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COUNCIL OF STATE AND
TERRITORIAL EPIDEMIOLOGISTS

CSTE Member Assessment of Emerging Issues for Private Well Water and Drinking Water, 2016

Acknowledgements

The Council of State and Territorial Epidemiologists (CSTE) would like to acknowledge the dedication of the CSTE Private Well Water Working Group that developed the assessment and subsequent report, the CSTE Environmental Health Subcommittee, the CDC Health Studies Branch (National Center for Environmental Health), and Anuja Mathur (CSTE Intern). The primary author of this report is Lisa Ferland (Independent Consultant) with the assistance of Jennifer Lemmings (CSTE National Office).

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Table of Contents

Introduction and Background

The importance of the cleanliness of the public's drinking water has never been more in the public focus than in the past few years. Recent public drinking water disasters in Flint, Michigan; Hoosick Falls, New York; and Newark, New Jersey public schools have resulted in a focus on the infrastructure providing water to the general public, who are now acutely aware of appropriate drinking water levels for lead, PFOAs, and other contaminants. However, the specific requirements and authority for providing clean and safe water to the portion of the public who are served by private well water is not well understood. In addition, the fact that water quality testing is the responsibility of private well owners is also not well understood.

Contaminants in drinking water can lead to a host of public health issues including gastrointestinal, reproductive, and neurological disorders. Infants, young children, pregnant women, the elderly and the immunocompromised are at greater risk of serious health issues after drinking contaminated drinking water[1].

Approximately 38.5 million people (12%) of the population of the U.S. use drinking water as residents of homes from private wells that are not regulated by the Federal Safe Drinking Water Act[2]. Several dozen million more are assumed to occasionally drink water as visitors to these homes. There are numerous contaminants in ground water caused by geologic conditions, urban runoff, fertilizers and pesticides, failed septic systems, and seepage of contaminants through landfills[3]. Both infectious and non-infectious contaminants are of concern to private well owners and state and federal public health practitioners.

In an attempt to gauge states' actions and priorities related to drinking water issues and private residential wells, the Council of State and Territorial Epidemiologist's Environmental Health Subcommittee collaborated with the Health Studies Branch's Clean Water for Health Program with the Centers for Disease Control and Prevention. In collaboration, the assessment was developed to identify priority non-infectious issues impacting drinking water, state and local technical assistance needs, and how CDC can best provide technical assistance and support in addressing these state priorities.

Methods

Assessment Development and Distribution

The CSTE Member Assessment for Emerging Issues for Private Well and Drinking Water was developed in collaboration with the CSTE Private Well Water working group members of the CSTE Environmental Health Subcommittee and investigators with the Health Studies Branch, National Center for Environmental Health, Centers for Disease Control and Prevention.

The assessment was pilot-tested in November 2015 by five subcommittee members. The assessment was revised based on CSTE member feedback and was approved through the CDC's OMB process (OMB No. 0920-0879) on February 11, 2016. The assessment consisted of 23 questions in total. Skip patterns were created to reduce the burden on the respondents and not every respondent was required to answer every question. The assessment was finalized and distributed to all State Epidemiologists (50 states and the District of Columbia), members of the Large City and Urban Epidemiologists point of contact list containing 23 cities, and members of the CSTE Private Well Workgroup on February 29, 2016 with instructions to forward the assessment to the person most knowledgeable on this topic. One response was requested per city/state. Results were collected using the web-based assessment tool Survey Monkey, with data collection closing on April 25, 2016. All non-responders were followed up by email.

Data Cleaning and Methodology

Descriptive statistics from the assessment were analyzed using Microsoft (MS) Excel 2011. Results were stratified and analyzed by USGS Ground-water regions.[4] All figures were created in MS Excel and tables were created in MS Word 2011.

Results

Respondents for thirty-nine[1] of fifty-one state health departments (including the District of Columbia) responded to the assessment for a response rate of 76%. Of the twenty-three large city health departments that received the assessment, one city responded to indicate that they did not address private well water issues at their health department, giving a total of 38 respondents used for analysis in this assessment. There was no follow up of this city to determine why they do not address private well water issues, or if another agency in the same geographic area addresses them. Twenty-three of the thirty-eight (61%) respondents were epidemiologists, chiefs, or directors of environmental health or mentioned drinking water quality specifically in their title, eight (21%) indicated they were staff epidemiologists or engineers, and seven (18%) indicated they were State Epidemiologists.

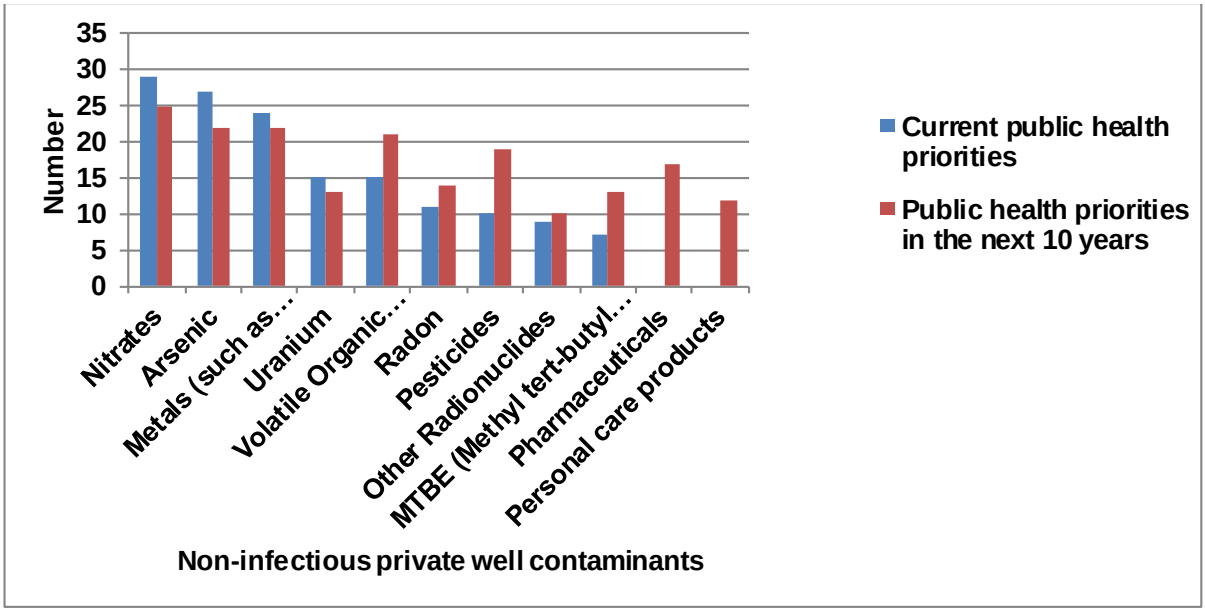
Twenty-one of thirty-eight respondents (55%) indicated that it is a priority for the state/city to seek funding and support to examine public health issues related to using private wells for drinking water. When asked to select the non-infectious private well contaminants that are current public health priorities at the state health department, 36 state health departments responded. The most commonly mentioned contaminants were: nitrates (29, 81%), arsenic (27, 75%), metals (such as arsenic, lead, etc.) (24,

[1] Respondents were requested to complete the entire assessment. Two respondents indicated that private well water issues were either not addressed by their department or were not a priority for their agency at this time and their responses were removed from the denominator for all questions except respondent type and the first question of the assessment, which asked if private well issues are a priority for the health department.

67%), uranium (15, 42%), and Volatile Organic Compounds (VOCs) (15, 42%), radon (11, 31%), pesticides (11, 31%), other radionuclides (9, 25%), and MTBE (methyl tert-butyl ether and other gasoline additives) (7, 19%). No respondent mentioned pharmaceuticals or personal care products as a priority at this time. Respondents were allowed to select more than one contaminant and 19 of 36 (53%) respondents chose four or more contaminants as priorities. Four respondents mentioned perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) as a current priority for their health agency.

In contrast, when asked to select the non-infectious private well contaminants that will become public health priorities within the next 10 years, 35 state health departments responded: nitrates (25, 71%), arsenic (22, 63%) and metals (22, 63%) were still within the top three most important contaminants, however, Volatile Organic Compounds (21, 60%), pesticides (19, 54%), pharmaceuticals (17, 49%), radon (14, 40%), MTBE (13, 37%), and personal care products (12, 34%) are predicted to become important public health priorities. Twenty-two (61%) respondents selected four or more non-infectious contaminants as public health priorities in the next 10 years. Figure 1 compares the current public health priorities and those within the near future for non-infectious private well contaminants.

Figure 1. Number of non-infectious private well contaminants selected by 36 states that are current public health priorities and are predicted to be public health priorities in the next 10 years, CSTE Member Private Well Water Assessment, 2016.



Respondents were asked to identify priority issues related to the use of private wells for drinking water priorities within their state. Respondents were allowed to choose more than one issue and the most commonly named issue was flooding (21, 64%), demographics and locations of private well owners (20, 61%), improving private well

stewardship (18, 55%), and drought (13, 39%). The most common combination of issues was selected by nine respondents mentioned demographics and locations of private well owners, flooding, and improving private well stewardship. Other issues mentioned by respondents included natural hazards, septic systems that are not properly maintained, impact on water tables due to "fracking", small lot dense development, and improving well owner education.

When asked what additional non-infectious issues related to the use of private wells for drinking water may become a public health priority in the next 10 years, respondents mentioned PFOS, PFOA, aging wells (and their subsequent failure), scarcity/overuse of water, climate change, proximity to landfills and storage tanks, salt water intrusion, and issues related to water rights for individual private wells in subdivisions versus public water supplies.

In order to address future or current public health priorities related to private well drinking water, respondents were asked to identify various types of technical assistance they might need (Table 1). Six respondents selected all six types of listed technical assistance.

Table 1. Type of technical assistance to address current or future priority non-infectious private well drinking water issues, CSTE Member Private Well Water Assessment, 2016

Technical Assistance	Number of states (n=35)
Identifying populations of private well users that may be at higher risk of exposure to toxic agents in drinking water	22
Assessing associations between occurrence of disease and exposure to non-infectious contaminants in drinking water	21
Investigating potential health effects from toxic agents in private well water	20
Identifying and prioritizing emerging groundwater contaminants with the highest potential to affect private well owners	19
Identifying and describing (e.g. demographics, stewardship practices, etc.) private well users	15
Measuring exposure to toxic agents before and/or after interventions to improve the quality of private well water	13
None of the above (i.e., not interested in technical assistance at this time)	3
Don't know at this time	3

Twenty-six of thirty-five (74%) respondents indicated that they had a database of private well locations. Of those 26 respondents, 4 (15%) include newly constructed wells only, 3 (12%) include all wells, and 19 (73%) indicated their private well databases house various information on constructed wells after a particular date, some historic, some newly constructed wells, wells with drilling permits, and other various states of partially

completed data by the driller. For nine of these nineteen respondents, their databases contain some element of incomplete data and not all well locations are known.

Eighteen (51%) respondents indicated that they had a database of private well water quality testing results. Seventeen respondents indicated that their state required well construction standards, well construction permits or registration, and siting requirements for private wells. Thirty-one states mentioned well construction standards, 28 mentioned well construction permits or registration, and 25 mentioned siting requirements.

Twelve (34%) states indicated their state required water testing for private wells immediately after construction, 11 (31%) indicated no water testing requirements for private wells, six (17%) indicated water testing at the time of property transfer, and six (17%) did not answer. Only one respondent indicated water quality testing at regular intervals. Despite allowing respondents to select more than one answer, only one state selected both immediately after construction and at time of property transfer.

Of the nineteen states that indicated water testing requirements for private wells, all 19 test for bacteria, 14 (74%) nitrates, 10 (53%) metals (e.g., arsenic, uranium, etc.), 3 (16%) Volatile Organic Compounds, and 1 (5%) pesticides. Other water testing requirements included iron, pH, manganese, temperature, quantity pumped, sulfates, and conductivity.

Twenty-five respondents have current efforts to increase voluntary private well testing in their state. Of those, 24 respondents mentioned that they disseminate information about the importance of testing through a media campaign, website, or local organization, 10 provide free or reduced testing, and 7 improve the convenience of providing a sample (e.g., collecting samples at local events such as fairs or locations such as schools).

Twenty-three respondents have current efforts to educate private well owners regarding water treatment options. This is most commonly done (21, 91%) through disseminating information about the treatment options via website or other public health education methods. Two states indicated they provide free or reduced price treatment systems.

Exposure to and possible health effects from emerging unregulated contaminants in drinking water were a concern for 17 (47%) of the respondents. Those seventeen respondents indicated that chemicals, cyanotoxins, heavy metals associated with coal ash, PFOA, PFOS, pharmaceuticals, and personal care products were all contaminants of concern.

To address the issues identified by possible health effects from unregulated contaminants, 12 respondents mentioned technical assistance related to studying potential health effects from drinking water. Seven requested technical assistance with measuring exposure to toxic agents in drinking water, and six were unsure at this time.

In the past five years, all respondents indicated that there were less than five documented illness clusters associated with private wells that were investigated by the

state/city health department. Sixteen specifically mention zero illnesses have been identified but many states mention that the true number is unknown as illnesses associated with private wells may be underreported. One respondent indicated that their clusters were discovered from independent studies but that three clusters have been investigated over the past five years. The clusters involved methane migration and unconventional natural gas drilling chemicals including isopropanol and Rock Oil Compounds.

Regional Analyses

The data in Table 3 indicate which non-infectious private well contaminants are current and future priorities. Data were stratified by USGS groundwater regions[4]. The USGS groundwater regions are shown in Figure 2.

Figure 2. USGS Groundwater Regions Map
(Source: http://pubs.usgs.gov/ha/ha730/gwa.html)

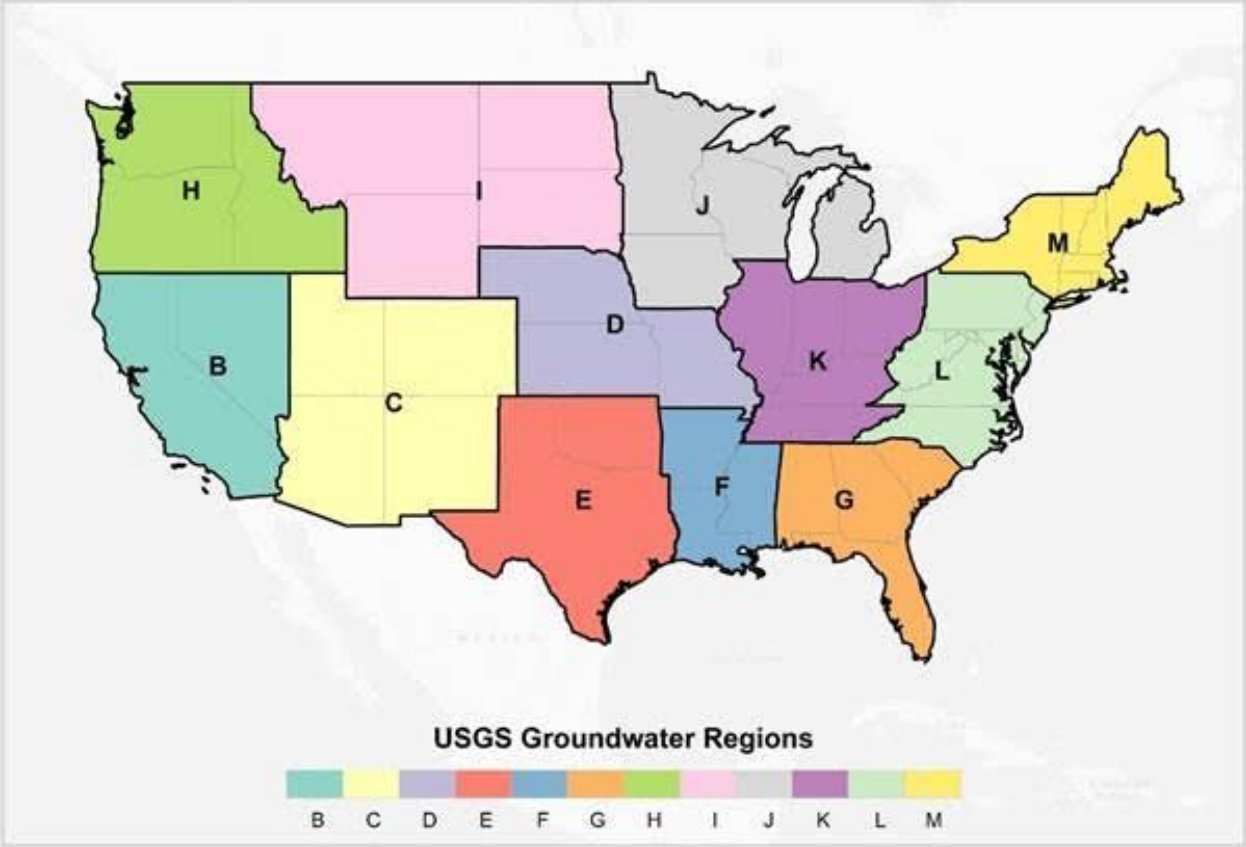


Table 3. Comparison of current non-infectious private well priorities and future private well public health priorities in the next 10 years by USGS Groundwater Region, CSTE Member Private Well Assessment, 2016.

USGS Groundwater Region (Fig 2)	**Current public health priority**	**Future public health priority in the next 10 years**
B		
C	Arsenic, Metals, Nitrates, Uranium	Arsenic, Metals, MTBE, Pharmaceuticals, Personal care products
D	Arsenic, Metals, Nitrates, Pesticides, Other radionuclides	Arsenic, Metals, Nitrates, Pesticides, Other radionuclides, Volatile Organic Compounds
E	Metals, Nitrates	Metals, Nitrates, Pesticides, Volatile Organic Compounds
F	Metals, Nitrates	Nitrates
G	MTBE, Nitrates, Volatile Organic Compounds	Pharmaceuticals
H	Arsenic, Nitrates	Arsenic, Nitrates
I	Nitrates	No clear priority mentioned
J	Arsenic, Nitrates	Arsenic, Metals, Nitrates, Pharmaceuticals, Personal care products, Pesticides
K	Arsenic, Metals, Nitrates	Metals, Radon, Volatile Organic Compounds
L	Nitrates, Volatile Organic Compounds	Arsenic, Metals, Volatile Organic Compounds
M	Arsenic, Metals, Volatile Organic Compounds	Arsenic, Metals, Nitrates, Other radionuclides, Uranium, Volatile Organic Compounds

Discussion

This CSTE member assessment was conducted to determine current and future priority issues for drinking water from private wells. The assessment focused on the non-infectious contaminants and emerging contaminants that are currently unregulated by the federal government for private drinking water wells.

The findings showed that while there may not be many documented illnesses associated with private well drinking water in the past five years, many states are seeking funding or support to help them address public health issues arising from private wells.

- At least 24 respondents mentioned nitrates, arsenic, and metals such as lead as the top public health priorities.
- These same contaminants (nitrates, arsenic, and metals) were also listed as future public health priorities within the next 10 years but states also identified Volatile Organic Compounds, pesticides, PFAs, pharmaceuticals, radon, uranium, MTBE, and personal care products.
- States are focused on addressing issues related to flooding (21) identifying the demographics and locations of private well owners (20), and improving private well stewardship (18).
- Further issues identified for private wells included climate change, groundwater contamination from storage tanks, improperly maintained septic tanks, landfills, and the public health implications of large populations drinking from unregulated private wells in residential subdivisions.

When asked about technical assistance, more than 20 states mentioned identifying populations of private well users that may be at higher risk of exposure to toxic agents in drinking water, assessing associations between occurrence of disease and exposure, and investigating potential public health effects from toxic agents in private wells.

- Although 72% of respondents indicated they had a database of private well locations, 19 (73%) of those with a database indicated that the databases were incomplete, lacked historical well data, or had some various limitation on recoding the actual locations of all private wells for drinking water.
- The majority (86%) of respondents had some requirement for private wells with most states (31) indicating they had well construction standards.
- While most respondents had construction standards, exactly 50% reported having a state/city water testing requirements for private wells. Many respondents indicated that there was no requirement to test at this time but that the state provided inexpensive tests to private well owners.
- Not many states indicated testing requirements for pesticides (1) and Volatile Organic Compounds (3)—two contaminants that were identified as top public health priorities in the next 10 years.
- Sixty-nine percent of respondents are making an effort to increase voluntary testing and are doing so by posting information on their website or through local organizations. Only two states indicated they were providing free or reduced price treatment systems to increase private well education efforts.

When analyzed regionally, ten of the twelve USGS groundwater regions identified nitrates and six of the twelve identified arsenic as current non-infectious private well contaminants that are current public health priorities (Table 3).

- The USGS groundwater regions on the east coast of the U.S., (i.e., M, L, and G) all identified Volatile Organic Compounds as a current public health priority.
- Regions E and F identified the same contaminant priorities (metals and nitrates).
- The most commonly identified non-infectious contaminants were nitrates (10 regions), arsenic (6 regions), and metals (6 regions)

These findings suggest that, while states have not reported many illnesses associated with private well drinking water, not many states require water quality testing or provide inexpensive water treatment options for private well owners. With the responsibility for monitoring and testing water quality falling with the private well owner, additional efforts by state health departments to increase education, provide affordable testing opportunities, and making a concerted effort to document the demographics and locations of private wells could increase the chance of successfully detecting and addressing any public health threats that may occur. States and federal partners should also collaborate to detect and address the emerging contaminants such as Volatile Organic Compounds, radon, uranium, pharmaceuticals, and personal care products in the groundwater supply.

Limitations

This assessment has some important limitations. First, the response rate was <100%, leading to the potential for results not to be fully representative of all states. Many cities do not have involvement with private wells. Given this, we carefully defined denominators. Second, we did not have 100% response rate for each of the USGS groundwater regions for the regional analyses. Some of the regions were only represented by one state and generalizations should be made with caution when interpreting regional results.

Future Directions

There is a general consensus, nationwide, as to the current issues related to groundwater contamination that directly affect private wells used for drinking water. To prepare for emerging threats, collaboration between states and federal partners to find ways to capture the demographics of private well owners and the locations of private wells would help accurately detect and address noninfectious as well as infectious disease illnesses associated with private wells. Once a more accurate database of private well owners is established, they can be more efficiently targeted with ongoing education efforts to increase private well stewardship.

References

[1] http://www.cdc.gov/healthywater/drinking/drinking-water-faq.html#where
[2] For their 2015 report, NGWA derived the estimated population using private or self-supplied water by multiplying the 2014 nonmetropolitan average household size by the number of occupied households using water wells as reported in: U.S. Census. 2015. American Housing Survey 2013. National Summary Tables. Available online http://www.census.gov/programs-surveys/ahs/data/2013/ahs-2013-summary-tables/national-summary-report-and-tables---ahs-2013.html
[3] http://water.usgs.gov/edu/groundwater-contaminants.html
[4] http://pubs.usgs.gov/ha/ha730/gwa.html

CSTE Member Assessment of Emerging Issues for Private Well Water and Drinking Water

Introduction

Form Approved OMB No. 0920-0879 Expiration Date 03/31/2018

This assessment is directed to epidemiologists or staff identified by the epidemiologists as subject matter experts, who work in state and local health departments, are acting in their official capacities as government employees, and have responsibility for drinking water issues and private residential wells. This project is funded through a Cooperative Agreement with the Centers for Disease Control and Prevention (CDC). The information obtained from this assessment will provide data needed to inform activities conducted by the Health Studies Branch's (HSB) Clean Water for Health Program, Division of Environmental Hazards and Health Effects, National Center for Environmental Health, Centers for Disease Control and Prevention. This assessment was developed to identify priority non-infectious issues impacting drinking water, state and local technical assistance needs, and how HSB can best provide technical assistance and support in addressing these priorities.

Identifiable information about the respondent (name, position, agency, phone, and email) will be removed when the results of this assessment are aggregated for analysis. Individually identifiable state and local responses will be kept secure and will not be shared with CDC or anyone else without permission. This assessment is estimated to require an average of 40 minutes of your time. Thank you for completing this assessment by COB Monday, March 14, 2016. Please contact Jennifer Lemmings (jlemmings@cste.org or 7704583811) if you have any questions. We appreciate your time and attention to this matter.

CDC estimates the average public reporting burden for this collection of information as 40 minutes per response, including the time for reviewing instructions, searching existing data/information sources, gathering and maintaining the data/information needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing burden to CDC/ATSDR Information Collection Review Office, 1600 Clifton Road NE, MS D-74, Atlanta, Georgia 30333; ATTN: PRA (0920-0879).

CSTE Member Assessment of Emerging Issues for Private Well Water and Drinking Water

1. Please enter the following information about the primary respondent to this assessment

Name

Position

Agency

State/Territoriy

Email Address

Phone Number

Unregulated Drinking Water

2. Has it been a priority for your state/city to seek funding/support to examine the public health issue of using private wells for drinking water?

- ◯ Yes
- ◯ No
- ◯ Don't know

3. Select the non-infectious private well contaminants that are current public health priorities in your state/city. Select all that apply.

- ☐ Arsenic
- ☐ Metals (such as arsenic, lead, etc.)
- ☐ MBTE (Methyl tert-butyl ether) and other gasoline additives
- ☐ Nitrates
- ☐ Pharmaceuticals
- ☐ Personal care products
- ☐ Pesticides
- ☐ Other Radionuclides
- ☐ Radon
- ☐ Uranium
- ☐ Volatile Organic Compounds (VOCs)
- ☐ Other (please specify)

4. Select the non-infectious private well contaminants that may impact your state/city within the next ten years. Select all that apply.

- [ ] Arsenic
- [ ] Metals (such as arsenic, lead, etc.)
- [ ] MTBE (Methyl tert-butyl ether) and other gasoline additives
- [ ] Nitrates
- [ ] Pharmaceuticals
- [ ] Personal care products
- [ ] Pesticides
- [ ] Other Radionuclides
- [ ] Radon
- [ ] Uranium
- [ ] Volatile Organic Compounds (VOCs)
- [ ] Other (please specify)

5. Are any of the following issues related to use of private wells for drinking water priorities in your state/city? Select all that apply.

- [ ] Demographics and locations of private well owners ("who and where are they?")
- [ ] Drought
- [ ] Flooding
- [ ] Improving private well stewardship
- [ ] None are a priority at this time
- [ ] Other (please specify)

6. What additional non-infectious issues related to use of private wells for drinking water do you expect might be priorities that may impact public health in your state/territory in the next ten years? Please list all that may apply.

7. What type of technical assistance would your state/city find helpful to address current or future priority non-infectious private well drinking water issues? Select all that apply.

- [ ] Measuring exposure to toxic agents in private well water
- [ ] Investigating potential health effects from toxic agents in private well water
- [ ] Identifying and describing (e.g. demographics, stewardship practices, etc.) private well users
- [ ] Identifying populations of private well users that may be at higher risk of exposure to toxic agents in drinking water
- [ ] Measuring exposure to toxic agents before and/or after interventions to improve the quality of private well water
- [ ] Assessing associations between occurrence of disease and exposure to non-infectious contaminants in drinking water
- [ ] Identifying and prioritizing emerging groundwater contaminants with the highest potential to affect private well owners
- [ ] None of the above (i.e., not interested in technical assistance at this time)
- [ ] Don't know at this time
- [ ] Other (please specify)

8. Does your state/city have a database of private well locations? Select only one option below.

- ◯ Yes
- ◯ No
- ◯ Don't know

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Yes - has database of private well locations

9. What does your database of well locations include? Select only one option below.

- ◯ All wells
- ◯ Newly constructed wells only
- ◯ Other (please specify)

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10. Does your state/city have a database of private well water quality testing results? Select only one option below.

- ◯ Yes
- ◯ No
- ◯ Don't know

11. Does your state/city have any of the following requirements for private wells? Select all that apply.

- ☐ Siting requirements
- ☐ Well construction standards
- ☐ Well constructions permits or registration
- ☐ Don't know
- ☐ Other (please specify)

12. Does your state/city have water testing requirements for private wells? Select all that apply.

- ☐ No water testing requirements for private wells
- ☐ Immediately after construction
- ☐ At time of property transfer
- ☐ At regular intervals
- ☐ Other (please specify)

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Has water testing requirements for private wells

13. You indicated that your state/city has water testing requirements for private wells. What contaminants are included in the required testing? Select all that apply.

- [ ] Bacteria
- [ ] Metals (e.g., arsenic, uranium, etc)
- [ ] Nitrates
- [ ] Volatile Organic Compounds
- [ ] Pesticides
- [ ] Don't know
- [ ] Other (please specify)

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14. Does your state/city have current efforts to try to increase voluntary private well testing? Select only one option below.

- ◯ Yes
- ◯ No
- ◯ Don't know

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Has efforts to increase voluntary testing

15. Do the efforts of your state/city to increase voluntary testing of private wells include any of the following components? Select all that apply.

- [ ] Providing free or reduced price testing
- [ ] Improving the convenience of providing a sample (e.g. collecting samples at local events such as fairs or locations such as schools, etc.)
- [ ] Disseminating information about the importance of testing (e.g. through a media campaign, website, local organizations, etc.)
- [ ] Other (please specify)

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16. Does your state/city have current efforts to try to educate private well owners regarding water treatment options? Select only one option below.

- ◯ Yes
- ◯ No
- ◯ Don't know

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State/territory has education efforts regarding water treatment options

17. Do your current education efforts include any of the following components? Select all that apply.

- ☐ Providing free or reduced price treatment systems
- ☐ Disseminating information about treatment options (e.g., website, etc.)
- ☐ Other (please specify)

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Regulated Drinking Water

18. Is exposure to and possible health effects from emerging unregulated contaminants in drinking water a priority public health issue in your state/city? Select only one option below.

- ◯ Yes
- ◯ No
- ◯ Don't know

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Emerging unregulated contaminants is a priority

19. Which contaminants are of concern? List all that apply.

20. What type of technical assistance would your state/city find helpful to address the issues identified by possible health effects from unregulated contaminants? Select all that apply.

- [ ] Measuring exposure to toxic agents in drinking water
- [ ] Studying potential health effects from toxic agents in drinking water
- [ ] None of the above (i.e., not interested in technical assistance at this time)
- [ ] Don't know at this time
- [ ] Other (please specify)

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Private Drinking Wells—Regulated or Unregulated

21. How many documented illness clusters have been associated with private wells have been investigated in your state/city within the past five years? Please describe below.

22. Please provide any additional information that you think might be helpful or relevant to this assessment.

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Thank you!

Thank you for taking the time to answer these questions. Your responses are invaluable to HSB's decision making and planning of future activities. For more information, please visit resources at HSB's website http://www.cdc.gov/nceh/hsb/cwh/default.htm.