



WADING INTO PRIVATE WELL WATER

Report by the Kansas Environmental Public Health Tracking Program



Introduction

The Kansas Environmental Public Health Tracking Program (KS-EPHT) is funded by a cooperative agreement between the Kansas Department of Health and Environment (KDHE) Bureau of Epidemiology and Public Health Informatics (BEPHI) and the Centers for Disease Control and Prevention (CDC). The Kansas Environmental Public Health Tracking Program is part of the National Environmental Public Health Tracking Network (NEPHTN). It is the nation's most comprehensive environmental public health surveillance system and the first to provide environmental hazard and public health data in one place.

Environmental Public Health Tracking is the ongoing collection, integration, analysis, interpretation, and dissemination of data on environmental hazards, exposures to those hazards, and health effects that may be related to the exposures. The vision for the tracking network called for federal, state, local agencies, and others to monitor and distribute information about environmental hazards and disease trends, as well as advance research on the possible linkages between environmental hazards and disease. The tracking network brings together data concerning health and environmental problems with the goal of providing better information for better health.



Project Purpose

In 2016, county environmental health professionals expressed an interest to the KS-EPHT program that they wanted to share private well water data with the state to assess current testing practices. Concerns were shared with program staff at conferences that this was an issue of importance which needed to be examined at the state level as a matter of environmental public health protection. Therefore, in response to this request, the pilot phase of the project was launched to evaluate current activities within the state.

The objective of the pilot project was to establish a baseline of knowledge related to private well water data for the state of Kansas. Several goals were identified for the project. The first goal was to determine the extent of private well water data collection throughout the state and ascertain if the data was being utilized for decision making purposes. The second goal of the project was to determine if enough data existed to develop a private well water dataset that could be utilized for internal and/or external purposes and, if so, then create a process and database to collect the data. The intent was for the findings of the project to be presented to the KS-EPHT program's Technical Advisory Group, internal partners, project participants, and the Kansas Health Foundation policy advisory group that is currently evaluating private well water policies.

Network Data Collection

In the summer of 2017, KS-EPHT program staff started the research phase of the private well water project. As part of the research, other NEPHTN states were queried to develop a list of common indicators and measures for private well water that were already collected as statewide datasets for public display. Five states publicly display private well water datasets: Colorado, Iowa, Maine, New Mexico, and Vermont. The number of private well water indicators and measures varied by state. However, all states that displayed private well water as an indicator had measures for arsenic and nitrate at the county level. Some NEPHTN states only display content related to private well water or link directly to their associated Bureau of Water. Neither the KS-EPHT program or the KDHE Bureau of Water publicly display any private well water data at this time.

Table 1. Private Well Water Indicators and Measures

Indicator	Measure
<i>Arsenic</i>	Average arsenic concentration micrograms per liter (mcg/L) by county
	Maximum value of arsenic samples by county
	Percent of arsenic samples over 10 mcg/L
	Percent of private wells sampled for arsenic
	Percent of arsenic tests above Maximum Contaminant Level (MCL)
	Total arsenic results above MCL
	Total arsenic tests conducted
	State level total arsenic median and 95 th percentile
	State level total arsenic mean and maximum
	<i>Bacteria</i>
Percent of private wells testing positive for bacteria	
<i>Coliform Bacteria</i>	Positive total coliform and fecal coliform
	Total coliform tests
<i>Nitrate</i>	Maximum value of nitrate samples by county
	Nitrate results above MCL
	Nitrate tests conducted
	Percent of nitrate samples over 10 milligrams per liter (mg/L)
	Percent of nitrate tests above the maximum
	95 th percentile of nitrate concentrations
	Percent of private wells sampled for nitrate
<i>Well Services</i>	Number of services provided (new construction, well closures, well renovations by county)
	Active wells versus number of wells tested
	Number of homes with private well water
<i>Statewide Contaminants</i>	Number of water tests by analytes

Bureau of Water Background

KS-EPHT program staff met with the KDHE Bureau of Water staff from the Local Environmental Protection Program (LEPP) in July 2017. Program staff had discussed the project's purpose, historical knowledge of KDHE private well water oversight in Kansas, current issues, and private well water regulations to inform continued endeavors. Bureau of Water staff are in the process of working with the Kansas Health Foundation as part of the advisory group for the Kansas Health Foundation Water Well Project. The advisory group is tasked with the analysis of Kansas current well water policies and the proposal of new policies. It was advised that the KS-EPHT program collaborate and share results with the advisory group.



KDHE regulations establish minimum standards for the construction, reconstruction, and plugging of non-public water wells, establish licensing requirements for water well contractors, and provide a regulatory mechanism for reporting and archiving water well and groundwater resource information for use by the public. KDHE regulations give authority to municipal and county governments to establish municipal and county regulations for non-public water wells.

Municipal and county governments have the authority to adopt through sanitary codes, more stringent water quality sampling requirements for private water supplies. Additional requirements for private drinking water supplies may be adopted by the municipal or county governmental body, such as sampling requirements, sampling protocol, routine drinking water supply inspections, and appropriate corrective actions in the event of contamination by certain impairments or to a certain level. Municipal and/or county requirements for private drinking water supplies are typically adopted in the sanitary code. KDHE LEPP approves all municipal and/or county sanitary codes, provides technical assistance to governing bodies implementing sanitary codes, and provides technical assistance to private citizens, installers, and sanitary service providers. Technical guidance documents are provided through KDHE LEPP related to the operation, maintenance, care and disinfection of private water supplies, and LEPP staff can serve as a liaison to additional contacts, resources for well owners and other governmental entities.

Some government entities have environmental codes that are outdated, the earliest county code date of adoption is 1987. Municipal and county government entities do not have a requirement to report private well water testing results to KDHE; therefore, a central data repository of private well sampling information does not exist at the state level. In many instances, this information does not exist at the county level either.



The Bureau of Water LEPP staff discussed several considerations regarding statewide collection and standardization of water quality data from private drinking water wells. One consideration is the variability of proximity to certified laboratories throughout the state. These services receive samples via mail, perform the tests, and may provide some general analysis back to the well owner. Some water quality tests (e.g. bacteriological indicators) involve a narrow sampling window, requiring samples to reach

the laboratory within 24 or 48 hours. If this type of test were standard, then a barrier would be presented to certain locales lacking sufficient proximity to testing services.

Another consideration relates to the costs associated with sampling and analysis. The testing alone, depending on the water quality indicators required, can cost anywhere from \$20 to hundreds of dollars per test. Standardization of water quality indicators to test on a routine basis would have to take these costs into consideration. A program devised for administering standardized water quality data collection from private drinking water supplies would require additional funds at both the state and municipal and/or county level. In addition to the cost of sampling and testing services, most governmental entities would also be incurring the cost for additional staff or staff hours dedicated to managing such a program, and the increased technical assistance time to work with well owners.

Also, the impact of updating technological infrastructure for data collection and management in locales throughout the state would be variable, and in many cases, cost-prohibitive under current funding. These factors limit the availability of standardized data collection and analysis to conduct surveillance, environmental health investigations, and to make informed decisions to protect the health and environment of Kansans.

Survey

A targeted survey was developed in July 2017 for county environmental health professionals and sanitarians. The intent of the survey was to ask if they were interested in submitting data for the pilot data collection phase of the project to evaluate the various types of private well water testing data available. The survey also asked for feedback regarding private well water testing activities in their jurisdictions. A total of twelve questions were asked and many of the questions allowed free text replies to gather additional feedback. The survey was sent to 83 individuals. A mailing list and promotion through *Public Health Connections*, which is a KDHE issued newsletter, were utilized to promote the survey. Participants were asked to respond by the end of August.

Survey Results

Nineteen people responded on behalf of their respective counties. The results indicated that most of counties do not have requirements for testing and that private well water testing is usually in response to complaints, real estate transfers, new well construction, and consumer interest in water quality and other water well indicators. Test results are not always sent to the county, they can be sent to other parties such as property owners, residents, and realtors. The most common analytes tested included total coliform bacteria, fecal coliform (or E. Coli bacteria), followed by nitrate and arsenic. Many of the respondents were not able to answer how many total private water wells were in their county. More respondents had records for on-site waste water permitting and systems numbers for their counties than they did for private water wells. They were also asked what information or data they would like to be able to provide to County Commissioners, property owners, and the public, as well as what types of questions they are asked most often. The answers given provided insight into the benefits of easy access to the data, ability to run data queries, and the importance of the technical assistance they provide their communities. The results of the survey were informative and have been included in their entirety within this report in Appendix 1.

Data Collection

Of the 19 respondents, 9 indicated that they wanted to participate in the pilot phase of the data collection portion of the project by providing county level private well water sampling and testing data for analysis. The respondents that stated they would like to participate were contacted and asked to submit their data before October 31st, 2017. Technical assistance and support were offered to alleviate potential barriers to collecting the data. Ultimately, however, the KS-EPHT program was only able to collect data from two different counties. Other prospective participants replied that their data was in hard copy paper form and the time it would take to put it into a usable or shareable format was not feasible for them to continue in the pilot phase of the project.



Data Analysis

Two counties submitted private well water data for data analysis. As part of the project, staff worked with the participants to collect relevant information to fully understand the data and the accompanying limitations. One participant provided 14 years of data (2003-2016) and the other participant shared 7 years (2011-2017). However one year of the second county's data was deemed incomplete for analysis purposes. Comparisons between the different datasets were not possible nor appropriate for the outcome of this project; therefore, the analysis was tailored for each dataset based on the data available and limitations. Individual reports were provided to the project participants. Beyond just the analysis, each participating county has been provided explanations of the methodology used, limitations of the data, and recommendations that could be used to improve the quality of the data collection process, resulting in better analysis outcomes should they be implemented. The data analysis results will not be provided in this report.

Conclusion

Water quality is an important environmental public health issue. While regulations and minimum design and construction standards are in place to protect both public water supply and private well water systems, respectively, private wells are not afforded the equivalent safeguards of routine sampling, monitoring and reporting that are required for public water suppliers. The burden falls upon the property owners and county environmental health professionals. At the onset of the project, we were optimistic that through private well water data collection and analysis we could preliminarily evaluate the extent and type of testing in the state. While submission and archiving of water well records has been required since 1974, correlation of well water quality data to the well construction records could be a challenge in some cases. The findings, however, indicate that this is a complex issue that deserves more thorough investigation and collaborative exploration. As we work together compiling information, we hope that these findings are informative to others as it highlights the importance of continued research on this topic.