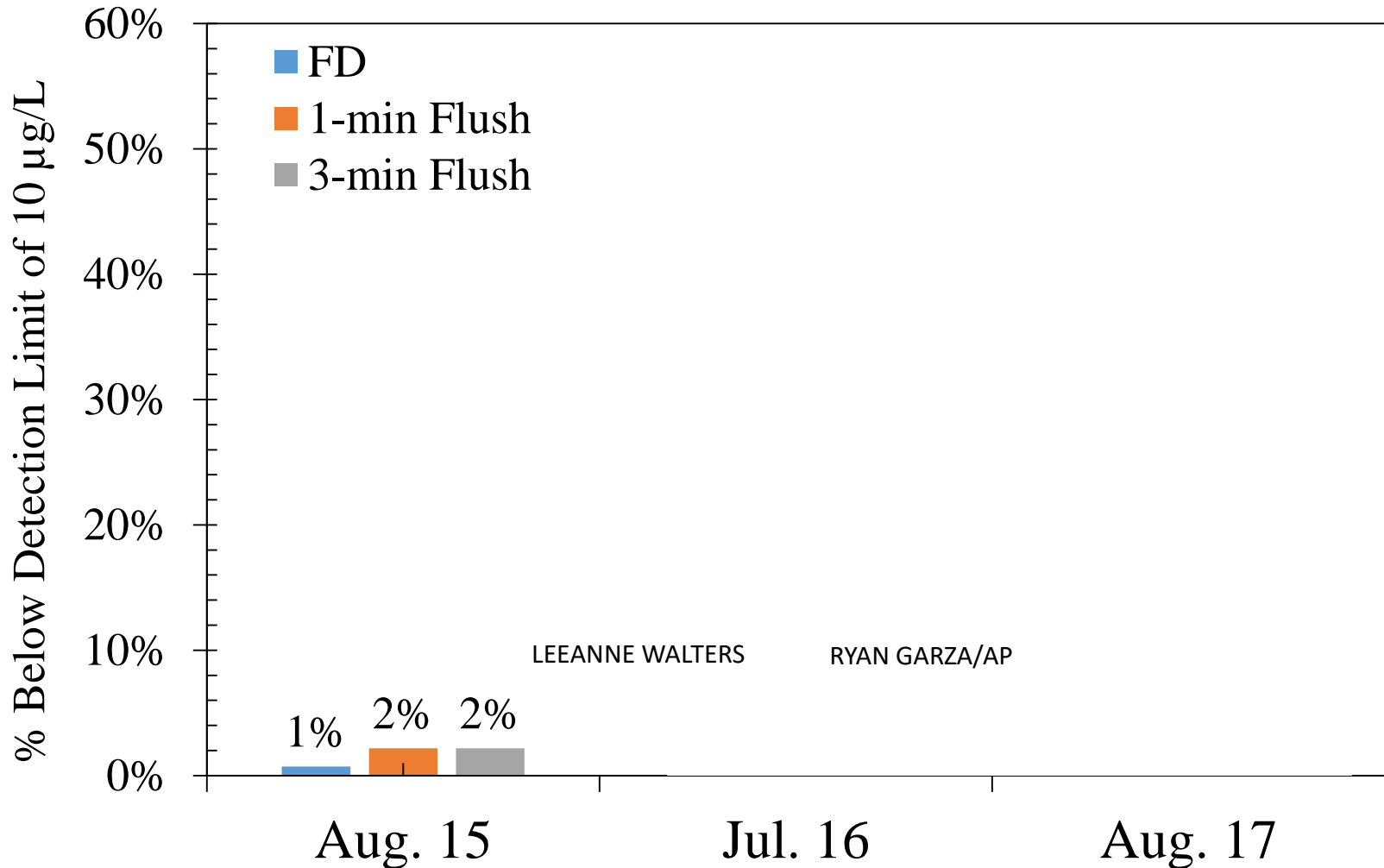
3-min Flush Sample: Flushed Water



% Below Detection Limit of Lead



% Below Detection Limit of Iron

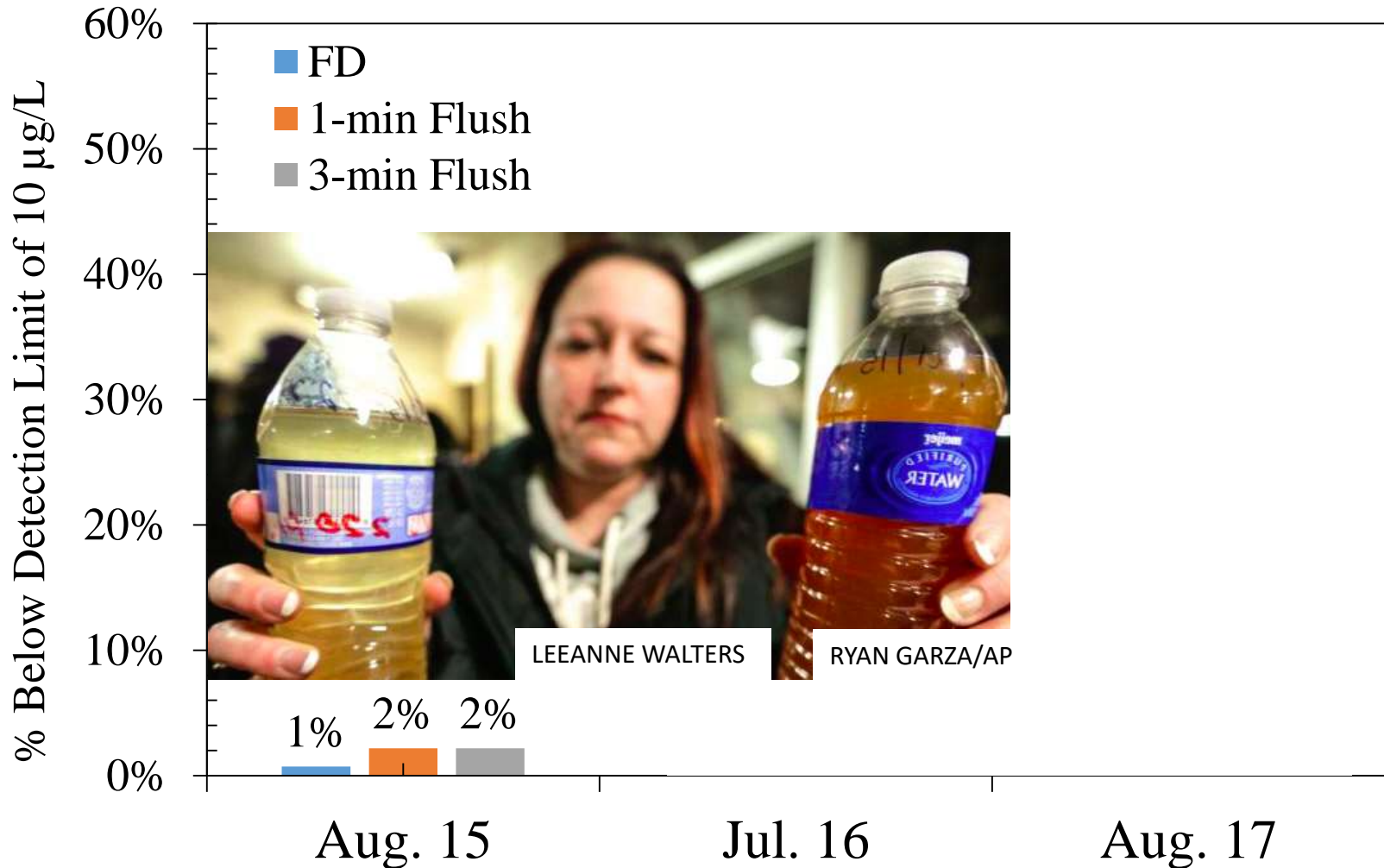


LEEANNE WALTERS

RYAN GARZA/AP

N=138

% Below Detection Limit of Iron



Flint Hospital 2015 vs. 2016



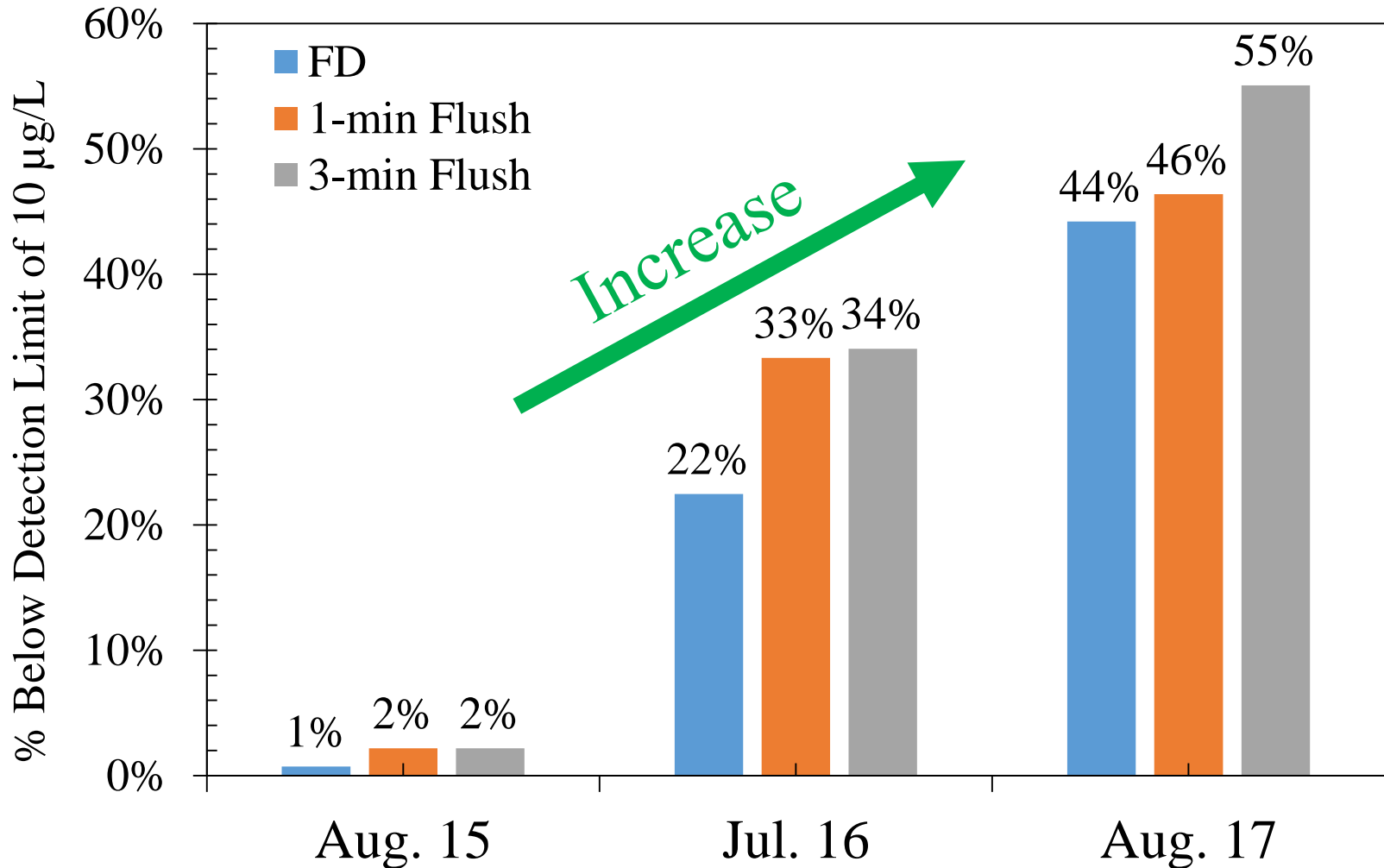
2015: Flint River without Corrosion Control



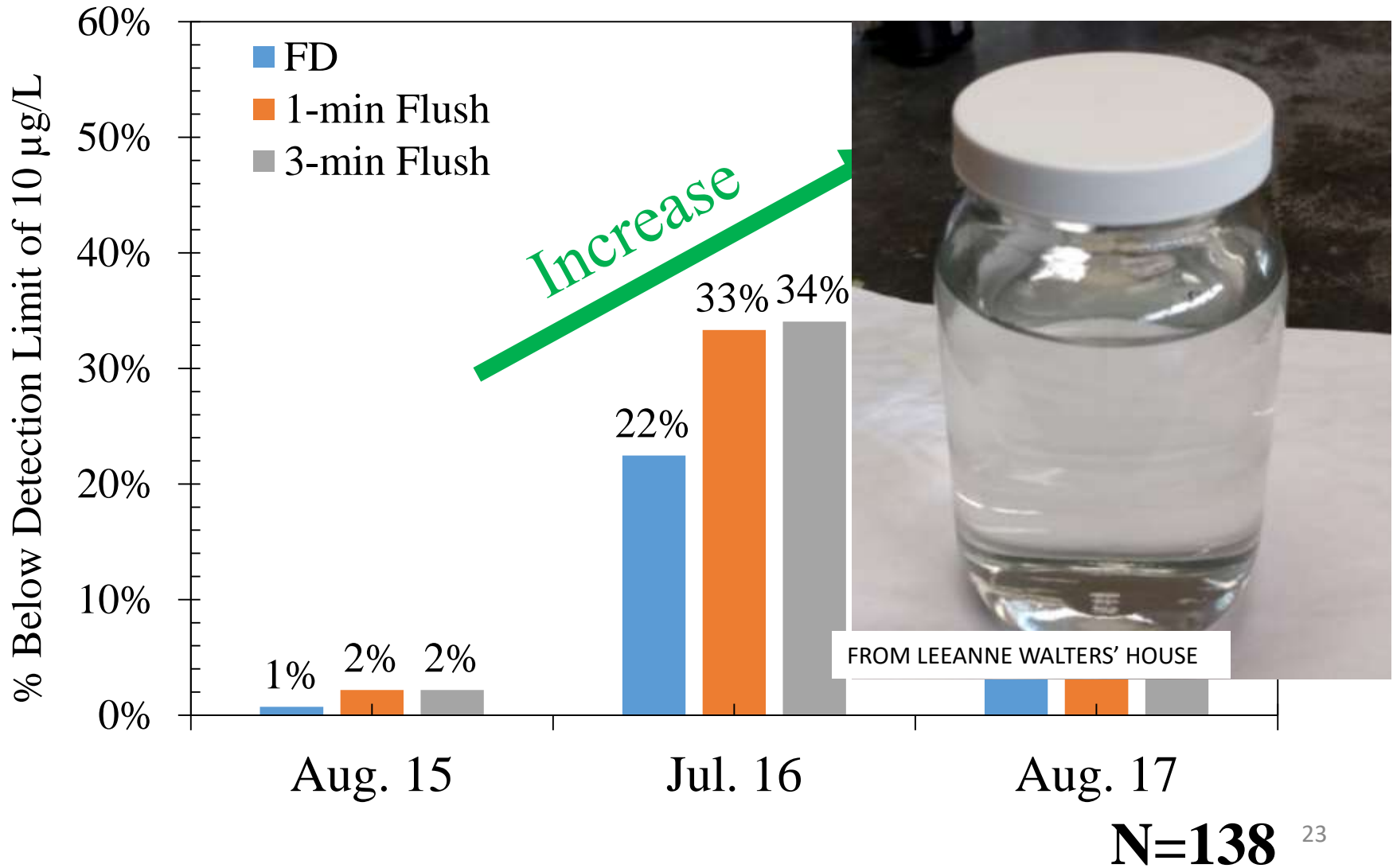
2016: Detroit Water with Enhanced Corrosion Control

Photographs: Zhu “Joyce” Ni, Min Tang, Pan Ji, Mariah Gnegy

% Below Detection Limit of Iron



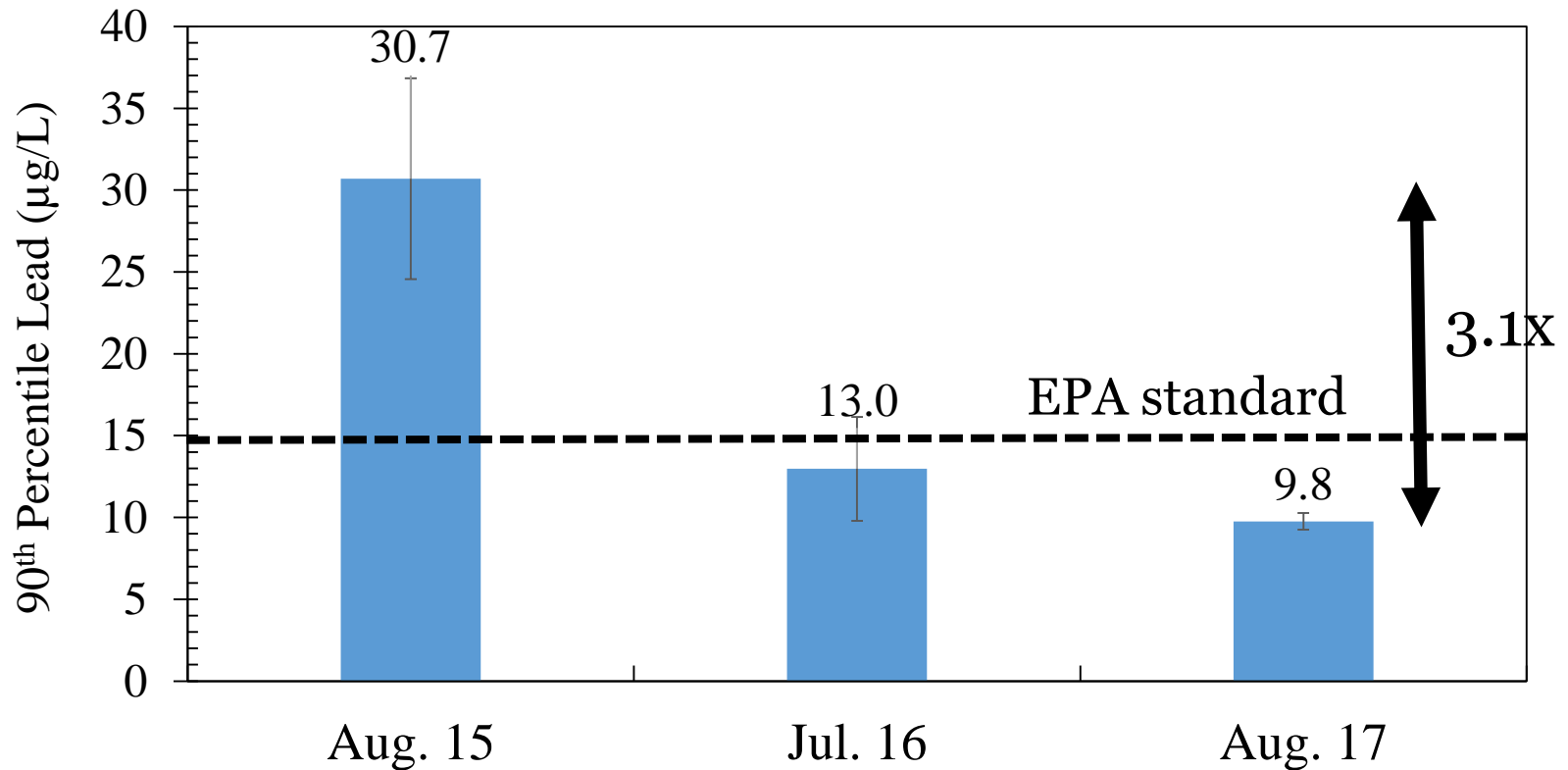
% Below Detection Limit of Iron



Calculated LCR Results

(using sample pool with 50% lead service line homes)

- Use data from 17 homes with lead pipes
- Randomly select 17 homes from the remaining 88 homes without lead pipes but built after 1986
- Calculate 90th percentile for the 34 selected homes for each of 10 simulations



Error bar denotes a 95% confidence interval.

N=34

The 10th round of State Extended Sentinel data indicates 90 percent of the Tier 1 samples are at or below 6 µg/L.



ABOUT THE DEQ

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WATER

SUSTAINABILITY

DEQ

Latest Test Results Show City of Flint's Water System at 6 PPB for Lead, Well Below Federal Action Level

Contact: Tiffany Brown, brownt22@michigan.gov [517-242-1376](tel:517-242-1376)

Agency: Environmental Quality

August 3, 2017

Continuing test results show water quality below action level for more than a year now

Conclusions

1. State data indicate Flint is meeting the lead action level. Flint citizen and VT sampling confirm that.
2. Lead and iron levels have decreased very significantly compared to first sampling event in August 2015.
3. Residents should continue to use lead filters or bottled water until further notice from the State or EPA, to avoid lead mobilized by infrastructure upgrades and “normal” (but still too high by modern standards) levels of lead from pipes

Water Heater Study: Update

William Rhoads, Taylor Bradley,
Amy Pruden and Marc Edwards



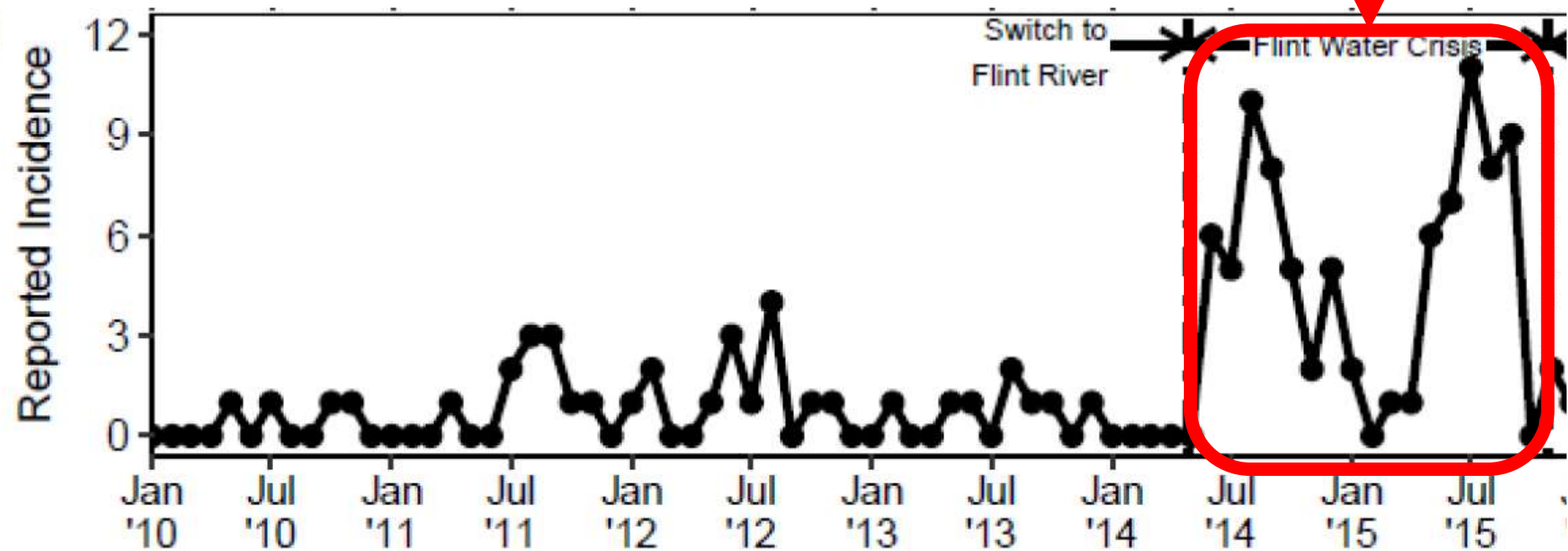
Virginia Tech
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Previous Press Conferences Reporting on this Study

- Tang, M.; Rhoads, W.J.; Strom, O.; Edwards, M.A. Flint Water Press Conference. December 2, 2016.
Available: <http://flintwaterstudy.org/2016/12/flint-water-study-press-conference-12-2-2016/> (Accessed 8/2/2017).
- Pieper, K.; Bradley, T.; Rhoads, W.J.; Edwards, M.A. Flint Water Press Conference. August 11, 2016.
Available: <http://flintwaterstudy.org/2016/08/flint-water-press-conference-august-11-2016/> (Accessed 8/2/2017).

Legionnaires' Disease Incidence

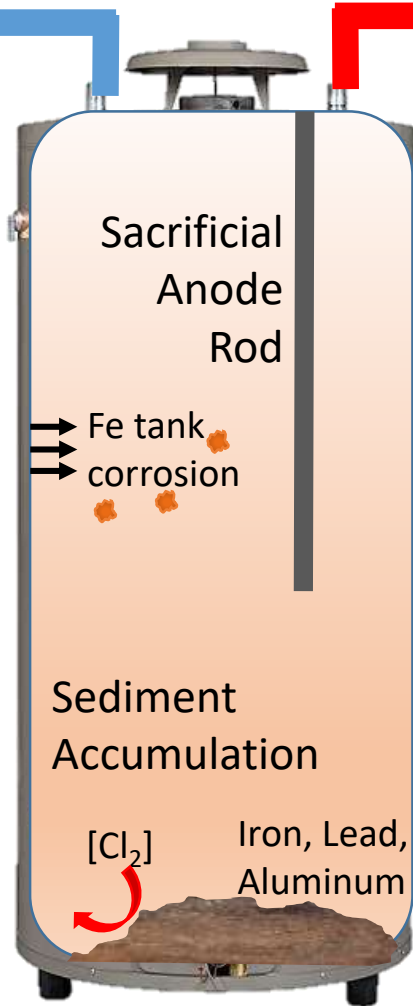
91 confirmed cases; 12 deaths



Water Quality Testing in Homes

July 2016 – 30 Homes

- Tested water
 - Metals (Pb, Fe, Al, Cu)
 - Chemistry (Cl_2 , pH, temperature)
 - *Legionella*
- Implemented intensive water heater cleaning protocol
- Very low detection rate of culturable *Legionella*
 - 2 out of 30 homes positive



Legionella bacteria is the cause of Legionnaires' disease and Pontiac fever

L. pneumophila serogroup 1 – identified in 85% of clinical isolates

Monoclonal Antibody Group 2 (MAb2)

L. pneumophila serogroup 1 MAb2
is observed in 94% of outbreak
cases

Follow-Up Sampling in One of the Homes

Culture *L. pneumophila* serogroup 1, MAb2 positive?

Kitchen Tap:

July 2016

Nov. 2016

“Distribution System Water”

Yes

No

Cold Water

Yes

No

Hot Water

Yes

No

Possible Explanations for Improved Water Quality with Respect to *Legionella*

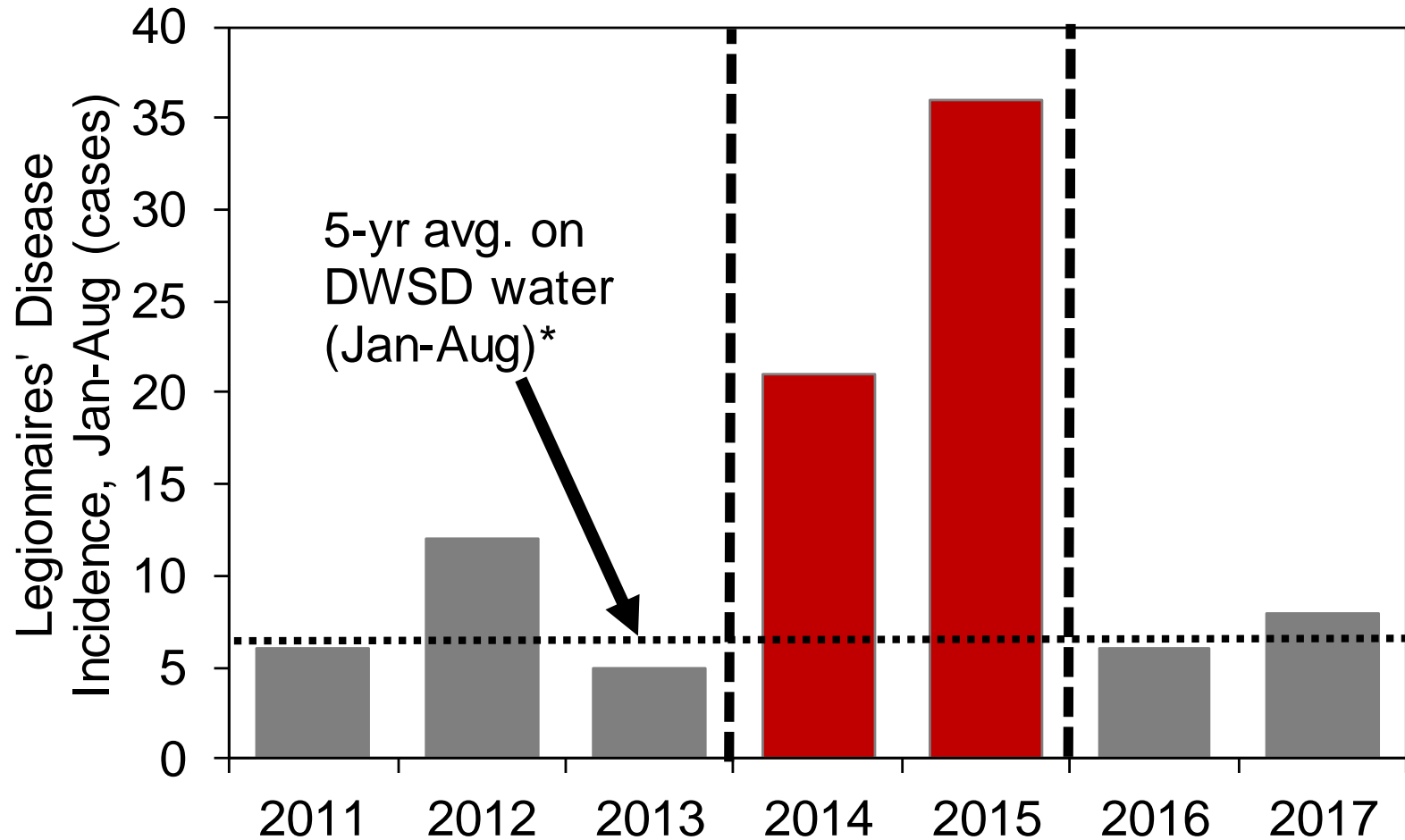
- Amount of time back on Detroit water
 - General Improved water quality stability
 - Chlorine residuals throughout system
 - Reduced Iron
- Increased water heater temperature
 - Hot water temperature = 53.7 °C (128.7 °F)
- **Seasonality**
 - **Cooler weather = cooler water in mains**

Follow up sampling Aug 2017

- Culturable *Legionella* in hot water
 - Not serogroup 1 or MAb2 positive
 - Concentration was very low
 - 0.025 CFU/mL (Below accurate quantification level)
- Levels of concern (French Guideline)
 - 1 CFU/mL (40X higher than what we detected)

Since initial sampling, we have not detected the strain of *Legionella* most commonly associated with disease outbreak.

Legionnaires' incidence Jan-Aug



***Dotted line indicates average of 2011-2017, but excludes time on the Flint River (2014 and 2015)**

Flint Citizen Science Team



Thank you!

