Community Assessment for Public Health Emergency Response (CASPER)

Following Detection of Microcystin Toxin in a Municipal Water Supply

Lucas County, Ohio

September, 2014

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Survey Respondents

Executive Summary

On August 2, 2014 at 2:00am EST, a 'do not drink' advisory was issued for customers of Collins Park water treatment plant in Lucas County, Ohio because microcystin toxin results surpassed the advisory threshold of 1ppb for drinking water. A state of emergency was declared by the Ohio Governor on August 2, 2014. Emergency water supplies were brought in by the Ohio National Guard, and water distribution sites were set up in the affected areas. On August 4, 2014 at 10:00am EST, the 'do not drink' advisory was lifted after multiple water samples confirmed microcystin toxin results were below the advisory threshold. After the 'do not drink' advisory was lifted, the community's use of public water systems, information sources, alternative sources of water, and perception of health impacts from the Toledo water event were unclear.

From September 11, 2014 to September 15, 2014, the Toledo-Lucas County Health Department worked with the Ohio Department of Health to conduct a Community Assessment for Public Health Emergency Response (CASPER) with technical assistance from the Centers for Disease Control and Prevention (CDC). CASPER is an epidemiologic technique designed to provide household-based information about a community in a timely and representative manner (1). The survey aimed to assess the potential impacts of the Toledo water event on households, to assess communications, characterize the population residing in the affected areas, and identify effective approaches to current and future health events.

After receiving training, field teams conducted interviews over a four day period. A total of 171 household interviews were completed. The major findings were as follows:

- The vast majority of households obtained an alternative source of water within less than a day of trying to obtain water.

- Barriers faced by households when trying to obtain alternative water sources were stores being out of water and long lines.

- The primary method of communication about the 'do not drink' advisory was TV.

- The majority of households considered TV as the most reliable source of information about the ‘do not drink’ advisory.

- An estimated 16.2% of all households reporting have one or more health issues they felt were related to the ‘do not drink’ advisory.

- Approximately 9.9% of all households reported one or more mental health issues they felt were related to the ‘do not drink’ advisory.

- An estimated 58.4% of all households were still using an alternative source of water at the time the surveys were administered, five weeks after the ‘do not drink’ advisory was lifted.

Based on these findings, the following recommendations have been made to Toledo-Lucas County Health Department and the Ohio Department of Health to guide ongoing recovery efforts and planning and response for future health events:

1. Promote water preparedness for all households.

2. Identify ways to provide alternative water supplies in future emergencies, particularly to vulnerable populations.

3. Focus public messaging on television, while also employing multiple supplemental communication routes during disasters where communication infrastructure is intact.

4. Publicize health and mental health resources.

5. Increase community education on current water recommendations.

BACKGROUND

On August 2, 2014 at 2:00am EST, a 'do not drink' advisory was issued for approximately 450,000 customers (108,301 households) of the Collins Park water-treatment plant in Lucas County, Ohio because microcystin toxin results surpassed the advisory threshold of 1ppb for public water systems (2). Microcystin, a hepatotoxin, is released by some species of cyanobacteria found in harmful algal blooms (HABs). Exposure to microcystin toxin through swallowing contaminated water, having direct skin contact (e.g., swimming, showering) with contaminated water, or breathing airborne droplets containing the toxins (e.g., boating, waterskiing) may cause gastrointestinal and hepatic illness in humans and animals (3). However, the health effects of exposure to microcystin toxin are not well-understood.

In response to the elevated microcystin levels, a state of emergency was declared by Governor John Kasich on August 2, 2014. Communication campaigns used text alerts, television, social media, radio, newspaper and internet news sites to disseminate public health messages to affected communities. The Ohio National Guard brought in emergency water supplies, and water distribution sites were set up in the affected areas. Emergency water supplies were provided by government agencies and through private donations from retail stores. On Monday, August 4, 2014 at 10:00am EST, the 'do not drink' advisory was lifted after results from multiple water samples confirmed microcystin toxin levels were below the advisory threshold. Toledo-Lucas County Health Department (TLCHD) advised residents and businesses on how to flush their water systems through various media outlets.

As part of the recovery effort and to help plan for future health events that may occur, the TLCHD and the Ohio Department of Health (ODH), with technical assistance from the Centers for Disease Control and Prevention, investigated to 1) assess the impact of the Toledo water event on households, 2) characterize the population residing in the affected areas, and 3) assess communication efforts to identify effective approaches for current and future health events.

METHODS AND MATERIALS

To accomplish these objectives, TLCHD and ODH, with onsite technical assistance from CDC, conducted a Community Assessment for Public Health Emergency Response (CASPER) in areas affected by the 'do not drink' advisory throughout Lucas County, Ohio September 11-13, 2014 and September 15, 2014.

CASPER Methodology

CASPER is an epidemiologic technique designed to provide household-based information about a community's needs in a timely, inexpensive, and representative manner to assess public health needs in both disaster and non-disaster settings (1). Data is collected through door-to-door household level interviews using a standardized questionnaire. Data collected can then be used to initiate public health action, to facilitate disaster planning, and to asses new or changing needs during the recovery period after a disaster.

We used the standard CASPER two-stage cluster sampling methodology described in the CASPER Toolkit Version 2.0 to select a representative sample of households to be interviewed in Lucas County. The sampling frame (Figure 1) was defined as those households in Lucas County who received water from the Collins Park water treatment plant and therefore was placed under a 'do not drink' advisory during the Toledo water event (a total of 108,301 households in the 2010 U.S. Census)(4). Using the Geographic Information System (GIS) 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 water treatment plant distribution area were provided to Toledo-Lucas County Health Department from the Lucas County Auditor. Street level satellite maps of each of the 30 clusters were generated from Google Earth within GIS. Two-person field interview teams were assigned to three or four clusters and were instructed to systematically select seven housing units per cluster by selecting every *n*th household (where 'n' is the total number of households in the cluster divided by seven). Teams were instructed to make three attempts to complete an interview at each selected household before replacing it with an additional household within

the cluster.

Data Collection Instrument

The two-page questionnaire collected information on demographics; messaging and information sources regarding the 'do not drink' advisory; household behaviors before, during, and after the 'do not drink' advisory; household water preparedness; household impact; and health and mental health issues since the 'do not drink' advisory that household members felt were related to the event (Appendix A). We adapted many questions from the 2014 *Disaster Response and Recovery Needs of Communities Affected by the Elk River Chemical Spill, West Virginia* report questionnaire (5) (questions 12 through 15, 17 through 22f, 24, and 26 through 29c, Appendix A). Additional questions were adapted from CDC waterborne disease resources and a multiagency working group (CDC, ODH and TLCHD).

Data Collection

CDC provided the field interview teams with a three-hour just-in-time training on the overall purpose of the CASPER, household selection methods, questionnaire content, interview techniques, volunteer safety, and logistics on the morning of Thursday, September 11, 2014. Teams conducted interviews between 3:30pm and 8:30pm EST on Thursday, September 11, 2014, between 10:30am and 8:30pm on Friday, September 12, 2014, and between 10:30am and 5:30pm on Saturday, September 13, 2014. Additional interviews were conducted between 10:00am and 4:45pm on September 15, 2014 to increase the total number of interviews. There were a total of nine teams on the first day, seven teams on the second day, four teams on the third day, and seven teams on the fourth day. Teams primarily consisted of TLCHD staff, with assistance from ODH, American Red Cross volunteers, Medical Reserve Corps (MRC) volunteers, and local students. To ensure interviewer safety, police were notified of areas where volunteers would be conducting surveys.

Teams attempted to conduct the seven interviews in each of the 30 selected clusters, with a goal of 210 total interviews. Eligible household respondents were 18 years of age or older and

resided in the selected household. When approached, all potential respondents were given a copy of the consent sheet containing contact telephone numbers for the TLCHDand educational information regarding harmful algal blooms (Appendix B). Educational information was available for handout to all interested persons. If the respondent gave consent, the questionnaire was administered, taking an average of ten to fifteen minutes to complete. Interviewers completed confidential referral forms whenever respondents expressed urgent physical or mental health needs.

Data Analysis

We conducted weighted cluster analysis based on the total number of households in the sampling frame to determine the projected number and percent of households with a particular response. To do this, we applied a weight for each surveyed household, shown below, to account for the probability that the responding household was selected.

$$Weight = \frac{Total\ \#\ of\ housing\ units\ in\ the\ sampling\ frame}{\#\ of\ housing\ units\ interviewed\ within\ a\ cluster \times \#\ of\ clusters\ selected}$$

Data analyses were conducted using EpiInfo 7.1.3 to calculate the unweighted frequencies, unweighted percentages, weighted frequencies, and weighted percentages with 95% confidence intervals.

RESULTS

The field interview teams completed 171 surveys over four days, yielding a completion rate of 81.4% (Table 1). Fifty-five percent of contacted households were eligible and willing to participate in the survey. Of randomly selected households where contact was attempted (including those not successfully contacted), 26.4% completed an interview.

For all results, percentages in the text represent weighted percentages. Unweighted frequencies, percentages, and projected population estimates based on weighted analyses can be found in Table 2 through Table 24.

Household Characteristics and Demographics

Household characteristics and demographics are shown in Table 2 and Table 3. The majority of households (85.7%) were single-family homes, followed by multiple units (5.3%), and mobile homes (5.6%). The majority (70.4%) of households were owned, not rented. Approximately 40.4% of households had two members or less currently living in the household, 35.7% had three to four members and 21.0% had five members or more. Nearly fifty percent of households contained one or more members 2 to 17 years of age and 87.6% contained one or more members 18 to 64 years of age. Approximately 11.7% of households identified as Hispanic or Latino, and the most common races identified by household members were white (68.5%) and black/African American (29.9%). Of households reporting the highest level of education completed by anyone in the household (n=170), 29.7% reported high school/GED or less, 19.7% reported some college, 33.7% reported a two-year or four-year degree, and 16.0% reported a graduate or professional degree.

'Do Not Drink' Advisory

When, where, and how households first learned about the 'do not drink advisory' are shown in Table 4 and Table 5. The majority of households (95.7%) first learned about the 'do not drink' advisory on August 2, 2014. Of these households, 88.1% reported learning about the advisory in the morning. An estimated 31% of households first learned about the 'do not drink' advisory through television, specifically WTOL 11 and ABC 13, followed by cell phone (19.6%) and text message (15.8%). An additional 11.4% first learned about the advisory through social media, most commonly through Facebook. Nearly one-third (33.2%) of households first learned about the 'do not drink' advisory from a family member and 18.5% first learned through a friend or neighbor.

Preparedness

The majority of households (95.1%) identified municipal water from the tap as a source of water at the time they first heard about the 'do not drink advisory', followed by purchased water (63%), municipal water processed with a home filter (10.8%), and well water (1.6%). Only

9.1% of households reported having a 3-day alternative source of water supply for each household member and pet prior to the 'do not drink' advisory, and 22.5% of households reported having a 3-day alternative source of water supply for people only (Table 6).

Communications

The majority (82.3%) of households reported television as a source for information about the 'do not drink' advisory, followed by word of mouth (54.5%), and social media (41.8%) newspaper (24.2%), radio (21.6%), and Internet (19.8%). Households primarily used the Internet to access information on news channel websites and search engines (Table 7). Nearly three-fourths (73.4%) of households identified television as being the most reliable source for information about the 'do not drink' advisory, followed by social media (8.3%) and word of mouth (8.2%) (Table 8).

The vast majority (92.3%) of households identified 'Do not drink the tap water' as advice received from public messaging about the 'do not drink' advisory, 68.8% of households identified 'Do not use the tap water' and 40.9% identified 'do not boil the tap water'. An additional 18% identified 'Other' advice received, which most commonly included 'Don't give water to pets' and 'Where to find water' (Table 9).

Household Use of Municipal Water from Tap

Household use of municipal water from the tap before and during the 'do not drink' advisory is shown in Table 10. The majority (90.7%) of households used municipal water before the advisory occurred. Of the 12 households reporting no use of municipal water before the advisory occurred, 40.2% used purchased water. Sixty-one percent (n=107) of households reported using municipal water during the advisory. Of these 107 households, 71.6% showered or bathed in the water, 52.5% washed hands and 32.1% brushed teeth using the water. Additionally, 17.5% drank the water, 16.7% drank or ate food prepared with water, and 7.4% gave the water to their pets.

Household Water Use During the 'Do Not Drink' Advisory

Of the 145 households that attempted to get alternative sources of water, the majority (85.8%) attempted to get water on August 2, 2014 while an additional 13.1% did not attempt to get water until August 3, 2014. Ninety-two percent of households were able to get water on the same day an attempt was made (Table 11). Approximately two-thirds (67.6%) of all households attempted to get alternative sources of water from a large store or grocery, followed by a convenience store or gas station (18.2%), water from a friend or relative (16.0%), and water distribution site in town (14.3%). Of 114 households who attempted to get water at a large store or grocery, 9.8% were unsuccessful at obtaining access to water. Of the 32 households who attempted to get water from a convenience store or gas station, 39.5% were unsuccessful at obtaining water.

Of the 145 households who attempted to get alternative sources of water, two-thirds (67.5%) used purchased water as an alternative source of water during the 'do not drink' advisory, followed by water from a friend or relative (20.5%), bottled water from a distribution site (16.4%), and containers filled at a distribution site (11.9%). Twenty-five percent of households traveled outside the affected area to get alternative sources of water, and 11.2% got water from a friend or relative (Table 12). Of the 32 households who visited a water distribution site, 78.3% received water distribution site location information via television, followed by face-to-face (20.4%), and social media (16.1%) (Table 13).

Forty-five percent of households were without access to an alternative source of water for some amount of time, and 7% were without access to an alternative source for one or more days. When respondents were asked why they had gone without access for one or more days, their responses included the following: stores were out of water, people didn't know about the advisory, there was no transportation available, people had other beverages available, distribution sites was closed or out of water, and there were long lines (Table 14).

Household Behavior and Economic Impact

Household impact and household behaviors are shown in Table 15 and Table 16. A small percentage of households (5.8%) had to stay overnight outside the home for one or more days in order to have access to an alternative source of water. Additionally, of the 59 households reporting children in the household, an estimated 6% were impacted by a daycare or school closure, and 1.5% had to take time off from work to care for children in the household. Nearly 6% of households were told not to come to work because of the 'do not drink' advisory and the majority received unpaid leave. Additionally, 3.9% of households visited a Lake Erie Beach for work or recreation during the advisory.

Household Health and Mental Health Impact

Approximately sixteen percent (16.2%) of households felt that at least one person in the household had health issues attributable to the 'do not drink' advisory. Thirteen percent of households reported at least one affected household member 18 years of age or older and 7.6% reported at least one affected household member 18 years of age or less. The most commonly reported health symptoms were diarrhea (12.2% of households), nausea (9.1%), abdominal pain (7.5%), vomiting (6.3%), and skin irritation or itching (5.5%). One percent of households reported other symptoms, which included dizziness, numbness in hands, and tingling in fingers. Of households reporting health issues (n=25), 53.5% reported an onset of symptoms before the 'do not drink' advisory was issued. Ninety-seven percent of these households reported that symptoms lasted less than a week (Table 17). Of the households reporting health issues, 89.1% reported that their health issues were not serious enough to seek medical care. Alternatively, 6.2% sought medical care at a primary care physician or provider, 4.3% sought care at an emergency department, and 3.1% sought care at an urgent care (Table 18). Ten percent of households reported mental health issues they felt were attributable to the 'do not drink' advisory. Commonly reported mental health symptoms were anxiety or stress (7.2% of households), loss of appetite (5%), and trouble sleeping or nightmares (4.3%). Two percent of households reported other mental health symptoms such as increased cigarette use and irritability (Table 19).

An estimated 1.9% of households had routine dental care services interrupted due to the 'do not drink' advisory and 1.6% reported that mental health services were interrupted. Moreover, 2.2% of households reported difficulty taking medications as prescribed because an alternative water source was not available to take medications orally (Table 18).

Impact on Household Pets

Of the 120 households reporting pet ownership, 5.1% of households (n=6) felt their pet(s) had health issues related to the 'do not drink' advisory. The most commonly reported health symptoms were diarrhea (3.5%), vomiting (2.3%), and abdominal pain (0.7%). Approximately 1.3% of households reported other symptoms, which included gas and loss of hair. No households reported seeking veterinary care (Table 20).

Household Communication and Behavior After 'Do Not Drink' Advisory Lifted

The majority of households (91.8%) learned the 'do not drink' advisory was lifted on August 4, 2014 while 6.7% did not learn the advisory was lifted until August 5, 2014. More than two-thirds (66.9%) of households first learned the 'do not drink' advisory was lifted via television, most commonly WTOL 11 and ABC 13, followed by face-to-face (10.3%) (Table 21). An estimated 66.4% of households received information on how to flush a household plumbing system through television, followed by internet (9.0%), face-to-face (7.4%), and social media (6.8%) (Table 22).

After the 'do not drink' advisory was lifted, an estimated 81.9% of households continued to use an alternative source of water. Approximately 1.4% of households continued to use an alternative water source for one day or less, 8.5% continued for two to six days, 11.6% continued for seven days or twenty-eight days, and 58.4% were still using an alternative source at the time of the interview (Table 23).

About one-third (33.8%) of households reported seeking information or answers to questions

about harmful algal blooms. Twenty-three percent of households looked up information on the Internet, most commonly through search engines and the TLCHD website (Table 24).

DISCUSSION

These data represent the CASPER surveys conducted in Lucas County, Ohio in September, 2014 as part of the recovery effort following the 'Do not drink' advisory and to help plan for future health events that may occur. The results of the CASPER provide important information on communications during the 'do not drink' advisory, availability and use of water sources, and the health and economic impacts of the contaminated water supply.

Communications

Although a large number of households were affected by the 'do not drink' advisory, overall, most households learned of the advisory during the morning of August 2, 2014, the day the advisory was issued indicating timely delivery of communications.

Television, family members, and Internet were the primary sources for information during the 'do not drink' advisory. Respondents reported television as the most common source for information about the advisory, the location of water distribution sites, and how to flush the household plumbing system. Television was also considered the most reliable source for information about the advisory. Additionally, one-third of households reported seeking information or answers to questions about harmful algal blooms via Internet search engines and the TLCHD website.

Availability and Use of Water Sources

Most residents identified water from the tap as a source of water at the time of the 'do not drink' advisory. Although many households reported already utilizing purchased water such as bottled water before the advisory, two-thirds of residents reported not having a 3-day alternative water supply for each household member and pet prior to the advisory.

Despite most households learning about the advisory during the morning of the first day, over half reported still using municipal water from the tap in some capacity during the advisory, primarily for showering or bathing, washing hands, brushing teeth, and/or drinking the water. While most households did seek and obtain alternative water sources on August 2, 2014, primarily from a large store or grocery, convenience store, or gas station, a small percentage of residents went without access to an alternative water source for one or more days. Barriers to accessing alternative sources of water include the following: stores were out of water, residents didn't know about the advisory, no transportation was available and residents had access to other beverages.

After the advisory was lifted, the majority of households continued to use an alternative source of water, and over half of residents were still using an alternative source of water five weeks after the event when surveys were administered.

Health and Economic Impacts

There were many reports of households who felt they had health issues related to the 'do not drink' advisory. The most commonly reported symptoms include diarrhea, nausea, and abdominal pain. Interestingly, over half of these residents reported an onset of symptoms before the 'do not drink' advisory with symptoms lasting less than a week. Although many households reported symptoms, most reported that the symptoms were not serious enough to seek medical care. Additionally, a small number of households reported mental health symptoms including anxiety or stress and loss of appetite. While not common, we did receive reports of residents having difficulty taking oral medications due to the lack of an alternative water source.

A small percentage of residents reported feeling their pet(s) had health issues related to the contaminated water. The most common reported symptoms include diarrhea, vomiting, and abdominal pain. No households sought veterinary care for their animals due to illness thought to be related to the advisory.

When addressing household and economic impacts, a quarter of residents reported traveling outside the affected area to purchase water. Some households even had to stay overnight outside the home in order to have access. This coincides with the large number of households attempting to get alternative sources of water in a short time frame. Although uncommon, there were some households affected by daycare and/or school closures. Additionally, residents who were told not to come into work went mostly without pay.

LIMITATIONS

Sampling weights were created using information from the 2010 census to determine the household probability of being selected. Census data may not be characteristic of the current population in selected areas due to potential population changes in those areas since 2010. Due to jurisdictional lines, the sampling frame was limited to the affected communities within Lucas County, Ohio. The 'do not drink' advisory' was also issued for a small number of households within two neighboring counties and one county in Southeast Michigan. However, these areas makeup up a small percentage of the affected communities.

As indicated by the contact rate of 26.4%, field interview teams had to approach many households within selected clusters to reach the necessary number of completed interviews. This may affect the representativeness of the results. Local knowledge of the cluster areas indicated a higher than anticipated number of vacant or abandoned houses which may have contributed to the lower contact rate if the occupancy status of a selected household was unknown and attempts were made to contact said households. Additionally, safety concerns for interview teams resulted in lower than expected interviews in some clusters.

Household surveys were conducted approximately five weeks after the 'do not drink' advisory which may affect the reliability of recall, particularly in questions examining exact dates and behaviors that occurred before, during, and after the 'do not drink' advisory. Additionally, there is no available information from a baseline or comparison group that can be used to interpret the incidence of reported human and animal illness.

RECOMMENDATIONS

On the basis of this CASPER, we make the following recommendations to guide ongoing recovery efforts from the Toledo water event and to guide planning and response for future health events.

1. *Promote water preparedness for all households.*

   Encouraging households to have a three-day supply of water for each person and pet in the household would aid in preparedness and response to any future health event. Sixty-seven percent of households reported not having a three-day alternative source of water supply (for drinking, preparing food, and washing) for each household member and pet in the home prior to the 'do not drink' advisory. While most residents were able to obtain alternative water within one day, there were challenges reported to accessing water in a timely manner, including stores running out of water and long lines. Increasing messaging on water preparedness would likely reduce these barriers and decrease strain on state emergency supply resources.

2. *Identify ways to provide alternative water supplies in future emergencies, particularly to vulnerable populations.*

   Several households reported having difficulty taking oral medications as prescribed because they did not have access to an alternative source of water. Failing to take medications as prescribed may lead to negative health consequences, especially in people who have chronic conditions. Water delivery services should be expanded to populations requiring daily oral medications. If water delivery services are not available, these populations should be provided guidance on alternative beverages approved for taking with oral medications (e.g. juice, tea, carbonated beverages).

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

   Eighty-two percent of households reported television as a source for information about the

'do not drink' advisory (WTOL 11 and ABC 13), and nearly three-fourths of households identified television as being the most reliable source for information. While television was the most utilized and reliable source for information, other communication routes (e.g., social media, Internet, radio) should also be employed to reach all residents in the affected communities.

4. *Publicize health and mental health resources.*

   Sixteen percent households reported having one or more health issues they felt were related to the 'do not drink' advisory and 9.9% reported mental health concerns. While the majority of affected households reported that health issues were not serious enough to seek medical care, officials should promote community awareness of available health and mental health resources to help prepare for future health events that may occur.

5. *Increase community education on current water safety.*

   The results indicated that 58% of households were still using an alternative source of drinking water at the time of the CASPER (five weeks after the 'do not drink' advisory was lifted). Public messaging, especially through the sources of information considered most reliable (e.g., television, social media), might help increase community education about current water safety and alleviate some consumer concerns.

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Table 1. Questionnaire response rates

Questionnaire response	(%)	Rate
Completion*	81.4	171/210
Cooperation†	54.5	171/314
Contact‡	26.4	171/647

*Percent of surveys completed in relation to the goal of 210

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

‡Percent of randomly selected households where contact was attempted which completed an interview

Table 2. Household characteristics

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Structure*				
Single family	145	86.8 (80.7-91.6)	88,274	85.7 (74.4-96.9)
Mobile home	6	3.6 (1.3-7.7)	5,415	5.3 (-2.6-13.2)
Multiple unit	9	5.4 (2.5-10.0)	5,759	5.6 (-0.9-12.1)
Other	7	4.2 (1.7-8.5)	3,610	3.5 (-2.7-9.7)
Number in households†				
One	25	14.7 (9.8-20.9)	15,927	14.8 (9.6-19.5)
Two	50	29.4 (22.7-36.9)	30,797	25.6 (20.4-36.7)
Three	29	17.1 (11.7-23.6)	17,638	16.4 (9.6-23.2)
Four	34	20.0 (14.3-26.8)	20,775	19.3 (13.2-25.3)
Five or more	32	18.8 (13.3-25.5)	22,649	21.0 (11.9-30.2)
Home ownership‡				
Own	113	66.9 (59.2-73.9)	75,501	70.4 (59.4-81.3)
Rent	56	33.1 (26.1-40.8)	31,768	29.6 (18.7-40.6)

*Of households reporting household structure (n=167)

†Of households reporting number in household (n=170)

‡Of households reporting home ownership type (n=169)

Table 3. Household demographics

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Age groups*				
Less than 2 years	16	9.5 (5.5-15.0)	8,630	8.1 (4.3-11.9)
2-17 years	78	46.4 (38.7-54.3)	51,692	48.5 (39.2-57.8)
18-64 years	147	87.5 (81.5-92.1)	93,362	87.6 (81.7-93.6)
65 or greater	34	20.2 (14.4-27.1)	24,462	23.0 (13.9-32.0)
Ethnicity†				
Hispanic or Latino	18	10.6 (6.4-16.2)	12,652	11.7 (5.1-18.4)
Race				
American Indian/Alaskan Native	6	3.5 (1.3-7.5)	3,301	3.1 (0.3-5.8)
Asian/Pacific Islander	3	1.8 (0.4-5.0)	1,934	1.8 (-0.3-3.9)
Black or African American	50	29.2 (22.6-36.7)	32,422	29.9 (17.2-42.7)
White	119	69.6 (62.1-76.4)	74,152	68.5 (55.3-81.7)
Other race	7	4.1 (1.7-8.3)	5,192	4.8 (0.6-9.0)
Highest level of education‡				
High school/GED and less	43	25.3 (19.0-32.5)	31,957	29.7 (19.0-40.3)
Some college	35	20.6 (14.8-27.5)	21,205	19.7 (13.5-25.9)
Two year degree	26	15.3 (10.2-21.6)	14,672	13.6 (8.0-19.2)
Four year degree	33	19.4 (13.8-26.2)	21,695	20.1 (13.0-27.3)
Graduate/Professional degree	31	18.2 (12.7-24.9)	17,225	16.0 (8.4-23.6)

*Of households reporting age groups (n=168)

†Of households reporting ethnicity (n=170)

‡Of households reporting highest level of education (n=170)

Table 4. When households first learned about the 'do not drink' advisory

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Date/time of day*				
August 2, 2014†	160	94.7 (90.1-97.5)	102,628	95.7 (92.8-98.6)
Morning	142	91.0 (85.4-95.0)	88,231	88.1 (79.6-96.6)
Afternoon	6	3.9 (1.4-8.2)	7,048	7.0 (-0.7-14.8)
Evening	1	0.6 (0.0-3.5)	516	0.5 (-0.5-1.6)
August 3, 2014	8	4.7 (2.1-9.1)	4,126	3.9 (1.1-6.6)
August 4, 2014	1	0.6 (0.0-3.3)	516	0.5 (-0.5-1.5)
Did not hear about advisory	0	0	0	0
Household not under advisory	0	0	0	0

*Of households reporting date (n=169)

†Of households reporting time of day on August 2, 2014 (n=156)

Table 5. How and from whom/where households first learned about the 'do not drink' advisory

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
How first learned*				
Landline	15	8.8 (5.0-14.1)	9,403	8.7 (4.2-13.3)
Cell phone	30	17.7 (12.2-24.2)	21,076	19.6 (11.1-28.0)
Text message	29	17.1 (11.7-23.6)	17,053	15.8 (10.1-21.6)
Radio	4	2.4 (0.6-5.9)	2,063	1.9 (0.1-3.8)
TV	53	31.2 (24.3-38.7)	33,462	31.0 (23.2-38.9)
Face-to-face	11	6.5 (3.3-11.3)	7,254	6.7 (2.7-10.8)
Social media	20	11.8 (7.3-17.6)	12,274	11.4 (5.6-17.2)
News paper	0	0	0	0
Internet	3	1.2 (0.4-5.1)	2,235	2.1 (-0.5-4.7)
Other	4	2.4 (0.6-5.9)	2,450	2.3 (-0.0-4.6)
From whom/where first learned				
Friend/neighbor	25	14.6 (9.7-20.8)	20,010	18.5 (10.5-26.4)
Family/relative	61	35.7 (28.5-43.3)	35,920	33.2 (26.4-40.0)
Co-worker	3	1.8 (0.4-5.0)	1,547	1.4 (-0.2-3.1)
Stranger	2	1.2 (0.1-4.2)	1,117	1.0 (-0.4-2.5)
Recorded message	2	1.2 (0.1-4.2)	1,418	1.3 (-0.6-3.2)
Internet†	14	8.2 (4.6-13.4)	9,068	8.4 (3.8-12.9)
Radio	3	1.8 (0.4-5.0)	1,547	1.4 (-0.2-3.1)
TV†	55	32.2 (25.2-39.7)	34,493	31.9 (24.3-39.4)
Newspaper	0	0	0	0

*Of households reporting how first learned (n=170)

†Most common sources:

- Facebook
- WTOL 11
- ABC 13

Table 6. Water source(s) in household at time of the 'do not drink' advisory

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Source				
Municipal water from tap	163	95.3 (91.0-98.0)	102,989	95.1 (91.0-99.2)
Municpal water processed with a filter	21	12.3 (7.8-18.2)	11,690	10.8 (5.8-15.8)
Well water	2	1.2 (0.1-4.2)	1,719	1.6 (-0.9-4.0)
Purchased water	109	63.7 (56.1-70.9)	68,238	63.0 (52.5-73.5)
Other*	1	0.6 (0.0-3.2)	516	0.5 (-0.5-1.5)
3-day alternative water source before advisory†				
No	114	67.9 (60.2-74.8)	71,504	67.0 (57.3-76.6)
Yes, for people only	34	20.2 (14.4-27.1)	23,964	22.5 (12.7-32.2)
Yes, for people and animals	18	10.7 (6.5-16.4)	9,661	9.1 (4.3-13.8)

*Other: ice

†Of households reporting status of 3-day alternative water source before advisory (n=168)

Table 7. Household source(s) of information about the 'do not drink' advisory

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Word of mouth	94	55.0 (47.2-62.6)	59,007	54.5 (45.0-63.9)
Social media	73	42.7 (35.2-50.5)	45,289	41.8 (32.1-51.5)
Radio	37	21.6 (15.7-28.6)	23,431	21.6 (15.0-28.3)
TV	142	83.0 (76.6-88.3)	89,108	82.3 (74.3-90.2)
Newspaper	36	21.1 (15.2-27.9)	26,190	24.2 (15.8-32.6)
Internet*	37	21.6 (15.7-28.6)	21,437	19.8 (12.7-26.9)
Other	9	5.3 (2.4-9.8)	5,321	4.9 (2.0-7.9)

*Most common sources

- News channel website
- Search engine

Table 8. Household source of information about the 'do not drink' advisory considered most reliable

	Frequency (n=170)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Word of mouth	14	8.2 (4.6-13.4)	8,853	8.2 (2.8-13.6)
Social media	15	8.8 (5.0-14.1)	8,922	8.3 (4.1-12.5)
Radio	4	2.4 (0.6-5.9)	2,269	2.1 (0.0-4.2)
TV	123	72.4 (65.0-78.9)	79,068	73.4 (66.2-80.6)
Newspaper	1	0.6 (0.0-3.2)	722	0.7 (-0.7-2.0)
Internet*	6	3.5 (1.3-7.5)	3,180	2.3 (0.3-5.6)
Other	1	0.6 (0.0-3.2)	903	0.8 (-0.9-2.6)

*Most common sources:

- News channel website

Table 9. Household advice received from public messaging about the 'do not drink' advisory

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Do not drink tap water	157	91.8 (86.6-95.5)	99,921	92.3 (88.7-95.9)
Do not use tap water	119	69.6 (62.1-76.4)	74,453	68.8(48.8-68.8)
Do not boil tap water	71	41.5 (34.1-49.3)	44,309	40.9 (29.5-52.4)
Not sure what the advice was	1	0.6 (0.0-3.2)	602	0.6 (-0.6-1.7)
Did not get any advice	0	0	0	0
Other*	31	18.1 (12.7-24.7)	19,537	18.0 (11.6-24.4)

*Common themes:

- Don't give to pets
- Where to find water

Table 10. Household use of municipal water from tap before and during the 'do not drink' advisory

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Used municipal water BEFORE advisory				
Yes	157	92.4 (87.3-95.9)	97,780	90.7 (83.5-98.0)
No	12	7.1 (3.7-12.0)	9,489	8.8 (1.7-26.0)
Purchased water*	7	58.3 (27.7-84.8)	3,816	40.2 (-1.8-82.2)
Other*	1	8.3 (0.2-38.5)	516	5.4 (-7.8-18.6)
Used municpal water DURING advisory				
Yes	107	62.6 (54.9-69.8)	66,089	61.0 (52.6-69.4)
Drank water†	18	16.8 (10.3-25.3)	11,552	17.5 (8.2-36.7)
Washed hands†	57	53.3 (43.4-63.0)	34,669	52.5 (41.6-63.4)
Brushed teeth†	36	33.6)24.8-43.4)	21,179	32.1 (21.1-43.0)
Ate or drank food prepared with water†	17	15.9 (9.5-24.2)	11,036	16.7 (6.9-26.5)
Made baby formula†	0	0	0	0
Washed clothes†	34	31.8 (23.1-41.5)	18,420	27.8 (19.2-36.6)
Watered plants/lawn/garden†	7	6.5 (2.7-13.0)	3,610	5.5 (1.0-9.9)
Ran dishwasher/hand-washed dishes†	28	26.2 (18.2-35.6)	15,721	23.8 (14.4-33.2)
Gave water to pets†	8	7.5 (3.3-14.2)	4,899	7.4 (1.6-13.2)
Showered/bathed in water †	76	71.0 (61.5-79.4)	47,317	71.6 (61.9-81.3)
Other†	4	3.7 (1.0-9.3)	2,751	4.2 (-0.7-9.0)
No	64	37.4 (30.2-45.1)	42,212	39.0 (30.6-47.4)

*Of households not using municipal water before advisory (n=12)

†Of households using municipal water during the advisory (n=107)

Table 11. Timing of household attempts to get alternate source(s) of water during the 'do not drink' advisory

	Frequency (n=145*)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Date attempted to get alternate source(s) of water	145	84.8 (78.5-89.8)	90,483	83.6 (77.3-89.8)
August 2, 2014	122	84.4 (77.2-89.7)	77,616	85.8(78.4-93.1)
August 3, 2014	21	14.5 (9.2-21.3)	11,836	13.1 (5.8-20.4)
August 4, 2014 and later	1	0.7 (0.0-3.8)	516	0.6 (-0.6-1.7)
Average time to successfully getting altnernative source(s) of water				
Same day	132	91.7 (85.9-95.6)	82,532	91.7 (87.1-96.3)
2 days	9	6.3 (2.9-11.5)	5,415	6.0 (1.8-10.2)
3 days	1	0.7 (0.0-3.8)	602	0.7 (-0.7-2.0)

*Of households who attempted water from alternate source (n=145)

Table 12. Alternative source(s) of water during the 'do not drink' advisory

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Alternative sources ATTEMPTED				
Large store or grocery	114	66.7 (59.1-73.7)	73,189	67.6 (60.0-75.1)
Well water on premesis	1	0.6 (0.0-3.2)	516	0.5 (-0.5-1.5)
Rainwater	3	1.8 (0.4-5.0)	2,441	2.3 (-0.5-5.0)
Convenience store/gas station	32	18.7 (13.2-25.4)	19,675	18.2 (11.4-24.9)
Water distribution site in town	26	15.2 (10.2-21.5)	15,454	14.3 (7.5-21.1)
Water distribution site outside town	7	4.1 (1.7-8.3)	4,023	3.7 (1.1-6.3)
Water from a friend or relative	29	17.0 (11.7-23.4)	17,328	16.0 (8.7-23.3)
Other	5	2.9 (1.0-6.7)	3,266	3.0 (-0.1-6.2)
Where unsuccessful				
Large store or grocery*	12	10.5 (5.6-17.7)	7,134	9.8 (3.7-15.8)
Rainwater†	2	66.7 (9.4-99.2)	1,238	50.7 (-111.4-212.8)
Convenience store/gas station‡	11	34.4 (18.6-53.2)	7,762	39.5 (18.8-60.1)
Water distribution site in town**	2	7.7 (1.0-25.1)	1,031	6.7 (-3.4-16.7)
Water distribution site outside town††	2	28.6 (3.7-71.0)	1,238	30.8 (-17.0-78.5)
Water from a friend or relative‡‡	2	6.9 (0.9-22.8)	1,238	7.1 (-3.1-17.4)
Alternative sources USED during advisory				
Purchased water	120	70.2 (62.7-76.9)	73,138	67.5 (59.8-75.3)
Well water on premises	4	2.3 (0.6-5.9)	2,269	2.1 (0.0-4.2)
Rainwater	2	1.2 (0.1-4.2)	1,925	1.8 (-0.8-4.4)
Water from a friend or relative	37	21.6 (15.7-28.6)	22,228	20.5 (13.5-27.6)
Filled containers at distribution site	20	11.7 (7.3-17.5)	12,876	11.9 (6.6-17.2)
Bottled water from water distribution site	26	15.2 (10.2-21.5)	17.741	16.4 (7.4-25.4)
Other	8	4.7 (2.0-9.0)	4,538	4.2 (0.3-8.1)
Traveled outside affected area for alternative source				
Yes, to purchase water	46	26.9 (20.4-34.2)	26,955	24.9 (18.1-31.7)
Yes, got water from friend/relative	19	11.1 (6.8-16.8)	12,085	11.2 (5.1-17.2)
Yes, but did not get water	2	1.2 (0.1-4.2)	12,38	1.1 (-0.5-2.8)

*Of households reporting large store or grocery (n=114)

†Of households reporting rainwater (n=3)

‡Of households reporting convenience store/gas station (n=32)

**Of households reporting water distribution site in town (n=26)
††Of households reporting water distribution site outside town (n=7)
‡‡Of households reporting water from a friend or relative (n=29)

Table 13. Household sources of information on the location of water distribution site(s)

	Frequency (n=32*)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Landline	0	0	0	0
Cell phone	2	6.3 (0.8-20.8)	1,031	5.4 (-2.1-13.0)
Text message	2	6.3 (0.8-20.8)	2,321	12.2 (-7.5-31.9)
Radio	2	6.3 (0.8-20.8)	2,321	12.2 (-8.1-32.6)
TV	25	78.1 (60.0-90.7)	14,853	78.3 (62.0-94.7)
Face-to-face	5	15.6 (5.3-32.8)	3,868	20.4 (-0.6-41.4)
Social media	3	9.4 (2.0-25.0)	3,043	16.1 (-4.2-36.3)
Newspaper	0	0	0	0
Internet	1	3.1 (0.1-16.2)	1,805	9.5 (-10.4-29.5)
Other†	3	9.4 (2.0-25.0)	1,633	8.6 (-1.4-18.7)

*Of households reporting visiting a water distribution site (n=32)
†Other: Driving past, saw signs

Table 14. Duration of time without access to an alternative water source during the 'do not drink' advisory

	Frequency (n=171)	% of households	Projected number of households	Weighted % (95% CI)
Less than one day	61	35.7 (28.5-43.3)	40,484	37.4 (28.1-46.7)
One day	6	3.5 (1.3-7.5)	3,094	2.9 (0.3-5.4)
Two days or more	8	4.7 (2.0-9.0)	4,813	4.4 (0.8-8.1)

Table 15. Household impact

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Need to stay overnight outside the home				
Paid accomodation	1	0.6 (0.0-3.2)	516	0.5 (-0.5-1.5)
Unpaid accomodation	11	6.4 (3.3-11.2)	5,759	5.3 (1.2-9.4)
Employment/Childcare				
Daycare or school closure*	4	6.8 (1.9-16.5)	2,355	6.0 (0.4-11.5)
Time off required from work to care for children*	1	1.7 (0.0-9.1)	602	1.5 (-1.6-4.6)
Work cancellation†	10	5.9 (2.8-10.5)	6,137	5.7 (2.4-9.0)

*Of households reporting with children (n=59)
†80% unpaid leave

Table 16. Household behaviors

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Visit Lake Erie Beach for work/recreation	6	3.5 (1.3-7.5)	4,169	3.9 (0.7-7.0)

Table 17. Household self-reported health impact

	Frequency (n=170)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Health issues related to the advisory	25	14.7 (9.8-20.9)	17,431	16.2 (7.6-24.8)
Age of household members affected*				
<18 years old	10	5.9 (2.9-10.6)	8,200	7.6 (1.6-13.6)
18 years or older	23	13.5 (8.8-19.6)	14,337	13.3 (7.7-18.9)
Reported symptoms				
Nausea	16	9.4 (5.5-14.8)	9,833	9.1 (4.2-14.1)
Vomiting	10	5.9 (2.9-10.6)	6,739	6.3 (1.9-10.6)
Abdominal pain	11	6.5 (3.3-11.3)	8,028	7.5 (2.5-12.4)
Diarrhea	19	11.2 (6.9-16.9)	13,134	12.2 (5.9-18.5)
Rash	4	2.3 (0.6-5.9)	3,352	3.1 (-0.6-6.8)
Skin irritation/itching	6	3.5 (1.3-7.5)	5,879	5.5 (-1.6-12.5)
Headache	6	3.5 (1.3-7.5)	3,988	3.7 (0.3-7.1)
Eye irritation/pain	2	1.2 (0.1-4.2)	2,321	2.2 (-1.4-5.7)
Respiratory illness/cough	2	1.2 (0.1-4.2)	2,321	2.2 (-1.4-5.7))
Other†	3	1.8 (0.4-5.1)	1,547	1.4 (-0.7-3.6)
Onset of symptoms‡				
Before the 'do not drink' advisory	13	52.0 (31.3-72.2)	9,369	53.5 (32.8-74.2)
During the 'do not drink' advisory	11	44.0 (24.4-65.1)	6,257	35.7 (11.3-60.1)
After the 'do not drink' advisory	5	20.0 (6.8-40.7)	3,868	24.0 (0.1-47.8)
Duration of symptoms‡				
< one week	24	96.0 (79.7-99.9)	17,002	97.1 (90.8-103.3)
≥ One week or more, but < a month	3	12.0 (68.8-97.5)	1,548	9.6 (-1.2-20.3)
≥ One month	1	4.0 (0.1-20.4)	516	3.2 (-3.8-10.2)

*At least 1 household member affected

†Other: Dizziness, numbness in hands, tingling fingers

‡Of households reporting health issues related to the advisory (n=25)

Table 18. Household medical care for symptoms related to the 'do not drink' advisory

	Frequency (n=169)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Location of medical care*				
PCP	2	8.0 (1.0-26.0)	1,031	6.2 (-3.1-15.4)
Urgent care	1	4.0 (0.1-20.4)	516	3.1 (-3.3-9.5)
Emergency room	1	4.0 (0.1-20.4)	722	4.3 (-5.1-13.8)
Was admitted to the hospital	0	0	0	0
Reasons medical care not sought*				
Health issues not serious enough	22	88.0 (68.8-97.5)	14,389	89.1 (76.8-101.5)
No insurance	1	4.0 (0.1-20.4)	1,805	10.4 (-8.3-29.0)
No transportation	0	0	0	0
Cost concerns	0	0	0	0
Other†	4	16.0 (4.5-36.1)	3,438	19.9 (1.7-38.1)
Interruptions of routine health services				
Dialysis	0	0	0	0
Dental	4	2.4 (0.7-6.0)	2,063	1.9 (0.0-3.8)
Podiatry	0	0	0	0
Outpatient surgical	0	0	0	0
Mental health services	2	1.2 (0.1-4.2)	1,719	1.6 (-0.9-4.1)
Difficulty taking medications‡	4	2.4 (0.7-6.0)	2,355	2.2 (0.1-4.4)
Clinic/physician closed	0	0	0	0
Pharmacy closed	0	0	0	0
No water availabe to take medications	4	100.0 (100.0-100.0)	2,355	100.0 (100.0-100.0)

*Of households reporting health issues related to the advisory (n=25)

†Other reasons: Crowded emergency department, media said "wait it out", "ride it out"

‡ Of households reporting difficulty taking medications as prescribed (n=168))

Table 19. Household self-reported mental health related to the 'do not drink' advisory

	Frequency (n=166)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Mental health issues related to the advisory	14	8.4 (4.7-13.8)	10,443	9.9 (4.4-15.4)
Agitated behavior	3	1.8 (0.4-5.2)	2,235	2.1 (-0.5-4.8)
Anxiety or stress	10	6.0 (2.9-10.8)	7,607	7.2 (2.3-12.1)
Difficulty concentrating	3	1.8 (0.4-5.2)	2,235	2.1 (-0.5-4.8)
Loss of appetite	5	3.0 (1.0-6.9)	5,243	5.0 (0.3-9.7)
Trouble sleeping/nightmares	5	3.0 (1.0-6.9)	4,556	4.3 (0.0-8.6)
Alcohol/drug use	1	0.6 (0.0-3.3)	516	0.5 (-0.5-1.5)
Witnessed or experienced violence	0	0	0	0
Other*	4	2.4 (0.7-6.1)	2,149	2.0 (0.1-4.0)

*Other: Increased cigarette use, irritability

Table 20. Household pet illness related to the 'do not drink advisory'

	Frequency (n=120*)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Pet illnesses due to water event	6	5.0 (1.9-10.6)	3,988	5.1 (1.0-9.3)
Pet symptoms†				
Vomiting	3	2.5 (0.5-7.1))	1,753	2.3 (-0.3-4.8)
Abdominal pain	1	0.8 (0.0-4.6)	516	0.7 (-0.7-2.0)
Diarrhea	4	3.3 (0.9-8.3)	2,751	3.5 (-0.2-7.2)
Rash	0	0	0	0
Skin irritation/itching	0	0	0	0
Eye irritation/pain	0	0	0	0
Respiratory illness/cough	0	0	0	0
Other‡	2	1.7 (0.2-5.9)	1,031	1.3 (-0.6-3.2)

*Of households reporting pet ownership (n=120)

† Veterinary care was not sought

‡ Other: Gas, loss of hair

Table 21. When, how and from whom/where households first learned the 'do not drink' advisory was lifted

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Date learned advisory was lifted				
August 4, 2014	159	93.0 (88.1-96.3)	99,371	91.8 (86.2-97.3)
August 5, 2014	9	5.3 (2.4-9.8)	7,297	6.7 (1.4-12.1)
August 6, 2014	1	0.6 (0.0-3.2)	602	0.6 (-0.6-1.7)
How first learned				
Landline	3	1.8 (0.4-5.0)	1,547	1.4 (-0.2-3.1)
Cell phone	9	5.3 (2.4-9.8)	4,934	4.6 (1.9-7.2)
Text message	4	2.3 (0.6-5.9)	2,063	1.9 (0.1-3.8)
Radio	6	3.5 (1.3-7.5)	3,094	2.9 (0.3-5.4)
TV	112	65.5 (57.9-72.6)	72,441	66.9 (59.4-74.4)
Face-to-face	16	9.4 (5.4-14.8)	11,165	10.3 (4.3-16.4)
Social media	8	4.7 (2.0-9.0)	5,672.9	5.2 (1.6-8.9)
Newspaper	0	0	0	0
Internet	7	4.1 (1.7-8.3)	3,902	3.6 (0.7-6.5)
Other*	6	3.5 (1.3-7.5)	3,481	3.2 (0.3-6.1)
From whom/Where first learned				
Friend/neighbor	11	6.4 (3.3-11.2)	6,618	6.1 (2.2-10.0)
Family/relative	11	6.4 (3.3-11.2)	5,965	5.5 (2.1-8.9)
Co-worker	9	5.3 (2.4-9.8)	5,922	5.5 (2.0-8.9)
Stranger	5	2.9 (1.0-6.7)	4,040	3.7 (-1.0-8.5)
Recorded message	0	0	0	0
Internet	10	5.9 (2.8-10.5)	5,922	5.5 (2.4-8.5)
Radio†	7	4.1 (1.7-8.3)	3,610	3.3 (0.7-6.0)
TV†	110	64.3 (56.7-71.5)	72,012	66.5 (59.2-73.8)
Newspaper	0	0	0	0

*Other: Email

†Most common sources:

- 93.5
- WTOL 11
- ABC 13

Table 22. Household sources of information on flushing household plumbing systems

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Did not receive information	25	14.6 (9.7-20.8)	18,816	17.4 (8.1-26.6)
Landline	2	1.2 (0.1-4.2)	1,031	1.0 (-0.4-2.3)
Cell phone	4	2.3 (0.6-5.9)	2,149	2.0 (-0.4-4.4)
Text message	0	0	0	0
Radio	3	1.8 (0.4-5.0)	1,547	1.4 (-0.2-3.1)
TV	117	68.4 (60.9-75.3)	71,926	66.4 (57.0-75.8)
Face-to-face	13	7.6 (4.1-12.7)	7,994	7.4 (2.5-12.3)
Social media	12	7.0 (3.7-11.9)	7,340	6.8 (2.8-10.8)
Newspaper	3	1.8 (0.4-5.0)	2,235	2.1 (-0.5-4.7)
Internet	15	8.8 (5.0-14.1)	9,781	9.0 (4.0-14.1)
Other*	8	4.7 (2.0-9.0)	4,805	4.4 (1.6-7.3)

*Other: Email, researched

Table 23. Alternative source of household water AFTER the "do not drink" advisory was lifted

	Frequency (n=170)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Continue to Use Alternate Water*				
No	21	12.4 (12.4-20.0)	12,205	11.4 (6.4-16.3)
Yes	136	80.0 (73.2-85.7))	88,050	81.9 (75.1-88.6)
Drank water*	127	93.4 (97.1-96.9)	82,996	94.3 (89.9-98.6)
Washed hands*	25	18.3 (12.2-25.8)	17,638	19.9 (9.6-30.2)
Brushed teeth*	57	41.9 (33.5-60.7)	34,562	39.3 (28.0-50.5)
Ate or drank food prepared with water*	79	58.1 (49.3-66.5)	51,125	58.1 (47.4-68.7)
Made baby formula*	11	8.1 (4.1-14.0)	5,965	6.8 (2.6-11.0)
Washed clothes*	8	5.9 (2.6-11.3)	4,418	5.0 (1.9-8.2)
Watered plants/lawn/garden*	3	2.2 (0.5-6.3)	1,839	2.1 (-0.3-4.5)
Ran dishwasher/ hand-washed dishes*	12	8.8 (4.6-14.9)	9,661	11.0 (2.3-19.6)
Gave water to pets*	47	34.6 (26.6-43.2)	32,121	36.5 (24.2-48.7)
Showered/bathed in water*	11	8.1 (4.1-14.0)	6,137	7.0 (2.7-11.3)
Other*	1	0.7 (0.0-4.0)	602	0.7 (-0.7-2.1)
How long				
1 day or less	3	1.8 (0.4-5.1)	1,547	1.4 (-0.7-3.6)
2-6 days	13	7.7 (4.1-12.7)	9,145	8.5 (2.8-14.2)
7-28 days	19	11.2 (6.9-16.9)	12,498	11.6 (5.6-17.7)
Stll using alternate source	97	57.1 (49.3-64.6)	62,797	58.4 (49.5-67.2)

*Of households reporting continuous use of alternative water source after the 'do not drink' advisory was lifted (n=136)

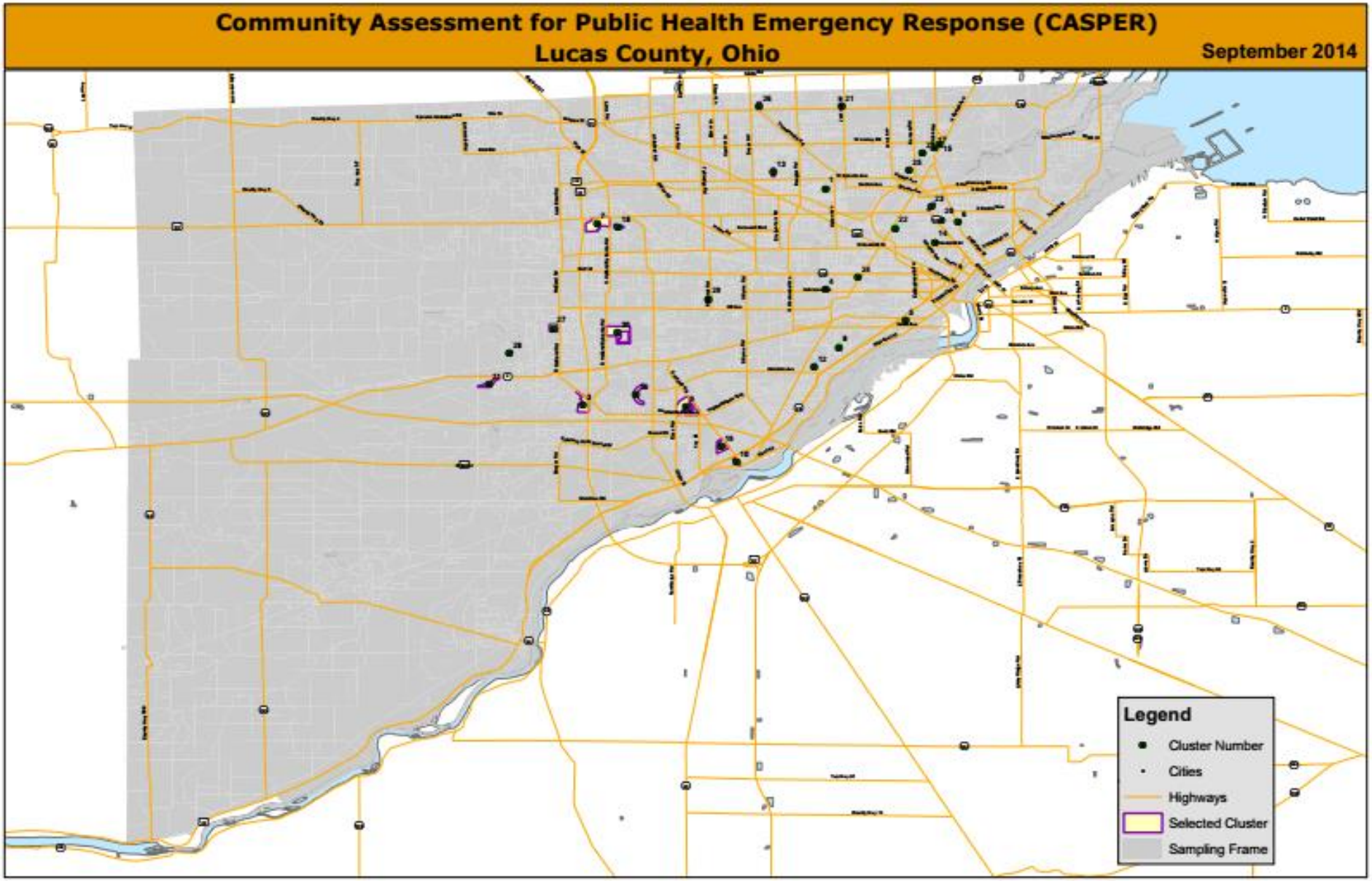
Table 24. Households seeking information on Harmful Algal Blooms

	Frequency (n=171)	% of households (95% CI)	Projected number of households	Weighted % (95% CI)
Looked up information regarding HAB	64	37.4 (30.2-45.1)	36,616	33.8 (25.7-42.0)
Where looked first				
Face-to-face	2	1.2 (0.1-3.2)	1,031	1.0 (-0.4-2.3)
Social media	2	1.2 (0.1-4.2)	1,238	1.1 (-0.5-2.8)
Radio	0	0	0	0
TV*	10	5.9 (2.8-10.5)	5,656	5.2 (2.4-8.1)
Newspaper	2	1.2 (0.1-4.2)	1,031	1.0 (-0.4-2.3)
Internet*	43	25.2 (18.8-32.3)	25,081	23.2 (16.4-29.9)
Other	4	2.3 (0.6-5.9)	2,269	2.1 (-0.4-4.6)

*Most common sources:

- Internet search engine
- Toledo Lucas County Health Department website
- WTOL 11

Figure 1. Sampling frame and selected clusters



Appendix A. Lucas County Toledo Water event CASPER questionnaire

Lucas County, Ohio CASPER- Toledo Water Event, August 2- August 4, 2014

To be completed by team BEFORE the interview

Q1. Date (MM/DD/YY):

Q2. Cluster Number:

Q3. Survey Number:

Q4. Interviewer Initials:

First, we would like to ask about basic household information.

Q5. Type of Structure: ☐ Single family ☐ Multiple unit ☐ Mobile home ☐ Other _____ ☐ DK ☐ Refused

Q6. Does your household own or rent this residence? ☐ Own ☐ Rent

Q7. How many people currently live in your household? _____

Q8. How many people living in your household are:
Less than 2 years old? _____ 2-17 years old? _____
18-64 years old? _____ More than 65 years old? _____ ☐ DK ☐ Refused

Q9. Does anyone in your household identify as Hispanic or Latino? ☐ Y ☐ N ☐ DK ☐ Refused

Q10. Which race categories does your household identify with? (Select all that apply)
☐ American Indian/Alaskan Native ☐ Asian/Pacific Islander
☐ Black or African American ☐ White ☐ Other race _____
☐ DK ☐ Refused

Q11. What is the highest level of education anyone in your household has completed?
☐ < High school ☐ High school/GED ☐ Some college ☐ 2yr degree ☐ 4yr degree
☐ Graduate ☐ Professional Degree ☐ DK ☐ Refused

Now, we would like to ask you about messaging and source(s) of water during the 'do not drink' advisory that occurred between August 2, 2014 and August 4, 2014.

Q12. When did anyone in your household first learn about the 'do not drink' advisory?
Date: 08/____/2014 Time of day: ☐ Morning ☐ Afternoon ☐ Evening
☐ Never heard about advisory ☐ Household was not under advisory ☐ DK ☐ Refused

Q13. How did your household FIRST LEARN about the 'do not drink' advisory? (Choose only ONE)
☐ Phone call on land line ☐ Phone call on cell phone ☐ Text message ☐ Radio
☐ TV ☐ Face-to-face talking to people ☐ Social media (e.g. Facebook, Twitter)
☐ Newspaper ☐ Internet ☐ Other (specify) _____ ☐ DK ☐ Refused

Q13b. From whom or where did your household FIRST LEARN about the 'do not drink' advisory (by the method in the previous question)? (Choose only ONE)
☐ Friend/neighbor ☐ Family/relative ☐ Co-worker ☐ Stranger ☐ Recorded message ☐ Internet (specify site): _____ ☐ Radio (specify station): _____
☐ TV (specify station): _____ ☐ Newspaper(specify): _____ ☐ DK ☐ Refused

Q14. Please list all sources of water that you had in your household at the time you first heard about 'do not drink' advisory. (Select ALL that apply)
☐ Municipal water from tap ☐ Municipal water processed with a home filter
☐ Well water ☐ Purchased water (e.g. bottled water) ☐ Other (specify) _____
☐ DK ☐ Refused

Q14b. Previous to the 'do not drink' advisory, was there a 3-day alternative source of water supply (for drinking, preparing food, and washing) 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 ☐ DK ☐ Refused

Q15. Where have members of your household received information about the 'do not drink' advisory since the event occurred? (Select ALL that apply)
☐ Word of mouth ☐ Social media (e.g. Facebook, Twitter) ☐ Radio ☐ TV ☐ Newspaper
☐ Internet (specify site): _____ ☐ Other: _____ ☐ DK ☐ Refused

Q15b. In your opinion, what was the most reliable source for information about the 'do not drink' advisory? (Choose only ONE)
☐ Word of mouth ☐ Social media (e.g. Facebook, Twitter) ☐ Radio ☐ TV ☐ Newspaper
☐ Internet (specify site): _____ ☐ Other: _____ ☐ DK ☐ Refused

Q16. What advice did your household get from the 'do not drink' advisory? (Select ALL that apply)
☐ Do not drink tap water ☐ Do not use tap water ☐ Not sure what the advice was
☐ I did not get any advice ☐ Do not boil tap water ☐ Other (specify) _____
☐ DK ☐ Refused

Q17. Did anyone in your household use municipal water from the tap in your home BEFORE the 'do not drink' advisory that occurred between August 2, 2014 and August 4, 2014? ☐ Y ☐ N ☐ DK ☐ Refused

IF NO, 17b. What source of water did your household use? (Select ALL that apply)
☐ Purchased water (e.g. bottled water) ☐ Well water on premises ☐ Rainwater
☐ Other (specify) _____ ☐ DK ☐ Refused

Q17c. Did anyone in your household use municipal water from the tap in your home at any point during the 'do not drink' advisory between August 2nd, 2014 and August 4th, 2014 for any of the following reasons? (Select ALL that apply)
☐ Did not use municipal water from tap during the advisory ☐ Drank the water
☐ Washed hands ☐ Brushed teeth ☐ Ate or drank food prepared with water
☐ Made baby formula ☐ Washed clothes ☐ Watered plants /lawn/garden
☐ Ran dishwasher/hand-washed dishes ☐ Gave water to pets
☐ Showered/bathed in water ☐ Other (specify) _____ ☐ DK ☐ Refused

Q18. During the 'do not drink' advisory, did anyone in your household try to get water from a source other than from your tap? ☐ Y ☐ N ☐ DK ☐ Refused

IF NO, skip to Q19

Q18b. When did anyone from your household FIRST ATTEMPT to get an alternative source of water for the household?
Date: 08/____/2014 ☐ DK ☐ Refused

Q18c. When did anyone from your household FIRST SUCCESSFULLY get an alternative source of water for the household?
Date: 08/____/2014 ☐ DK ☐ Refused

Q18d. Where did your household TRY TO GET alternative source(s) of water from during the 'do not drink' advisory? (Select ALL that apply)
☐ Large store or grocery ☐ Well water on premises ☐ Rainwater
☐ Nearby convenience store or gas station ☐ Water distribution site in my town of residence ☐ Water distribution site outside of my town of residence
☐ Water from a friend or relative ☐ Other (specify) _____ ☐ DK ☐ Refused

Q18e. Where was your household ABLE TO GET alternative source(s) of water during the 'do not drink' advisory? (Select ALL that apply)
☐ Large store or grocery ☐ Well water on premises ☐ Rainwater
☐ Nearby convenience store or gas station ☐ Water distribution site in my town of residence ☐ Water distribution site outside of my town of residence
☐ Water from a friend or relative ☐ Other (specify) _____ ☐ DK ☐ Refused

Q18f. What other water source(s) did your household USE during the 'do not drink' advisory? (Select ALL that apply)
☐ Purchased water (e.g. bottled water) ☐ Well water on premises ☐ Rainwater
☐ Water from a friend or relative ☐ Filled container(s) at water distribution site
☐ Bottled water from a water distribution site ☐ Other (specify) _____
☐ DK ☐ Refused

Q18g. If anyone in your household visited a water distribution site, how did you find out about the location? (Select ALL that apply)
☐ Phone call on land line ☐ Phone call on cell phone ☐ Text message ☐ Radio
☐ TV ☐ Face-to-face talking to people ☐ Social media (e.g. Facebook, Twitter)
☐ Newspaper ☐ Internet ☐ Other (specify) _____ ☐ DK ☐ Refused

Q18h. Did anyone in your household travel outside of the affected area to get alternative source(s) of water during the 'do not drink' advisory? (Select ALL that apply)
☐ Yes, to purchase water ☐ Yes, got water from friend/relative
☐ Yes, but did not get water ☐ No ☐ DK ☐ Refused

Q19. How long was your household without ANY alternative source of drinking water during the 'do not drink' advisory?
☐ My household was never without an alternative source of drinking water
☐ less than 1 day ☐ #__ days ☐ DK ☐ Refused

IF NEVER, skip to Q20

Q19b. What was the reason your household was without an alternative source of drinking water for one or more days? (Select ALL that apply)
☐ 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 (specify) _____
☐ DK ☐ Refused

Now, we would like to ask you some questions about the impact of the 'do not drink' advisory event on your household.

Q20. 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 ☐ DK ☐ Refused

Q20b. If you have children in your household in daycare/preschool or grades K-12, did any of their schools or daycares close due to the 'do not drink' advisory?
☐ Yes ☐ No ☐ N/A (children do not go to school or daycare/preschool)
☐ N/A (do not have children) ☐ DK ☐ Refused

IF NO or NA, skip to Q21

Q20c. Did anyone in the household have to take off from work to care for them? (Select ALL that apply) ☐ Yes ☐ No, they did not require supervision
☐ No, unpaid friend/relative was able to supervise them
☐ No, someone was paid to supervise them ☐ Other (specify) _____
☐ DK ☐ Refused

Q21. Was any member of your household told not to come in to work because of the 'do not drink' advisory? (Select ALL that apply)
☐ Yes, with paid leave ☐ Yes, with unpaid leave ☐ No ☐ Other (specify) _____
☐ DK ☐ Refused

Now, we would like to ask your some questions about the health of members of your household.

Q22. Since the 'do not drink' advisory on August 2, 2014, did anyone in your household have any health issues they felt were related to the 'do not drink' advisory?
☐ Y ☐ N ☐ DK ☐ Refused

IF NO, skip to Q23

Q22b. How many people in your household feel they had health issues related to the 'do not drink' advisory? ☐# __ less than 18 years ☐# __ 18 years old or older?
☐ DK ☐ Refused

Q22c. What type of health issues did you or your household members have? (Select ALL that apply)
☐ Nausea ☐ Vomiting ☐ Abdominal pain ☐ Diarrhea
☐ Rash ☐ Skin irritation/itching ☐ Headache ☐ Eye irritation/pain
☐ Respiratory illness/cough ☐ Other (specify) _____ ☐ DK ☐ Refused

Q22d. When did the symptom(s) start? (Select ALL that apply)
☐ Before the 'do not drink' advisory ☐ During the 'do not drink' advisory ☐ After the 'do not drink' advisory was lifted ☐ Other (specify) _____ ☐ DK ☐ Refused

Q22e. Where was medical care sought? (Select ALL that apply)
☐ Did not seek medical care ☐ Primary care physician/provider ☐ Urgent care
☐ Emergency room ☐ Was admitted to the hospital ☐ Other (specify) _____
☐ DK ☐ Refused

Q22f. If household members did NOT seek medical care, what were reason(s) for not doing so? (Select ALL that apply)
☐ Health issues were not serious enough to seek medical care ☐ No insurance
☐ No transportation ☐ Concerned about the cost of seeking medical care
☐ Routine medical/mental health services were interrupted
☐ Other (specify) _____ ☐ DK ☐ Refused

Q22g. How long did symptoms last?
☐ Less than a week ☐ Greater than a week ☐ Month ☐ Ongoing
☐ DK ☐ Refused

Q23. If routine medical/mental health services were interrupted due 'do not drink' advisory, what type(s) of services were interrupted? (Select ALL that apply)
☐ Routine medical/mental health services were not interrupted ☐ Dialysis ☐ Dental
☐ Podiatric (foot) ☐ Outpatient surgical ☐ Mental health services
☐ Other (specify) _____ ☐ DK ☐ Refused

Q24. Since the 'do not drink' advisory, has anyone in your household experienced any of the following mental health issues they felt were related to the 'do not drink' advisory? (Select ALL that apply)
☐ Agitated behavior ☐ Anxiety or stress ☐ Difficultly concentrating ☐ Loss of appetite
☐ Trouble sleeping/nightmares ☐ Alcohol/drug use ☐ Witnessed or experienced violence ☐ Other (specify) _____ ☐ N ☐ DK ☐ Refused

Q25. During 'do not drink' advisory, did anyone in your household have difficulty taking medications as prescribed? ☐ Y ☐ N ☐ DK ☐ Refused

IF NO, skip to Q26

Q24b. What were the reasons? (Select ALL that apply)
☐ Clinic/physician closed ☐ Pharmacy closed ☐ Alternative water source not available to take medications orally ☐ Other (specify) _____ ☐ DK ☐ Refused

Q26. Did any of your pets have any illness that you felt was related to the 'do not drink' advisory?
☐ Y ☐ N ☐ DK ☐ Refused

IF NO, skip to Q27

Q26b. What type of symptoms did your pets have? (Select ALL that apply)
☐Vomiting ☐Abdominal pain ☐Diarrhea ☐Rash ☐Skin irritation/itching
☐ Eye irritation/pain ☐Respiratory illness/cough ☐ Other (specify) _____
☐ DK ☐ Refused

Q26c. Did you seek veterinary care for your animal(s)?
☐ Y ☐ N ☐ DK ☐ Refused

Finally, we would like to ask you some questions about your household after the 'do not drink' advisory was lifted.

Q27. When did anyone in your household first learn that the 'do not drink' advisory was lifted for your household? Date: 08/____/2014 ☐ DK ☐ Refused

Q28. How did your household FIRST LEARN that the 'do not drink' advisory was lifted? (Choose only ONE)
☐ Phone call on land line ☐ Phone call on cell phone ☐ Text message ☐ Radio
☐ TV ☐ Face-to-face talking to people ☐ Social media (e.g. Facebook, Twitter)
☐ Newspaper ☐ Internet ☐ Other (specify) _____ ☐ DK ☐ Refused

Q28b. From whom or where did your household FIRST LEARN that the 'do not drink' advisory was lifted? (Choose only ONE)
☐ Friend/neighbor ☐ Family/relative ☐ Co-worker ☐ Stranger ☐ Recorded message ☐ Internet (specify site): _____ ☐ Radio (specify station): _____
☐ TV (specify station): _____ ☐ Newspaper(specify): _____ ☐ DK ☐ Refused

Q28c. How did your household receive information on how to flush your household plumbing system? (Select ALL that apply)
☐ 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 ☐Did not receive information
☐ Other (specify) _____ ☐ DK ☐ Refused

Q29. After the 'do not drink' advisory was lifted on August 4, 2014, did anyone in your household continue to use an alternative water source?
☐ Y ☐ N ☐ N/A (Have always used bottled water, well water, or rainwater from 18b)
☐ DK ☐ Refused

IF NO or NA, skip to Q30

Q29b. For what purposes? (Select ALL that apply)
☐Drank the water ☐Washed hands ☐Brushed teeth ☐Ate or drank food prepared with water ☐Made baby formula ☐Washed clothes ☐Watered plants /lawn/garden
☐Ran dishwasher/hand-washed dishes ☐Gave water to pets
☐Showered/bathed in water ☐Other (specify) _____ ☐ DK ☐ Refused

Q29c. How long did anyone in your household continue to use an alternative water source?
Days: ___ Weeks: ___ ☐ Still using alternate water source ☐ DK ☐ Refused

Q30. Between August 2, 2014 and August 4, 2014, did anyone in your household visit any Lake Erie beach for work or recreation? ☐ Y ☐ N ☐ DK ☐ Refused

Q31. Has anyone in your household looked for information or answers to questions about Harmful Algal Blooms? ☐ Y ☐ N ☐ DK ☐ Refused

IF NO, skip to Q32

Q31b. Where did you look first? (Choose only ONE)
☐ Face-to-face talking to people ☐ Social media (e.g. Facebook, Twitter) ☐ Radio
☐ TV ☐ Newspaper ☐ Internet (specify site): _____ ☐ Other (specify) _____
☐ DK ☐ Refused

Q32. Do you have any additional comments or questions about the 'do not drink' advisory that occurred between August 2, 2014 and August 4, 2014?

Thank you for your time!

Appendix B. Harmful Algal Bloom (HAB) Material

Lucas County, Ohio CASPER- Toledo Water Event, August 2- August 4, 2014
Introduction and Consent

Hello, we are _____and_____ with the Toledo-Lucas County Health Department. We have some information we would like to leave with you related to Harmful Algal Blooms following the recent water events in Lucas County.

Also, we are talking to residents in **Lucas County** about their health and possible exposure they may have had to drinking water between August 2 – August 4, 2014 during the 'do not drink' advisory. Our goal is to get a better idea of the potential impacts of the Toledo water event on households and assess communications to identify effective approaches to health events. Your house is one of many that have been randomly chosen to be in this survey. If you agree to participate, we will ask you some general questions about your house and the people who live there and questions about drinking water contact during the 'do not drink' advisory that occurred between August 2 – August 4, 2014. The survey should take no more than 15 minutes to complete. We will keep your answers private. You can refuse to take part in the survey or refuse to answer any of the questions. Nothing will happen to you or your household if you choose not to take part in the survey.

You may have questions about this survey. If so, you can ask anyone here right now. If you would like to confirm that we were sent by the Toledo-Lucas County Health Department, you can call Samantha Eitniear at 419-213-4073 or 419-276-8955.

Are you willing to participate in this survey?

*[WAIT FOR RESPONDENT TO CLEARLY ANSWER **YES** OR **NO**].*

Thank you very much for your time.

TOLEDO-LUCAS COUNTY HEALTH DEPARTMENT
Stay informed. Stay healthy.

Harmful Algal Blooms

What Are Blue-Green Algae?

Cyanobacteria, often called blue-green algae, are bacteria that are naturally found in Ohio lakes, ponds, and slow-moving streams. Although many species of algae do not produce toxins, some species of bluegreen algae can cause Harmful Algal Blooms (HABs). HABs can produce neurotoxins (which affect the nervous system) and hepatotoxins (which affect the liver). These toxins can potentially impact the health of people who come into contact with water where HABs are present in high numbers.

Why does massive growth of blue-green algae occur?

Under the right water conditions, which usually occur in the warmer months, the number of these blue-green algae can dramatically increase, or "bloom." Some blooms can be visible as thick mats or scum on the surface of the water, while others can be present without visible surface scum. The mats or scum can vary in color and could be bluish-green to red .

It is important to note that not all "blooms" produce toxins. Scientists do not fully understand what causes the same species of algae to trigger toxin production during one bloom and not produce toxin during the next.

Blue-green algae need warm temperatures, sunlight, phosphorus, and nitrogen to reproduce. Phosphorus and nitrogen are commonly found in animal and human waste and in fertilizers. Some common ways for phosphorus and nitrogen to enter lakes and streams are from agricultural and residential lawn runoff and improperly functioning septic systems, and erosion of nutrient-rich soil.

Can you get sick from exposure to blue-green algae?

Yes, you can get sick from exposure to cyanobacteria toxins. But getting sick will depend on the type of cyanobacteria, the levels in the water and the type of contact you had with this "algae."

Can the cyanobacteria toxins be released to the outside air and pose a health hazard?

The chemical toxins produced by these blue-green algae do not volatilize (change from a liquid to a gas) and they are not released as vapors to the outside air. However, recreational activities like power boating, water-skiing, jet-skiing and tubing can whip up the surface of the water and create aerosols – toxincontaining water droplets – that can be inhaled or ingested, potentially resulting in negative health effects. Other activities that have the potential to aerosolize the lake water include using the lake water to irrigate (spray) lawns/gardens and golf courses.

Are the odors associated with blue-green algae hazardous to my health?

Some of the blue-green algae produce an odorgenerating byproduct, named geosmin. The human nose is extremely sensitive to geosmin and is able to detect it at concentrations at very low levels. These odors are not chemically toxic but do have a very unpleasant smell which can cause sensitive individuals to become nauseated (upset stomach, vomiting) and have headaches.

Source: ODH

For more information, contact the Toledo-Lucas County Health Department Division of Community Services at 419-213-4100

6/18/2014

How do you come in contact with blue-green algae and HABs?

- Ingestion (drinking) untreated water or incidentally swallowing water during recreational activities that comes from a lake or reservoir with HABs.
- Dermal (skin) contact by swimming and other recreational activities in HAB-contaminated waters.
- Inhaling aerosolized water droplets (misting) from water-related activities such as jet-skiing, power boating, tubing, or water skiing.
- The incidental swallowing or inhalation of aerosolized water droplets when watering lawns, gardens and golf courses with contaminated water.

What types of health problems can people and pets experience from exposure to HIGH concentrations of HABs?

- **Skin contact:** Contact with the skin may cause rashes, hives, or skin blisters
- **Inhalation of (breathing) water droplets:** Breathing aerosolizing (suspended water droplets-mist) from the lake water-related recreational activities and/or lawn irrigation can cause runny eyes and noses, a sore throat, asthma-like symptoms, or allergic reactions.
- **Swallowing water:** Swallowing HAB contaminated water can cause: immediate severe diarrhea and vomiting , abnormal liver function, abdominal pain, diarrhea and vomiting, weakness, salivation, tingly fingers, numbness, dizziness, difficulties breathing, and death .

Is it safe to eat fish caught from HAB contaminated water?

Some studies have shown that cyanotoxins can accumulate in fish in waters with high toxin levels. While there have been no confirmed reports of cyanotoxin-related human health effects related to fish consumption, there are few data on cyanotoxins on which to base judgments about health risk. Should you decide to consume fish, you would do so at your own risk, and should remove intestines, fat and skin, consuming only the fillet.

How to protect yourself, your family, and your pets from exposure to HABs:

- Don't swim, water-ski, or boat in areas where the blooms are occurring – avoid direct contact with the lake water.
- Don't water lawns, gardens, or golf course with water from HAB-impacted lakes or ponds.
- Report unpleasant tastes or smells in your drinking water to your local water utility.
- Follow posted water closures announced by state agencies or local public health authorities.

How to treat people or animals that have been exposed to HAB toxins:

- If you do come into contact with the HAB – contaminated water, rinse off with clean, fresh water as soon as possible.
- Pets that have been swimming in an area with an algae bloom may ingest significant amounts of toxins by licking their fur after leaving the water. Thoroughly rinse of your pets with clean, fresh water.
- Seek medical treatment ASAP if you think you, your pet, or your livestock might have been poisoned by toxic HABs.
- Remove people from the exposure and treat the symptoms.

For additional information:

For more in-depth analysis and documentation, visit the CDC and ODH HAB public health documents and resources available on the ODH HAB web site http://www.odh.ohio.gov/odhprograms/eh/HABs/algalblooms.aspx

For a one-stop shop for the current algae information in Ohio, visit www.Ohioalgaeinfo.com

References: Harmful Algal Blooms www.cdc.gov/hab/cyanobacteria/pdfs/facts.pdf

CDC, Environmental Hazards & Health Effects, Harmful Algal Blooms (HABs), http://www.cdc.gov/nceh/hsb/hab/default.htm

Ohio | Department of Health
Department of Natural Resources
Environmental Protection Agency

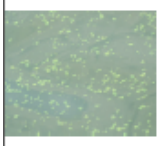
Harmful Algal Blooms

BE AWARE

ohioalgaeinfo.com








What is a Harmful Algal Bloom?

A harmful algal bloom (HAB) is a large growth of bacteria that can produce toxins. These toxins may affect the liver, nervous system and/or skin.

How dangerous are HABs?

If you touch HABs, swallow water with HAB toxins or breathe in water droplets, you could get a rash, have an allergic reaction, get a stomach ache, or feel dizzy or light-headed. HABs also are toxic to pets.

Always look for HABs before going in the water. Check for HAB advisories on www.ohioalgaeinfo.com. Ask the park manager if there has been a recent HAB because colorless toxins can still be in water.

How will I know if there is a HAB?

HABs have different colors and looks. Some colors are green, blue-green, brown, black, white, purple, red and black. They can look like film, crust or puff balls at the surface. They also may look like grass clippings or dots in the water. Some HABs look like spilled paint, pea soup, foam, wool, streaks or green cottage cheese curd.

What should I do if I see a HAB?

- Stay out of water that may have a HAB.
- Do not let your children or pets play in HAB debris on the shore.
- After swimming or wading in lake water, even where no HABs are visible, rinse off with fresh water as soon as possible.
- Never swallow any lake or river water, whether you see HABs or not.
- Do not let pets lick HAB material from their fur or eat HAB material.
- Do not drink or cook with lake water.
- See a doctor if you or your children might be ill from HAB toxins. If your pet appears ill, contact your veterinarian.

What about fishing and other activities?

If you plan to eat the fish you catch, remove the guts and liver, and rinse fillets in tap water before eating.

Other activities near the water such as camping, picnicking, biking and hiking are safe. If you are picnicking, wash your hands before eating if you have had contact with lake water or shore debris.

For general HAB information, current advisories and forms to report HAB locations

ohioalgaeinfo.com