Disaster Response and Recovery Needs of Communities

Affected by the Elk River Chemical Spill, West Virginia

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Executive Summary

On January 9, 2014, a chemical spill of 4-methylcyclohexanemethanol (MCHM) and a mixture of propylene glycol phenyl ethers (PPH), both known to have human health effects, contaminated the water supply of approximately 100,000 West Virginia households. The West Virginia Governor declared a State of Emergency, and the local water company issued a "Do Not Use" water order for nine counties on January 9, 2014, which was lifted for all counties by January 19, 2014. Despite lifting the order, the community's use of public water systems, information sources, alternative sources of water, and perception of health impacts and public water system safety were unclear.

On January 9, 2014, a chemical spill of 4-methylcyclohexanemethanol (MCHM) and a mixture of propylene glycol phenyl ethers (PPH), both known to have human health effects, contaminated the water supply of approximately 100,000 West Virginia households. The West Virginia Governor declared a State of Emergency, and the local water company issued a "Do Not Use" water order for nine counties on January 9, 2014, which was lifted for all counties by January 19, 2014. Despite lifting the order, the community's use of public water systems, information sources, alternative sources of water, and perception of health impacts and public water system safety were unclear. Early on, the West Virginia Bureau for Public Health (WVBPH) requested assistance from the Centers for Disease Control and Prevention (CDC) to better understand two separate aspects of the spill:

- Symptoms experienced by community members in the immediate aftermath, and
- The effectiveness of the emergency response and how to improve it in the future.

In collaboration with WVBPH, CDC conducted separate investigations to address these two issues. To answer questions about symptoms experienced by household members immediately following the spill, we reviewed emergency department medical records and released the results in April:http://www.wvdhhr.org/Elk%20River%20Chemical%20Spill%20Health%20Effects%20-%20Findings%20of%20Emergency%20Department%20Record%20Review.pdf. WVBPH also analyzed non-emergency health providers' reports of patient visits: http://www.dhhr.wv.gov/News/chemical-spill/Documents/PRFindings.pdf. Both activities resulted in similar findings.

To address the emergency response, the Community Assessment for Public Health Emergency Response (CASPER) was conducted April 8-10 to help WVBPH evaluate the response and improve future responses. The CASPER health questions were not designed or intended to assess ongoing or current health issues related to the spill. This report describes the CASPER and its findings.

Specifically, the CASPER looked at: 1) assessing perceived impact of the chemical spill on households, 2) providing WVBPH with information on household water use and practices before, during, and after the "Do Not Use" order, and 3) assessing communications to identify effective approaches for the current and future events.

Interview teams were provided one full-day training and short briefings on safety and media inquiries prior to conducting interviews over three days in the field. A total of 171 household interviews were conducted. The major findings of the survey were as follows:

- The main method of communication about the chemical spill and implementation and lifting of the “Do Not Use” order was TV.
- The majority of households considered TV as the most reliable source of information about the chemical spill.
- Almost three-fourths of households did not have a 3-day alternative source of water supply for every person and pet in the household.
- The vast majority of households obtained an alternative source of water within less than one day of trying to obtain an alternative source of water.
- A potential challenge faced by households when trying to obtain alternative water sources was stores being out of water.
- Almost one in five households reported that a household member was told not to come into work because of the chemical spill.
- An estimated 21.7% of all households reported having one or more health issues (that is, symptoms that occurred between the time of the spill and the time they were interviewed) they felt were related to the chemical spill.
- An estimated 3.5% of all households reported having one or more mental health issues they felt were related to the chemical spill.
- Approximately 37.4% of households affected by the “Do Not Use” order used West Virginia American Water (WVAW) water during the “Do Not Use” order. More households used WVAW water after the “Do Not Use” order was lifted (approximately 66.8%) than during the “Do Not Use” order, and approximately 98.3% of households

were using their household's WVAW water at the time the questionnaire was administered.

- Approximately 36.1% of households affected by the "Do Not Use" order believe that WVAW is safe since the "Do Not Use" order was lifted.

Based on these findings, CDC has made recommendations to WVBPH to guide ongoing recovery efforts in the assessment area:

1. Focus on TV for public messaging during disasters when communication infrastructure remains intact, and also use multiple supplemental communication routes.
2. Encourage households to prepare a 3-day water supply to help them become prepared for future emergencies or disasters of any type.
3. Identify additional ways of providing alternative sources of water supplies in future emergencies to help reach household members without transportation or those who cannot leave work. For example, using volunteer agencies (e.g. American Red Cross) to deliver alternative water supplies.
4. Promote the availability of health and mental health resources to help affected community members access needed services.
5. Increase community education on current water safety to help alleviate consumer concerns.

BACKGROUND

On January 9, 2014, a chemical spill into the Elk River 1.5 miles upstream from the Kanawha County municipal water intake in Charleston, West Virginia contaminated the water supply of an estimated 100,000 West Virginia households (approximately 300,000 residents). The chemicals, 4-methylcyclohexanemethanol (MCHM) a mixture of propylene glycol phenyl ethers (PPH), have known human health effects including skin, eye, and respiratory tract irritation. The West Virginia Governor declared a State of Emergency, and the local water company issued a "Do Not Use" water order for nine counties at 6:00 PM on the evening of January 9, 2014. The "Do Not Use" order was lifted at different times for different geographic areas, but it was lifted for all counties by January 19, 2014. The Agency for Toxic Substances and Disease Registry (ATSDR) in collaboration with the West Virginia Bureau for Public Health (WVBPH) conducted investigations of emergency department medical chart reviews of persons presenting because of exposure to MCHM and an Assessment of Chemical Exposures (ACE) Survey of hospitals that cared for patients exposed to MCHM (1).

However, the affected populations' use of public water systems, information sources, alternative sources of water, and perception of health impacts and public water system safety remained unclear. To move the recovery process forward and improve response capability for future events, information on the aforementioned topics was urgently needed. The WVBPH requested assistance from CDC in conducting a Community Assessment for Public Health Emergency Response (CASPER) in the community affected by the "Do Not Use" order. On April 6, 2014, EIS Officers Ethan Fechter-Leggett and Joy Hsu, CDC staff Sherry Burrer, Rebecca Noe,

and Tesfaye Bayleyegn, and ORISE Fellow Nicole Nakata departed for Charleston, West Virginia. They joined WVBPH staff in conducting a rapid needs assessment in affected communities using CASPER methodology.

CASPER is an epidemiologic technique designed to provide household-based information about an affected community's needs in a timely, inexpensive, and representative manner used to assess public health needs in both disaster and non-disaster settings (2). This information can then be used to initiate public health action, to facilitate disaster planning, and to assess new or changing needs during the recovery period after a disaster. The specific goals of this CASPER were the following: 1) assess perceived impact of the chemical spill on households, 2) provide WVBPH with information on household water use and practices before, during, and after the "Do Not Use" order, and 3) assess communications to identify effective approaches for the current and future events.

METHODS AND MATERIALS

To accomplish these goals, WVBPH with assistance from CDC conducted a CASPER in West Virginia on April 8–10, 2014. WVBPH and CDC, in consultation with CDC's National Center for Environmental Health, Division of Environmental Hazards and Health Effects water subject matter expert, collaborated to develop a two-page data collection instrument (Appendix A). The survey instrument collected information on demographics; information sources about the chemical spill, "Do Not Use" order, and lifting of the "Do Not Use" order; alternative sources of water; household impact of the chemical spill; health and mental health issues since the spill

occurred on January 9, 2014, that household members felt were related to the chemical spill; and trust of the public water supply.

We used a two-stage cluster sampling methodology to select a representative sample of households to be interviewed within the sampling frame. The sampling frame was defined as the area of WVAW company's "Do Not Use" order, with a total of 122,339 housing units in the 2010 U.S. Census. First, using the Geographic Information Systems CASPER tool, 30 Census blocks (clusters) were selected with a probability proportional to the number of housing units within the clusters from the predefined sampling frame (GIS shapefiles of the "Do Not Use" order area were provided to WVBPH by WVAW). Second, interview teams used systematic random sampling to select seven households from each of the 30 selected clusters. Two-person interview teams were assigned to one or two clusters, provided with detailed maps from Google Earth of all of their cluster(s), instructed to select a random housing unit as the starting point, and then go to every n^{th} housing unit (where "n" is the total number of housing units in the cluster divided by seven) to select the seven housing units to interview. Teams were instructed to make three attempts at each selected household before replacement.

CDC provided the interview teams and additional trainees with an eight-hour training on Monday, April 7, 2014 on the overall purpose of CASPER, household selection methods, mapping, questionnaire content, interview techniques, safety, and logistics. On Tuesday, April 8, 2014, CDC provided the interview teams with a one-hour refresher on household selection methods and data collection and provided answers to questions raised the previous day

regarding questionnaire content. The interview teams also received a safety training from Kanawha County Sherif's Department and a media briefing by WVBPH. There were a total of 18 teams on the first and second interview days and 4 teams on the third interview day. All interview teams had at least one state public health staff person, with assistance provided by West Virginia University School of Public Health students and CDC staff. Teams conducted interviews between 2:00pm and 7:30pm EST. Teams attempted to conduct seven interviews in each of the 30 selected clusters, with a goal of 210 total interviews. All potential respondents approached were given a copy of the consent sheet containing contact telephone numbers for WVBPH and educational material from the Substance Abuse and Mental Health Services Administration (SAMHSA) Disaster Distress Helpline. Documents available for handout to all interested persons were the SAMHSA Disaster Distress Helpline brochure; a list of community behavioral health center contacts prepared by WVBPH; a list of additional websites and phone numbers to obtain more information on the governor's state of emergency, the role of CDC and WVBPH in the response efforts, poison center and National Disaster Distress Helpline contact information, and water testing through private laboratories; and a signed letter from the West Virginia Commissioner and State Health Officer for interviewer identity verification. Eligible household respondents were 18 years of age or older and resided in the selected household. Additionally, the interviewers were instructed to complete confidential referral forms whenever they encountered urgent physical or mental health needs.

We conducted weighted cluster analysis to report the projected number and percent of households with a particular response in the sampling frame. We calculated a weight for each

interview to account for the probability that the responding household was selected. Data analysis was conducted in EpiInfo 7.1.3 (CDC, Atlanta, 2013) to calculate the unweighted frequencies, unweighted percentages with 95% confidence intervals, weighted frequencies with 95% confidence intervals, and weighted percentages with 95% confidence intervals. Most survey questions were asked of all households, regardless of "Do Not Use" order status (Appendix A, questions highlighted in yellow); however some questions were asked of only WVAW customers affected by the "Do Not Use" order (Appendix A, questions in white).

RESULTS

The 18 interview teams completed 171 surveys over three days for an overall completion rate of 81.4% (Table 1). Teams completed interviews in 41.4% of houses approached. Of the households with an eligible participant answering the door, 63.3% completed an interview.

For all results, unless otherwise stated, frequencies and percentages in the text represent weighted frequencies and weighted percentages. For those questions asked of only WVAW customers affected by the "Do Not Use" order, we have a smaller response number for those questions (n≤128); for each of these question results, marked with an asterisk, we provide the weighted point estimate, but these should be interpreted as approximate.

Household demographics (Tables 2–7)

The majority (79.7%) of households were single family homes, followed by mobile homes (12.8%). Almost 81% of households were owned. The majority (87.9%) of households had at

least one female in the household, and of households with at least one female, at least one pregnant female was reported in 8 interviewed households (projected number of households: 5,127; weighted percent: 5.2% [1.4%–9.0%][*]). Over three-fourths (77.4%) of households had at least one person 18–64 years old, and only 6 interviewed households (projected number of households: 3,728; weighted percent: 3.2% [0.3%–6.0%][*]) had at least one person less than two years old. Almost all households (99%) identified the ethnicity of household members as not Hispanic/Latino. The most common race identified of household members was white (93.6%), followed by black (4.8%). Of households reporting the highest level of education completed by anyone in the household, 35.7% reported some college and 33.7% reported a bachelor's or advanced degree. More than half of households reported a total yearly income of $25,000–$49,999 (25.9%) or $50,000–$99,999 (25.4%). Of all households, 62.1% reported ownership of at least one pet; 73.8% (65.1%–82.5%)[*] of these households owned dogs and 58.1% (47.9%–68.3%)[*] owned cats.

Of all households within the sampling frame, 78.5% were WVAW customers. However, 75.0% of all households reported being affected by the "Do Not Use" order; the remaining 3.5% mentioned their water came from a different WVAW plant than the plant affected by the chemical spill and thus their household was not affected by the "Do Not Use" order.

Communications (Tables 8–17, Figures 2–5)

[*] Weighted point estimate to be interpreted as approximate.

Almost 80% of households first learned about the chemical spill on January 9, 2014, the same day the chemical spill occurred. By the next day, January 10, 2014, a total of 93.3% of households had learned about the chemical spill. Of households that reported they learned of the chemical spill on January 9, 2014, the most common time was in the evening (defined as 5:00PM–11:59PM), while of those that reported learning on January 10, 2014, the most common time was morning (defined as 12:00AM–11:59AM). Most households (54.3%) first learned about the chemical spill from TV. The next most common ways households learned about the chemical spill, though substantially less than the percentage that learned from TV, were face-to-face talking to people, commonly referred to as word of mouth (12.5%, most commonly a co-worker), phone call on cell phone (9.3%, most commonly family/relative), and phone call on land line (8.2%, most commonly family/relative). The main sources from which households received information about the chemical spill were TV (83.1%), word of mouth (49.5%), and newspaper (45.6%). Only 25% of households cited WVAW website as a source of information about the chemical spill. The majority (58.0%) of households considered TV as the most reliable source of information about the chemical spill. The next most common information sources considered reliable, though substantially less than the percentage that considered TV the most reliable, were internet (not WVAW website) (8.5%), word of mouth (6.7%), social media (5.6%), and WVAW website (5.1%). Of all households, regardless of "Do Not Use" order status, 14 interviewed households (8.2% of interviewed households) stated that there was no reliable source of information.

Of households affected by the “Do Not Use” order, 65.9% (55.9%–75.8%)* learned about the “Do Not Use” order on January 9, 2014, the day WVAW issued the order, and considerably fewer households learned on January 10, 2014 or after. The most common way households learned about the “Do Not Use” order was from TV (52.5% [44.6%–60.5%]*), followed by word of mouth (13.8% [8.3%–19.3%]*) and phone call on cell phone (10.0% [3.9%–16.0%]*), both most commonly from family/relative. Of households affected by the “Do Not Use” order that tried to get an alternative source of water, the top sources of information about water distribution sites were TV (38.1% [25.3%–50.9%]*), word of mouth (28.2% [19.5%–36.9%]*), radio (13.8% [7.1%–20.6%]*), and social media (12.1% [6.0%–18.3%]*).

Of households affected by the “Do Not Use” order, 70.5% (59.9%–81.0%)* did not know the date when the household first learned the “Do Not Use” order for their household was lifted. Television was the most common way households learned the “Do Not Use” order for their household was lifted (52.2% [42.4%–62.0%]*), followed by map on WVAW website (17.3% [10.8%–23.7%]*) and phone call on land line (8.5% [2.4%–14.7%]*), most commonly from the WVAW company. Television was also the most common source of information about household plumbing flushing instructions (58.0% [48.2%–67.8%]*). Other sources of flushing instructions were WVAW website (36.9% [27.0%–46.8%]*) and word of mouth (12.3% [5.6%–19.0%]*); all other sources of flushing instructions accounted for less than 14% of households each. Of households that received plumbing flushing instructions, 94.1% (89.4%–98.8%)* thought they were easy to read and understand.

Preparedness (Tables 18–19)

Water sources in the household at the time the household first heard about the chemical spill were WVAW (77.5%; note that 2 of 132 households that were WVAW customers reported not having WVAW in the household at the time the household first learned about the chemical spill), purchased water (e.g., bottled water) (51.7%), other public water supply (17.8%), and well water (1.5%). Almost three-quarters (74.4%) of households did not have a 3-day alternative source of water supply for each household member and pet in the household. About 14.1% of households had a 3-day alternative water supply for people only.

Alternative sources of water (Tables 20–27, Figures 6–8)

The vast majority (89.7% [81.8%–98.2%][*]) of households affected by the "Do Not Use" order reported using purchased water (e.g., bottled water) during the "Do Not Use" order; bottled water from a water distribution site (56.3% [40.8%–71.7%][*]) and water from a friend or relative (42.5% [30.4%–54.6%][*]) were also commonly used water sources during the "Do Not Use" order. Almost all households affected by the "Do Not Use" order (97.5% [94.6%–100.0%][*]) reported trying to get an alternative source of water. Of households that tried to obtain an alternative source of water, at least half first attempted to get an alternative source of water on either January 9, 2014 (36.1% [26.4%–45.8%][*]) or January 10, 2014 (40.0% [27.4%–52.6%][*]) and first successfully obtained an alternative source of water on January 9, 2014 (29.4% [20.3%–38.5%][*]) or January 10, 2014 (43.2% [30.2%–56.2%][*]). The majority (83.6% [77.6%–89.6%][*]) of households successfully procured an alternative source of water the same day they attempted to obtain it. Most households (72.8% [63.5%–82.1%][*]) tried to acquire an alternative source of

water from a large store or grocery (e.g., Wal-Mart, Kroger). Other places where households tried to get an alternative source of water were a water distribution site in the household's town of residence (49.6% [33.8%–65.3%][*]) and water from a friend or relative (41.3% [28.1%–54.5%][*]). Most households (70.8% [60.7%–80.8%][*]) were able to obtain water from a large store or grocery, while other places from where households were commonly able to obtain water were a water distribution site in the household's town of residence (47.3% [32.4%–62.2%][*]) and water from a friend or relative (45.0% [32.3%–57.7%][*]). More households reported not travelling outside of the affected area to get an alternative source of water (50.4% [38.2%–62.5%][*]) than those that did travel outside of the affected area to purchase water (16.9% [9.4%–24.4%][*]); however, some households (33.9% [20.5%–47.2%][*]) reported travelling and getting water from a friend or relative. The most common length of time households reported being without any alternative source of drinking water was "never without an alternative source of drinking water" (55.0% [42.0%–67.9%][*]), followed by less than one day (29.2% [18.7%–39.7%][*]); other lengths of time of one day or more were much less frequently reported. Of households reporting being without an alternative source of drinking water for one or more days, 47.9% (19.5%–76.4%)[*] cited the reason was that the store was out of water.

Household impact (Tables 28–31)

Of households affected by the "Do Not Use" order, the majority (81.8% [73.7%–90.0%][*]) reported not staying overnight outside of the home for one or more days to have access to an alternative source of water, and less than 7% paid money to stay elsewhere (e.g., hotel). Among all households, regardless of the household's "Do Not Use" order status, 21.2%

reported their child(ren)s' school or daycare closed due to the chemical spill; however, school or childcare closures did not affect 65.8% of households, because they either did not have children or their children did not go to school or daycare. Of households reporting school or daycare closure, less than half reported they either took off work to care for their children (19.2% [5.1%–33.4%][*]), or someone was paid to supervise them (4.7% [0.0%–11.4%][*]). About 10% of households owned a business, and only 4.8% (0.0%–15.3%)[*] of those households with a business reported that the business was ordered to close as a result of the chemical spill. Of all households, 18.1% claimed any member was told not to come into work because of the chemical spill, 11.3% with paid leave and 6.8% with unpaid leave.

Health (Tables 32–36)

Of all households, regardless of the household's "Do Not Use" order status, 21.7% reported anyone in the household having health issues they felt were related to the chemical spill. Of all households, regardless of the household's "Do Not Use" order status, that reported health issues they felt were related to the chemical spill, 89.6% (78.7%–100.0%)[*] stated the age of affected household members was 18 years of age or older, and 14.9% (3.4%–26.5%)[*] stated the age as less than 18 years old. Symptoms reported included rash (53.2% [32.9%–73.5%][*]), skin irritation/itching (41.6% [20.6%–62.6%][*]), respiratory illness/cough (16.1% [2.6%–29.6%][*]), diarrhea (14.8% [2.0%–27.5%][*]), and nausea (13.1% [1.5%–24.6%][*]). When asked where medical care was sought, the most common response was "did not seek medical care" (54.2% [39.8%–68.6%][*]). Of those who did not seek medical care, the most common reason was because the health issues were not serious enough (66.8% [42.2%–91.4%][*]). Of all households

regardless of "Do Not Use" order status, 3.5% reported anyone in the household having experienced any mental health issues they felt were related to the chemical spill. Of households reporting mental health issues they felt were related to the chemical spill, 83.7% (41.3%–100.0%)* mentioned anxiety or stress. Of households reporting any pet ownership, 2.2% (0.0%–5.3%)* reported pets having illness they felt was related to the chemical spill.

Public water supply: behaviors and beliefs (Tables 37–40)

Of households affected by the "Do Not Use" order, 37.4% (26.7%–48.2%)* reported using WVAW water during the "Do Not Use" order. Of these households, the most common WVAW water use during the "Do Not Use" order was showered/bathed (80.1% [71.4%–88.8%]*). Other uses included washed hands (45.9% [28.8%–63.0%]*), washed clothes (37.7% [21.7%–53.6%]*), ran dishwasher/hand-washed dishes (32.2% [15.5%–48.8%]*), and brushed teeth (31.8% [18.9%–44.6%]*). Less than half of households participated in consumption behaviors during the "Do Not Use" order; 26.9% (14.3%–39.4%)* ate or drank food prepared with water and 26.6% (14.1%–39.0%)* drank the water. Of the households reporting any pet ownership, 19.2% (6.4%–32.0%)* gave WVAW water to pets during the "Do Not Use" order.

Of households affected by the "Do Not Use" order, 66.8% (57.3%–76.3%)* reported using WVAW water after the "Do Not Use" order was lifted but before the end of January; households were specifically asked about this time period in order to describe water uses soon after the "Do Not Use" order was lifted. During this time, WVAW water uses of these households included showering/bathing (91.8% [85.6%–98.1%]*), hand washing (74.2% [62.1%–

86.3%][*]), and brushing teeth (36.3% [22.6%–50.0%][*]). Both washing clothes (93.8% [88.3%–99.3%][*]) and dishwashing (67.6% [54.8%–80.4%][*]) uses were more than during the "Do Not Use" order.

Of households affected by the "Do Not Use" order, 98.3% (95.9%–100.0%)[*] reported using their household's WVAW water at the time the questionnaire was administered. The vast majority of these households reported using their household's WVAW water at the time the questionnaire was administered for showering/bathing (97.2% [94.0%–100.0%][*]), washing clothes (95.4% [90.9%–99.9%][*]), hand washing (94.2% [90.1%–98.3%][*]), and dishwashing (90.6% [84.3%–96.8%][*]). Using the water for cooking at the time the questionnaire was administered (50.7% [41.0%–60.4%][*]) was higher than during the "Do Not Use" order and after the "Do Not Use" order was lifted but before the end of January. Less than half of the households (33.5% [26.6%–40.4%][*]) reporting using their household's WVAW water for drinking at the time the questionnaire was administered. Of households reporting any pet ownership, 55.0% (42.6%–67.4%)[*] reported giving WVAW water to pets at the time the questionnaire was administered.

Of households affected by the "Do Not Use" order, 85.6% (79.8%–91.3%)[*] reported that before the chemical spill, they believed the WVAW water supply their household received was safe. When asked, "Since the 'Do Not Use' order was lifted, do you believe that the WVAW water supply your household receives is safe?" only 36.1% (27.8%–44.4%)[*] replied "Yes."

Discussion

These data represent the CASPER surveys conducted in West Virginia on April 8–10, 2014 during the recovery phase after a chemical spill into the Elk River. We anticipated the vast majority of included households would be WVAW customers affected by the "Do Not Use" order and that the proportion of households utilizing another public water supply would be very small. Because only 75.0% of all households within the sampling frame were WVAW customers affected by the "Do Not Use" order, this resulted in having a smaller sample size for those questions asked only of WVAW customers affected by the "Do Not Use" order. However, this may also mean that 25% of all households within the sampling frame were either not WVAW customers or WVAW customers that were not affected by the "Do Not Use" order (due to their water coming from a different WVAW plant), and hence were not faced with concerns of seeking, obtaining, and using alternative sources of water and conducting household plumbing flushing. We assume that responding households are representative of households within the sampling frame.

Seven topic areas formed the basis of this CASPER: 1) demographics, 2) communications, 3) emergency water preparedness, 4) obtainment of alternative sources of water, 5) household impact of the chemical spill, 6) health and mental health issues felt to be related to the chemical spill, and 7) public water supply behaviors and beliefs.

Demographics of the sampling frame were similar to the most recent census estimates of the counties included in the sampling frame, which supports the sample of interviewed households

being representative of the sampling frame (3).

It appears that people knew about the chemical spill and “Do Not Use” order very quickly, most on the day of the chemical spill. The main methods of communication about the spill and “Do Not Use” order status included TV and calling on cell phone and land lines, which is consistent with a disaster or emergency that does not affect communication infrastructure. Word of mouth was also a common method of communication about the chemical spill and “Do Not Use” order, which may reflect the day of the week the chemical spill occurred (Thursday) and time of day most people found out about the chemical spill (i.e., evening of the day the chemical spill was announced and the following morning). In contrast, radio, social media, and the internet were more common sources of information about water distribution sites than they were for communicating information about the chemical spill, “Do Not Use” order, or lifting of the “Do Not Use” order. Again, this is consistent with methods of information sharing when communication infrastructure remains intact.

Almost three-fourths of households were not adequately prepared for a lack-of-water crisis and did not have a 3-day alternative source of water supply while only 14.1% had a 3-day water supply for each person in the household and were therefore adequately prepared (4). While not directly comparable, these results seem considerably lower than the 2009 Federal Emergency Management Agency (FEMA) Personal Preparedness in America report that found 53% of individuals reported “having supplies set aside in their home to be used only in the case of a disaster,” and of those, 73% reported those supplies included bottled water (5). The vast

majority of households obtained an alternative source of water within less than one day of trying to obtain an alternative source, and of those who had difficulty obtaining an alternative source of water, stores being out of water was a commonly cited reason. The percentage of households that reporting using purchased water (e.g. bottled water) during the "Do Not Use" order may be higher than the percentage of households reporting trying to get an alternative source of water from a large store or grocery, because some households reported having water delivered to them (for example, from church or family members) and may not have considered this delivery of water an attempt to obtain an alternative source of water. In terms of household impact, almost one in five households claimed any household member was told not to come into work because of the chemical spill.

Less than one-quarter of households reported health issues they felt were related to the chemical spill, and of those, the symptoms reported were similar to what have been reported in the ACE investigation (1) and to the National Poison Data System (E. J. Scharman, Pharm.D, email communication, May 2014) (6). If household respondents did not consider stress or anxiety as a mental health issue, our study may have underestimated mental health issues that households felt were related to the chemical spill. Symptoms that occurred between the time of the spill through the time of the household interview were captured. The interview did not ask for dates when symptoms occurred or when they were resolved.

The vast majority of households were using WVAW water at the time the questionnaire was administered for many daily activities, including showering/bathing and washing clothes,

dishes, and hands; however, it appears that less than half of households were using the water for drinking at the time the questionnaire was administered. It is important to note that we do not know baseline prevalence of drinking WVAW water before the chemical spill. However, we do know that the majority thought WVAW water was safe before the chemical spill and less than half think it is safe since the "Do Not Use" order has been lifted.

Recommendations

On the basis of this CASPER, we make the following recommendations to guide ongoing recovery efforts in the assessment area:

1. Public messaging should focus on TV, while also employing multiple supplemental communication routes, during disasters where communication infrastructure is intact.

Our results indicate that the most common source of information about the chemical spill and implementation and lifting of the "Do Not Use" order was TV, and the majority of households considered TV as the most reliable source of information about the chemical spill. In addition to TV, this community also utilized a wide range of communication strategies for information about the chemical spill, "Do Not Use" order status, and water distribution sites. Especially in disasters and emergencies where communication infrastructure remains intact, projecting consistent communication objectives through TV as well as multiple other supplemental communication routes could help reach a broad audience.

2. Promote water preparedness for all households.

Encouraging households to prepare a 3-day water supply for each person and pet in the

household would promote households taking an active role in the recovery process and help them become prepared for future disasters. The website Ready.gov recommends storing at least one gallon of water per person per day for drinking and sanitation; the website also details water preparedness recommendations for special populations (e.g. children, nursing mothers) and climates as well as methods of preparing and storing water (4).

3. Identify ways to provide alternative water supplies in future emergencies.

While the majority of households obtained an alternative water source the same day they attempted to obtain it, a potential challenge of households reporting being without an alternative source of drinking water for one or more days was because a store was out of water, among other reasons. Despite information sharing about water distribution sites, some households were without an alternative source of drinking water for one or more days because they could not locate distribution sites or the distribution site was out of water. Additional methods of providing alternative sources of water, such as leveraging community centers, employers, volunteer agencies, and schools, as well as delivery of water to some homes could help some households obtain water in future emergencies, especially those that cited “no transportation” or “could not leave work” as reasons for being without water.

4. Publicize health and mental health resources.

Although less than one-quarter of households reported health issues they felt were related to the chemical spill and 3.5% reported mental health issues they felt were related to the chemical spill, those who are experiencing health or mental health issues need access to appropriate

services. Promotion of the availability of resources such as local behavioral health centers can help affected community members access the needed services.

5. Increase community education on current safety.

Our results indicate that less than half of the households affected by the “Do Not Use” order believe WVAW water is safe since the “Do Not Use” order was lifted. Public messaging, especially through the most trusted source of information (television), might help increase community education about current water safety and alleviate some consumer concerns.

References

1. **West Virginia Bureau for Public Health (WVBPH) and Agency for Toxic Substances and Disease Registry (ATSDR).** Elk River Chemical Spill Health Effects: Findings of Emergency Department Record Review. *2014 West Virginia Chemical Release.* [Online] April 24, 2014. [Cited: April 30, 2014.] http://www.wvdhhr.org/Elk%20River%20Chemical%20Spill%20Health%20Effects%20-%20Findings%20of%20Emergency%20Department%20Record%20Review.pdf.

2. **Centers for Disease Control and Prevention (CDC).** *Community Assessment for Public Health Emergency Response (CASPER) Toolkit: Second edition.* Atlanta (GA) : CDC, 2012.

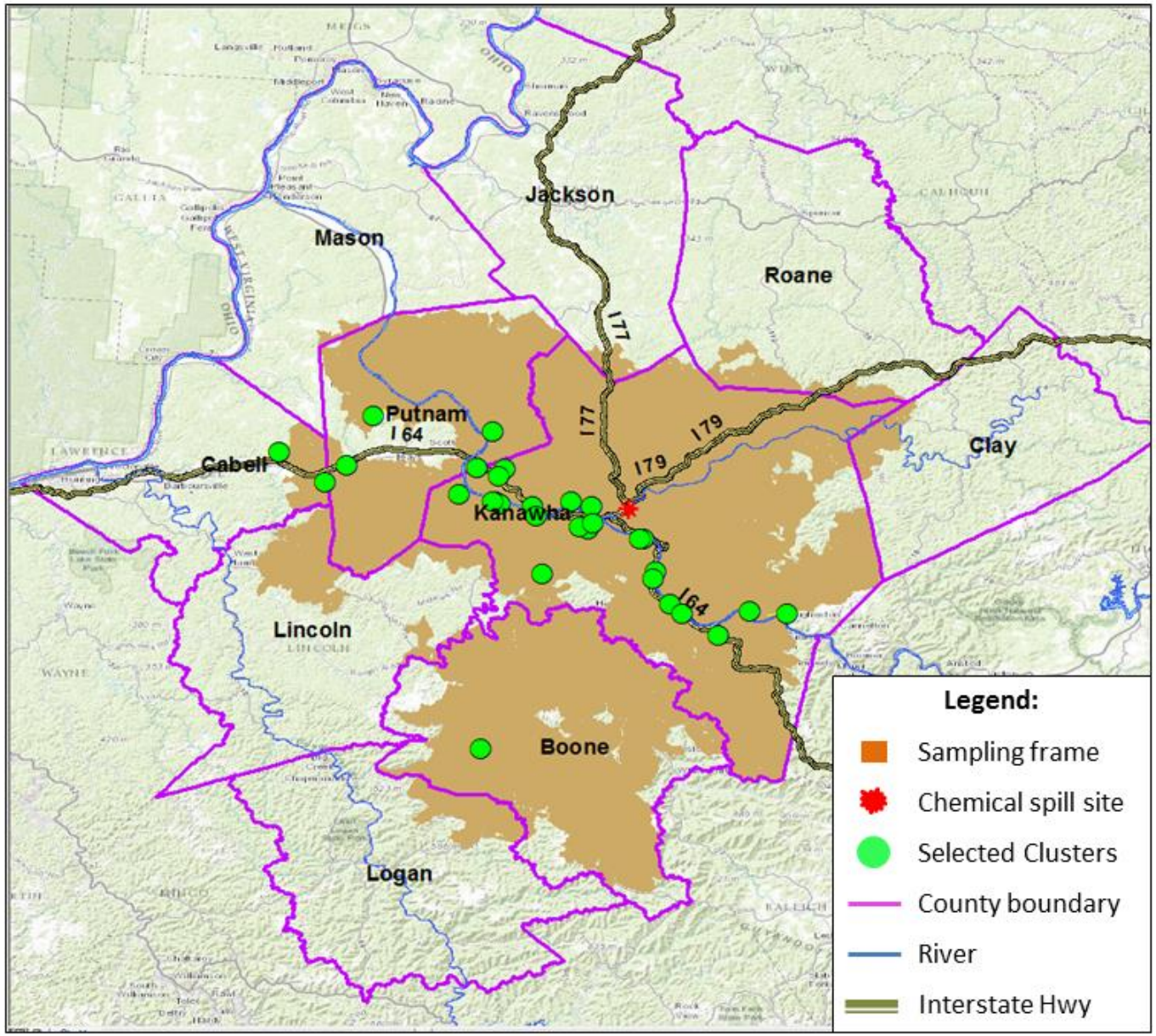
3. **West Virginia QuickFacts from the US Census Bureau.** *United States Census Bureau.* [Online] 2014. [Cited: April 27, 2014.] http://quickfacts.census.gov/qfd/maps/west_virginia_map.html.

4. **Water | Ready.gov.** *Ready.* [Online] April 9, 2014. [Cited: May 8, 2014.] http://www.ready.gov/water.

5. **Federal Emergency Management Agency (FEMA) Community Preparedness Division and Citizen Corps.** Personal Preparedness Survey: 2009. *Ready: Prepare. Plan. Stay Informed.* [Online] August 8, 2013. [Cited: April 30, 2014.] http://www.ready.gov/personal-preparedness-survey-2009.

6. **West Virginia Poison Center and MidAtlantic Center for Children's Health and the Environment.** Fact Sheet for Healthcare Providers. *Children's National Medical Center.* [Online] February 10, 2014. [Cited: May 9, 2014.] http://www.childrensnational.org/files/PDF/MACCHE/Charleston_WV_Health_Professionals_Factsheet.pdf.

Figure 1. Sampling frame with selected clusters



Demographics

Table 1. Questionnaire response rates

Questionnaire response	(%)	Rate
Completion*	81.4	171/210
Cooperation†	63.3	171/270
Contact‡	41.4	171/413

*Percent of surveys completed in relation to the standard CASPER goal of 210 (2)

†Percent of contacted households that were eligible and willing to participate in the survey

‡Percent of randomly selected households which completed an interview

Table 2. Household characteristics

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Structure				
Single family home	134	78.4 (71.4–84.3)	94,288 (82,364–106,211)	79.7 (69.6–89.8)
Mobile home	23	13.5 (8.7–19.5)	15,186 (5,747–24,626)	12.8 (4.9–20.8)
Multi-unit (e.g., apartment, condo)	14	8.2 (4.6–13.4)	8,787 (0–17,848)	7.4 (0.0–15.1)
Own or Rent				
Own	138	80.7 (74.0–86.3)	95,327 (83,746–106,902)	80.6 (70.8–90.4)
Rent	32	18.7 (13.2–25.4)	22,351 (10,666–34,035)	18.9 (9.0–28.8)
Other*	1	0.6 (0.0–3.2)	582 (0–1,786)	0.5 (0–1.5)

*Other type not specified

Table 3. Household demographics

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Sex*				
Male	140	83.8 (77.4–89.1)	97,327 (88,596–106,067)	84.0 (76.5–91.6)
Female	148	88.6 (82.8–93.0)	101,784 (96,137–107,433)	87.9 (83.0–92.7)
Pregnant[†]	8	5.6 (2.4–10.7)	5,127 (1,404–8,849)	5.2 (1.4–9.0)
Male and female	121	72.5 (65.0–79.1)	83,278 (72,164–94,402)	71.9 (62.3–81.5)
Age[‡]				
Less than 2 years	6	3.5 (1.3–7.5)	3,728 (396–7,061)	3.2 (0.3–6.0)
2–17 years	42	24.7 (18.4–31.9)	29,691 (19,871–39,500)	25.3 (17.0–33.7)
18–64 years	130	76.5 (69.4–82.6)	90,735 (81,422–100,051)	77.4 (69.4–85.3)
65 years or older	61	35.9 (28.7–43.6)	40,372 (30,797–49,959)	34.4 (26.3–42.6)
Ethnicity				
Hispanic/Latino	2	1.2 (0.1–4.2)	1,165 (0–2,809)	1.0 (0.0–2.4)
Not Hispanic/Latino	169	98.8 (95.8–99.9)	117,096 (115,444–118,267)	99.0 (97.6–100.0)
Race				
American Indian/Alaska Native	3	1.8 (0.4–5.0)	2,719 (0–7,071)	2.3 (0.0–6.0)
Asian	2	1.2 (0.1–4.2)	1,165 (0–3,534)	1.0 (0.0–3,534)
Black	7	4.1 (1.7–8.3)	5,622 (320–10,932)	4.8 (0.3–9.2)
White	161	94.2 (89.5–97.2)	110,688 (103,119–118,248)	93.6 (87.2–100.0)
Native Hawaiian/Pacific Islander	1	0.6 (0.0–3.2)	583 (0–1,786)	0.5 (0.0–1.5)
Other[§]	3	1.8 (0.4–5.0)	2,185 (0–4,775)	1.9 (0.0–4.0)

*Of households reporting sex of household member(s) (n=167)

[†]Of households reporting female household member(s) and pregnancy status (n=144)

[‡]Of households reporting age of household member(s) (n=170)

[§]Other races included biracial black/white (n=1), Filipino (n=1), and Arabic (n=1)

Table 4. Education level

	Frequency (n=170*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Did not complete high school/GED	9	5.3 (2.5–9.8)	7,418 (1,658–13,172)	6.3 (1.4–11.2)
High school graduate or equivalent	39	22.9 (16.9–30.0)	27,390 (19,602–35,183)	23.4 (16.7–30.0)
Some college (e.g., AA, AS / no degree)	63	37.1 (29.8–44.8)	41,867 (30,372–53,363)	35.7 (25.9–45.5)
Bachelor's degree (e.g., BA, BS, AB)	34	20.0 (14.3–26.8)	22,749 (14,900–30,607)	19.4 (12.7–26.1)
Advanced degree (e.g., MD, MS, PhD, JD)	24	14.1 (9.3–20.3)	16,797 (9,712–23,867)	14.3 (8.3–20.4)
Refused	1	0.6 (0.0–3.2)	1,019 (0–3,105)	0.9 (0.0–2.7)

*Missing=1

Table 5. Total yearly income

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Less than $15,000	8	4.7 (2.0–9.0)	5,962 (1,055–10,870)	5.0 (0.9–9.2)
$15,000–$24,999	27	15.8 (10.7–22.1)	18,331 (11,254–25,410)	15.5 (9.5–21.5)
$25,000–$49,999	43	25.2 (18.8–32.3)	30,633 (21,016–40,257)	25.9 (17.8–34.0)
$50,000–$99,999	44	25.7 (19.4–33.0)	30,080 (21,301–38,847)	25.4 (18.0–32.9)
$100,000–$150,000	10	5.9 (2.8–10.5)	6,389 (2,159–10,623)	5.4 (1.8–9.0)
More than $150,000	7	4.1 (1.7–8.3)	5,554 (0–11,611)	4.7 (0.0–9.8)
Don't know	9	5.3 (2.4–9.8)	6,107 (1,617–10,607)	5.2 (1.4–9.0)
Refused	23	13.5 (8.7–19.5)	15,205 (7,390–23,013)	12.9 (6.3–19.5)

Table 6. Pet ownership and type

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Any pet	106	62.0 (54.3–69.3)	73,462 (61,997–84,923)	62.1 (52.4–71.8)
Dog(s)*	78	73.6 (64.1–81.7)	54,218 (47,818–60,623)	73.8 (65.1–82.5)
Cat(s)*	60	56.6 (46.6–66.2)	42,702 (35,200–50,202)	58.1 (47.9–68.3)
Other(s)*†	14	13.2 (7.4–21.2)	9,894 (5,316–14,469)	13.5 (7.2–19.7)

*Of households reporting any pet ownership (n=106)

†Other pet types specified included bird (n=1), cattle (n=1), chickens (n=1), fish (n=3), horse (n=1), and sugar glider (n=1)

Table 7. WVAW customers and those affected by the "do not use" order

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
WVAW customer				
Yes	132	77.2 (70.2–83.3)	92,774 (74,311–111,232)	78.5 (62.8–94.1)
No	39	22.8 (16.8–29.8)	25,487 (7,028–43,952)	21.6 (5.9–37.2)
WVAW customer affected by "do not use" order	128*	74.9 (67.7–81.2)	88,696 (69,217–108,175)	75.0 (58.5–91.5)

*4 households reported their WVAW water came from a different WVAW plant than the plant affected by the chemical spill and thus their households were not affected by the "Do Not Use" order.

Communications

Table 8. Date when households first learned about the chemical spill

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
January 9, 2014	138	80.7 (74.0–86.3)	93,288 (85,211–101,374)	78.9 (72.1–85.7)
January 10, 2014	22	12.9 (8.2–18.8)	17,001 (9,441–24,552)	14.4 (8.0–20.8)
January 11, 2014	3	1.8 (0.4–5.0)	1,845 (0–3,953)	1.6 (0.0–3.3)
Don't know	8	4.7 (2.0–9.0)	6,127 (2,201–10,053)	5.2 (1.9–8.5)

Figure 2. Number of households that learned about the chemical spill by date learned

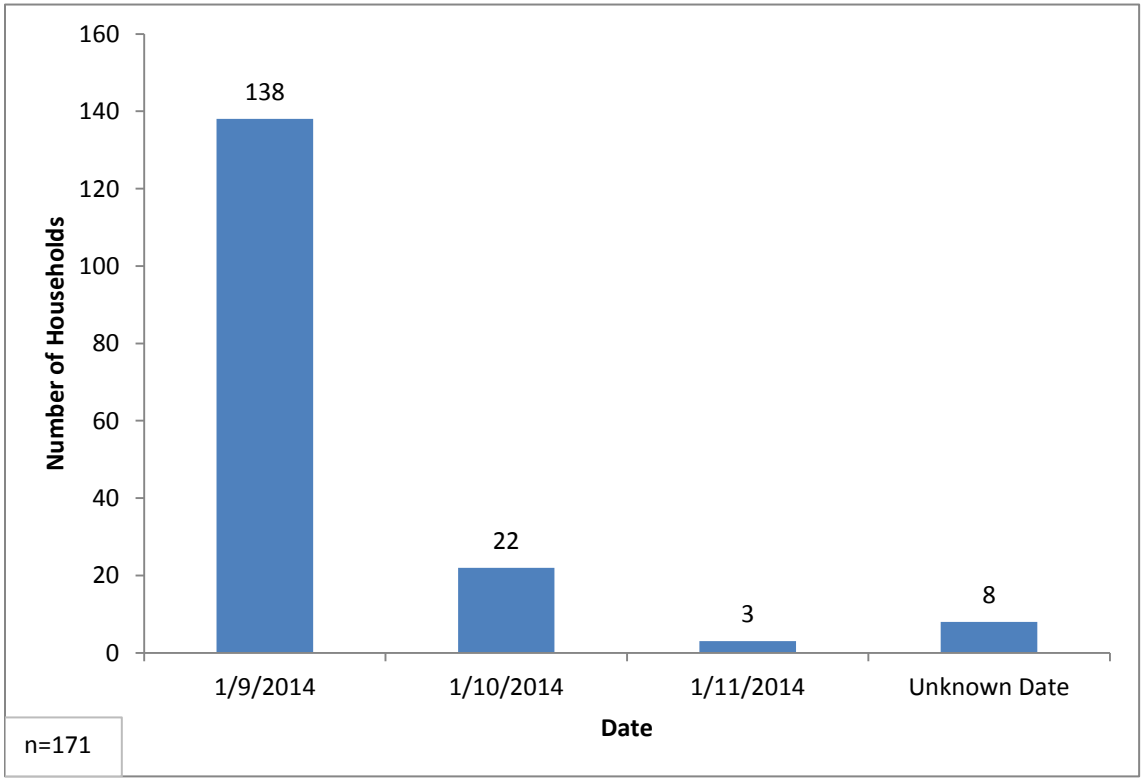


Figure 3. Percent of households that learned about the chemical spill by date and time first learned

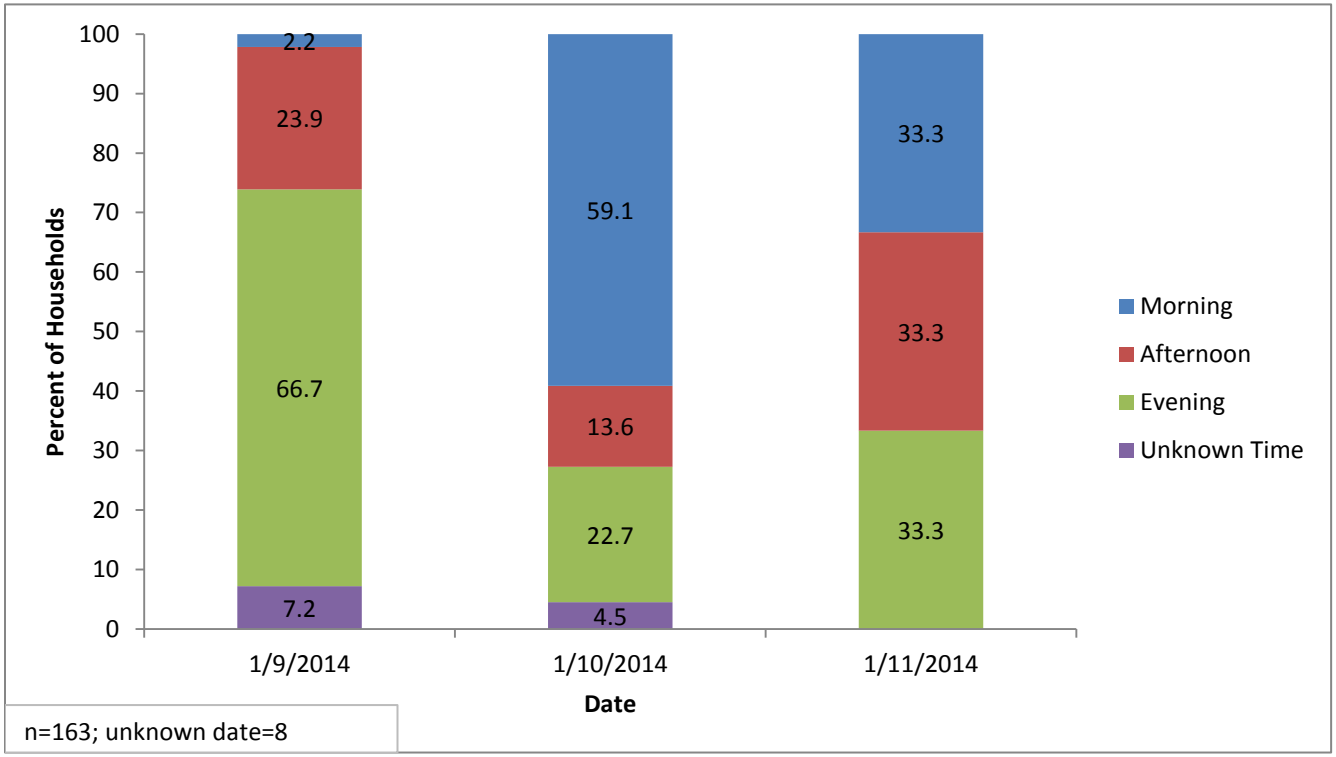


Table 9. How and from whom/where households first learned about the chemical spill

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
TV	92	53.8 (46.0–61.4)	64,199 (55,224–73,164)	54.3 (46.7–61.9)
Face-to-face talking to people	23	13.5 (8.7–19.5)	14,729 (8,628–20,842)	12.5 (7.3–17.6)
Co-worker*	7	30.4 (13.2–52.9)	4,777 (892–8,662)	32.4 (6.1–58.8)
Friend/neighbor*	6	26.1 (10.2–48.4)	3,592 (734–6,451)	24.4 (5.0–43.8)
Stranger*	5	21.7 (7.5–43.7)	3,010 (658–5,360)	20.4 (4.5–36.4)
Family/relative*	3	13.0 (2.8–33.6)	1,748 (0–3,860)	11.9 (0.0–26.2)
Other*[†]	2	8.7 (1.1–28.0)	1,602 (0–3,932)	10.9 (0.0–26.7)
Phone call on cell phone	15	8.8 (5.0–14.1)	11,049 (5,453–16,653)	9.3 (4.6–14.1)
Family/relative[‡]	8	53.3 (26.6–78.7)	5,767 (2,723–8,811)	52.2 (24.6–79.7)
Friend/neighbor[‡]	6	40.0 (16.3–67.7)	4,602 (1,608–7,597)	41.7 (14.5–68.8)
Co-worker[‡]	1	6.7 (0.2–32.0)	680 (0–2,199)	6.2 (0.0–19.9)
Phone call on land line	13	7.6 (4.1–12.7)	9,641 (3,122–16,168)	8.2 (2.6–13.7)
Family/relative[§]	9	69.2 (38.6–90.9)	6,777 (4,151–9,403)	70.3 (43.1–97.5)
Friend/neighbor[§]	2	15.4 (1.9–45.5)	1,262 (0–3,020)	13.1 (0.0–31.3)
Co-worker[§]	1	7.7 (0.2–36.0)	1,019 (0–3,504)	10.6 (0.0–36.3)
Other[§]**	1	7.7 (0.2–36.0)	583 (0–1,979)	6.0 (0.0–20.5)
Text message	9	5.3 (2.4–9.8)	5,806 (983–10,630)	4.9 (0.8–9.0)
Friend/neighbor[††]	3	33.3 (7.5–70.1)	1,981 (0–3,972)	34.1 (0.0–68.4)
Family/relative[††]	3	33.3 (7.5–70.1)	1,981 (0–3,972)	34.1 (0.0–68.4)
Other[††‡‡]	3	33.3 (7.5–70.1)	1,845 (0–5,082)	31.8 (0.0–5,082)
Social media (e.g., Facebook, Twitter)	6	3.5 (1.3–7.5)	4,602 (838–8,372)	3.9 (0.7–7.1)
Radio	4	2.3 (0.6–5.9)	2,427 (72–4,788)	2.1 (0.1–4.0)
Internet	3	1.8 (0.4–5.0)	1,981 (0–4,285)	1.7 (0.0–3.6)
Don't know	2	1.2 (0.1–4.2)	1,495 (0–3,644)	1.3 (0.0–3.1)
Other[§§]	4	2.3 (0.6–5.9)	2,330 (75–4,586)	2.0 (0.1–3.9)

*Of households reporting face-to-face talking to people (n=23)

[†]Other reported were restaurant staff (n=2)

[‡]Of households reporting phone call on cell phone (n=15)

[§]Of households reporting phone call on land line (n=13)

**Other reported was employer (n=1)

[††]Of households reporting text message (n=9)

[‡‡]Other reported were text message from news station (n=3)

[§§]Other included water odor (n=2), hospital (n=1), and store (n=1)

Table 10. Sources of information about the chemical spill

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
TV	146	85.4 (79.2–90.3)	98,269 (89,346–107,182)	83.1 (75.6–90.6)
Word of mouth	86	50.3 (42.6–58.0)	58,587 (47,967–69,208)	49.5 (40.6–58.5)
Newspaper	81	47.4 (39.7–55.1)	53,926 (44,392–63,459)	45.6 (37.5–53.7)
Internet (not WVAW website)	62	36.3 (29.1–43.9)	42,702 (33,192–52,209)	36.1 (28.1–44.1)
Radio	54	31.6 (24.7–39.1)	34,711 (24,208–45,218)	29.4 (20.5–38.2)
Social media	51	29.8 (23.1–37.3)	33,352 (23,429–43,279)	28.2 (19.8–36.6)
WVAW website	45	26.3 (19.9–33.6)	29,585 (19,851–39,310)	25.0 (16.8–33.2)
Other*	2	1.2 (0.1–4.2)	1,165 (0–2,809)	1.0 (0.0–2.4)

*Other included State of West Virginia (n=1) and WVAW call (n=1)

Table 11. Sources of information about the chemical spill considered most reliable

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
TV	96	56.1 (48.4–63.7)	68,558 (58,010–79,111)	58.0 (49.1–66.9)
Internet (not WVAW website)	15	8.8 (5.0–14.1)	10,001 (5,153–14,840)	8.5 (4.4–12.6)
Word of mouth	11	6.4 (3.3–11.2)	7,952 (3,345–12,568)	6.7 (2.8–10.6)
Social media	10	5.9 (2.8–10.5)	6,593 (2,573–10,624)	5.6 (2.2–9.0)
WVAW website	8	4.7 (2.0–9.0)	5,971 (721–11,220)	5.1 (0.6–9.5)
Newspaper	8	4.7 (2.0–9.0)	4,894 (595–9,188)	4.1 (0.5–7.8)
Radio	1	0.6 (0.0–3.2)	680 (0–2,089)	0.6 (0.0–1.8)
Don’t know	6	3.5 (1.3–7.5)	3,728 (0–7,862)	3.2 (0.0–6.6)
Other*	16	9.4 (5.4–14.8)	9,884 (4,972–14,792)	8.4 (4.2–12.5)

*Other included doctor (n=1), governor and WVAW president (n=1), and no source of reliable information (n=14)

Table 12. Date when households first learned about the "do not use" order for their household

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
January 9, 2014	86	67.2 (58.3–75.2)	58,412 (49,621–67,197)	65.9 (55.9–75.8)
January 10, 2014	17	13.3 (7.9–20.4)	13,224 (6,369–20,079)	14.9 (7.2–22.6)
January 11, 2014	5	3.9 (1.3–8.9)	3,107 (0–6,423)	3.5 (0.0–7.2)
January 12, 2014	3	2.3 (0.5–6.7)	2,185 (0–4,795)	2.5 (0.0–5.4)
January 13, 2014	2	1.6 (0.2–5.5)	1,699 (0–4,179)	1.9 (0.0–4.7)
January 16, 2014	1	0.8 (0.0–4.3)	583 (0–1,785)	0.7 (0.0–2.0)
Don't know	14	10.9 (6.1–17.7)	9,486 (2,922–16,041)	10.7 (3.3–18.1)

Figure 4. Number of households that learned about the "do not use" order for their household by date first learned

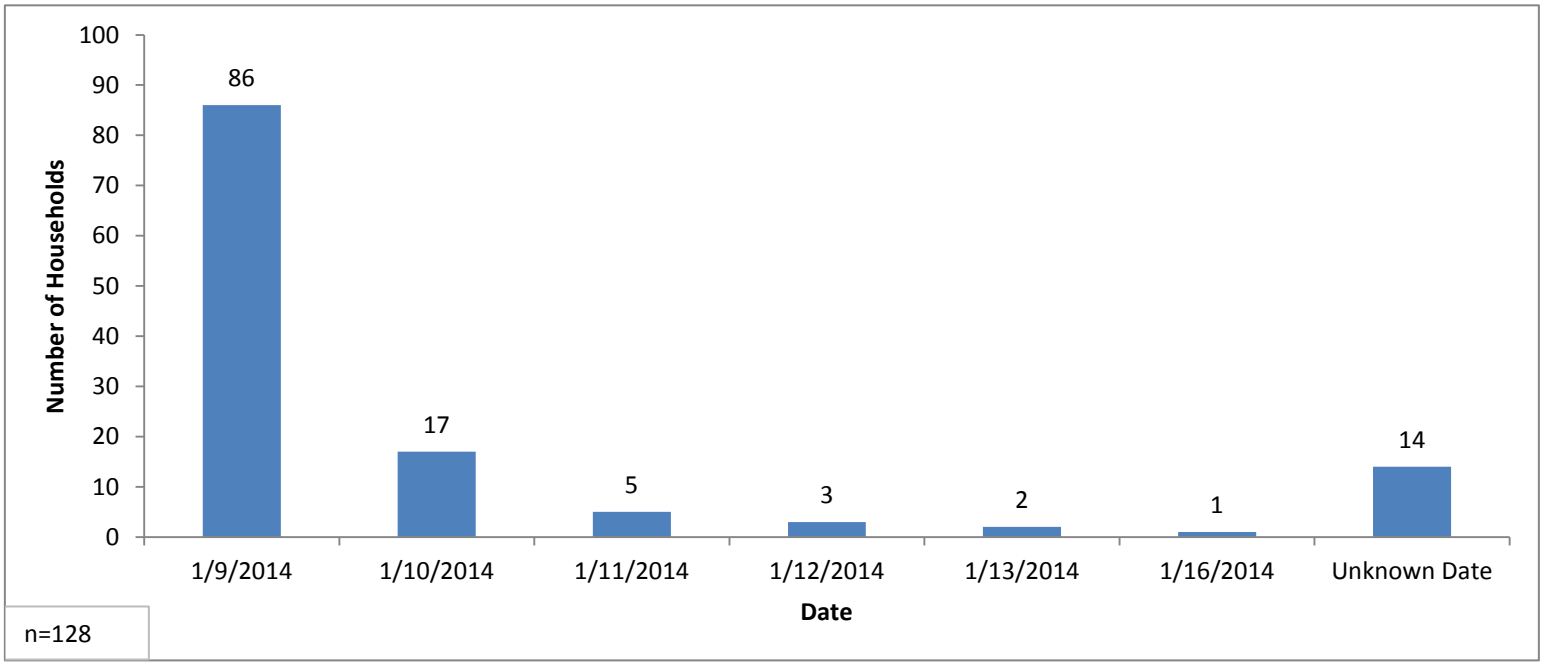


Table 13. How and from whom/where households first learned about the "do not use" order for their household

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
TV	67	52.3 (43.3–61.2)	46,586 (39,518–53,659)	52.5 (44.6–60.5)
Face-to-face talking to people	17	13.3 (7.9–20.4)	12,205 (7,333–17,078)	13.8 (8.3–19.3)
Family/relative*	4	23.5 (6.8–49.9)	3,000 (148–5,853)	24.6 (1.2–48.0)
Friend/neighbor*	4	23.5 (6.8–49.9)	2,961 (205–5,719)	24.3 (1.7–46.8)
Co-worker*	4	23.5 (6.8–49.9)	2,796 (124–5,470)	22.9 (1.0–44.8)
Stranger*	4	23.5 (6.8–49.9)	2,427 (127–4,728)	19.9 (1.0–38.7)
Other*[†]	1	5.9 (0.2–28.7)	1,019 (0–3,206)	8.4 (0.2–26.3)
Phone call on cell phone	12	9.4 (4.9–15.8)	8,836 (3,477–14,197)	10.0 (3.9–16.0)
Family/relative[‡]	6	50.0 (21.1–78.9)	4,369 (1,546–7,193)	49.5 (17.5–81.4)
Friend/neighbor[‡]	5	41.7 (15.2–72.3)	3,787 (1,023–6,549)	42.9 (11.6–74.1)
Co-worker[‡]	1	8.3 (0.2–38.5)	680 (0–2,277)	7.7 (0.0–25.8)
Text message	9	7.0 (3.3–12.9)	6,583 (1,666–11,503)	7.4 (1.9–13.0)
Friend/neighbor[§]	3	33.3 (7.5–70.1)	2,757 (0–5,646)	41.9 (0–85.8)
Family/relative[§]	3	33.3 (7.5–70.1)	1,981 (0–4,020)	30.1 (0–61.1)
WVAW[§]	1	11.1 (0.3–48.3)	583 (0–1,973)	8.9 (0–30.0)
Other[§]**	2	22.2 (2.8–60.0)	1,262 (0–3,573)	19.2 (0–54.3)
Phone call on land line	7	5.5 (2.2–10.9)	4,641 (300–8,987)	5.2 (0.3–10.1)
Family/relative[††]	5	71.4 (29.0–96.3)	3,476 (1,297–5,655)	74.9 (27.9–100.0)
Friend/neighbor[††]	1	14.3 (0.4–57.9)	583 (0–2,136)	12.6 (0.0–46.0)
Other[††‡‡]	1	14.3 (0.4–57.9)	583 (0–2,381)	12.6 (0.0–51.3)
Radio	6	4.7 (1.7–9.9)	3,592 (934–6,252)	4.1 (1.1–7.0)
Social media (e.g., Facebook, Twitter)	3	2.3 (0.5–6.7)	1,845 (0–3,955)	2.1 (0.0–4.5)
Internet	2	1.6 (0.2–5.5)	1,398 (0–3,425)	1.6 (0.0–3.9)
Newspaper	1	0.8 (0.0–4.3)	583 (0–1,785)	0.7 (0.0–2.0)
Don't know	3	2.3 (0.5–6.7)	1,845 (0–4,588)	2.1 (0.0–5.2)
Other[§§]	1	0.8 (0.0–4.3)	583 (0–1,785)	0.7 (0.0–2.0)

*Of households reporting face-to-face talking to people (n=17)

[†]Other reported was restaurant staff (n=1)

[‡]Of households reporting phone call on cell phone (n=12)

[§]Of households reporting text message (n=9)

**Other reported was new station (n=2)

[††]Of households reporting phone call on land line (n=7)

[‡‡]Other reported was employer (n=1)

[§§]Other was announcement in a store (n=1)

Table 14. If visited a water distribution site, sources of information about the water distribution site location

	Frequency (n=125*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
TV	47	37.6 (29.1–46.7)	32,944 (21,873–44,021)	38.1 (25.3–50.9)
Face-to-face talking to people	36	28.8 (21.1–37.6)	24,400 (16,883–31,924)	28.2 (19.5–36.9)
Radio	18	14.4 (8.8–21.8)	11,943 (6,103–17,782)	13.8 (7.1–20.6)
Social media (e.g., Facebook, Twitter)	16	12.8 (7.5–20.0)	10,486 (5,176–15,788)	12.1 (6.0–18.3)
Internet	12	9.6 (5.1–16.2)	8,253 (2,684–13,829)	9.5 (3.1–16.0)
Newspaper	9	7.2 (3.4–13.2)	5,631 (1,454–9,812)	6.5 (1.7–11.3)
Received phone call on cell phone	5	4.0 (1.3–9.1)	2,913 (0–5,892)	3.4 (0.0–6.8)
Received phone call on land line	4	3.2 (0.9–8.0)	2,427 (83–4,767)	2.8 (0.1–5.5)
Text message	3	2.4 (0.5–6.9)	2,524 (0–5,692)	2.9 (0.0–6.6)
Other[†]	12	9.6 (51–16.2)	7,185 (1,915–12,451)	8.3 (2.2–14.4)
Don't know	1	0.8 (0.0–4.4)	1,019 (0–3,133)	1.2 (0.0–3.6)
Not applicable	42	33.6 (25.4–42.6)	29,624 (17,750–41,504)	34.6 (20.5–48.0)

*3 households affected by the "do not use" order reported not trying to get an alternative source of water

[†]Other included drive-by (n=10), EMS (n=1), and work (n=1)

Table 15. Date when households first learned the "do not use" order for their household was lifted

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
January 13, 2014	1	0.8 (0.0–4.3)	583 (0–1,785)	0.7 (0.0–2.0)
January 14, 2014	10	7.8 (3.8–1.9)	6,525 (1,724–11,319)	7.4 (1.9–12.8)
January 15, 2014	5	3.9 (1.3–8.9)	4,224 (555–7,894)	4.8 (0.6–8.9)
January 16, 2014	4	3.1 (0.9–7.8)	2,767 (0–5,544)	3.1 (0.0–6.3)
January 17, 2014	2	1.6 (0.2–5.5)	1,165 (0–2,843)	1.3 (0.0–3.2)
January 18, 2014	2	1.6 (0.2–5.5)	1,262 (0–3,084)	1.4 (0.0–3.5)
January 19, 2014	1	0.8 (0.0–4.3)	816 (0–2,510)	0.9 (0.0–2.8)
January 20, 2014	1	0.8 (0.0–4.3)	680 (0–2,082)	0.8 (0.0–2.4)
January 22, 2014	3	2.3 (0.5–6.7)	2,282 (0–4,978)	2.6 (0.0–5.6)
January 23, 2014	2	1.6 (0.2–5.5)	1,262 (0–3,084)	1.4 (0.0–3.5)
January 24, 2014	1	0.8 (0.0–4.3)	583 (0–1,785)	0.7 (0.0–2.0)
January 29, 2014	2	1.6 (0.2–5.5)	1,602 (0–3,983)	1.8 (0.0–4.5)
January 30, 2014	2	1.6 (0.2–5.5)	1,262 (0–3,084)	1.4 (0.0–3.5)
February 9, 2014	2	1.6 (0.2–5.5)	1,165 (0–3,597)	1.3 (0.0–4.0)
Don't know	90	70.3 (61.6–78.1)	62,519 (53,157–71,876)	70.5 (59.9–81.0)

Figure 5. Number of households that learned the "do not use" order for their household was lifted by date first learned

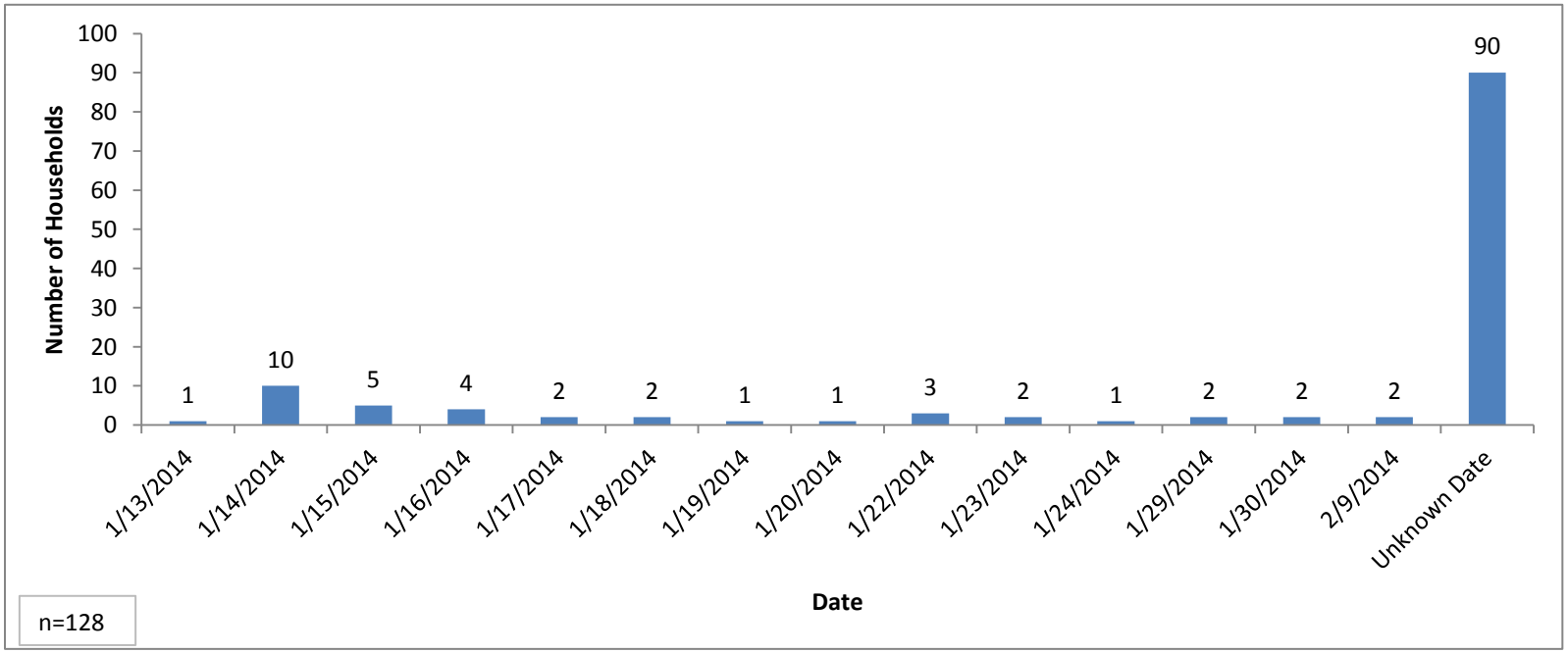


Table 16. How and from whom/where households first learned the "do not use" order for their household was lifted

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
TV	66	51.6 (42.6–60.5)	46,295 (37,644–54,953)	52.2 (42.4–62.0)
Map on WVAW website	23	18.0 (11.7–25.7)	15,302 (9,587–21,021)	17.3 (10.8–23.7)
Phone call on land line	11	8.6 (4.4–14.9)	7,573 (2,137–13,008)	8.5 (2.4–14.7)
WVAW*	6	54.6 (23.4–83.3)	4,029 (1,567–6,491)	53.2 (20.7–85.7)
Family/relative*	3	27.3 (6.0–61.0)	2,282 (227–4,336)	30.1 (3.0–57.3)
Don't know*	2	18.2 (2.3–51.8)	1,262 (0–3,088)	16.7 (0.0–40.8)
Face-to-face talking to people	6	4.7 (1.7–9.9)	4,398 (238–8,557)	5.0 (0.3–9.7)
Friend/neighbor†	2	33.3 (4.3–77.7)	1,602 (0–4,399)	36.4 (0.0–100.0)
Co-worker†	2	33.3 (4.3–77.7)	1,398 (0–3,409)	31.8 (0.0–77.5)
Family/relative†	1	16.7 (0.4–64.1)	816 (0–2,610)	18.5 (0.0–59.3)
Other†‡	1	16.7 (0.4–64.1)	583 (0–2,371)	13.3 (0.0–53.9)
Newspaper	4	3.1 (0.9–7.8)	2,563 (64–5,063)	2.9 (0.1–5.7)
Phone call on cell phone	3	2.3 (0.5–6.7)	2,185 (0–4,795)	2.5 (0.0–5.4)
Friend/neighbor§	2	66.7 (9.4–99.2)	1,602 (0–2,185)	73.3 (0.0–100.0)
Family/relative§	1	33.3 (0.8–90.6)	583 (0–2,184)	26.7 (0.0–100.0)
Social media (e.g., Facebook, Twitter)	3	2.3 (0.5–6.7)	1,942 (0–4,161)	2.2 (0.0–4.7)
Internet (other than WVAW website)	2	1.6 (0.2–5.5)	1,398 (0–3,425)	1.6 (0.0–3.9)
Radio	2	1.6 (0.2–5.5)	1,165 (0–2,843)	1.3 (0.0–3.2)
Text Message	2	1.6 (0.2–5.5)	1,165 (0–3,597)	1.3 (0.0–4.0)
Don't know	6	4.7 (1.7–9.9)	4,709 (827–8,590)	5.3 (0.9–9.7)

*Of households reporting phone call on land line (n=11)

†Of households reporting face-to-face talking to people (n=6)

‡Other was unspecified (n=1)

§Of households reporting phone call on cell phone (n=3)

Table 17. Household plumbing flushing instructions: source of information and were instructions easy to read and understand

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Source of information				
TV	72	56.3 (47.2–65.0)	51,441 (42,775–60,101)	58.0 (48.2–67.8)
WVAW website	50	39.1 (30.6–48.1)	32,721 (23,926–41,517)	36.9 (27.0–46.8)
Face-to-face talking to people	17	13.3 (7.9–20.4)	10,904 (4,945–16,868)	12.3 (5.6–19.0)
Newspaper	12	9.4 (4.9–15.8)	7,185 (2,277–12,095)	8.1 (2.6–13.6)
Phone call on land line	9	7.0 (3.3–12.9)	6,544 (1,845–11,240)	7.4 (2.1–12.7)
Internet (other than WVAW website)	9	7.0 (3.3–12.9)	5,534 (264–10,804)	6.2 (0.3–12.2)
Social media (e.g., Facebook, Twitter)	7	5.5 (2.2–10.9)	4,612 (1,447–7,777)	5.2 (1.6–8.8)
Radio	6	4.7 (1.7–9.9)	4,466 (0–9,401)	5.0 (0.0–10.6)
Phone call on cell phone	5	3.9 (1.3–8.9)	3,010 (493–5,533)	3.4 (0.6–6.2)
Did not receive information	4	3.1 (0.9–7.8)	3,204 (0–6,871)	3.6 (0.0–7.7)
Text message	0	0.0 --	0 --	0.0 --
Other*	9	7.0 (3.3–12.9)	6,709 (982–12,444)	7.6 (1.1–14.0)
Easy to read and understand†				
Yes	117	94.4 (88.7–97.7)	80,443 (76,453–84,440)	94.1 (89.4–98.8)
No	7	5.7 (2.3–11.3)	5,049 (1,055–9,036)	5.9 (1.2–10.6)

*Other included flyer/sign near home or mail (n=4), family member (n=1), plumber (n=1), common sense (n=1), unspecified (n=1), and still have not received correct information (n=1)

†Of households that received household plumbing flushing instructions (n=124)

Preparedness

Table 18. Water sources present in households at the time households first learned about the chemical spill

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
West Virginia American Water	130*	76.0 (68.9–82.2)	91,069 (73,319–109,905)	77.5 (62.0–92.9)
Purchased water (e.g., bottled water)	90	52.6 (44.9–60.3)	61,189 (53,503–68,876)	51.7 (45.2–58.2)
Other public water supply	33	19.3 (13.7–26.0)	21,060 (5,832–36,282)	17.8 (4.9–30.7)
Well water	3	1.8 (0.4–5.0)	1,748 (0–4,372)	1.5 (0.0–3.7)

*2 of 132 households that were WVAW customers reported not having WVAW in the household at the time the household first learned about the chemical spill

Table 19. Availability of a 3-day alternative source of water supply (for drinking, preparing food, and hygiene) for each household member and pet in the household

	Frequency (n=170*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Yes, for people only	25	14.7 (9.8–20.9)	16,564 (8,925–24,213)	14.1 (7.6–20.6)
Yes, for people and animals	17	10.0 (5.9–15.5)	11,438 (4,747–18,127)	9.7 (4.0–15.4)
No	125	73.5 (66.2–80.0)	87,366 (75,047–99,679)	74.4 (63.9–84.9)
Don't know	2	1.2 (0.1–4.2)	1,262 (0–3,077)	1.1 (0.0–2.6)
Refused	1	0.6 (0.0–3.2)	816 (0–2,514)	0.7 (0.0–2.1)

*Missing=1

Alternative Sources of Water

Table 20. Other water sources used during the "do not use" order

	Frequency (n=125*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Purchased water (e.g., bottled water)	112	89.6 (82.9–94.4)	77,549 (70,149–84,951)	89.7 (81.1–98.2)
Bottled water from a water distribution site	72	57.6 (48.4–66.4)	48,673 (35,308–62,041)	56.3 (40.8–71.7)
Water from a friend or relative	52	41.6 (32.9–50.8)	36,760 (26,317–47,196)	42.5 (30.4–54.6)
Rainwater	22	17.6 (11.4–25.4)	14,030 (6,842–21,223)	16.2 (7.9–24.5)
Filled container(s) at water distribution site	20	16.0 (10.1–23.6)	14,846 (5,999–23,687)	17.2 (6.9–27.4)
Well water on premises	7	5.6 (2.3–11.2)	4,806 (0–9,967)	5.6 (0.0–11.5)
Other[†]	15	12.0 (6.9–19.0)	9,603 (3,417–15,794)	11.1 (4.0–18.3)

*3 households affected by the "do not use" order reported not trying to get an alternative source of water

[†]Other included work/employer (n=6), well not on premises (n=4), church (n=1), fire department (n=1), pool (n=1), school (n=1), private water company (n=1) and natural source (creek) (n=1)

Table 21. Households trying to get an alternative source of water and date when households first attempted

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Tried to get an alternative source of water				
Yes	125	97.7 (93.3–99.5)	86,482 (83,929–88,700)	97.5 (94.6–100.0)
No	3	2.3 (0.5–6.7)	2,214 (0–4,762)	2.5 (0.0–5.4)
Date first attempted to get an alternative source of water*				
January 9, 2014	47	37.6 (29.1–46.7)	31,226 (22,839–39,607)	36.1 (26.4–45.8)
January 10, 2014	46	36.8 (28.4–45.9)	34,585 (23,707–45,465)	40.0 (27.4–52.6)
January 11, 2014	16	12.8 (7.5–20.0)	9,515 (4,225–14,810)	11.0 (4.9–17.1)
January 12, 2014	2	1.6 (0.2–5.7)	1,398 (0–3,445)	1.6 (0.0–4.0)
January 13, 2014	7	5.6 (2.3–11.2)	5,146 (0–10,572)	6.0 (0.0–12.2)
January 14, 2014	1	0.8 (0.0–4.4)	583 (0–1,802)	0.7 (0.0–2.1)
January 15, 2014	1	0.8 (0.0–4.4)	583 (0–1,802)	0.7 (0.0–2.1)
Don't know	5	4.0 (1.3–9.1)	3,447 (479–6,406)	4.0 (0.6–7.4)

*Of households that reporting trying to get an alternative source of water (n=125)

Figure 6. Number of households that first attempted to get an alternative source of water by date

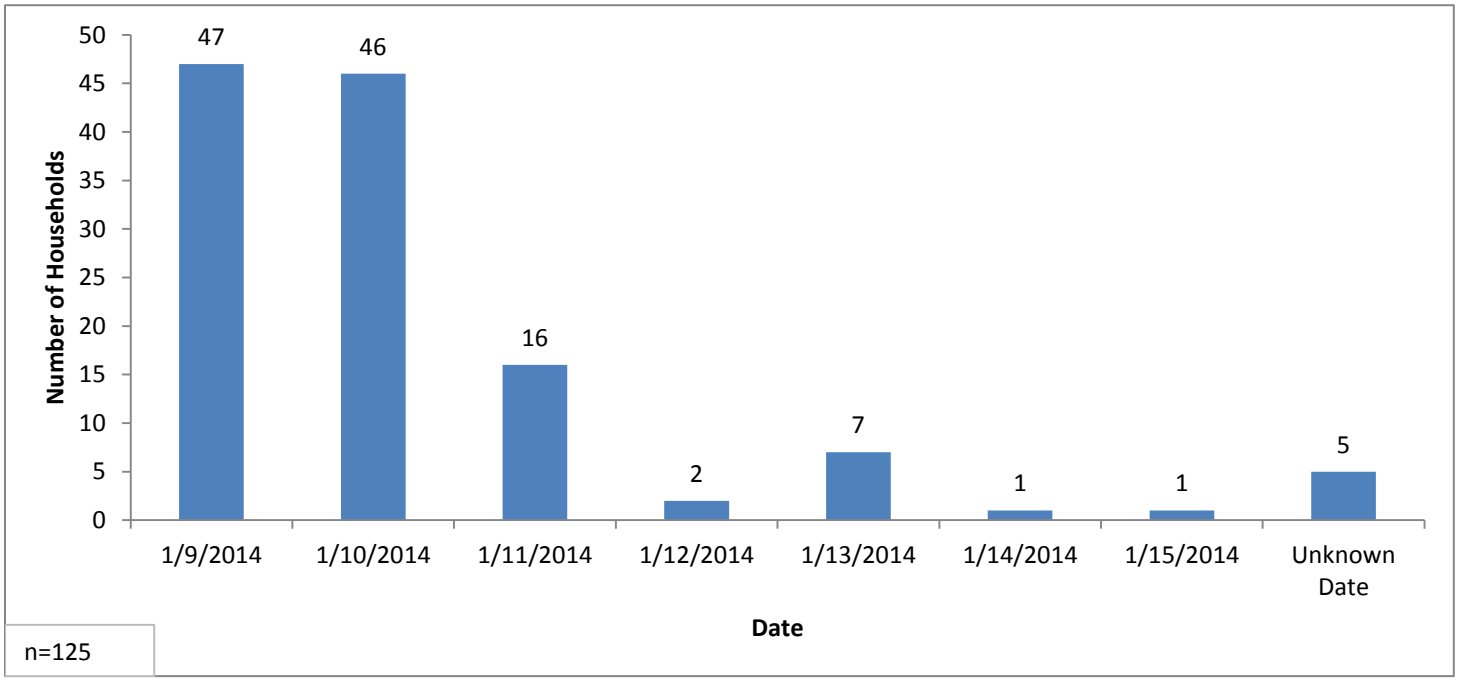


Table 22. Date when households first successfully got an alternative source of water

	Frequency (n=125*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
January 9, 2014	38	30.4 (22.5–39.3)	25,448 (17,567–33,323)	29.4 (20.3–38.5)
January 10, 2014	50	40.0 (31.3–49.1)	37,352 (26,104–48,601)	43.2 (30.2–56.2)
January 11, 2014	17	13.6 (8.1–20.9)	10,098 (4,102–16,086)	11.7 (4.7–18.6)
January 12, 2014	3	2.4 (0.5–6.9)	1,981 (0–4,313)	2.3 (0.0–5.0)
January 13, 2014	7	5.6 (2.3–11.2)	4,952 (0–10,502)	5.7 (0.0–12.2)
January 14, 2014	1	0.8 (0.0–4.4)	583 (0–1,802)	0.7 (0.0–2.1)
January 15, 2014	2	1.6 (0.2–5.7)	1,262 (0–3,073)	1.5 (0.0–3.6)
January 16, 2014	1	0.8 (0.0–4.4)	680 (0–2,080)	0.8 (0.0–2.4)
Don't know	6	4.8 (1.8–10.2)	4,127 (392–7,864)	4.8 (0.5–9.1)

*3 households affected by the "do not use" order reported not trying to get an alternative source of water

Figure 7. Number of households that first successfully got an alternative source of water by date

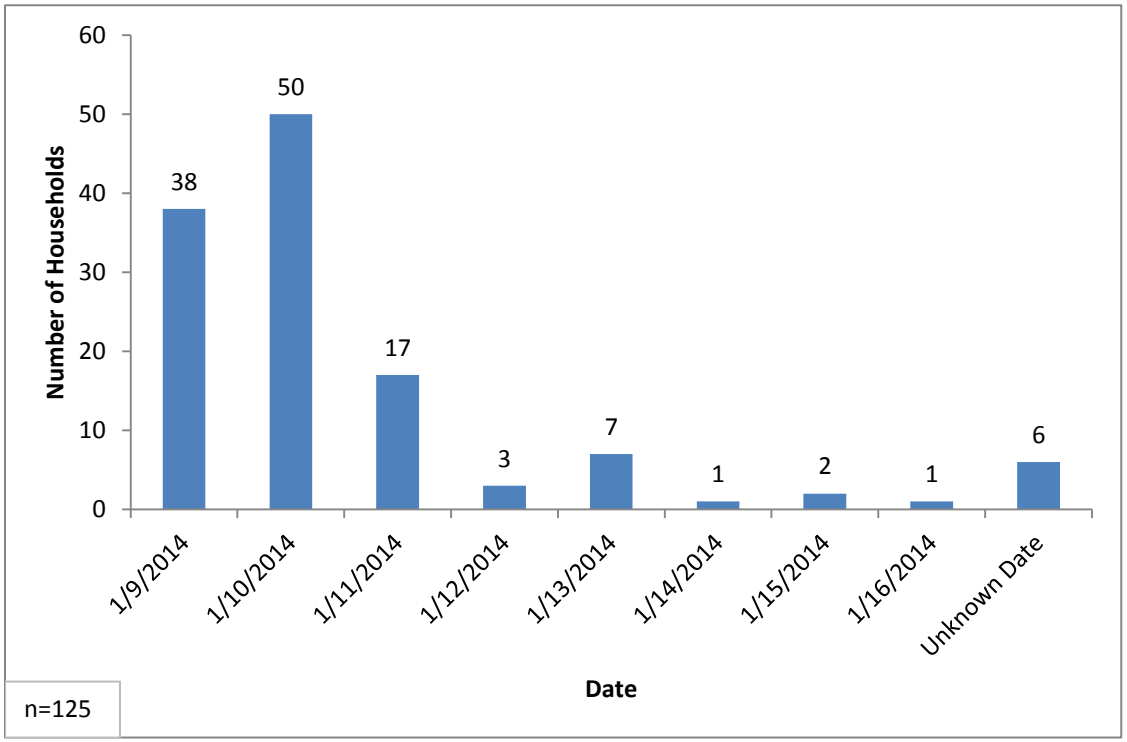


Table 23. Number of days between household first attempting and first successfully getting an alternative source of water

	Frequency (n=125*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Same day	103	82.4 (74.6–88.6)	72,306 (67,150–77,460)	83.6 (77.6–89.6)
1 day	12	9.6 (5.1–16.2)	7,525 (3,141–11,910)	8.7 (3.6–13.8)
2 days	2	1.6 (0.2–5.7)	1,262 (0–3,073)	1.5 (0.0–3.6)
3 days	1	0.8 (0.0–4.4)	680 (0–2,080)	0.8 (0.0–2.4)
4 days	1	0.8 (0.0–4.4)	583 (0–1,810)	0.7 (0.0–2.1)
Don't know	6	4.8 (1.8–10.2)	4,127 (392–7,864)	4.8 (0.5–9.1)

*3 households affected by the "do not use" order reported not trying to get an alternative source of water

Figure 8. Number of households by length of time between trying and successfully getting an alternative source of water

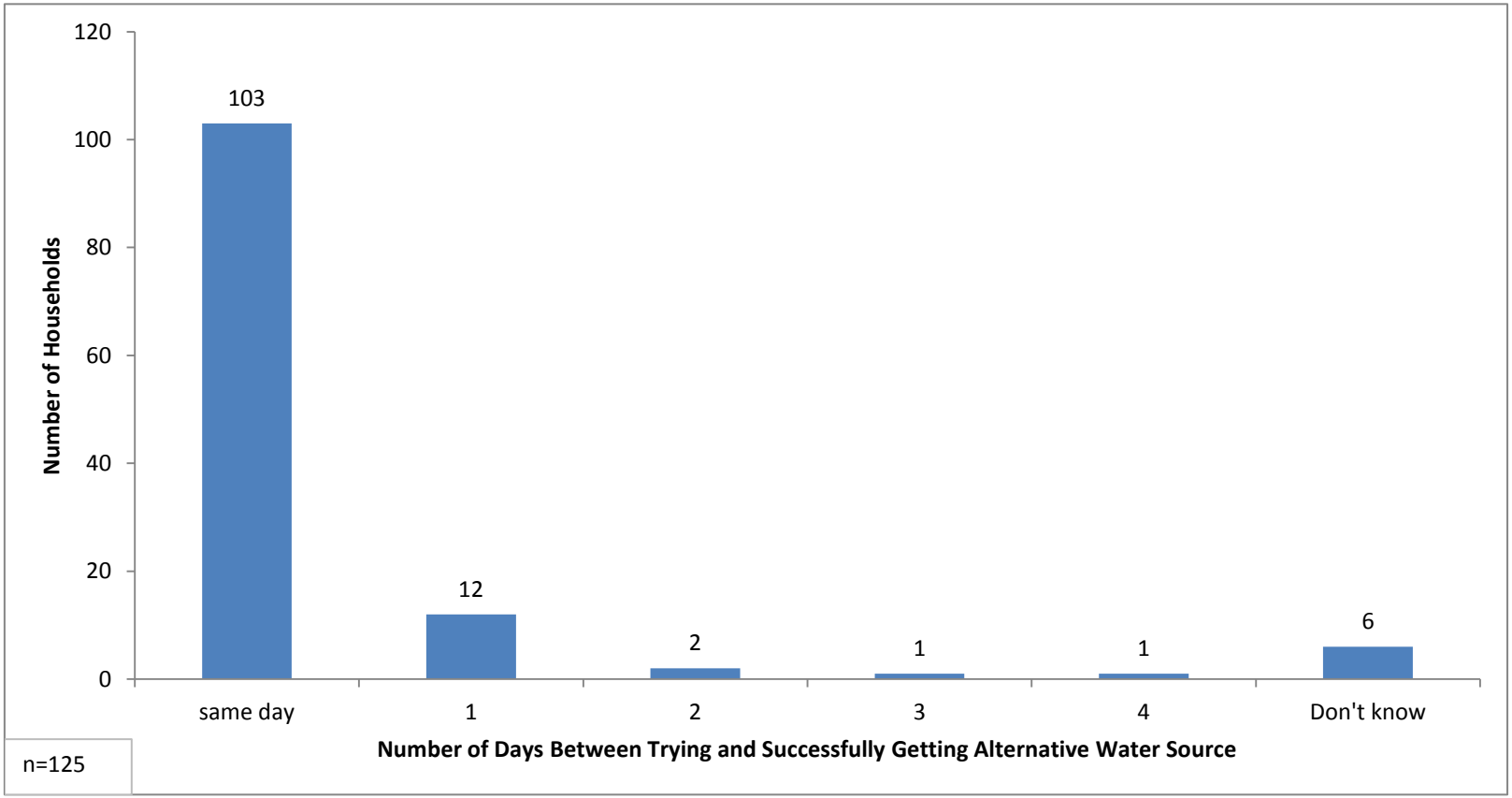


Table 24. Where households tried to get alternative sources of water

	Frequency (n=125*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Large store or grocery (e.g., Wal-Mart, Kroger)	92	73.6 (65.0–81.1)	62,985 (54,954–71,016)	72.8 (63.5–82.1)
Water distribution site in my town of residence	63	50.4 (41.3–59.5)	42,848 (29,262–56,425)	49.6 (33.8–65.3)
Water from a friend or relative	51	40.8 (32.1–50.0)	35,711 (24,300–47,129)	41.3 (28.1–54.5)
Nearby convenience store or gas station	34	27.2 (19.6–35.9)	25,060 (15,257–34,858)	29.0 (17.6–40.3)
Water distribution site outside my town	32	25.6 (18.2–34.2)	23,623 (11,972–35,267)	27.3 (13.8–40.8)
Rainwater	19	15.2 (9.4–22.7)	12,380 (5,162–19,605)	14.3 (6.0–22.7)
Well water on premises	4	3.2 (0.9–8.0)	2,622 (0–6,967)	3.0 (0.0–8.1)
Other[†]	14	11.2 (6.3–18.1)	9,253 (3,417–15,089)	10.7 (4.0–17.4)

*3 households affected by the "do not use" order reported not trying to get an alternative source of water

[†]Other included church (n=5), employer (n=3), fire department (n=2), private water company (n=2), well not on premises (n=1), pool (n=1), natural source (spring) (n=1), and not specified (n=1)

Table 25. Where households were able to get alternative sources of water

	Frequency (n=125*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Purchased from large store or grocery (e.g., Wal-Mart, Kroger)	90	72.0 (63.3–79.7)	61,189 (52,462–69,921)	70.8 (60.7–80.8)
Water distribution site in my town of residence	60	48.0 (39.0–57.1)	40,906 (28,014–53,798)	47.3 (32.4–62.2)
Water from a friend or relative	55	44.0 (35.1–53.2)	38,945 (27,970–49,922)	45.0 (32.3–57.7)
Water distribution site outside my town	32	25.6 (18.2–34.2)	23,526 (12,088–34,970)	27.2 (14.0–40.4)
Purchased from nearby convenience store or gas station	23	18.4 (12.0–26.3)	17,293 (8,546–26,031)	20.0 (9.9–30.1)
Rainwater	18	14.4 (8.8–21.8)	11,603 (5,287–17,913)	13.4 (6.1–20.7)
Well water on premises	4	3.2 (0.9–8.0)	2,622 (0–6,967)	3.0 (0.0–8.1)
Don't know	1	0.8 (0.0–4.4)	680 (0–2,080)	0.8 (0.0–2.4)
Other[†]	15	12.0 (6.9–19.0)	10,104 (5,001–15,077)	11.6 (5.8–17.4)

*3 households affected by the "do not use" order reported not trying to get an alternative source of water

[†]Other included church (n=3), employer (n=3), fire department (n=2), private water company (n=2), well not on premises (n=2), natural source (spring/creek) (n=2), pool (n=1), school (n=1), and not specified (n=1)

Table 26. Travelling outside of the affected area to get an alternative source of water

	Frequency (n=125*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Yes, to purchase water	20	16.0 (10.1–23.6)	14,632 (8,147–21,116)	16.9 (9.4–24.4)
Yes, got water from friend/relative	41	32.8 (24.7–41.8)	29,284 (17,758–40,811)	33.9 (20.5–47.2)
Yes, but did not get water	7	5.6 (2.3–11.2)	5,049 (415–9,679)	5.8 (0.5–11.2)
No	64	51.2 (42.1–60.2)	43,547 (33,065–54,035)	50.4 (38.2–62.5)
Don't know	1	0.8 (0.0–4.4)	583 (0–1,802)	0.7 (0.0–2.1)
Not applicable	1	0.8 (0.0–4.4)	1,019 (0–3,160)	1.2 (0.0–3.7)

*3 households affected by the "do not use" order reported not trying to get an alternative source of water

Table 27. How long households were without any alternative source of drinking water and reasons for being without

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
How long without alternative source of drinking water				
My household was never without with alternative source of drinking water	71	55.5 (46.4–64.3)	48,761 (37,276–60,238)	55.0 (42.0–67.9)
Less than 1 day	37	28.9 (21.2–37.6)	25,895 (16,589–35,193)	29.2 (18.7–39.7)
1 day	9	7.0 (3.3–12.9)	6,000 (850–11,143)	6.8 (1.0–12.6)
2 days	5	3.9 (1.3–8.9)	3,243 (502–5,977)	3.7 (0.6–6.7)
4 days	1	0.8 (0.0–4.3)	680 (0–2,082)	0.8 (0.0–2.4)
5 days	1	0.8 (0.0–4.3)	1,019 (0–3,137)	1.2 (0.0–3.5)
7 days	3	2.3 (0.5–6.7)	2,515 (0–5,464)	2.8 (0.0–6.2)
Don't know	1	0.8 (0.0–4.3)	583 (0–1,785)	0.7 (0.0–2.0)
Reasons for being without an alternative source of drinking water for one or more days*				
Store was out of water	10	52.6 (28.9–75.6)	6,447 (2,618–10,275)	47.9 (19.5–76.4)
Could not locate distribution site	4	21.1 (6.1–45.6)	2,427 (0–4,886)	18.0 (0.0–36.3)
No transportation	3	15.8 (3.4–39.6)	2,622 (0–6,061)	19.5 (0.0–45.0)
Could not leave work	2	10.5 (1.3–33.1)	1,495 (0–3,700)	11.1 (0.0–27.5)
Not enough money to purchase water	2	10.5 (1.3–33.1)	1,495 (0–3,311)	11.1 (0.0–24.6)
Did not have clean containers for filling	2	10.5 (1.3–33.1)	1,359 (0–4,169)	10.1 (0.0–31.0)
Distribution site was out of water	2	10.5 (1.3–33.1)	1,262 (0–3,029)	9.4 (0.0–22.5)
Distribution site changed	0	0.0 --	0 --	0.0 --
Distribution site closed	0	0.0 --	0 --	0.0 --
Other†	5	26.3 (9.2–51.2)	3,340 (319–6,361)	24.8 (2.4–47.3)

*Of households reporting being without an alternative source of drinking water for one or more days (n=19)

†Other included distribution site not open yet (n=1), not enough information/didn't know about it (n=2), doesn't drive at night (n=1), internet down/slow (n=1)

Household Impact

Table 28. Staying overnight outside of the home for one or more days to have access to alternative source of water

	Frequency (n=127*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Yes, paid money to stay elsewhere (e.g., hotel)	4	3.2 (0.9–7.9)	2,767 (0–6,050)	3.1 (0.0–6.9)
Yes, did not have to pay (e.g., stayed with a friend)	19	15.0 (9.3–22.4)	13,234 (7, 405–19,062)	15.0 (8.4–21.6)
No	104	81.9 (74.1–88.2)	72,112 (64,945–79,279)	81.8 (73.7–90.0)

*Missing=1

Table 29. School and childcare closures and taking off from work to care for children

	Frequency (n=169*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Schools (K-12) or daycare closure				
Yes	35	20.7 (14.9–27.6)	24,681 (15,417–33,939)	21.2 (13.2–29.1)
No	21	12.4 (7.9–18.4)	13,797 (7,237–20,349)	11.8 (6.2–17.4)
Don't know	1	0.6 (0.0–3.3)	583 (0–1,773)	0.5 (0.0–1.5)
N/A (do not have children)	95	56.2 (48.4–63.8)	65,791 (53,802–77,772)	56.4 (46.1–66.7)
N/A (children don't go to school/daycare)	16	9.5 (5.5–14.9)	10,991 (5,713–16,273)	9.4 (4.9–13.9)
Refused	1	0.6 (0.0–3.3)	816 (0–2,483)	0.7 (0.0–2.1)
Had to take off from work to care for children[†]				
Yes	7	20.0 (8.4–36.9)	4,748 (1,259–8,235)	19.2 (5.1–33.4)
No, unpaid friend/relative supervised	14	40.0 (23.9–57.9)	11,011 (5,619–16,402)	44.6 (22.8–66.5)
No, they did not require supervision	11	31.4 (16.9–49.3)	7,175 (2,671–11,680)	29.1 (10.8–47.3)
No, someone was paid to supervise them	2	5.7 (0.7–19.2)	1,165 (0–2,807)	4.7 (0.0–11.4)
Other[‡]	1	2.9 (0.1–14.9)	583 (0–1,823)	2.4 (0.0–7.4)

*Missing=2

[†]Of households reporting school or daycare closure (n=35)

[‡]Other reported was stay at home mom (n=1)

Table 30. Business ownership and businesses ordered to close

	Frequency (n=170*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Own a business				
Yes	18	10.6 (6.4–16.2)	12,156 (7,029–17,283)	10.3 (6.0–14.7)
No	150	88.2 (82.4–92.7)	103,687 (98,541–108,834)	88.1 (83.7–92.5)
Don't know	1	0.6 (0.0–3.2)	1,019 (0–3,095)	0.9 (0.0–2.6)
Refused	1	0.6 (0.0–3.2)	816 (0–2,498)	0.7 (0.0–2.1)
Business ordered to close[†]				
Yes	1	5.6 (0.1–27.3)	583 (0–1,863)	4.8 (0.0–15.3)
No	17	94.4 (72.7–99.9)	11,574 (10,293–12,156)	95.2 (84.7–100.0)

*Missing=1

[†]Of households reporting owning a business (n=18)

Table 31. Told not to come into work because of the chemical spill

	Frequency (n=169*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Yes, with paid leave	19	11.2 (6.9–17.0)	13,176 (7,140–19,215)	11.3 (6.1–16.4)
Yes, with unpaid leave	12	7.1 (3.7–12.1)	7,991 (4,204–11,778)	6.8 (3.6–10.1)
No	110	65.1 (57.4–72.3)	76,976 (67,840–86,119)	65.8 (58.0–73.6)
Don't know	3	1.8 (0.4–5.1)	1,748 (0–4,387)	1.5 (0.0–3.7)
Not applicable	22	13.0 (8.3–19.0)	15,127 (7,116–23,137)	12.9 (6.1–19.8)
Other[†]	2	1.2 (0.1–4.2)	1,165 (0–2,809)	1.0 (0.0–2.4)
Refused	1	0.6 (0.0–3.3)	816 (0–2,476)	0.7 (0.0–2.1)

*Missing=2

[†]Other reported was yes, but unsure about leave (n=2)

Health

Table 32. Households with members with health issues they felt were related to the chemical spill and age of affected

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Health issues				
Yes	39	22.8 (16.8–29.8)	25,623 (17,062–34,177)	21.7 (14.4–28.9)
No	126	73.7 (66.4–80.1)	88,715 (79,767–97,655)	75.0 (67.5–82.6)
Don't know	5	2.9 (1.0–6.7)	3,107 (0–6,254)	2.6 (0.0–5.3)
Refused	1	0.6 (0.0–3.2)	816 (0–2,485)	0.7 (0.0–2.1)
Age of affected household members*				
Less than 18 years	6	15.4 (5.9–30.5)	3,826 (869–6,782)	14.9 (3.4–26.5)
18 years or older	35	89.7 (75.8–97.1)	22,963 (20,163–25,762)	89.6 (78.7–100.0)

*Of households reporting household members with health issues (n=39)

Table 33. Health issues symptoms and onset

	Frequency (n=39)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Symptom reported				
Rash	21	53.9 (37.2–69.9)	13,632 (8,419–18,846)	53.2 (32.9–73.5)
Skin irritation/itching	17	43.6 (27.8–60.4)	10,671 (5,291–16,053)	41.6 (20.6–62.6)
Respiratory illness/cough	6	15.4 (5.9–30.5)	4,127 (674–7,581)	16.1 (2.6–29.6)
Diarrhea	5	12.8 (4.3–27.4)	3,787 (520–7,053)	14.8 (2.0–27.5)
Nausea	5	12.8 (4.3–27.4)	3,350 (394–6,307)	13.1 (1.5–24.6)
Sore throat	4	10.3 (2.9–24.2)	2,864 (97–5,631)	11.2 (0.4–22.0)
Headache	4	10.3 (2.9–24.2)	2,767 (164–5,370)	10.8 (0.6–21.0)
Vomiting	2	5.1 (0.6–17.3)	1,699 (0–4,187)	6.6 (0.0–16.3)
Abdominal pain	2	5.1 (0.6–17.3)	1,262 (0–3,113)	4.9 (0.0–12.2)
Eye irritation/pain	2	5.1 (0.6–17.3)	1,165 (0–2,785)	4.6 (0.0–10.9)
Other*	9	23.1 (11.1–39.3)	6,214 (2,882–9,547)	24.3 (11.2–37.3)
Symptom onset				
Before the "do not use" order	6	15.4 (5.9–30.5)	3,932 (841–7,022)	15.4 (3.3–27.4)
During the "do not use" order	18	46.2 (30.1–62.8)	12,525 (7,081–17,971)	48.9 (27.6–70.1)
After the "do not use" order was lifted	19	48.7 (32.4–65.2)	11,593 (6,931–16,258)	45.2 (27.0–63.4)

*Other symptoms reported included dizziness (n=3), dry skin (n=2), cellulitis (n=1), "chest on fire" (n=1), rapid heat beat (n=1), and unspecified (n=1)

Table 34. Health issues symptoms and onset

	Frequency (n=39)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Medical care source				
Did not seek medical care	22	56.4 (39.6–72.2)	13,885 (10,202–17,566)	54.2 (39.8–68.6)
Primary care physician/provider	6	15.4 (5.9–30.5)	3,592 (916–6,270)	14.0 (3.6–24.5)
Emergency room	4	10.3 (2.9–24.2)	3,301 (0–6,704)	12.9 (0.0–26.2)
Admitted to the hospital	3	7.7 (1.6–20.9)	2,185 (0–4,568)	8.5 (0.0–17.8)
Urgent care	1	2.6 (0.1–13.5)	583 (0–1,782)	2.3 (0.0–6.9)
Other*	5	12.8 (4.3–27.4)	3,680 (381–6,980)	14.4 (1.5–27.2)
Reasons for not seeking medical care[†]				
Not serious enough to seek medical care	15	68.2 (45.1–86.1)	9,273 (5,854–12,691)	66.8 (42.2–91.4)
Concerned about cost of seeking care	3	13.6 (2.9–34.9)	1,748 (0–3,810)	12.6 (0.0–27.4)
No transportation	2	9.1 (1.1–29.2)	1,165 (0–3,548)	8.4 (0.0–25.6)
No insurance	1	4.6 (0.1–22.8)	583 (0–1,772)	4.2 (0.0–12.8)
Other[‡]	6	27.3 (10.7–50.2)	4,127 (237–8,016)	29.7 (1.7–57.7)

*Other medical care sources included specialist (n=1) and unspecified type (n=4)

[†]Of households reporting medical care was not sought (n=22)

[‡]Other reasons reported for not seeking medical care included never or rarely going to the doctor (n=2), resolved on its own (n=1), inability to treat because "nothing known about the chemical" (n=1), and other information sources including calling poison center (n=2)

Table 35. Households with members with mental health issues they felt were related to the chemical spill and symptoms

	Frequency (n=171)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Mental health issues				
Yes	7	4.1 (1.7–8.3)	4,175 (829–7,522)	3.5 (0.7–6.4)
No	163	95.3 (91.0–98.0)	113,270 (109,669–116,871)	95.8 (92.7–98.8)
Refused	1	0.6 (0.0–3.2)	816 (0–2,485)	0.7 (0.0–2.1)
Symptoms reported*				
Anxiety or stress	6	85.7 (42.1–99.6)	3,495 (1,724–4,175)	83.7 (41.3–100.0)
Agitated behavior	1	14.3 (0.4–57.9)	583 (0–2,142)	14.0 (0.0–51.3)
Difficulty concentrating	1	14.3 (0.4–57.9)	583 (0–2,142)	14.0 (0.0–51.3)
Loss of appetite	1	14.3 (0.4–57.9)	583 (0–2,142)	14.0 (0.0–51.3)
Trouble sleeping/nightmares	1	14.3 (0.4–57.9)	583 (0–2,142)	14.0 (0.0–51.3)
Alcohol/drug use	0	0.0 --	0 --	0.0 --
Witnessed or experienced violence	0	0.0 --	0 --	0.0 --

*Of households reporting household members with mental health issues (n=7)

Table 36. Households with pets with illness they felt were related to the chemical spill, symptoms, and veterinary care

	Frequency (n=106)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Pet illness				
Yes	3	2.8 (0.6–8.1)	1,845 (0–3,889)	2.2 (0.0–5.3)
No	101	95.3 (89.3–98.5)	70,219 (67,512–72,920)	95.6 (91.9–99.3)
Don't know	1	0.9 (0.0–5.1)	583 (0–1,785)	0.8 (0.0–2.4)
Refused	1	0.9 (0.0–5.1)	816 (0–2,502)	1.1 (0.0–3.4)
Symptoms reported*				
Diarrhea	1	33.3 (0.8–90.6)	680 (0–1,845)	36.8 (0.0–100.0)
Vomiting	1	33.3 (0.8–90.6)	583 (0–1,845)	31.6 (0.0–100.0)
Other†	1	33.3 (0.8–90.6)	583 (0–1,845)	31.6 (0.0–100.0)
Veterinary care sought*				
Yes	1	33.3 (0.8–90.6)	680 (0–1,845)	36.8 (0.0–100.0)
No	2	66.7 (9.4–99.2)	1,165 (0–1,845)	63.2 (0.0–100.0)

*Of households reporting pet with illness (n=3)

†Other symptoms reported were fish died (n=1)

Public Water Supply: Behaviors and Beliefs

Table 37. WVAW use during the "do not use" order and how water was used

	Frequency (n=127*)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
WVAW use during "do not use" order				
Yes	47	37.0 (28.6–46.0)	32,983 (23,525–42,445)	37.4 (26.7–48.2)
No	79	62.2 (53.2–70.7)	54,548 (45,048–64,040)	61.9 (51.1–72.7)
Don't know	1	0.8 (0.0–4.3)	583 (0–1,805)	0.7 (0.0–2.0)
How water was used				
Showered/bathed in water†	37	78.8 (64.3–89.3)	26,429 (23,566–29,292)	80.1 (71.4–88.8)
Washed hands†	22	46.8 (32.1–61.9)	15,137 (9,489–20,787)	45.9 (28.8–63.0)
Washed clothes†	19	40.4 (26.4–55.7)	12,418 (7,173–17,664)	37.7 (21.7–53.6)
Ran dishwasher/hand-washed dishes†	16	34.0 (20.9–49.3)	10,612 (5,118–16,104)	32.2 (15.5–48.8)
Brushed teeth†	16	34.0 (20.9–49.3)	10,476 (6,244–14,711)	31.8 (18.9–44.6)
Ate or drank food prepared with water†	13	27.7 (15.6–42.6)	8,865 (4,731–12,997)	26.9 (14.3–39.4)
Drank the water†	13	27.7 (15.6–42.6)	8,768 (4,658–12,879)	26.6 (14.1–39.0)
Gave water to pets‡	6	19.4 (7.5–37.5)	4,224 (1,407–7,040)	19.2 (6.4–32.0)
Watered plants†	4	8.5 (2.4–20.4)	2,757 (0–5,708)	8.4 (0.0–17.3)

*Missing=1

†Of households reporting WVAW use during the "do not use" order (n=47)

‡Of households reporting WVAW use during the "do not use" order and any pet ownership (n=31)

Table 38. WVAW use after "do not use" order was lifted but before the end of January and how water was used

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
WVAW use after lifting of "do not use" order but before the end of January				
Yes	86	67.2 (58.3–75.2)	59,237 (50,813–67,656)	66.8 (57.3–76.3)
No	39	30.5 (22.7–39.2)	27,614 (19,620–35,613)	31.1 (22.1–40.1)
Don't know	3	2.3 (0.5–6.7)	1,845 (0–4,588)	2.1 (0.0–5.2)
How water was used				
Washing clothes*	81	94.2 (87.0–98.1)	55,557 (52,308–58,805)	93.8 (88.3–99.3)
Showering/bathing*	79	91.9 (84.0–96.7)	54,392 (50,678–58,108)	91.8 (85.6–98.1)
Hand washing*	62	72.1 (61.4–81.2)	43,955 (36,792–51,118)	74.2 (62.1–86.3)
Dishwashing*	59	68.6 (57.7–78.2)	40,032 (32,466–47,598)	67.6 (54.8–80.4)
Brushing teeth*	30	34.9 (24.9–45.9)	21,487 (13,371–29,605)	36.3 (22.6–50.0)
Watering plants*	25	29.1 (19.8–39.9)	17,700 (10,950–24,451)	29.9 (18.5–41.3)
Cooking*	18	20.9 (12.9–31.1)	13,195 (7,958–18,426)	22.3 (13.4–31.1)
Giving water to pets†	12	21.8 (11.8–35.0)	8,972 (4,781–13,165)	23.5 (12.5–34.4)
Drinking*	12	14.0 (7.4–23.1)	8,457 (4,573–12,337)	14.3 (7.7–20.8)

*Of households reporting WVAW use after the "do not use" order was lifted but before the end of January (n=86)

†Of households reporting WVAW use after the "do not use" order was lifted but before the end of January and any pet ownership (n=55)

Table 39. Current [at the time questionnaire was administered] WVAW use and how water is used

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Current WVAW use				
Yes	126	98.4 (94.5–99.8)	78,201 (85,050–88,700)	98.3 (95.9–100.0)
No	2	1.6 (0.2–5.5)	1,495 (0–3,640)	1.7 (0.0–4.1)
How water is used				
Showering/bathing*	123	97.6 (93.2–99.5)	84,783 (81,953–87,198)	97.2 (94.0–100.0)
Washing clothes*	121	96.0 (91.0–98.7)	83,181 (79,242–87,120)	95.4 (90.9–99.9)
Hand washing*	119	94.4 (88.9–97.7)	82,152 (78,590–85,713)	94.2 (90.1–98.3)
Dishwashing*	115	91.3 (84.9–95.6)	78,957 (73,470–84,439)	90.6 (84.3–96.8)
Brushing teeth*	84	66.7 (57.7–74.8)	58,033 (51,225–64,846)	66.6 (58.7–74.4)
Cooking*	62	49.2 (40.2–58.3)	44,246 (35,792–52,700)	50.7 (41.0–60.4)
Watering plants*	53	42.1 (33.3–51.2)	37,692 (27,127–48,265)	43.2 (31.1–55.3)
Giving water to pets†	42	54.6 (42.8–65.9)	29,206 (22,611–35,802)	55.0 (42.6–67.4)
Drinking*	41	32.5 (24.5–41.5)	29,225 (23,224–35,218)	33.5 (26.6–40.4)

*Of households reporting current [at the time questionnaire was administered] WVAW use (n=126)

†Of households reporting current [at the time questionnaire was administered] WVAW use and any pet ownership (n=77)

Table 40. Affected households beliefs that WVAW is safe: before the chemical spill and since the "do not use" order was lifted

	Frequency (n=128)	% of interviewed households (95% CI)	Projected number of households (95% CI)	Weighted % (95% CI)
Before the chemical spill				
Yes	109	85.2 (77.8–90.8)	75,889 (70,756–81,024)	85.6 (79.8–91.3)
No	14	10.9 (6.1–17.7)	8,447 (4,274–12,626)	9.5 (4.8–14.2)
Don't know	5	3.9 (1.3–8.9)	4,360 (463–8,247)	4.9 (0.5–9.3)
Since the "do not use" order was lifted				
Yes	46	35.9 (27.7–44.9)	32,012 (24,682–39,345)	36.1 (27.8–44.4)
No	66	51.6 (42.6–60.5)	44,848 (37,608–52,095)	50.6 (42.4–58.7)
Don't know	16	12.5 (7.3–19.5)	11,836 (5,110–18,569)	13.3 (5.8–20.9)

Appendix A: West Virginia CASPER Questionnaire – April 2014

Form Approved
OMB No. 0920-0008
Exp Date: 07/31/2014

West Virginia Community Assessment for Public Health Emergency Response - Elk River Chemical Spill, January 9th, 2014

D/K=don't know Ref=refused N/A=not applicable CATA= Check all that apply WVAW= West Virginia American Water

Date: ____/_____/2014 Cluster No.: _____ Interview No.: _____ Interviewers initials: _____

This set of questions asks for some basic information about your household.

Q1. What is your type of residence:
[ ]Single family home [ ]Multi-unit (e.g. apt,condo)
[ ]Mobile home [ ]Other_____

Q2. Is your place of residence owned or rented?
[ ]Own [ ]Rent [ ]Other_____ [ ]D/K [ ]Ref

Q3. How many pets are in your household?
[ ]Dogs __#__ [ ]Cats __#__ [ ]Other__#__
[ ]D/K [ ]Ref [ ]N/A

Q4. How many people in your household are:
[ ]Male __#__ [ ]Female__#__ [ ] Ref

Q4a. How many people in your household are:
[ ]__#__ less than 2 years [ ]__#__65+ years
[ ]__#__2-17 years [ ] D/K
[ ]__#__18-64 years [ ]Ref

Q4b. Any pregnant women in your household?
[ ]Yes__#__ [ ]No [ ]D/K [ ]Ref

Q5. What is the highest level of education completed by anyone in your household?
[ ]Did not complete high school/GED
[ ]High school graduate or equivalent
[ ]Some college (e.g. AA, AS /no degree)
[ ]Bachelor's degree (e.g. BA, BS, AB)
[ ]Advanced degree (e.g. MD, MS, PhD, JD)
[ ]D/K [ ]Ref

Q6. Please identify the ethnicity of household members. *CATA.*
[ ]Hispanic/Latino [ ]Not Hispanic or Latino
[ ]Other_____ [ ]D/K [ ]Ref

Q6a. Please identify the race of household members. *CATA.*
[ ]American Indian/Alaska Native [ ] Asian [ ]Black [ ]White
[ ]Native Hawaiian/ Pacific Islander [ ]Other_____ [ ]D/K [ ]Ref

This set of questions is about messaging and source(s) of water during the chemical spill into the Elk River that occurred on Thursday, January 9th, 2014.

Q7. Are you a West Virginia American Water (WVAW) customer? [ ]Yes [ ]No [ ]D/K [ ]Ref

Q8. When did anyone in your household first learn about the chemical spill into the Elk River? *(show calendar)*
Date: 01 / /2014 Time of day: [ ]Morning [ ]Afternoon [ ]Evening [ ] D/K [ ]Ref [ ]N/A

Q9. How did your household FIRST LEARN about the chemical spill? Choose only ONE.
[ ]Phone call on land line [ ]Phone call on cell phone [ ]Text message [ ]Face-to-face talking to people [ ]Social media (e.g. Facebook, Twitter)
[ ]Radio [ ]TV [ ]Newspaper [ ]Internet [ ]Other:_____ [ ] D/K [ ]Ref [ ]N/A

Q9a. From whom or where did your household FIRST LEARN about the chemical spill (by the method in the previous question)? Choose only ONE.
[ ]WVAW [ ]Friend/neighbor [ ]Family/relative [ ]Co-worker [ ]Stranger [ ]Internet (specify site):_____
[ ]Radio (specify station):_____ [ ]TV (specify station):_____ [ ]Newspaper(specify):_____ [ ]Other:_____ [ ] D/K [ ]Ref [ ]N/A

Just to verify, you FIRST LEARNED about the chemical spill from (*Q9a answer*) by (*Q9 answer*), is this correct?

Q10. Please list all sources of water that you had in your household at the time you first heard about the chemical spill. *CATA.*
[ ]WVAW [ ]Other public water supply [ ]Well water [ ]Purchased water (e.g. bottled water) [ ]Other: _____ [ ]D/K [ ]Ref

Q10a. Previous to the spill, was there a 3-day alternative source of water supply (for drinking, preparing food, and hygiene) for each household member and pet at your home (1 day supply = 1 gallon/person or pet/day)? [ ]Yes, for people only [ ]Yes, for people and animals [ ]No [ ]D/K [ ]Ref

Q11. Where have members of your household received information about the chemical spill since the event occurred? *CATA.* [ ]D/K [ ]Ref
[ ]Word of mouth [ ]Social media [ ]Radio [ ]TV [ ]Newspaper [ ]WVAW website [ ]Internet (not WVAW website) [ ] Other: _____ [ ]N/A

Q11a. In your opinion, what was the most reliable source for information about the chemical spill? Choose only ONE. [ ]D/K [ ]Ref
[ ]Word of mouth [ ]Social media [ ]Radio [ ]TV [ ]Newspaper [ ]WVAW website [ ]Internet (not WVAW website) [ ] Other: _____ [ ]N/A

Q12. When did anyone in your household first learn the 'do not use' order was in effect for your household? Date: 01/ /2014 [ ]D/K [ ]Ref [ ]N/A

Q13. How did your household FIRST LEARN about the 'do not use' order for your household? Choose only ONE.
[ ]Phone call on land line [ ]Phone call on cell phone [ ]Text message [ ]Face-to-face talking to people [ ]Social media (e.g. Facebook, Twitter)
[ ]Radio [ ]TV [ ]Newspaper [ ]Internet [ ]Other:_____ [ ] D/K [ ] Ref [ ]N/A

Q13a. From whom or where did your household FIRST LEARN about the 'do not use' order for your household? Choose only ONE.
[ ]WVAW [ ]Friend/neighbor [ ]Family/relative [ ]Co-worker [ ]Stranger [ ]Internet (specify site):_____
[ ]Radio (specify station):_____ [ ]TV (specify station):_____ [ ]Newspaper(specify):_____ [ ]Other:_____ [ ] D/K [ ]Ref [ ]N/A

Just to verify, you FIRST LEARNED about the 'do not use' order for your household from (*Q13a answer*) by (*Q13 answer*), is this correct?

Q14. Did anyone in your household use WVAW in your home at any point during the time that the 'do not use' order was in effect for your household (other than flushing the toilet or trying to put out a fire)? [ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

IF YES to Q14 →Q14a. How was the water used? *CATA.*
[ ]Drank the water [ ]Washed hands [ ]Brushed teeth [ ]Ate or drank food prepared with water [ ]Washed clothes [ ] Watered plants
[ ]Ran dishwasher/hand-washed dishes [ ]Gave water to pets [ ]Showered/bathed in water [ ]Other _____ [ ]D/K [ ]Ref [ ]N/A

Q15. After the chemical spill, did anyone in your household try to get water from an alternative source to your WVAW water?
[ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

IF YES to Q15→Q15a. When did anyone from your household FIRST ATTEMPT to get an alternative source of water for the household?
Date: 01 / /2014 [ ]D/K [ ]Ref [ ]N/A

IF YES to Q15→Q15b. When did anyone from your household FIRST SUCCESSFULLY get an alternative source of water for the household?
Date: 01 / /2014 [ ]D/K [ ]Ref [ ]N/A

IF YES to Q15→Q15c. What other water source(s) did your household USE during the 'do not use order?' *CATA.*
[ ]Purchased water (e.g. bottled water) [ ]Filled container(s) at water distribution site [ ]Well water on premises [ ]Rainwater
[ ]Water from a friend or relative [ ]Bottled water from a water distribution site [ ]Other: _____ [ ]D/K [ ]Ref [ ]N/A

IF YES to Q15→Q15d. Where did your household TRY TO GET alternative source(s) of water from during the 'do not use order?' *CATA.*
[ ]Large store or grocery (e.g. Wal-Mart, Kroger) [ ]Water distribution site in my town of residence [ ]Well water on premises
[ ]Nearby convenience store or gas station [ ]Water distribution site outside of my town of residence [ ]Rainwater
[ ]Water from a friend or relative [ ]Other: _____ [ ]D/K [ ]Ref [ ]N/A

IF YES to Q15→Q15e. Where was your household ABLE TO GET alternative source(s) of water during the 'do not use order?' *CATA.*
[ ]Purchased from large store or grocery (e.g. Wal-Mart, Kroger) [ ]Water distribution site in my town of residence [ ]Well water on premises
[ ]Purchased from nearby convenience store or gas station [ ]Water distribution site outside of my town of residence [ ]Rainwater
[ ]Water from a friend or relative [ ]Other: _____ [ ]D/K [ ]Ref [ ]N/A

IF YES to Q15→Q15f. If anyone in your household visited a water distribution site, how did you find out about the location? *CATA.*
[ ]Received phone call on land line [ ]Received phone call on cell phone [ ]Text message [ ]Face-to-face talking to people [ ]D/K
[ ]Social media (e.g. Facebook, Twitter) [ ]Radio [ ]TV [ ]Newspaper [ ]Internet [ ]Other:_____ [ ]Ref [ ]N/A

IF YES to Q15→Q15g. Did anyone in your household travel outside of the area affected by the chemical spill to get alternative source(s) of water during the 'do not use' order? *CATA* .[ ]Yes, to purchase water [ ]Yes, got water from friend/relative [ ]Yes, but did not get water [ ]No [ ]D/K [ ]Ref [ ]N/A

Q16. How long was your household without ANY alternative source of drinking water during the 'do not use' order?
[ ]My household was never without an alternative source of drinking water [ ]less than 1 day [ ]__#__ days [ ]D/K [ ]Ref [ ]N/A

Q16a. If your household was without an alternative source of drinking water for one or more days, what was the reason for this? *CATA.*
[ ]Not enough money to purchase water [ ]No transportation [ ]Store was out of water [ ]Distribution site was out of water
[ ]Could not locate distribution site [ ]Distribution site changed [ ]Distribution site closed [ ]Did not have clean containers for filling
[ ]Could not leave work [ ]Other _____ [ ]D/K [ ]Ref [ ]N/A

Continued on the back page →

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This next set of questions is about the impact of the chemical spill on your household.

Q17. Did anyone in your household stay overnight outside of your home for one or more days in order to have access to an alternative source of water?
[ ]Yes, paid money to stay elsewhere (e.g. hotel) [ ]Yes, but did not have to pay (e.g., stayed with a friend) [ ]No [ ]D/K [ ]Ref [ ]N/A

Q18. If you have children in your household in daycare or grades K-12, did any of their schools or daycares close due to the chemical spill?
[ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A (children do not go to school or daycare) [ ]N/A (do not have children)

IF YES TO Q18→Q18a. Did anyone in the household have to take off from work to care for them? *CATA.*
[ ]Yes [ ]No, they did not require supervision [ ]No, unpaid friend/relative was able to supervise them
[ ]No, someone was paid to supervise them [ ]Other _____ [ ]D/K [ ]Ref [ ]N/A

Q19. Does anyone in the household own a business? [ ]Yes [ ]No [ ]D/K [ ]Ref
IF YES to Q19→Q19a. Was the business ORDERED to close as a result of the chemical spill? [ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

Q20. Was any member of your household told not to come in to work because of the chemical spill?
[ ]Yes, with paid leave [ ]Yes, with unpaid leave [ ]No [ ]Other: _____ [ ]D/K [ ]Ref [ ]N/A

This next set of questions is about the health of members of your household.

Q21. Since the chemical spill on January 9th (*show calendar*), did anyone in your household have any health issues they felt were related to the chemical spill? [ ]Yes [ ]No [ ]D/K [ ]Ref

IF YES to Q21.→Q21a. How many people in your household feel they had health issues related to the chemical spill?
[ ] __#__ less than 18 years [ ]__#__ 18 years old or older [ ]D/K [ ]Ref [ ]N/A

IF YES to Q21.→Q21b. What type of health issues did you or your household members have? *(Do NOT read list aloud; wait for interviewee to list & CATA)*
[ ]Nausea [ ]Vomiting [ ]Abdominal pain [ ]Diarrhea [ ]Rash [ ]Skin irritation/itching [ ]Headache
[ ] Eye irritation/pain [ ]Sore throat [ ]Respiratory illness/cough [ ]Other: _____ [ ]D/K [ ]Ref [ ]N/A

IF YES to Q21.→Q21c. When did the symptom(s) start? *CATA.*
[ ]Before the 'do not use' order [ ]During the 'do not use' order [ ]After the 'do not use' order was lifted [ ]Other:_____ [ ]D/K [ ]Ref [ ]N/A

IF YES to Q21.→Q21d. Where was medical care sought? *CATA.*
[ ]Did not seek medical care [ ]Primary care physician/provider [ ]Urgent care [ ]Emergency room
[ ]Was admitted to the hospital [ ] Other: _____ [ ]D/K [ ]Ref [ ]N/A

IF YES to Q21.→Q21e. If household members did NOT seek medical care, what were reason(s) for not doing so? *CATA.*
[ ]Health issues were not serious enough to seek medical care [ ]No insurance [ ]No transportation
[ ]Concerned about the cost of seeking medical care [ ]Other: _____ [ ]D/K [ ]Ref [ ]N/A

Q22. Since the chemical spill, has anyone in your household experienced any mental health issues they felt were related to the chemical spill?
[ ]Yes [ ]No [ ]D/K [ ]Ref

IF YES to Q22 →Q22a. What kinds of mental health issues? *(Do NOT read list aloud; wait for interviewee to list, then CATA)*
[ ]Agitated behavior [ ]Anxiety or stress [ ]Difficultly concentrating [ ]Loss of appetite [ ]Trouble sleeping/nightmares [ ]Alcohol/drug use
[ ]Witnessed or experienced violence [ ]Other: _____ [ ]D/K [ ]Ref [ ]N/A

Q23. Did any of your pets have any illness that you felt was related to the chemical spill? [ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

IF YES to Q23→Q23a. What type of symptoms did your pets have? *(Do NOT read list aloud; wait for interviewee to list, then CATA)*
[ ]Vomiting [ ]Diarrhea [ ]Rash [ ]Skin irritation/itching [ ]Eye irritation [ ]Respiratory illness/cough [ ]Other: ___ [ ]D/K [ ]Ref [ ]N/A

IF YES to Q23→Q23b. Did you seek veterinary care for your animal(s)? [ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

This next set of questions is about your household after the 'do not use order' was lifted.

Q24. When did anyone in your household first learn that the 'do not use' order was lifted for your household? Date: 01/ /2014 [ ]D/K [ ]Ref [ ]N/A

Q25. How did your household FIRST LEARN that the 'do not use' order was lifted? Choose only ONE.
[ ]Phone call on land line [ ]Phone call on cell phone [ ]Text message [ ]Face-to-face talking to people [ ]Social media (e.g. Facebook, Twitter)
[ ]Radio [ ]TV [ ]Newspaper [ ]Map on WVAW website [ ]Internet (other than WVAW website) [ ]Other:_____ [ ] D/K [ ]Ref [ ]N/A

Q25a. From whom or where did your household FIRST LEARN that the 'do not use' order was lifted? Choose only ONE.
[ ]WVAW [ ]Friend/neighbor [ ]Family/relative [ ]Co-worker [ ]Stranger [ ]Internet (specify site):_____
[ ]Radio (specify station):_____ [ ]TV (specify station):_____ [ ]Newspaper(specify):_____ [ ]Other:_____ [ ] D/K [ ]Ref [ ]N/A

Just to verify, you FIRST LEARNED that the 'do not use' order was lifted from (*Q25a answer*) by (*Q25 answer*), is this correct?

Q26. How did your household receive information on how to flush your household plumbing system? *CATA.*
[ ]Phone call on land line [ ]Phone call on cell phone [ ]Text message [ ]Face-to-face talking to people [ ]Social media (e.g. Facebook, Twitter)
[ ]Radio [ ]TV [ ]Newspaper [ ]WVAW website [ ]Internet (other than WVAW website) [ ]Did not receive information
[ ]Other:_____ [ ] D/K [ ]Ref [ ]N/A

Q27. Was the information on how to flush your home plumbing system easy to read and understand? [ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

Q28. After the 'do not use' order was lifted, did anyone in your household begin using water from WVAW before the end of January?
[ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

IF YES to Q28 →Q28a. For what purposes? *CATA.*
[ ]Drinking [ ]Hand washing [ ]Brushing teeth [ ]Cooking [ ]Washing clothes [ ]Showering/bathing
[ ]Dishwashing [ ]Giving water to pets [ ]Watering plants [ ]Other _____ [ ] D/K [ ]Ref [ ]N/A

Q29. Is anyone in your household currently using water from WVAW? [ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

IF YES to Q29 →Q29a. For what purposes? *CATA.*
[ ]Drinking [ ]Hand washing [ ]Brushing teeth [ ]Cooking [ ]Washing clothes [ ]Showering/bathing
[ ]Dishwashing [ ]Giving water to pets [ ]Watering plants [ ]Other _____ [ ] D/K [ ]Ref [ ]N/A

Q30. BEFORE the chemical spill, did you believe that the WVAW water supply your household received was safe?
[ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

Q31. SINCE the 'do not use' order was lifted, do you believe that the WVAW water supply your household receives is safe?
[ ]Yes [ ]No [ ]D/K [ ]Ref [ ]N/A

Q32. What is the total yearly income for your household?
[ ]less than $15,000 [ ]$15,000-$24,999 [ ]$25,000–$49,999 [ ]$50,000-$99,999 [ ]$100,000- $150,000 [ ]$150,000+ [ ]D/K [ ]Ref

Q33. Is there anything else you would like to share with us related to the chemical spill?