Iowa Private Well Survey:
Partnerships for Public Health and Contaminant Research

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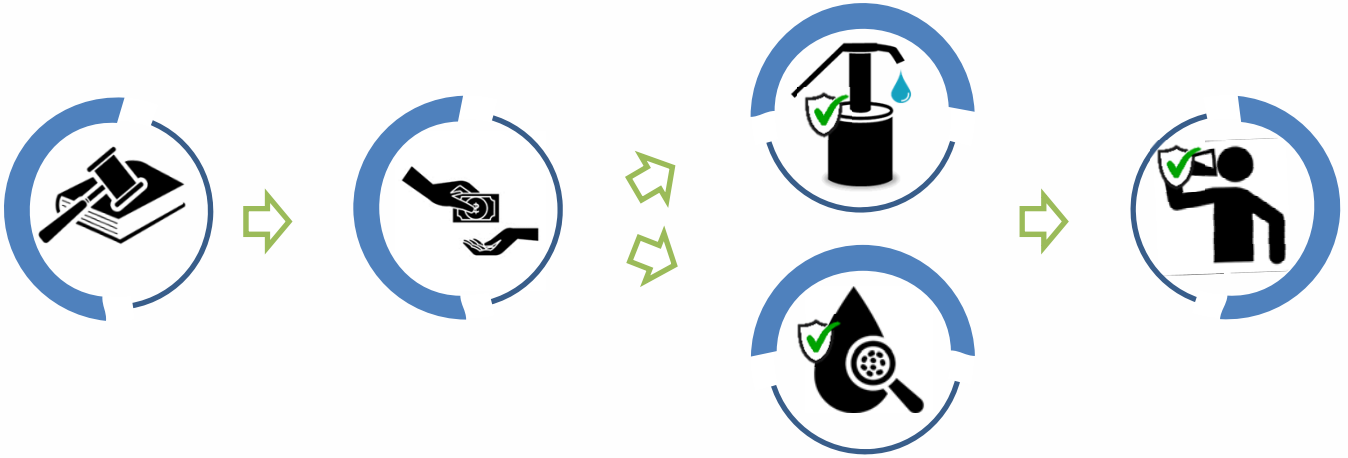
APHL Quality Improvement Forum Call
July 2019

Background



1987

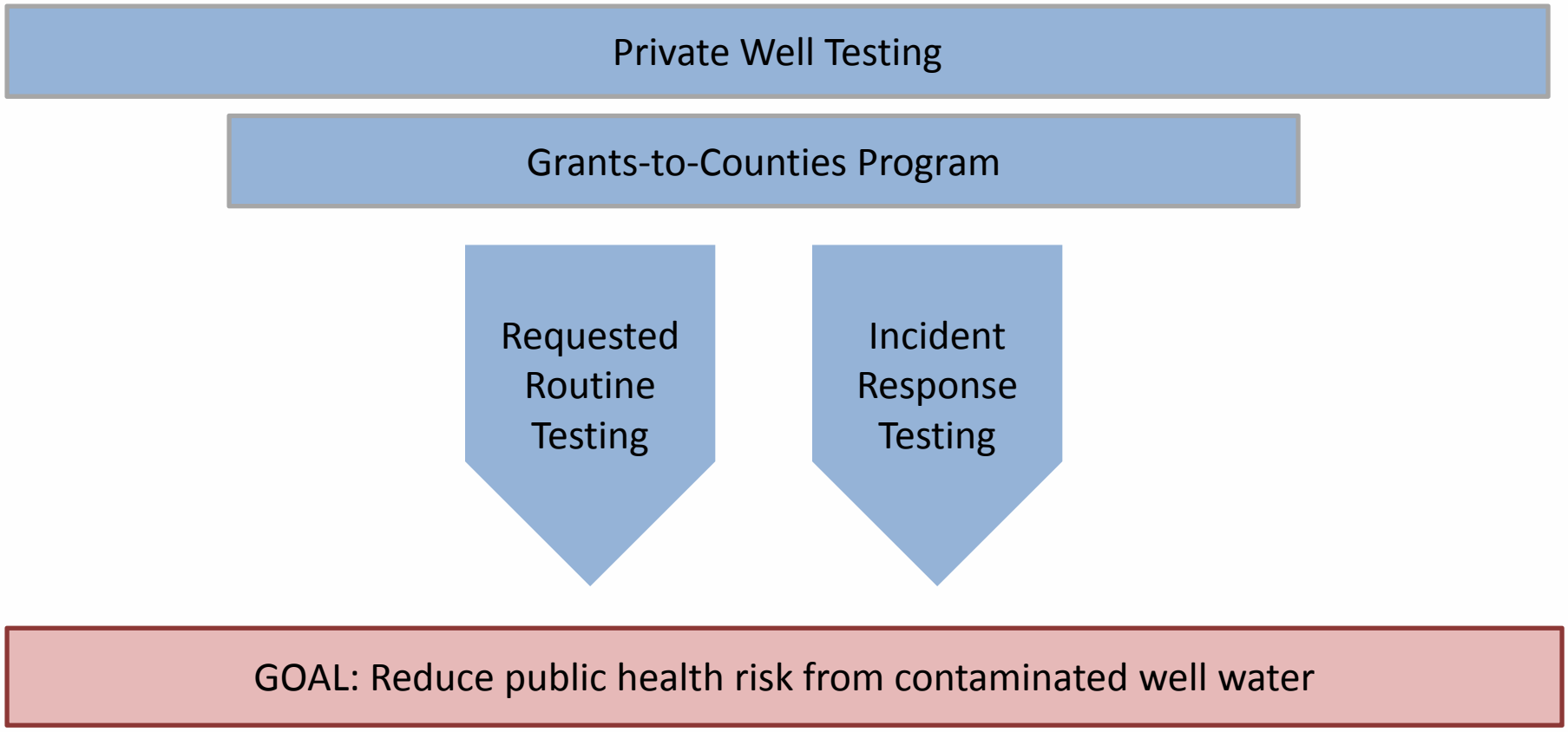
Iowa Groundwater Protection Act

Help prevent further contamination of one of Iowa's most precious resources; our groundwater

Grants-to-Counties (GTC) Water Well Program

Grants are made available to local county health departments and various state for the purpose of testing private water wells, reconstructing private water wells, and the proper plugging of abandoned private water wells (including cisterns that present a contamination risk to groundwater).

SHL's role in GTC Private Well Testing



Problem

- Approx 110,000 wells serve 300,000 residents
- Wells are not regulated. It is left to the homeowner to determine when, or if, to test.
- Less than 20% are characterized for water chemistry and physical characteristics, and less than 7% are tested annually for bacteria and nitrate as recommended.

WHY? WHAT ARE THE BARRIERS?

WHAT CAN WE DO?

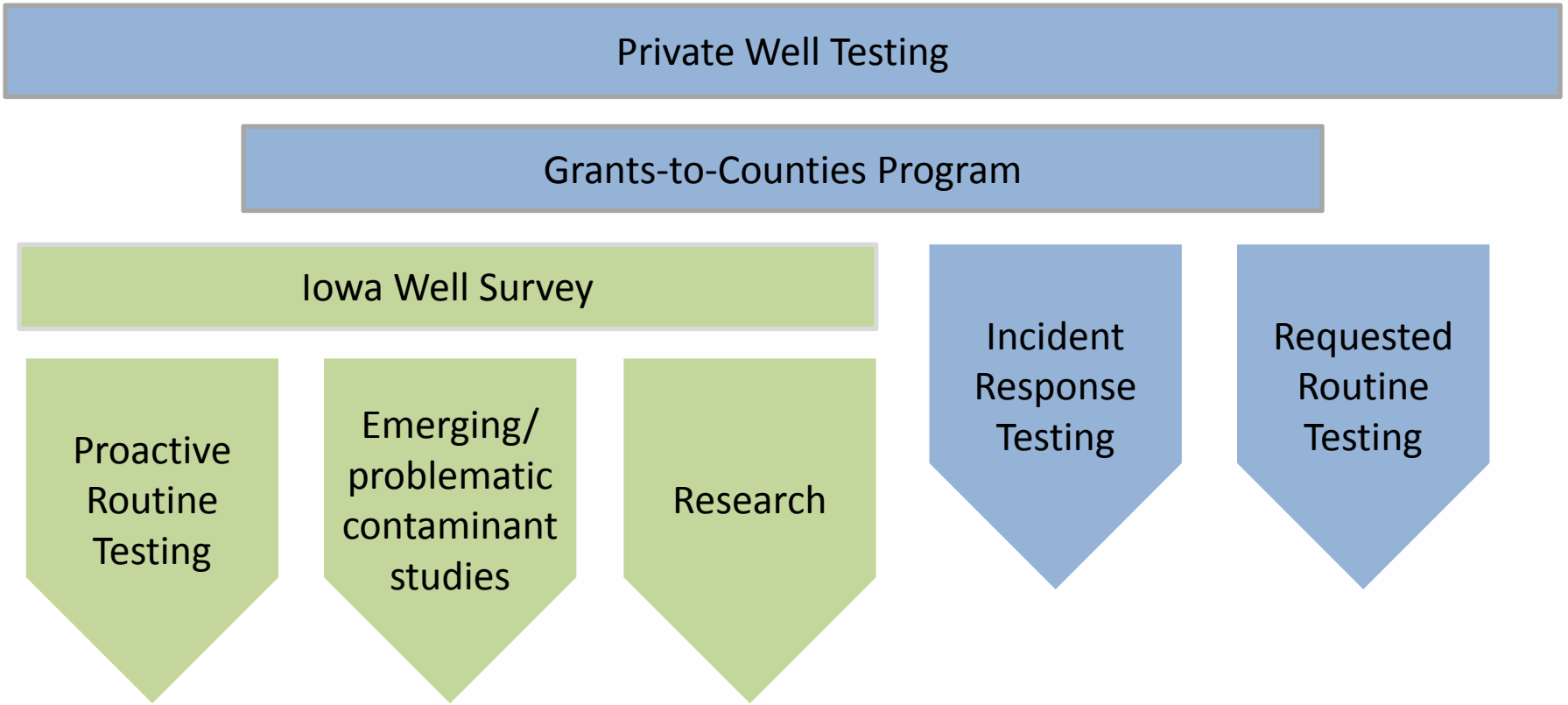
Idea

Leverage existing network and resources to proactively:

- Increase awareness about testing
- Improve characterization of wells/water quality
- Further enhance partnerships

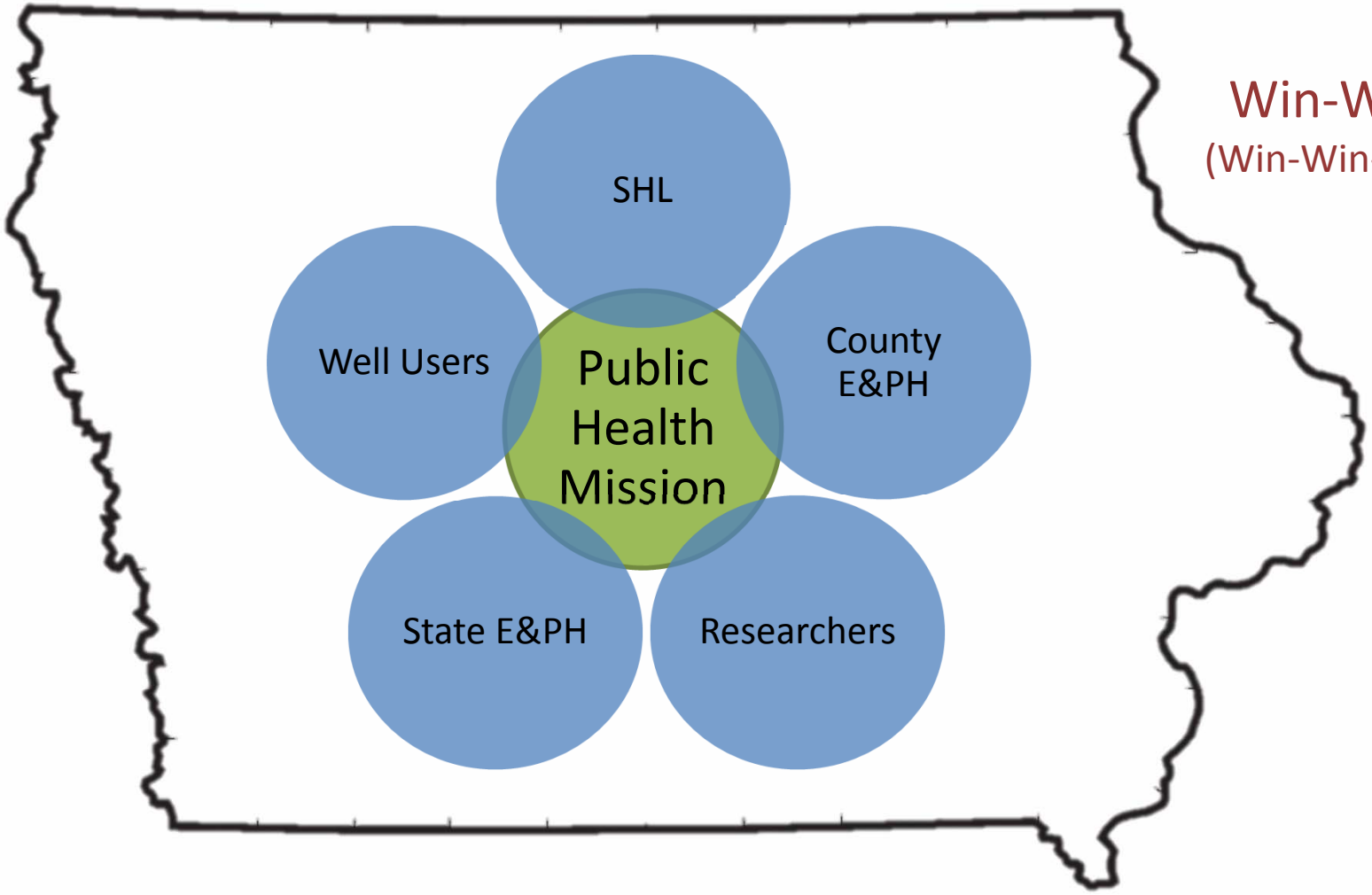
(ideally leading to safer water sources and reduced public health risk)

Iowa Well Survey



GOAL: Reduce public health risk from contaminated well water

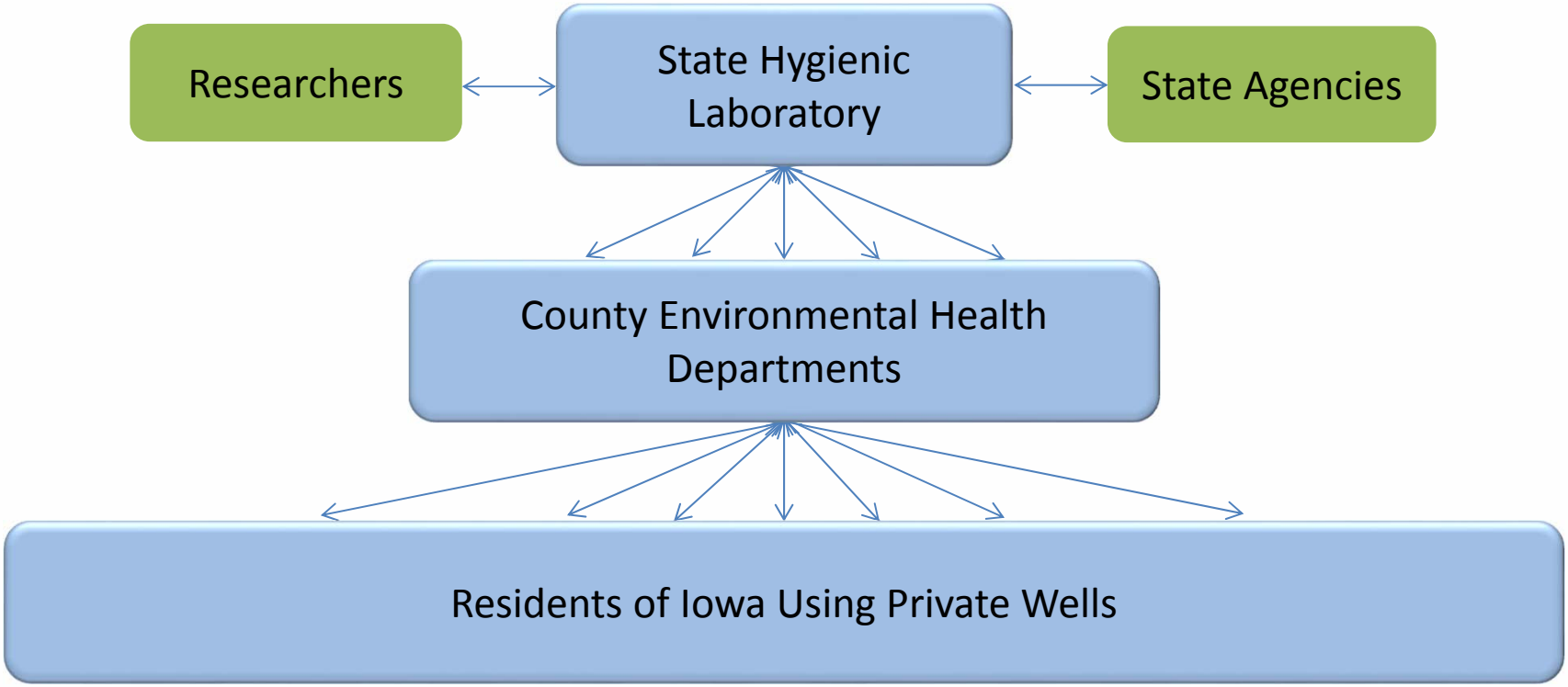
Program Design



Win-Win
(Win-Win-Win)

Program Design

Ongoing, proactive private well monitoring program



Program Design

Counties participate on volunteer basis as frequently as desired

2 month sampling periods, spring and fall each year

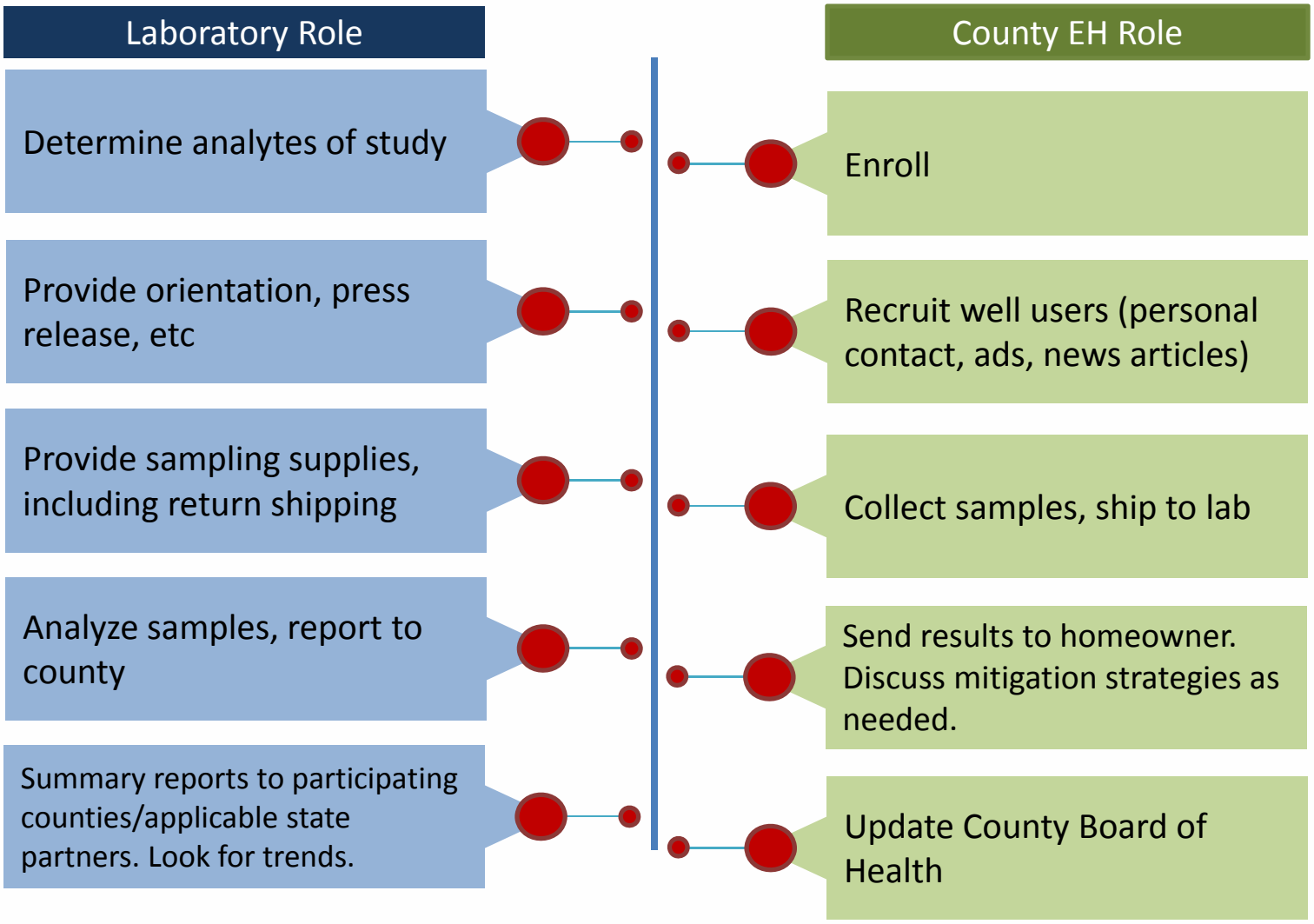
Always test for bacteria, nitrate & arsenic. Additional parameter(s) determined by season.

Sampling Target: 25 wells per county (+/-)

Primary sample: Untreated

Secondary sample: Treated (if possible, for comparison)

Program Design



Learning Opportunities

#1 – External Reports

In trying not to disrupt normal flow of testing for counties, we allowed participants to use private labs for GTC samples (bacteria, nitrate and arsenic), and send SHL the data.

Problem

Inconsistent reporting of results

Lesson Learned

Quality data is enhanced by continuity of services

Learning Opportunities

#2 – Sub-Studies

SHL's primary survey objective for fall 2018 was to test for GTC + manganese (emerging issue). Two separate requests – one internal, one external – lead to two sub-studies:

- Chloroacetanilides and safeners, 9/29 counties, 10/25 wells
- Nitrate stability study (SHL), 6/29 counties, 10/25 wells

Problem

Layers of complexity created room for error and stress on all fronts

Lesson Learned

Simplicity, whenever possible, takes precedence in order to ensure quality.

Learning Opportunities

#3 – Collection procedures

In addition to bacteria and nitrate, spring 2019 was focused on conducting a metals panel (arsenic, manganese, lead and copper).

Problem

Sampling protocols for lead and copper differ from the other metals and water quality parameters.

Lesson Learned

Collection protocols may dictate which analytes can be studied within the scope of the survey to meet the analysis requirements of other standard parameters. Separate studies may be necessary for analytes such as lead and copper.

Learning Opportunities

#4 – Method determination

Analytical methods for neonicotinoid insecticides differ in concentrating the compounds for analysis.

Problem

Limit of quantitation was not low enough.

Lesson Learned

Determine the range of concentrations you are likely to encounter in samples from the study. May require preliminary sampling to determine appropriate method.

Learning Opportunities

#5 – Data management

For a robust data set, each sample must include completed paperwork specifying the well number, full address, well user name, and treatment information, among other details.

Problem

Information is inconsistent.

Lesson Learned

Limiting and standardizing information is important. How to implement that remains the challenge.

Learning Opportunities

#6 – Budget management

Depletion of county funds, for various reasons.

Problem

All participants are drawing funds from the same source.

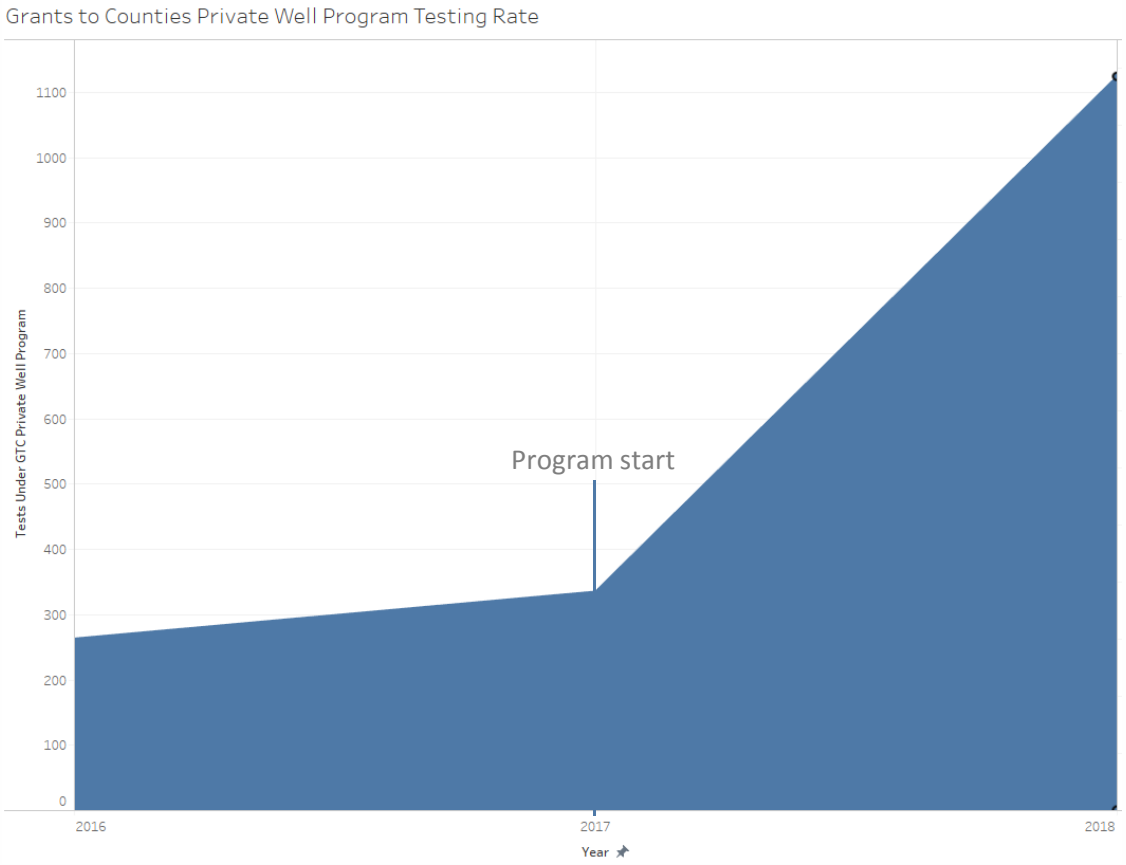
Lesson Learned

Timing of the survey must align with budget cycles. Each partner must closely watch their budget. Some funds must be held in reserve to respond to emergencies and mitigation.

Results

1) Increase awareness

The rate of water testing through the Iowa Grants-to-Counties Private Water Well Program, and therefore engagement with private well users, increased more than four-fold in the first year of the IWS.

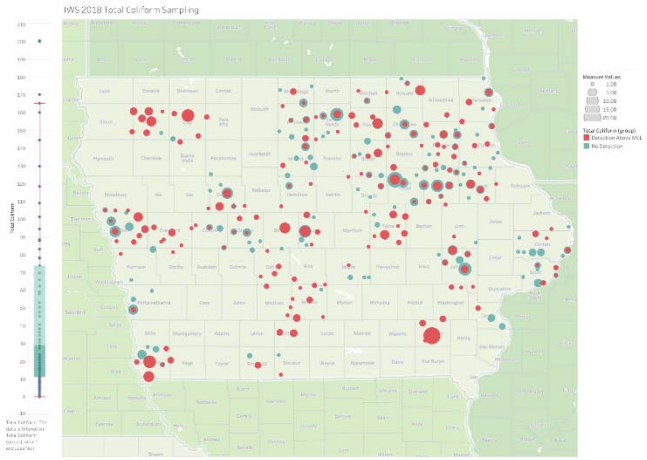


Results

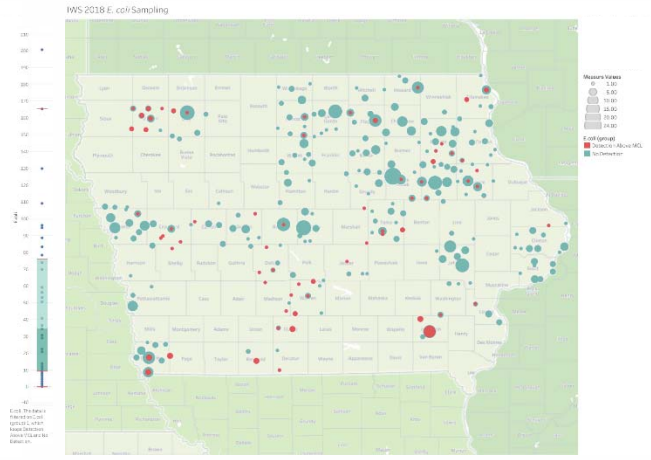
2) Improve characterization of private wells.

Additional data for statewide databases.

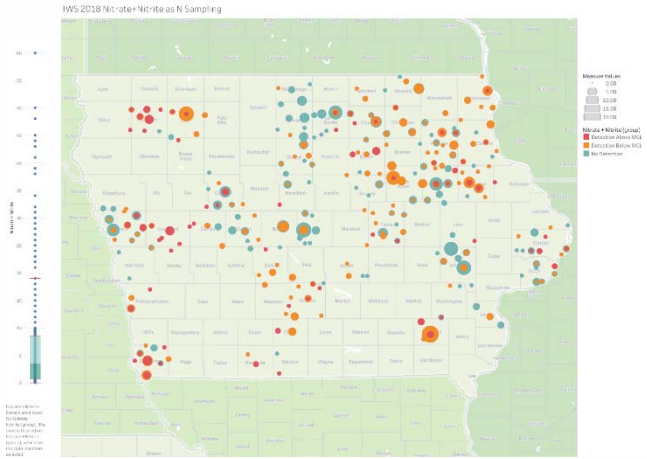
County-by-county trends for the local Depts of Health



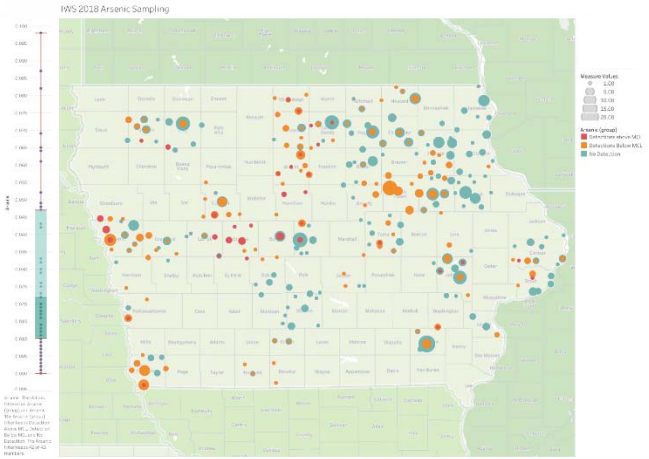
Concentrations of total coliform bacteria were quantifiable in approximately 45% of the wells sampled, all in exceedance of the EPA-established MCL.



E. coli bacteria was quantified in 11% of wells sampled, all in exceedance of the EPA-established MCL, and 98% of wells containing *e. coli* also contained total coliform bacteria.

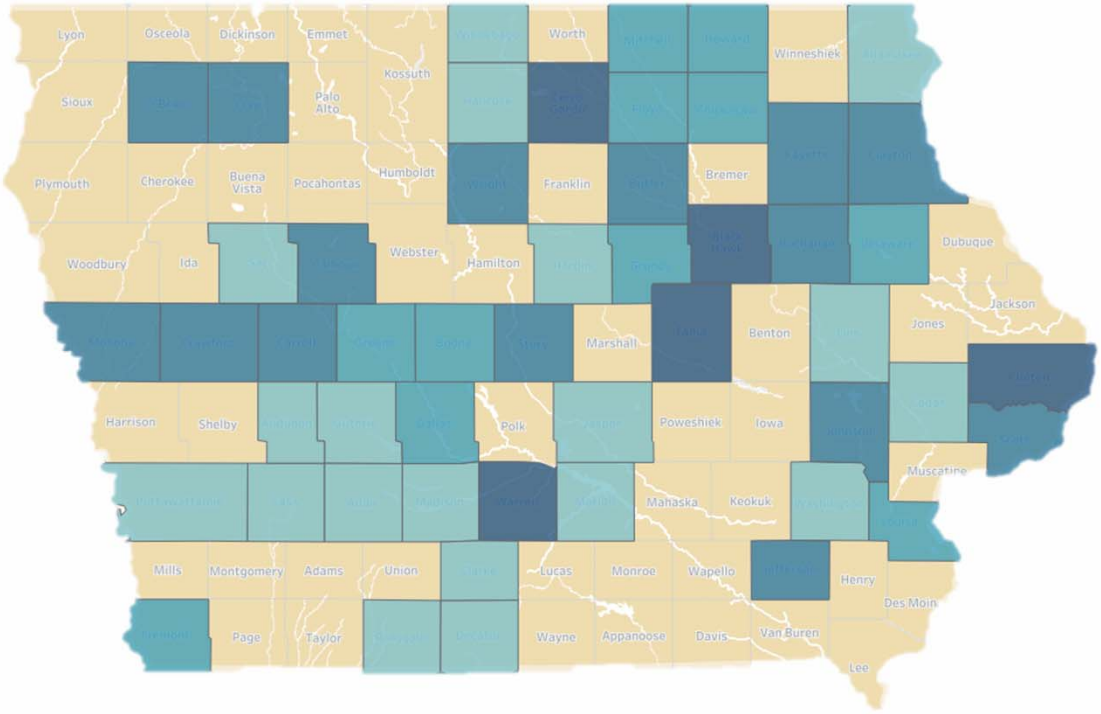


Nitrate levels reached concentrations as high as 60 mg/L with 12% exceeding the EPA-established MCL of 10 mg/L.



Concentrations of arsenic were quantified in 36% of wells sampled, with approximately 6% exceeding the MCL of 0. 01 mg/L.

Results



3) Enhance partnerships

50 of 99 counties have participated for at least one sampling season

Enhances relationships

Leads to collaborations

Provides the lab with better understanding of what the counties need

Acknowledgements

- Susie Dai, SHL Environmental Health Director
- Michael Pentella, SHL Director
- SHL analytical chemists and support services staff
- Lorelei Kurimski, APHL (former SHL GTC program manager)
- Iowa County EH Departments
- Iowa Department of Natural Resources
- Iowa Department of Public Health
- UI Center for Health Effects of Environmental Contamination

Thank you!

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Mission: The State Hygienic Laboratory at the University of Iowa protects and improves quality of life by providing reliable environmental and public health information through the collective knowledge and capabilities of our organization.