

## Appendix A. Survey Instrument

Cluster # \_\_\_\_\_ Interview # \_\_\_\_\_ HH = Household DK = Don't Know Ref = Refused NA= Not Applicable SATA = Select all that apply

We will get started with some basic questions about your HH characteristics.	
<b>Q1.</b> Including yourself, how many people live in your HH? _____  <b>Q2.</b> Including yourself, how many people live in your HH? <2 yrs _____ 2-17 yrs _____ 18-64 yrs _____ 65+ yrs _____  <b>Q3.</b> What is the main language spoken in your HH? (select one) <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Other, specify _____ <input type="checkbox"/> DK <input type="checkbox"/> Ref _____  <b>Q5.</b> Does your HH have any of the following emergency plans? (SATA) <input type="checkbox"/> a) How to contact family members if you are not together when a disaster happens <input type="checkbox"/> b) Routes to exit your community if there is an evacuation <input type="checkbox"/> c) Where to shelter safely if it is safer to shelter in place <input type="checkbox"/> d) How to receive information such as emergency alerts and warnings <input type="checkbox"/> e) How to get copies of important documents such as insurance records  <b>Q6.</b> Where does your HH typically shelter for a tornado? _____  <b>Q7.</b> If one or more members of the HH were at home, where did your HH shelter during the tornadoes? <input type="checkbox"/> Basement <input type="checkbox"/> Designated tornado shelter (private) <input type="checkbox"/> Designated tornado shelter (community/public) <input type="checkbox"/> Small interior room w/o windows, such as a closet, bathroom/tub, laundry room, stairwell <input type="checkbox"/> Other, please specify _____  <b>Q8.</b> Did you feel that sheltering would protect you and members of your HH from physical injury? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q4.</b> [INTERVIEWER TO COMPLETE] Which of the following best describes this residence? <input type="checkbox"/> Stand-alone (detached) permanent structure, like a house <input type="checkbox"/> Condo, townhouse, or duplex that is attached to another structure <input type="checkbox"/> Apartment or dorm room that is part of larger residential complex <input type="checkbox"/> Mobile home (whether placed on permanent foundation or not) <input type="checkbox"/> Other, specify: _____ <input type="checkbox"/> DK  <div style="background-color: #ffcc00; padding: 5px; text-align: center;">The first set of questions will ask about how your HH prepares for emergencies, like the recent tornadoes.</div> <b>Q9.</b> An emergency supply kit or go-kit has items stored together in containers that can easily be accessed in an emergency. Did your HH have an emergency supply kit prior to the tornado? <input type="checkbox"/> Yes <input type="checkbox"/> No [skip Q10-12] <input type="checkbox"/> DK <input type="checkbox"/> Ref  <b>Q10.</b> Did your household use emergency supplies from the emergency supply kit? <input type="checkbox"/> Yes <input type="checkbox"/> No [skip Q11] <input type="checkbox"/> DK <input type="checkbox"/> Ref  <b>Q11.</b> Did your HH use any of the following? (SATA) <input type="checkbox"/> 11a) Food <input type="checkbox"/> 11b) Water <input type="checkbox"/> 11c) Batteries <input type="checkbox"/> 11d) Medical supplies <input type="checkbox"/> 11e) Other, please specify: _____  <b>Q12.</b> Did your HH need emergency supplies that were not included in your emergency supply kit? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref  <b>Q13.</b> (For all respondents) What supplies were needed that your HH did not have? Please specify: _____  <div style="background-color: #00b0f0; color: white; padding: 5px; text-align: center;">This block of questions is adapted from the National Oceanic and Atmospheric Administration's post-tornado survey.</div> <b>Q22.</b> How did you and members of your HH learn about the tornado warning? (SATA) <input type="checkbox"/> a) Broadcast radio <input type="checkbox"/> b) Weather radio (National Weather Service radio) <input type="checkbox"/> c) TV <input type="checkbox"/> d) Siren or other alarm <input type="checkbox"/> e) Internet <input type="checkbox"/> f) Social media (Twitter/X, Facebook) <input type="checkbox"/> g) Word of mouth (including phone or text, email, etc.) from family, friends, neighbors, employers, co-workers, etc. <input type="checkbox"/> h) Automated text or phone notification specify: _____ <input type="checkbox"/> i) Other, specify: _____ <input type="checkbox"/> j) DNR <input type="checkbox"/> k) No warning received  <b>Q23.</b> When your HH received the tornado warning, how confident were you and the members of your HH that you could take action to protect yourselves? <input type="checkbox"/> Not at all <input type="checkbox"/> Only slightly <input type="checkbox"/> Somewhat <input type="checkbox"/> Moderately <input type="checkbox"/> Very <input type="checkbox"/> DNR <input type="checkbox"/> No warning received  <b>Q24.</b> When your HH received the tornado warning, did you or the members of your HH need to seek additional information on actions you could take to stay safe? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure  <b>Q25.</b> What did your HH do when you got the tornado warning? (SATA) <input type="checkbox"/> a) Nothing; continued my daily activities <input type="checkbox"/> b) Monitored the situation, but did not move to shelter <input type="checkbox"/> c) Moved to the most sheltered part of the building, but did not leave the building <input type="checkbox"/> d) Moved family or friends to the most sheltered part of the building, but did not leave the building <input type="checkbox"/> e) Moved to a specially constructed storm shelter in the building <input type="checkbox"/> f) Moved to nearby location/building that provided safer shelter <input type="checkbox"/> g) Left the building & drove away from the tornado warning area <input type="checkbox"/> h) Other, specify: _____ <input type="checkbox"/> i) DNR  <b>Q26.</b> A tornado watch is issued by the National Weather Service when tornadoes are possible in and near the watch area. Did you or any member of your HH receive a tornado watch for your area? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DNR  <b>Q27.</b> How did your household learn about the tornado watch? (SATA) <input type="checkbox"/> a) Broadcast radio <input type="checkbox"/> b) Weather radio (National Weather Service radio) (SATA) <input type="checkbox"/> a) Broadcast radio <input type="checkbox"/> b) Weather radio (National Weather Service radio) <input type="checkbox"/> c) TV <input type="checkbox"/> d) Siren/other alarm <input type="checkbox"/> e) Internet <input type="checkbox"/> f) Social media (Twitter/X, Facebook) <input type="checkbox"/> g) Word of mouth (including phone or text, email, etc.) from family, friends, neighbors, employers, co-workers, etc. <input type="checkbox"/> h) Automated text or phone notification specify <input type="checkbox"/> i) Other specify: _____ <input type="checkbox"/> j) DNR <input type="checkbox"/> k) Got no warning  <b>Q28.</b> What did your household do when you got the tornado watch? (SATA) <input type="checkbox"/> a) Checked emergency supplies <input type="checkbox"/> b) Bought emergency supplies <input type="checkbox"/> c) Made sure NOAA/NWS radio was on & charged/plugged in <input type="checkbox"/> d) Had local TV news/weather on <input type="checkbox"/> e) Had local radio news/weather on <input type="checkbox"/> f) Checked weather app on phone frequently (NOAA weather radar, etc.) <input type="checkbox"/> g) Called friends and family nearby to warn them <input type="checkbox"/> h) Sought information on tornado safety <input type="checkbox"/> i) Other, specify: _____ <input type="checkbox"/> j) Nothing <input type="checkbox"/> k) DNR <input type="checkbox"/> l) Got no watch



<b>Q29.</b> Did your HH lose access to power and/or information sources during the incident? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q30.</b> Did your location and available resources make it easier or harder to protect yourself and members of your HH? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref
The next set of questions covers the health and wellbeing of your household.	
<b>Q31.</b> How would you describe the damage to your home? <input type="checkbox"/> None/minimal <input type="checkbox"/> Damaged but repairable <input type="checkbox"/> Significant damage but habitable <input type="checkbox"/> Destroyed/ uninhabitable <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q37.</b> (If any selected in Q36) Have you or anyone in your HH experienced interruptions or increased difficulty in accessing or maintaining these needs? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref
<b>Q32.</b> Does your HH feel that your home is structurally safe to live in presently? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q38.</b> Were you or anyone in your HH injured as a result of the tornado? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref
<b>Q33.</b> Was your HH displaced from your primary residence? <input type="checkbox"/> Yes (go to Q34) <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q39.</b> Were you or anyone in your HH injured as a result of cleanup activities so far? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref
<b>Q34.</b> (If yes to Q33) Where is your HH currently sheltering? [don't read list] <input type="checkbox"/> Community shelter, such as churches, Red Cross, etc. <input type="checkbox"/> With family or friends <input type="checkbox"/> Hotel or temporary accommodation <input type="checkbox"/> Secondary residence <input type="checkbox"/> Currently unsheltered <input type="checkbox"/> Other, specify: _____ <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q40.</b> Have all adults in your HH had a tetanus shot (e.g., DTaP/Tdap/Td) in the past 10 years? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref
<b>Q35.</b> Does everyone in your HH currently have health insurance? <input type="checkbox"/> Yes – all <input type="checkbox"/> Yes – some <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q41.</b> Since the tornado, have you or any members of your HH experienced worsening of any of the following conditions? (SATA) <input type="checkbox"/> a) Asthma/COPD <input type="checkbox"/> b) Allergies <input type="checkbox"/> c) Diabetes <input type="checkbox"/> d) Hypertension <input type="checkbox"/> e) Previous mental health condition <input type="checkbox"/> f) Other, specify: _____ <input type="checkbox"/> e) DK <input type="checkbox"/> f) Ref
<b>Q36.</b> Does anyone in your HH have complex medical needs? (SATA) [NOTE to interviewer – let the participant self-identify complex medical needs] <input type="checkbox"/> a) Reliance on oxygen or ventilation <input type="checkbox"/> b) Dialysis <input type="checkbox"/> c) Use of assistive tech for mobility, including wheelchairs, power chairs, walkers <input type="checkbox"/> d) Insulin/diabetes <input type="checkbox"/> e) DK <input type="checkbox"/> f) Ref	<b>Q42.</b> Since the tornado, has anyone in your HH had any of the following? (SATA) <input type="checkbox"/> a) Difficulty concentrating <input type="checkbox"/> b) Trouble sleeping/ nightmares <input type="checkbox"/> c) Loss of appetite <input type="checkbox"/> d) Agitated behavior <input type="checkbox"/> e) Witnessed firsthand violent behavior/threats <input type="checkbox"/> f) Increased alcohol consumption <input type="checkbox"/> g) Increased drug use <input type="checkbox"/> h) Other, please specify: _____ <input type="checkbox"/> e) DK <input type="checkbox"/> f) Ref
<b>Q43.</b> In general, how would you describe the health of children in the HH? <input type="checkbox"/> Excellent <input type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> Other, specify: _____ <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>This section covers the wellbeing of children in the HH after the tornado. [only if children aged 2-17 in household]</b>
<b>Q44.</b> Compared with before the tornado, would you say the health of children in the HH is better, worse, or about the same? <input type="checkbox"/> Better <input type="checkbox"/> Worse <input type="checkbox"/> About the same <input type="checkbox"/> Other: _____ <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q45.</b> Since the tornado, have children in the HH experienced any of the following? (SATA) <input type="checkbox"/> a) Been very sad or depressed <input type="checkbox"/> b) Felt nervous/afraid <input type="checkbox"/> c) Had problems sleeping <input type="checkbox"/> d) Had problems getting along with other children <input type="checkbox"/> e) Experienced concerns for physical safety/wellbeing <input type="checkbox"/> f) Been unable to attend school or extracurricular activities <input type="checkbox"/> g) Other behavioral/emotional problems: _____ <input type="checkbox"/> h) DK <input type="checkbox"/> i) Ref
<b>Q46.</b> Is there a healthcare professional you could turn to if any children in your HH had physical or mental health problems that may be related to the tornado? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref	
In this section, we are now going to ask about communications and communication preferences in emergency situations.	
<b>Q47.</b> Does your HH know about resources to aid in recovery in your area? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q51.</b> What are your HH's three (3) preferred sources of information for receiving emergency communications? (SATA) <input type="checkbox"/> a) TV <input type="checkbox"/> b) Radio <input type="checkbox"/> c) Internet/online news <input type="checkbox"/> d) Social media <input type="checkbox"/> e) Friends/ family /word of mouth <input type="checkbox"/> f) Text message/cell phone alert <input type="checkbox"/> g) Church/ place of worship <input type="checkbox"/> h) Other, specify: _____ <input type="checkbox"/> i) DK <input type="checkbox"/> j) Ref
<b>Q48.</b> How has you HH received info on resources available to aid in recovery in your area? (SATA) <input type="checkbox"/> a) Newspaper <input type="checkbox"/> b) Internet/online news <input type="checkbox"/> c) social media <input type="checkbox"/> d) TV <input type="checkbox"/> e) Radio <input type="checkbox"/> f) Friends, family, word of mouth <input type="checkbox"/> Church/place of worship <input type="checkbox"/> h) Other: _____ <input type="checkbox"/> i) None <input type="checkbox"/> j) DK <input type="checkbox"/> k) Ref	<b>Q52.</b> Does anyone in your HH have any of the following conditions that could be barriers to effective communication during an emergency? (SATA) <input type="checkbox"/> a) Impaired hearing <input type="checkbox"/> b) Impaired vision <input type="checkbox"/> c) Developmental/cognitive disability <input type="checkbox"/> d) Difficulty understanding English <input type="checkbox"/> e) Difficulty understanding written material <input type="checkbox"/> f) Other: _____ <input type="checkbox"/> g) None <input type="checkbox"/> h) DK <input type="checkbox"/> i) Ref
<b>Q49.</b> Is your HH aware of the following resources that were made available in Washington Co. to assist in recovery efforts? (SATA) <input type="checkbox"/> a) Washington County Damage Survey online form <input type="checkbox"/> b) Red Cross & other shelters <input type="checkbox"/> c) Tetanus vaccine clinics <input type="checkbox"/> d) Tree limb & debris drop-off locations <input type="checkbox"/> e) Landfill fee waivers <input type="checkbox"/> f) Building permit fee waivers <input type="checkbox"/> g) Other, specify: _____ <input type="checkbox"/> h) DK <input type="checkbox"/> i) Ref	<b>Q53.</b> Did your HH encounter any local disaster response teams? <input type="checkbox"/> Yes (go to Q54) <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref
<b>Q50.</b> What was your HH's main source of info about the tornado during the event? <input type="checkbox"/> a) TV <input type="checkbox"/> b) Radio <input type="checkbox"/> c) Internet/online news <input type="checkbox"/> d) Social media <input type="checkbox"/> e) Friends/family/word of mouth <input type="checkbox"/> f) Text message/cell phone alert <input type="checkbox"/> g) Church/ place of worship <input type="checkbox"/> h) Other, specify: _____ <input type="checkbox"/> i) DK <input type="checkbox"/> j) Ref	<b>Q54.</b> (If yes to Q53) <input type="checkbox"/> How many days after the tornado did your HH encounter the local disaster response team? <input type="checkbox"/> 0 day <input type="checkbox"/> 1-2 days <input type="checkbox"/> 3-4 days <input type="checkbox"/> 5-7 days <input type="checkbox"/> 8+ days <input type="checkbox"/> Other, specify: _____ <input type="checkbox"/> DK <input type="checkbox"/> Ref
	<b>Q55.</b> Did you or anyone in your HH volunteer to assist in recovery efforts? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Ref
In this section, we are going to ask about your individual health and wellbeing.	
<b>Q56.</b> Over the last two (2) weeks, how often have you had little interest or pleasure in doing things? <input type="checkbox"/> Not at all <input type="checkbox"/> Several days <input type="checkbox"/> More than half the days <input type="checkbox"/> Nearly every day <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q58.</b> Over the last two (2) weeks, how often have you felt nervous, anxious, or on edge? <input type="checkbox"/> Not at all <input type="checkbox"/> Several days <input type="checkbox"/> More than half the days <input type="checkbox"/> Nearly every day <input type="checkbox"/> DK <input type="checkbox"/> Ref
<b>Q57.</b> Over the last two (2) weeks, how often have you felt down, depressed, or hopeless? <input type="checkbox"/> Not at all <input type="checkbox"/> Several days <input type="checkbox"/> More than half the days <input type="checkbox"/> Nearly every day <input type="checkbox"/> DK <input type="checkbox"/> Ref	<b>Q59.</b> Over the last two (2) weeks, how often have you been unable to stop or control worrying? <input type="checkbox"/> Not at all <input type="checkbox"/> Several days <input type="checkbox"/> More than half the days <input type="checkbox"/> Nearly every day <input type="checkbox"/> DK <input type="checkbox"/> Ref
We will finish up with one last question –	
<b>Q60.</b> What other information would your HH like us to know about this event/ This can be anything you want to share about your experience with this tornado. [VERBATIM]	

## **Appendix B. Focus Group Interview Protocol**

We are from the University of Nebraska Medical Center's Water, Climate, and Health Program. As part of our work in collaboration with Three Rivers Public Health and Douglas County Public Health Departments, we asked questions about protective action decision making for households during the April 26, 2024, tornado outbreak. Protective action decision making models have been used to understand how communities receive and respond to warnings and risk information to protect themselves and others from hazards or in emergency events. To supplement analysis of those data, we have asked you all to join us for this focus group session. This focus group solicits your experiences, expertise, and ideas around the implementation and utilization of early warning systems in your role with National Weather Service Omaha.

**[written consent obtained prior to focus group] [verbal consent for recording]**

Thank you for agreeing to participate in this focus group discussion. We would like to ask everyone to remember that this discussion should be respectful, and we should all presume good intent from fellow participants. As we go through questions, please feel free to build off one another's responses and discuss ideas that come up throughout the discussion.

### **Questions.**

For the April 26, 2024, tornado outbreak in particular –

1. What went well in the NWS Omaha's work and coverage during the outbreak? What were the effects of these things that went/worked well?
2. What could be improved in work and coverage in future events? What were the effects of these things that did not work well in the Arbor Day tornado outbreak?

Broader questions –

3. What existing relationships does NWS have with the communities within its catchment area? How have these relationships been established and maintained? a. Were these relationships utilized during the Arbor Day tornado? If so, how? If not, what were the ramifications of not having and/or utilizing these relationships?
4. What channels of dissemination have historically been most effective for warnings in tornadoes? Presently? a. Were these channels of dissemination used during the Arbor Day tornado? If no, why not?
5. Which other agencies does NWS Omaha coordinate coverage and response with? Are there interagency relationships that do not presently exist that you feel would benefit your work at NWS Omaha? a. If there are existing relationships, did you coordinate coverage and response during the Arbor Day tornado? Can you speak about that experience? What lessons will you carry forward from these experiences?

General questions –

6. How do you see early warning systems evolving as new technologies develop? How will dissemination channels be adapted to be compatible with new means of obtaining information?
7. What capacities for early warning and dissemination do you not have that you feel would benefit this work moving forward?
8. How do early warning systems operate across hazard types? a. Are there opportunities for integration across hazard types?
9. What data, information, support, etc. do you feel would be beneficial to creating more robust early warning

## Appendix C. Formulas Used for Weighting

To provide weighted estimates for the Washington County assessment, we calculated weights for stratum 1 as:

$$\text{Stratum 1 Weight} = \frac{\text{total households in stratum}}{\text{households interviewed in cluster} * \text{clusters selected}}$$

Weights for this stratum were calculated per standard CASPER methodology:

$$\text{Stratum 2 Weight} = \frac{\text{total households in stratum}}{(\text{households interviewed in cluster} * \text{clusters selected})}$$

Completion, contact, and cooperation rates were used to help characterize the utility of the modified RNAs following the Arbor Day tornado. Response rates were calculated to determine the success of the assessment according to the following formulas:

$$\text{Contact rate} = \frac{\text{completed interviews}}{\text{households where contact was attempted}}$$

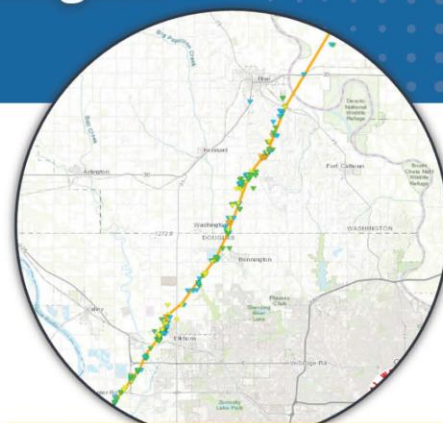
$$\text{Cooperation rate} = \frac{\text{completed interviews}}{\text{households where contact was made}}$$

$$\text{Completion rate} = \frac{\text{completed interviews}}{\text{interviews intended to complete}}$$



# Post-Tornado Assessment in Washington County: What Did We Learn?

On May 15-18, 2024, the Three Rivers Public Health Department, the University of Nebraska Medical Center, and the Nebraska Department of Health and Human Services went door-to-door to survey Washington County residents who were impacted by the tornado on April 26. The goal of this survey was to assess physical and mental health and well-being, infrastructure impacts, and community experiences during the tornadoes, to determine how public health and other emergency response sectors could better serve affected communities.

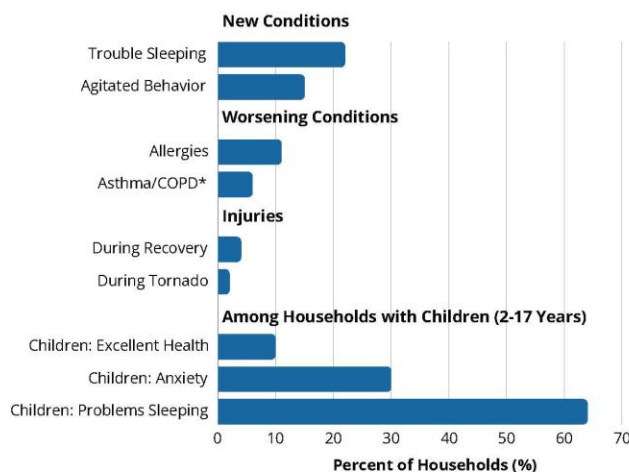


Arbor Day tornado track, EF-3 rating with a max wind speed of 165 mph, max width of 1 mile, and track length of 201 miles. Image Credit: NWS Omaha/Valley

## Summary of Survey Results

### Health and Well-Being

#### Household-Level Physical & Mental Health Impacts



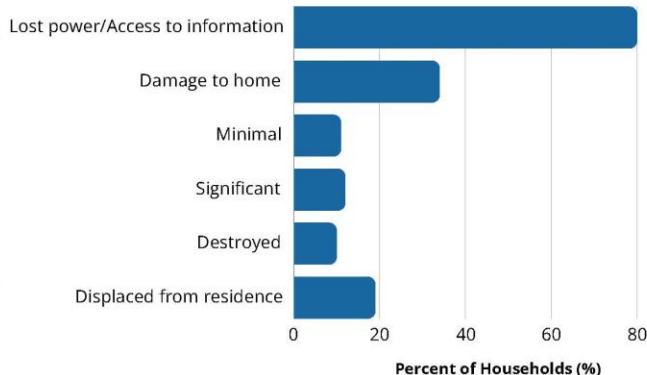
\* COPD: Chronic Obstructive Pulmonary Disease

### Recommendations:

- 1 Engage with community members on the development of more **robust** and **redundant** warning systems
- 2 Encourage the use of NOAA **weather radios**
- 3 Re-evaluate and **revise** emergency **communication strategies** & methods based on reported communication preferences

### Infrastructure Impacts

#### Common Infrastructure Impacts Reported



#### Positive Feedback on Response Efforts

"OPPD had a fantastic response, very fast."

"The sheriff was amazing!"

"I have been overwhelmed by the generosity of volunteers..."

### Other Community Concerns:

- Ongoing need for tree and **debris removal** assistance and clean-up support
  - Wildfire threats, impacts to air quality, limited visibility due to debris piles
- Minimal or impacted emergency warnings and **limited communications** for response and recovery
  - Lack of community sirens
  - Power loss impacted communications

Other important objectives of the survey were to:

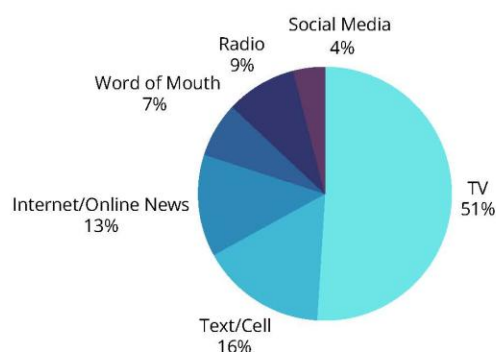
- Determine **household-level emergency preparedness** and knowledge;
- Understand **emergency communication preferences** before, during, after a disaster;
- Identify **barriers** to effective emergency communication and response.



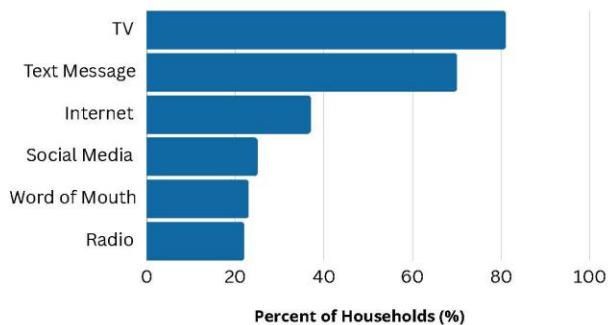
Members of the project team and other volunteers surveyed **110 households** over 3 days.  
Image Credit: Christine Allmon, UNMC

## Emergency Communications

Primary Source of Information During Tornado (%)



Preferred Sources of Emergency Information



## Recommendations:

Provide **community education** that focuses on:

- Use of **multiple sources of information**
- Family **emergency planning** & communication
- Access to **emergency supply kits**

## Barriers to Communication & Response



### Complex Medical Needs

Insulin resistance -- 13%  
Mobility assistance -- 9%  
Oxygen/Ventilator -- 4%  
Difficulty accessing services -- 11%

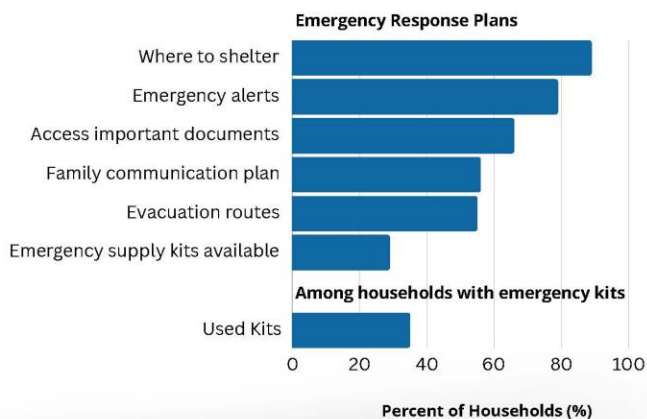


### Communication Barriers

Insulin resistance -- 12%  
Mobility assistance -- 4%  
Oxygen/Ventilator -- 2%  
Difficulty accessing services -- 1%

## Preparedness

### Household-Level Emergency Preparedness



For a full copy of the report, visit:

<https://go.unmc.edu/wctrecovery>

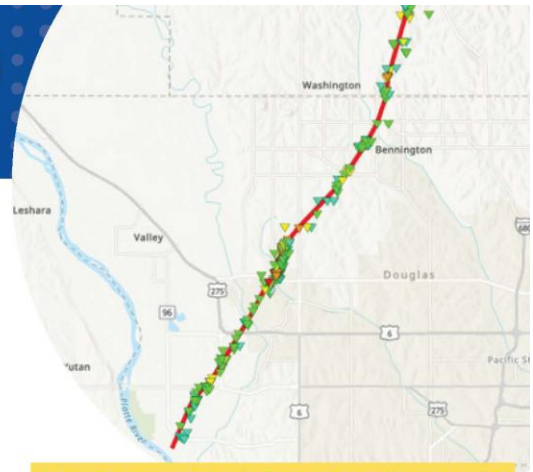


Funding was provided by the UNMC Water, Climate, and Health Program and the Natural Hazard Center's Special Call for Health Outcomes and Climate-Related Disaster Research, part of the Quick Response Research Award program. The Quick Response Research Award Program is based on work supported by the National Science Foundation (NSF Award #1635593). Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF or Natural Hazards Center.



## Post-Tornado Assessment in Douglas County: What Did We Learn?

On May 2024, the Douglas County Health Department and the University of Nebraska Medical Center sent surveys via mail to Douglas County residents who were impacted by the tornado on April 26. The goal of this survey was to assess physical and mental health and well-being, infrastructure impacts, and community experiences during the tornadoes, to determine how public health and other emergency response sectors could better serve affected communities.

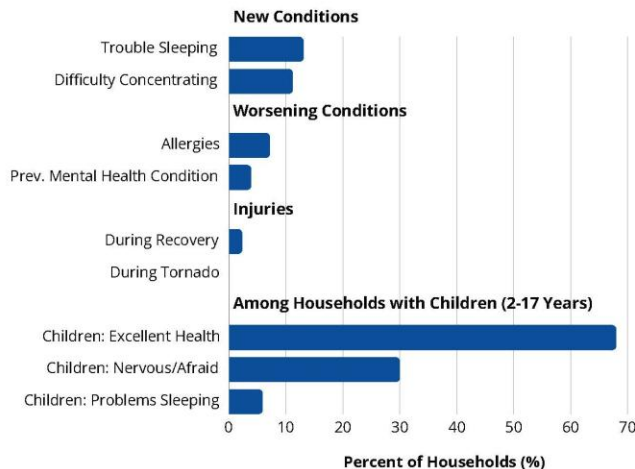


Arbor Day tornado track, EF-4 rating with a max wind speed of 165 mph, max width of 1 mile, and track length of 201 miles. Image Credit: NWS Omaha/Valley

### Summary of Survey Results

#### Health and Well-Being

##### Household-Level Physical & Mental Health Impacts

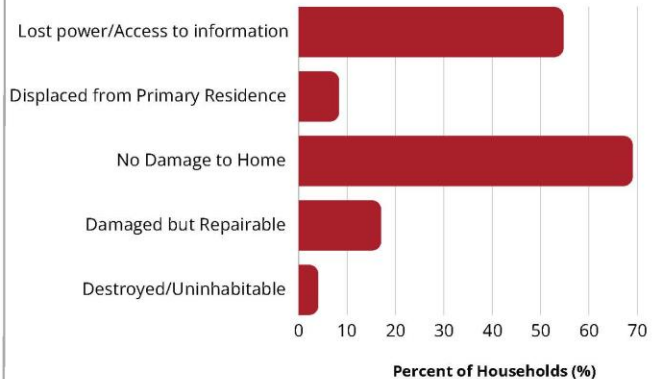


#### Recommendations:

- 1 Engage with community members on the development of more **robust** and **redundant** warning systems
- 2 Encourage the use of NOAA **weather radios**
- 3 Re-evaluate and **revise** emergency **communication strategies** & methods based on reported communication preferences
- 4 Provide onsite **mental health counseling** and **behavioral services** in the near-term. Provide long-term assistance for getting care to deal with chronic impacts.

#### Infrastructure Impacts

##### Common Infrastructure Impacts Reported



##### Positive Feedback on Response Efforts

"What an amazing response by the community, within hours of the event!"

"Local TV stations did a fantastic job letting us know the storm was approaching."

#### Other Community Concerns:

- Ongoing need for tree and **debris removal** assistance and clean-up support
  - Wildfire threats, impacts to air quality, limited visibility due to debris piles
- Minimal or impacted emergency warnings and **limited communications** for response and recovery
  - Lack of community sirens
  - Power loss impacted communications

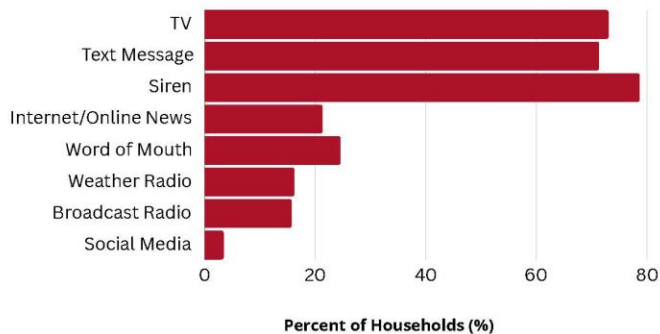


Other important objectives of the survey were to:

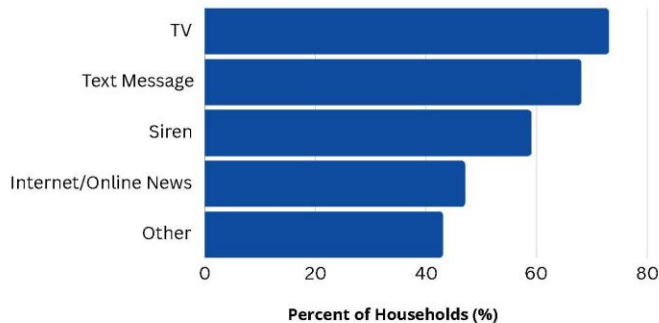
- Determine **household-level emergency preparedness** and knowledge;
- Understand **emergency communication preferences** before, during, after a disaster;
- Identify **barriers** to effective emergency communication and response.

## Emergency Communications

How did you and members of your household learn about the tornado warning? (Select all)



Preferred Sources of Emergency Information



## Recommendations:

Provide **community education** that focuses on:

- Use of **multiple sources of information**
- Family **emergency planning** & communication
- Access to **emergency supply kits**

<p>You have been selected to participate in a survey.</p> <p><b>Douglas County Post-Tornado Needs Assessment</b></p> <p>⌚ Takes 15 Minutes</p> <p>💻 Available online or phone</p> <p>❤️ Helps improve emergency response</p>	<p>Ha sido seleccionado para participar en una encuesta.</p> <p><b>Evaluación de las Necesidades Después del Tornado en el Condado de Douglas</b></p> <p>⌚ Tarda 15 minutos</p> <p>💻 Disponible en línea o por teléfono</p> <p>❤️ Ayuda a mejorar la respuesta de emergencia</p>

DCHD and UNMC mailed a total of 2,512 postcards with the link to the survey on May 24, 2024.

## Barriers to Communication & Response



### Complex Medical Needs

Insulin resistance -- 13%

Mobility assistance -- 9%

Oxygen/Ventilator -- 4%

Difficulty accessing services -- 11%



### Communication Barriers

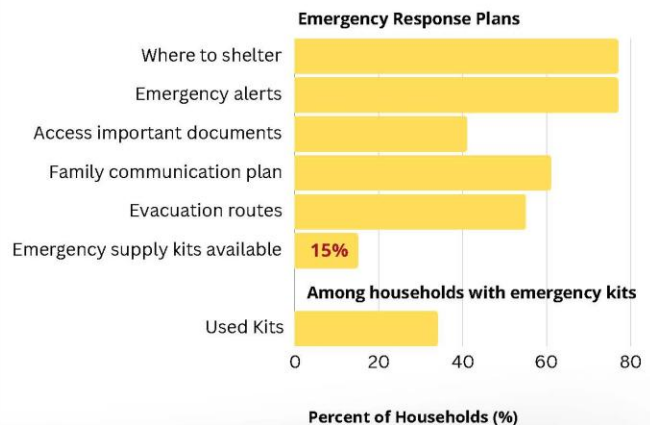
Impaired Hearing -- 5%

Developmental or cognitive disability- 5%

Impaired Vision -- 1%

## Preparedness

### Household-Level Emergency Preparedness



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