

Highlights of a Community Health Assessment Following Detection of Microcystin Toxin in a Municipal Water Supply

September 2014



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Harmful Algal Blooms



- Cyanobacteria
 - Blue-green algae
 - Found in lakes, ponds, and slow-moving rivers
 - Many species **do not** produce toxins
- Harmful Algal Blooms (HABs)
 - Shallow body of fresh water, warm temperature, sunlight, excessive amounts of nutrients in the water.
 - Numbers of blue-green algae can dramatically increase or "bloom"
 - **Can produce toxins** (e.g. neurotoxins, hepatotoxins, dermatotoxins)



Toledo Water Crisis-- Timeline



- **August 1**
 - Microcystin toxin detected in finished water at Collins Park Water Treatment Plant in Toledo, Ohio
- **August 2**
 - 'Do not drink' advisory issued
 - ~450,000 individuals affected
- **August 4**
 - 'Do not drink' advisory lifted
- **Novel event**
 - Carroll Township- September 2013



Aerial View of Western Lake Erie



Objectives



- Characterize the population residing in the affected areas
- Assess the impact of the Toledo water event on households
- Assess communication efforts to identify effective approaches for current and future health events

What is CASPER?



- Community Assessment for Public Health Emergency Response (**CASPER**)
- A technique which provides **household-based** information about the needs of a community
- Multi-stage probability sampling

Why CASPER?



- **Quick and reliable**
- **Flexible**
- Can be used in **disaster** or **non-disaster** settings
- Fosters teamwork across agencies



Planning



- Institutional Review Board (IRB) Submission
 - Study proposal and plan
- Volunteer Recruitment

HAB CASPER

What is CASPER?
The Community Assessment for Public Health Emergency Response (CASPER) enables public health practitioners and emergency management officials to determine rapidly the health status and basic needs of the affected community. CASPER uses valid statistical methods to gather information about health and basic needs, allowing public health and emergency managers to prioritize their response and distribution of resources accurately.



What is a HAB?
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.



What does that all mean?
Toledo-Lucas County Health Department (TLCHD) has been partnering with the Ohio Department of Health (ODH) and receiving technical support from the Centers for Disease Control and Prevention (CDC) to conduct a CASPER as it relates to HABs. Following an algal bloom, TLCHD will be partnering with the Medical Reserve Corps (MRC) in Lucas County and Northwest Ohio to survey 210 households in a given geographic area.

What are the objectives of this project?

- Assess the impact of the Toledo water event on households.
- Characterize the population residing in the affected area.
- Assess communications to identify effective approaches for current and future events.

What is the proposed timeline?
The Community Assessment will take place on September 11 and 12. Prepare to arrive on September 11 at 12:45 pm to go through Just in Time Training at the Toledo-Lucas County Health Department (635 North Erie Street Toledo, Ohio 43604). Following the training, teams of two will be sent out to sampling areas in Lucas County to conduct door-to-door surveys between 3:30 and 8:30 pm. For September 12, plan to arrive at 2:45 pm to conduct door-to-door surveys between 3:30 and 8:30 pm. Volunteers would be asked to participate for at least 6 hours per day.

How to Prepare/What to Bring?
Arrive with an open mind, identification, and comfortable walking shoes. Water, sandwiches and light snacks will be provided. Please RSVP at: <https://www.eventbrite.com/e/hab-casper-tickets-12797470579>

Where do I Park?
The Salvation Army has agreed to allow individuals participating in CASPER to park in their lot 620 North Erie Street (across the street from TLCHD)

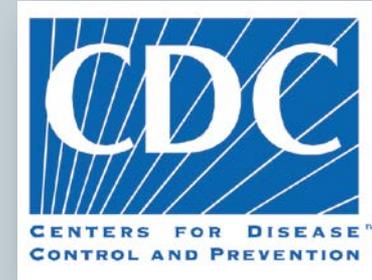
Questions or Concerns?
Contact Samantha Etnier with TLCHD at setnier@co.lucas.oh.us or 419-213-4073.



Planning



- CDC Technical Assistance
- Police Notification
- Assemble Interview Teams
- Just-in-Time Training

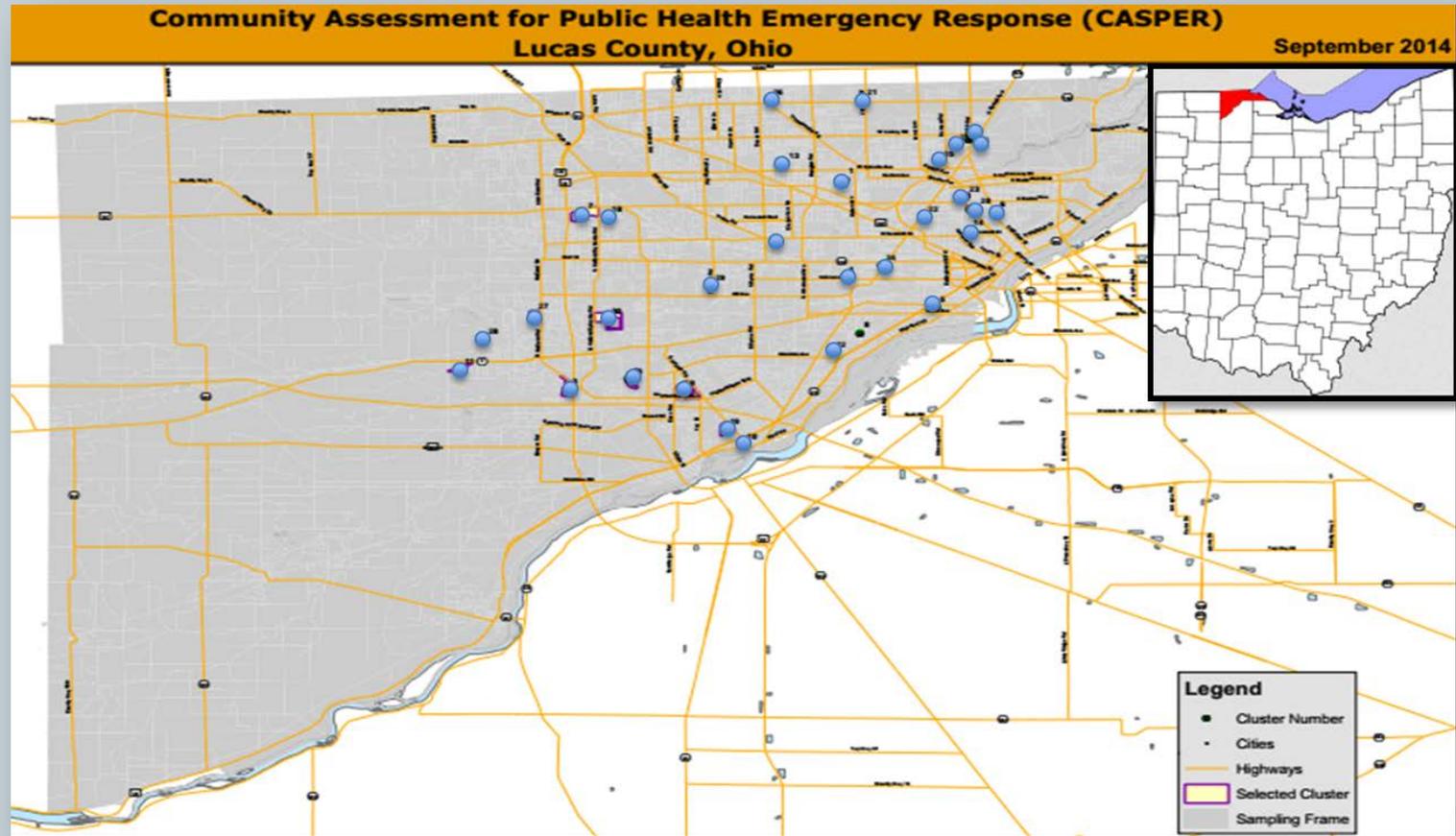


Sampling Design



- **Sampling frame**
 - Households who received water from the Collins Park Water Treatment Plant in Lucas County, Ohio
- **Two-stage cluster probability sampling**
 - 30 clusters
 - 7 households systematically chosen from each cluster
- **Household Interview**

Sample area and selected clusters: Lucas County, Ohio



Data Collection



- Questionnaire → **32 questions**
- Interview ~**15 minutes**
- Interview Teams
- Survey collection time → **29 hours**
- **647** houses approached and **171** interviews completed



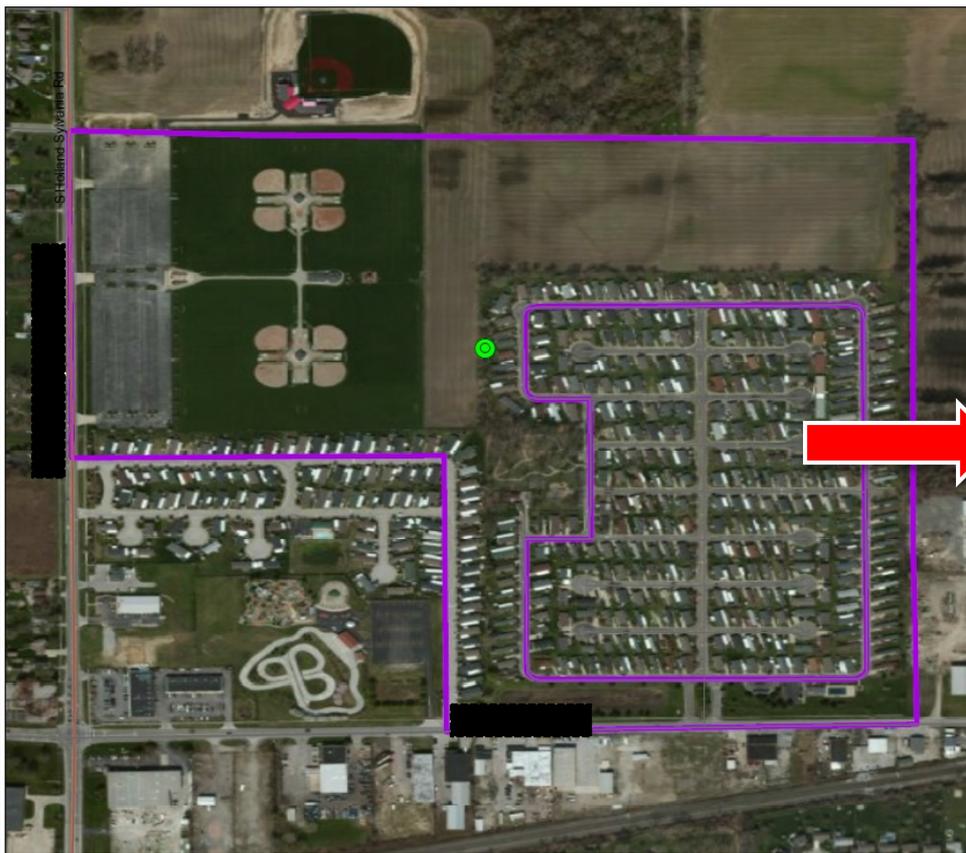


UNITED STATES
DEPARTMENT
OF HEALTH AND
HUMAN SERVICES

Community Assessment for Public Health Emergency Response (CASPER)



Sept 2014



Ohio

COUNTY : Lucas
TRACT : [REDACTED]
BLOCK : 1016
CLUSTER : 30
SAMPLES 7

Reference Point:
Longitude : [REDACTED]
Latitude : [REDACTED]

NOTES:
Approx HHs = 159

LEGEND:

- Interstates
- Major Highways
- Streets
- Clusters
- Waterways

0.01
Miles

Map Produced By :

GRASP

GEOSPATIAL RESEARCH, ANALYSIS,
AND SERVICES PROGRAM
DIV OF HEALTH STUDIES, ATSDR, CDC

Data Analysis



- Weighted analysis to adjust for non-random sampling and obtain population estimates

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



Response Rates

Questionnaire response (n=171)	Percent	Rate	Description
<i>Completion</i>	81.4%	171/210	Total completed/210
<i>Cooperation</i>	54.5%	171/314	Total completed/total contact made
<i>Contact</i>	26.4%	171/647	Total completed/total selected

Household Demographics

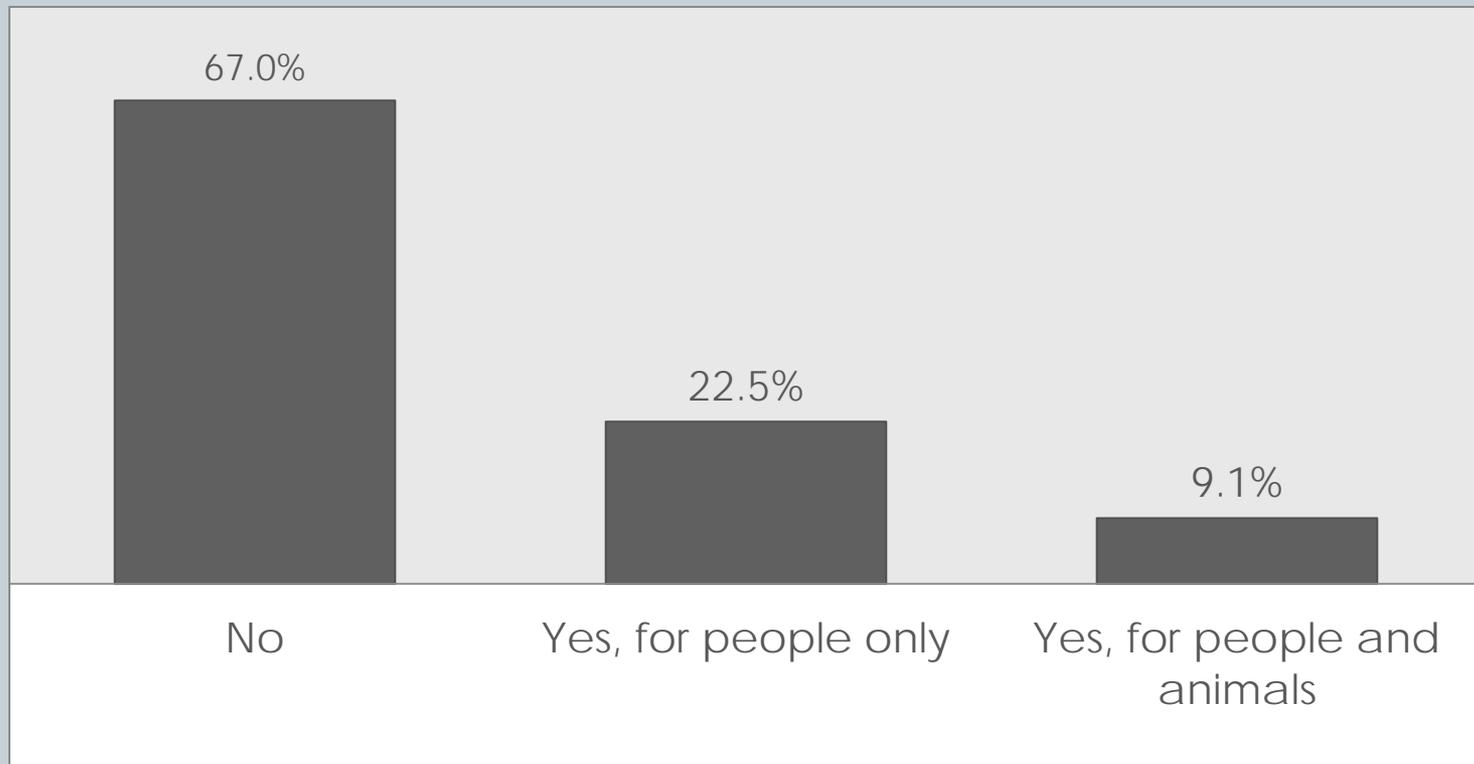


	Frequency (n=171)	% of HH	Projected HH	Weighted %	95% CI
Age groups					
Less than 2 years	16	9.5	8,630	8.1	4.3-11.9
2-17 years	78	46.4	51,692	48.5	39.2-57.8
18-64 years	147	87.5	93,362	87.6	81.7-93.6
65 or greater	34	20.2	24,462	23.0	13.9-32.0
Ethnicity					
Hispanic or Latino	18	10.6	12,652	11.7	5.1-18.4
Race					
American Indian/Alaskan Native	6	3.5	3,301	3.1	0.3-5.8
Asian/Pacific Islander	3	1.8	1,934	1.8	-0.3-3.9
Black or African American	50	29.2	32,422	29.9	17.2-42.7
White	119	69.6	74,152	68.5	55.3-81.7
Other race	7	4.1	5,192	4.8	0.6-9.0

Household Preparedness



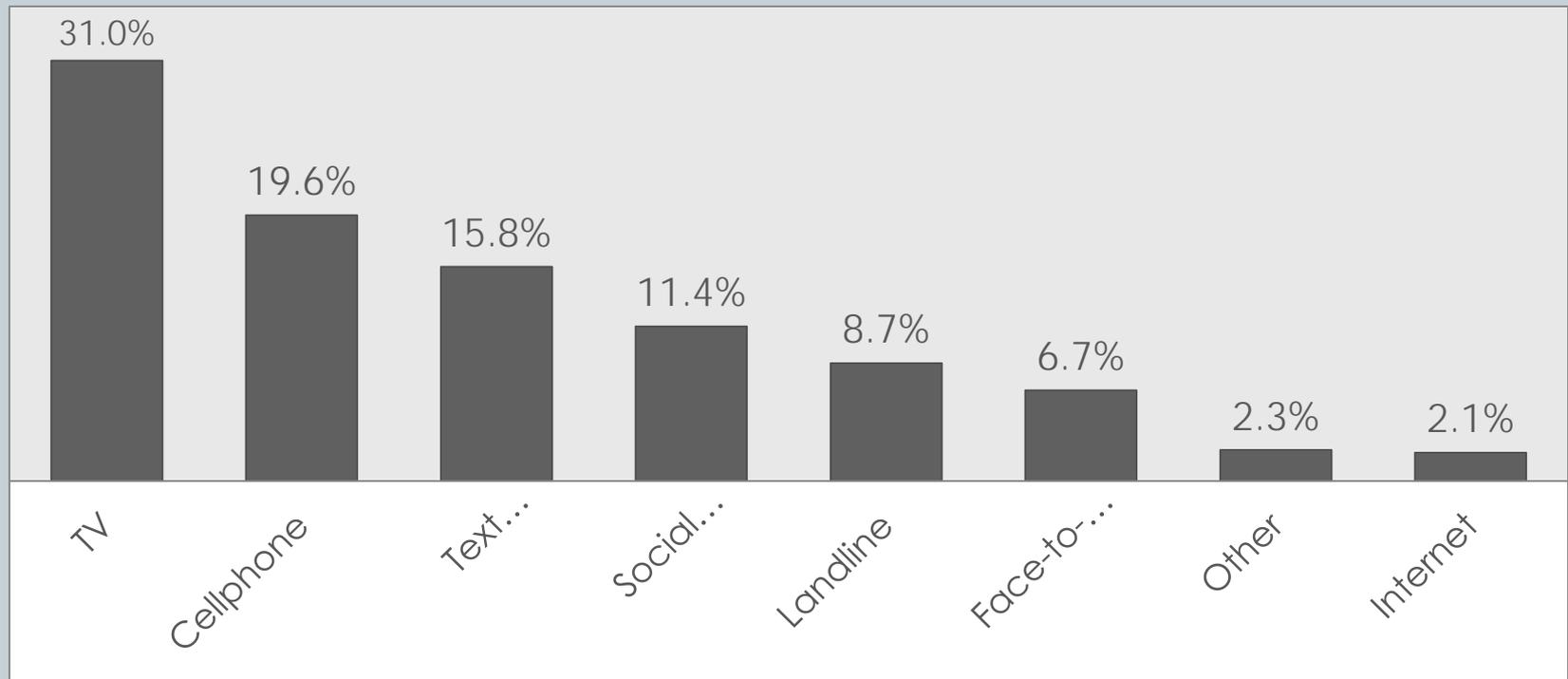
3-day alternative water supply prior to the advisory
(n=168)



Household Communications



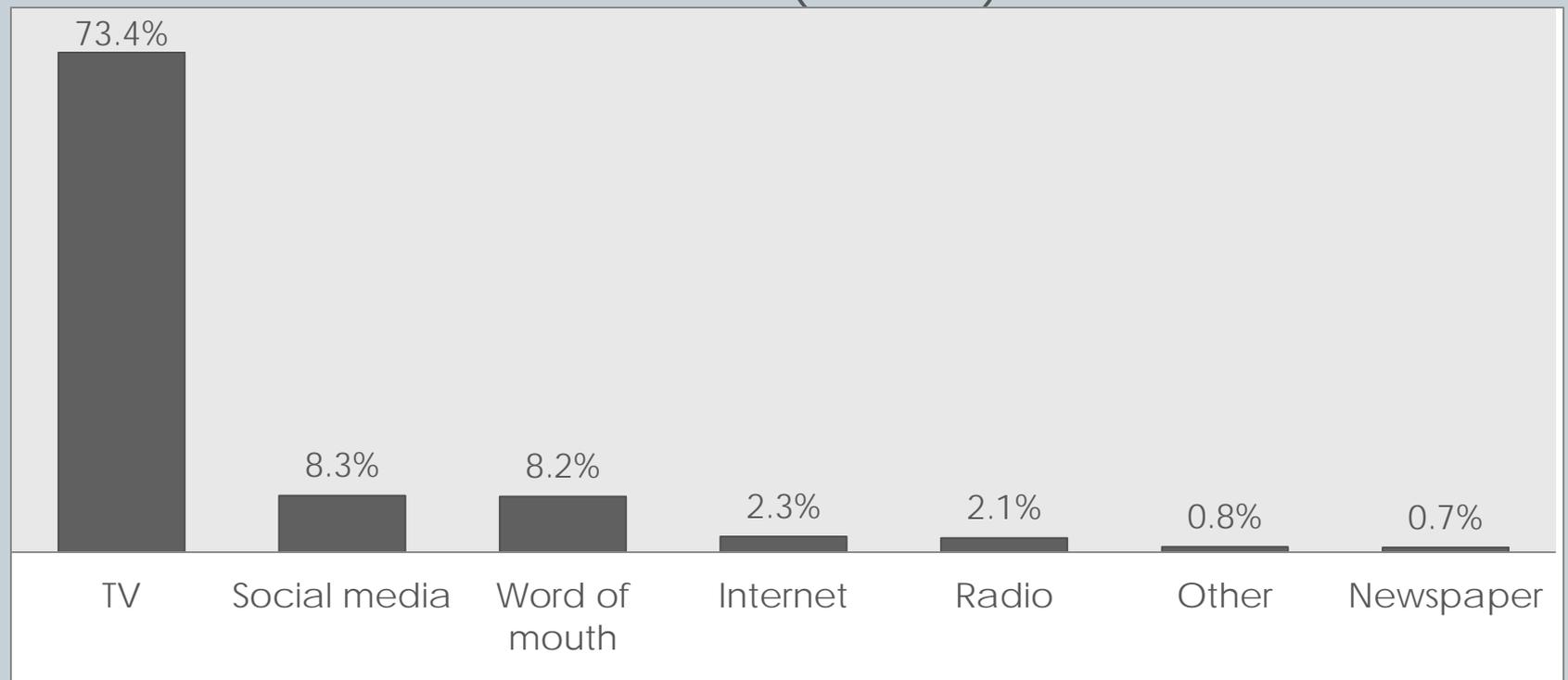
How households first learned about the 'do not drink' advisory (n=170)



Household Communications



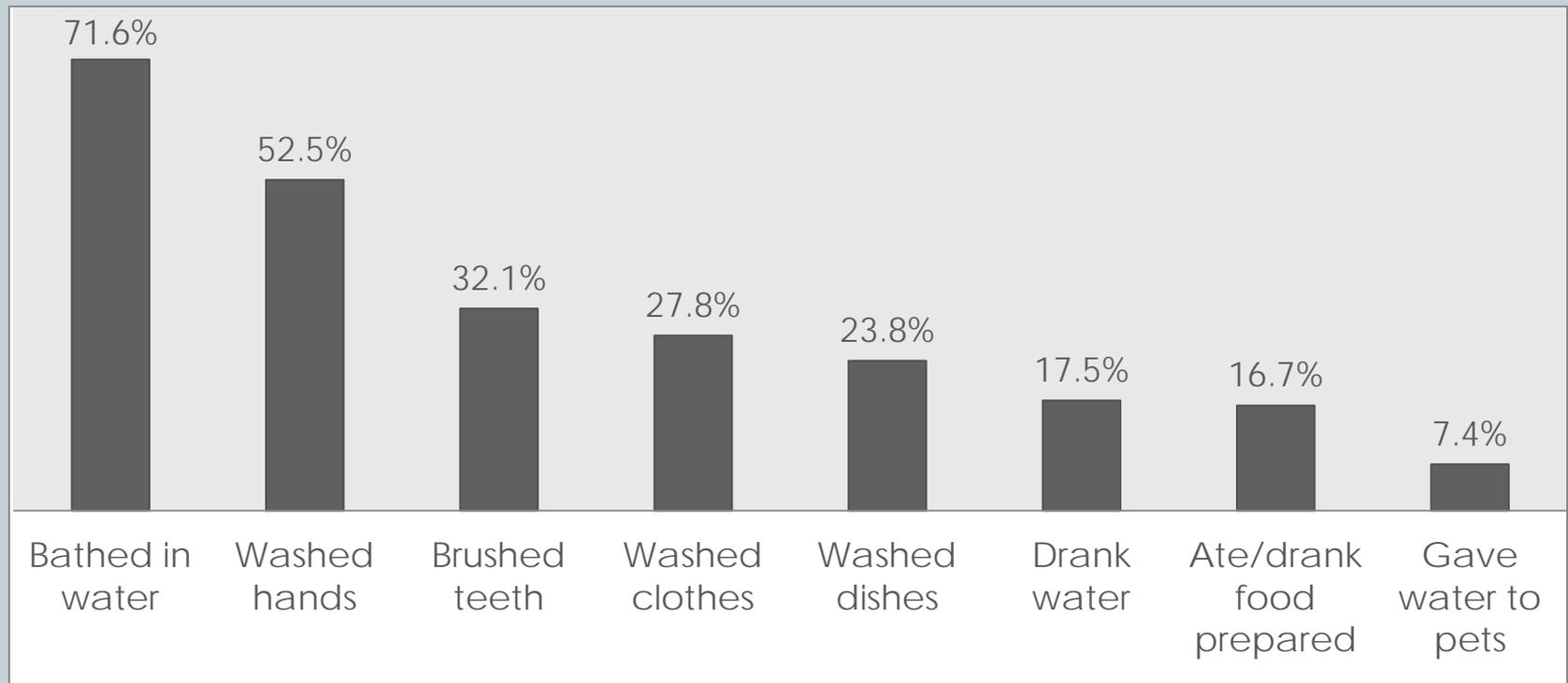
Household source of information considered most reliable (n=170)



Household Use of Municipal Water



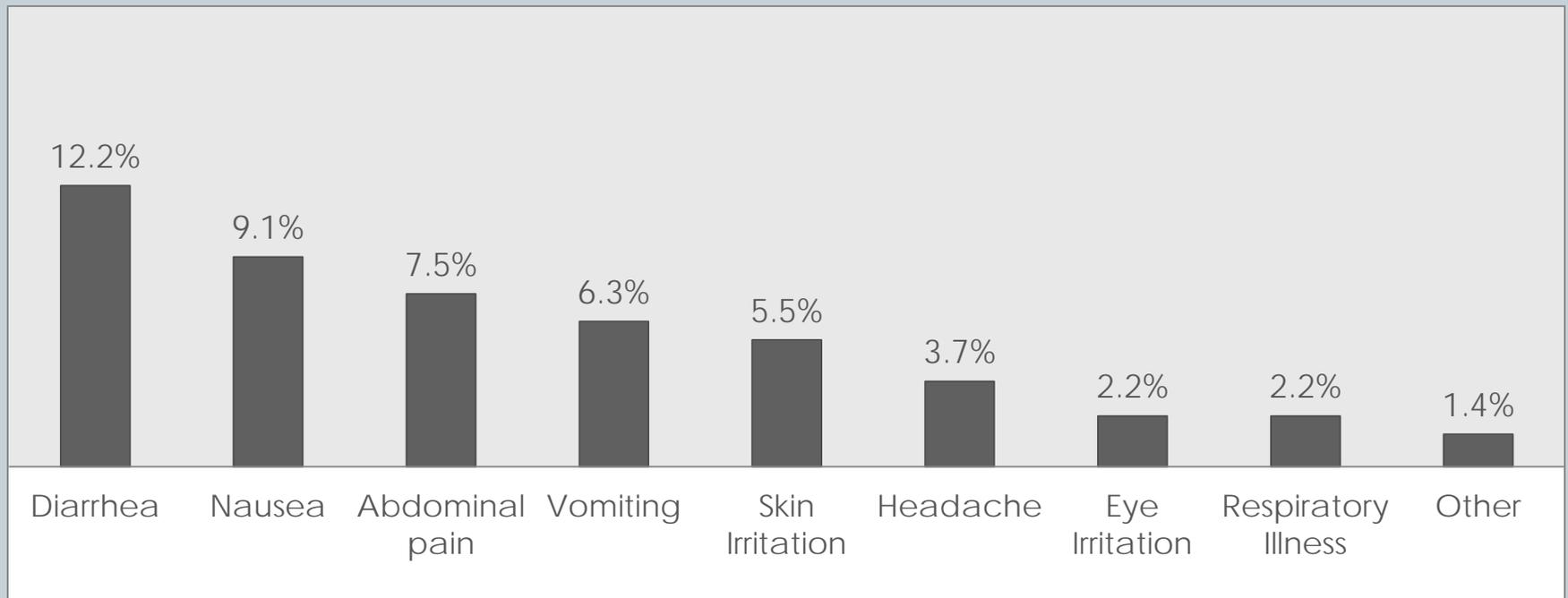
Use of municipal water from the tap DURING the advisory (n=107)



Household Health Impact



Household self-reported health impact (n=170)



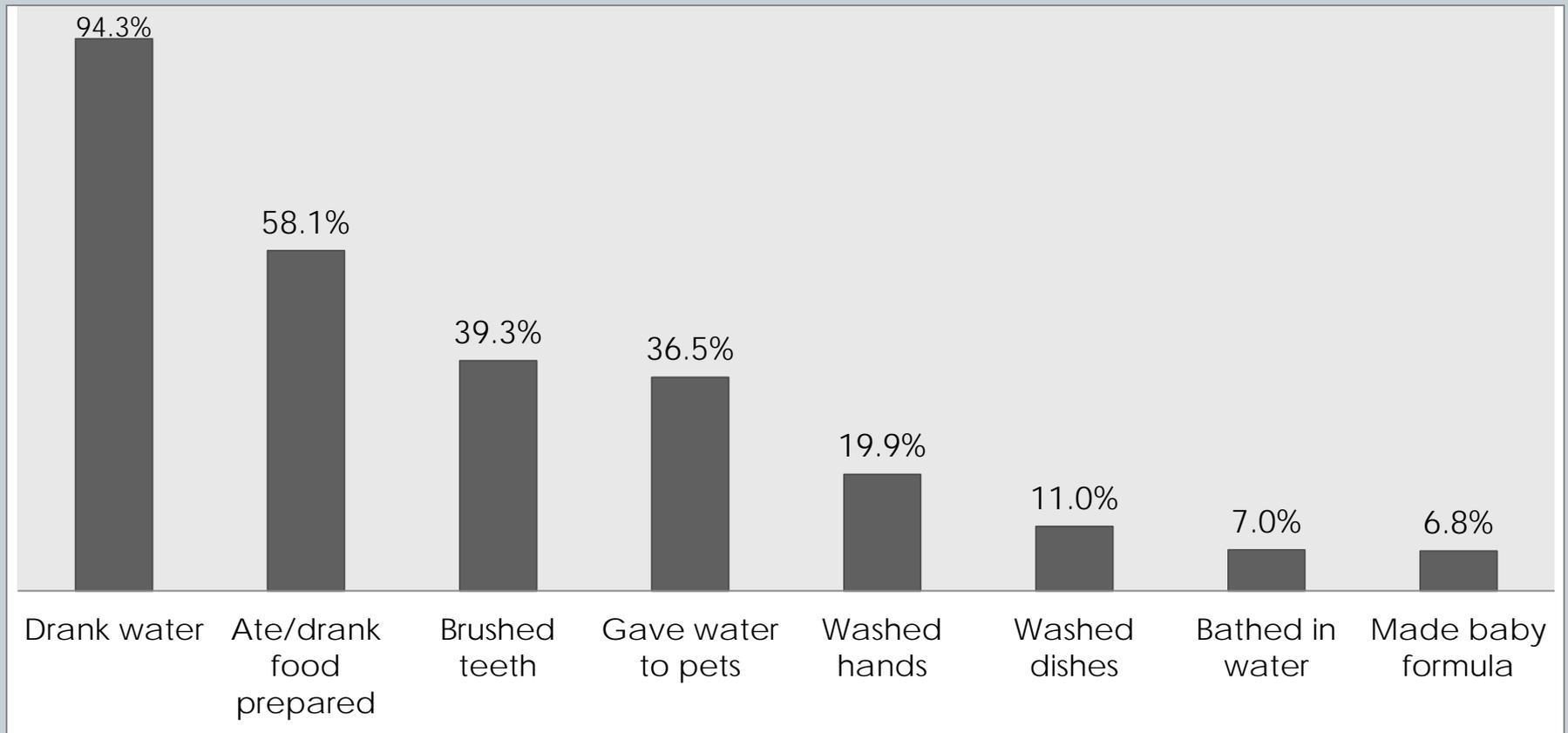
Self-reported mental health related to the 'do not drink' advisory



- Anxiety/stress → 7.2%
- Loss of appetite → 5.0%
- Trouble sleeping/nightmares → 4.3%

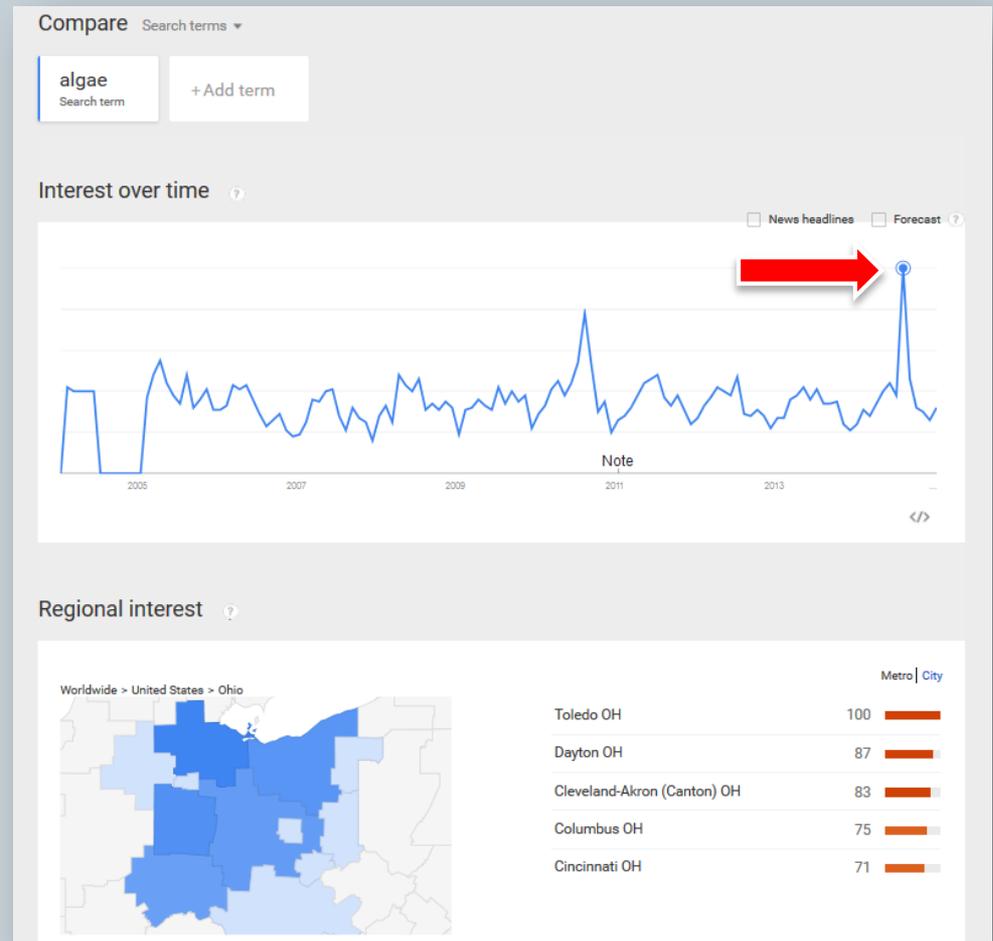
Household Use of Alternative Water Source(s)

Use of alternative water source(s) AFTER the advisory
(n=136)



Households seeking information on HABs

- 34% of households sought information about HABs
- 23% utilized the Internet



Recommendations: Considerations for future emergency planning



- **Promote water preparedness** for all households
- Identify ways to **provide alternative water supplies** in future emergencies, particularly to vulnerable populations

Recommendations: Considerations for future health messaging

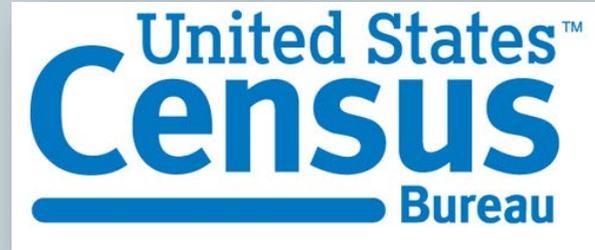


- Public messaging should **focus on television**, while also employing multiple supplemental communication routes during disasters where communication infrastructure is intact
- **Publicize** health and mental health **resources**
- **Increase community education** on current water recommendations

Limitations



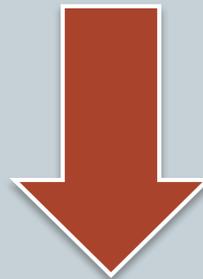
- Sampling weights based on **2010 Census** data



- Survey **recall bias**



- **Low** contact rate



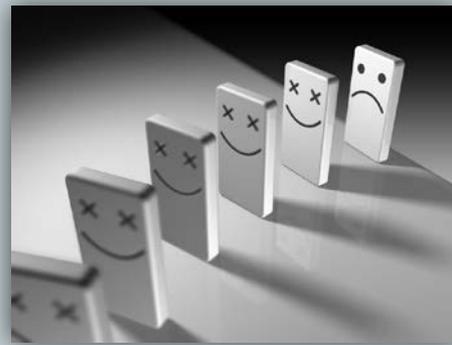
Limitations



- Volunteer Safety



- Causality



Final Report



➤ Released March 31st, 2015

Community Assessment for Public Health Emergency Response (CASPER)
Following Detection of Microcystin Toxin in a Municipal Water Supply
Lucas County, Ohio

September, 2014

Next Steps



- Application of findings to emergency preparedness activities
- Utilize CASPER training for future response and/or preparedness activities
- Contribute to disaster epidemiology capacity within Ohio

Fast Forward



- Government and community partnerships
- Guidelines and legislation addressing nutrient runoff
- Enhanced surveillance for toxin levels and HAB-associated illness (e.g. OHHABS)
- US EPA Guidelines (July 2015)
 - Safe levels of microcystin toxin in drinking water
- Ohio EPA Guidelines
 - Modified thresholds for a do not drink advisory

Publication



- Full report in **September 9** issue of Morbidity and Mortality Weekly Report (MMWR)

Acknowledgements



- Toledo-Lucas County Health Department
- Ohio Department of Health
- CDC
- US EPA
- Interview Teams
- Survey Respondents

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