Disaster Medicine and Public Health Preparedness

www.cambridge.org/dmp

Original Research

Cite this article: Balasuriya L, Johnson O, Riley T, Lockard AS, McManus P, Raleigh A, Ellis M, Schnall AH, Hanchey A, Darling S, Bolen K and Thoroughman D (2024). Experiences of Communities Living in Shelters During the 2022 Eastern Kentucky Floods. *Disaster Medicine and Public Health Preparedness*, **18**, e309, 1–7
https://doi.org/10.1017/dmp.2024.136

Received: 08 March 2024
Revised: 27 May 2024
Accepted: 31 May 2024

Keywords:
community assessment; CASPER assessment; rapid needs assessment; environmental disasters; public health response; mental health

Corresponding author:
Lilanthi Balasuriya;
Email: rre1@cdc.gov

Experiences of Communities Living in Shelters During the 2022 Eastern Kentucky Floods

Lilanthi Balasuriya MD[1], Oshea Johnson PhD[1,2], Tammy Riley MA[3], Anthony Scott Lockard MSW[4], Pamela McManus RN[5], Angela Raleigh MS[6], Martha Ellis MPH[7], Amy Helene Schnall DrPH[1], Arianna Hanchey MPH[1], Sandra Darling[2], Kristy Bolen[2] and Doug Thoroughman PhD[1,2]

[1]Centers for Disease Control and Prevention, Atlanta, GA; [2]Kentucky Department for Public Health, Division of Epidemiology and Health Planning, Frankfort, KY; [3]Pike County Health Department, Pikeville, KY; [4]Kentucky River District Health Department, Hazard, KY; [5]Floyd County Health Department; [6]Breathitt County Health Department, Jackson, KY and [7]Floyd County Health Department, Prestonsburg, KY

Abstract

Background: On July 28, 2022, floods in eastern Kentucky displaced over 600 individuals. With the goal of understanding mental health needs of affected families, we surveyed households living in flood evacuation shelters after the 2022 Kentucky floods.

Methods: Families experiencing displacement from the 2022 Kentucky floods currently living in three different temporary shelter locations were surveyed via convenience sampling. A rapid community needs assessment involving in-person interviews using modified two stage cluster methodology (CASPER) was conducted between September 6-9, 2022.

Results: Teams conducted 61 household interviews. Since the flood, 27.7% reported that their household received services from behavioral health and 19.6% received grief counseling. Experiencing agitation (36.7%), difficulty concentrating (47.5%), nightmares (62.3%), or suicidal thoughts/self-harm (6.6%) were reported by households surveyed. Over one-fourth (27.0%) of individuals surveyed reported being depressed nearly every day. Over 20% reported anhedonia (inability to feel pleasure) nearly every day. Over 75% of individuals surveyed reported being anxious several days or more over the last two weeks. Over one-third of individuals (34.0%) reported being unable to stop worrying nearly every day. Of those individuals surveyed, 36.1% reported barriers to mental health services.

Conclusions: Symptoms of depressed mood, anhedonia, anxiety, and nightmares were prevalent in displaced families six weeks after the 2022 Kentucky floods. Providing and encouraging access to mental health services are important priorities during disaster recovery.

On July 28, 2022, over 10" of heavy rains overnight created flash flooding in eastern Kentucky, leading to the deadliest flood in state history.[1,2] Nearly 600 homes were destroyed with thousands severely damaged.[3] Over 600 people were displaced in emergency shelters, state parks, and travel trailers.[3]

Sudden, unexpected displacement, as caused by natural disasters, from one's home can cause profound effects on physical and mental health as well as one's ability to receive health messaging and access basic necessities.[4,5,6] Damage to property, loss of shelter, and the impacts of water damage can last well beyond the immediate stages of disaster response.[6] Damage to powerlines, loss of access to broadband internet, and inability to use transportation may lead to devastating loss in access to communication and community.[4] The number of natural disasters is anticipated to rise, making it imperative to understand the needs of communities impacted by disasters in order to best prepare for the future.[7]

With the goal of understanding the needs of affected families post-initial disaster response, we surveyed households living in flood evacuation shelters 6weeks after the 2022 eastern Kentucky floods. There were 5 key topic areas we wanted to understand through the survey: 1) household experiences during the flood, 2) household repair status, 3) communication and messaging at their shelter site, 4) household recovery status and needs, and 5) physical and behavioral impacts.

Methods

Kentucky Department for Public Health and local health department leadership developed a survey instrument with CDC subject matter experts. The final questionnaire included household demographics, when families evacuated their home, families' access to internet, transportation,

and cellular service, housing status, communications, recovery status after the flood, physical health status, mental health status and needs, and individual-level mental health status that included the 2 item Patient Health Questionnaire (PHQ-2) and 2 item Generalized Anxiety Questionnaire (GAD-2). The questionnaire was 2 pages and took about 20 minutes to administer (Appendix I). In this paper, we describe the findings of these sub-topics as well as considerations for actions that may improve the status of these flood-impacted communities and households.

Prior to conducting interviews, a just-in-time training occurred. At these trainings, volunteers were trained on the overall purpose of the questionnaires, content of the questionnaires, interview techniques, safety, what to do if there is a serious mental health concern, and logistics. All volunteer teams conducting surveys consisted of at least 1member of the public health departments from affected counties in eastern Kentucky. Teams were provided with informational material on public health needs (e.g., mold clean up, suicide hotlines, local public health resources) that could be provided to all potential respondents.

Families experiencing displacement from the 2022 eastern Kentucky floods currently living in 3 different temporary shelter locations (which included sheltering in travel trailers, campers, rooms, cottages, and campgrounds) were surveyed. Data were collected 6 weeks after the floods, over the course of 4 days during September 6-9, 2022. These emergency shelters included lodging at state resort park cabins and RV parks (Jenny Wiley State Resort Park ("Jenny Wiley"), Buckhorn Lake State Resort Park ("Buckhorn"), and Mine Maid Adventure Park ("Mine Maid"). The local health departments contacted the emergency shelters to let them know the days teams were coming to conduct the survey.

Convenience sampling was used to enroll participants to capture the experience of as many families living in the shelters as possible. This consisted of volunteers knocking on doors and soliciting participation over 4 days. Participation was completely voluntary. Three shelters in different areas of eastern Kentucky were chosen to ensure the sample was as representative of the affected population and their needs as possible. Interview participants were required to be aged ≥18 years and living in regions effected by the floods prior to being displaced in shelters. One representative for each family unit housed at the shelter was invited to represent that household unit in the survey. The families displaced will be referred to as "households" throughout this paper.

Results

A total of 150 families who were displaced from the flood were still living in the 3 shelter sites during the survey week: 80 families at Jenny Wiley; 41 families at Buckhorn; and 29 families in trailers at Mine Made. A total of 61 (40.6%) families were surveyed. Of these, 52.5% were living at Jenny Wiley, 23.0% at Buckhorn, and 24.6% at Mine Maid (Table 1). Prior to the flood, approximately half of shelter site residents owned their homes while the other half were renters. When asked when they evacuated their households (before, during, or after the flood), less than 20% of households reported evacuating before (11.5%), or after (18.0%) the flood, with most households reporting evacuation during the actual flooding event (70.5%). Most households in these shelter sites had family members between the ages of 2-64 years, with roughly a quarter of households (27.9%) reporting household members aged ≥65 years and <5% reporting children aged <2 years.

Table 1. Shelter sites household demographics — KY Flooding 2022

Shelter site households (n = 61)		
	Frequency	%
Shelter location		
Buckhorn	14	22.9
Jenny Wiley	32	52.5
Mine Maid	15	24.6
Own or rent HH		
Own	32	53.3
Rent	28	46.7
HH evacuate at any time before or after flood		
Before	7	11.5
During	43	70.5
After	11	18
Number of HH with members in each age category*		
Less than 2 years	2	4.7
2–17 years	39	78
18–64 years	55	94.8
65 years or older	12	27.9

*Households could identify more than 1response.

Household Experiences Since the Flood

At the time of the survey, 6 weeks after the flooding event, nearly half of households at shelter sites reported no internet service (46.7%) and 20.0% reported not having access to transportation or cellular service (Table 2). When asked how close their home is to being how it was prior to floods (excluding landscape), 72.4% of households reported their home was not repaired at all. Nearly a quarter of households reported the availability of contractors/skilled labor (23.0%) and finding materials/supplies (24.6%) were barriers to their home being repaired, and 21.3% reported insufficient money.[1] When asked if they would be willing to relocate outside of the floodplain if their household had an offer to sell, 42.6% of households reported they would be willing and 11.5% reported "maybe." Approximately a quarter (26.7%) of shelter site households reported *none* of the debris and waste had been removed from their property and almost 40% of households reported *some* debris and waste and been removed (38.3%). Nearly 15% of shelter site households (12.1%) indicated they did not have a 7-day supply of prescription medications.

Communications

Most households at shelter sites reported having no warning of the flood (85.3%); half (50.8%) reported seeing rising water as their first warning sign of the flood; nearly a third heard from friends/family (32.8%); 16.4% received a phone weather alert; and about 10% received warning of the flood through social media, television, and/or internet news (Table 3). When participants were asked if any member of their household had difficulty prior to the flood accessing the radio, television, internet, or cell for communication, 37.7% reported no difficulties. However, almost 30% of households

[1]The reporting of results are condensed and we only provide tables for key findings. Supplemental tables are available upon request

https://doi.org/10.1017/dmp.2024.136 Published online by Cambridge University Press

Table 2. Shelter sites household experiences and utilities/services during the recent flood — KY Flooding 2022

Shelter site households (n = 61)		
	Frequency	%
Current utility/service access*		
No Internet service	28	46.7
No transportation	12	20
No cellular phone service	12	20.3
Home (excluding landscape) repair status		
Not repaired at all	42	72.4
Somewhat repaired	10	17.2
Completely repaired	2	3.5
Don't know	4	6.9
HH move outside floodplain if offered to sell at preflood value		
Yes	26	42.6
Maybe	7	11.5
No	19	31.1
Don't know	9	14.8
Debris and waste have been removed from property		
None	15	26.7
Some	23	38.3
All	16	25.0
Don't know	5	8.3
No need	1	1.7
7-day supply of prescription medications		
Yes	48	82.8
No	7	12.1
No – no meds	1	1.7
Don't' know	1	1.7
Not applicable	1	1.7

*Households could identify more than 1 response.

Table 3. Shelter sites household flood warning and communication — KY Flooding 2022

Shelter site households (n = 61)		
	Frequency	%
Hear warning about flood/rising water*		
Saw water rising	31	50.8
Word of Mouth	20	32.8
Phone weather alert	10	16.4
No warning	9	14.8
TV	6	9.8
Social media	6	9.8
Internet news	6	9.8
Radio	2	3.3
Difficulty accessing radio, TV, internet, cell, communication messages*		
Yes	38	62.3
Radio	*13*	*21.3*
TV	*15*	*24.6*
Internet	*17*	*27.9*
Cell	*12*	*19.7*
No - no difficulty	23	37.7

*Households could identify more than 1response.

reported having difficulty receiving communication through the internet, nearly a quarter reported difficulty with television (24.6%), and approximately 20% reported having difficulty with cellular service (19.7%) and radio (21.3%).

Households living in shelter sites were asked, since the flood, what, if any health and clean up messages their household heard. Approximately 40% reported hearing messages about mold clean-up and disaster recovery centers, 16.4% about vaccinations, and 27.9% reported not hearing any clean up or health messaging (Table 4). When asked how their household heard messaging about health and/or clean-up, 45.9% reported hearing messaging from friends with only a small percentage of households reporting health and/or clean-up messaging from other sources such as TV, radio, church/place of worship, public health department, internet news, social media, or flyer/poster.

Home Clean-Up and Assistance

Households living at shelter sites were asked what stage of home clean-up their family's home was in currently. Half (50.9%) reported their home was destroyed and they can't live there again. When asked if anyone in their household had attempted to receive assistance related to the floods, 67.4% reported receiving assistance from churches, 57.4% from family/friends, 38.5% from non-profit organizations, 34.4% from Red Cross, and 33.3% from local government.

Regarding assistance from FEMA, 32.8% reported their household attempted to receive assistance from FEMA, and of that group, 62.3% of those reported receiving funds from FEMA. For those who received FEMA assistance, they were asked how difficult it was to get assistance, with 28.1% saying it was "very difficult" and 38.6% saying it was "difficult," or nearly 70% indicating difficulty. If assistance was received, households were asked if the assistance covered the financial costs needed for the home: 78.2% said "no." Some of the top barriers to receiving assistance included the documentation/paperwork process being difficult and confusing to navigate (25.0%), issues with FEMA such as attitude of FEMA personnel and documentation (9.3%), and FEMA not paying enough (3.1%).

Access to Professional Medical Care

Households living at shelter sites were asked if it's been more difficult to get needed professional medical care for any member of their household since the flood, and 15.3% reported more difficulty receiving usual medical care. Households were also asked if it has been difficult to get needed prescriptions; 18.3% said "yes." When asked if it had been more difficult to get needed medical supplies, 18.6% said "yes." Since the flood, 41.4% reported their household experienced a worsening of allergies, 35.6% reported experiencing a worsening of high blood pressure, 32.1% worsening overall health, 31.0% a worsening of asthma, and 22.4% a worsening of COPD.

https://doi.org/10.1017/dmp.2024.136 Published online by Cambridge University Press

Table 4. Shelter sites household messaging regarding health and/or clean-up — KY Flooding 2022

Shelter site households (n = 61)		
	Frequency	%
Messages heard regarding health and/or clean-up*		
Clean-up/mold	25	41
Disaster Recovery Centers	24	39.3
None	17	27.9
Mental health	10	16.4
Vaccination (tetanus, hep)	10	16.4
Drinking water safety	9	14.8
Well water safety	2	3.3
Mosquito safety	2	3.3
Don't know	7	11.5
Source of messages about health and/or clean-up*		
Word of mouth	28	45.9
Social media	8	13.1
Didn't hear messages	8	13.1
Internet news	5	8.2
Church/Place of worship	5	8.2
Radio	4	6.6
Public Health Department	2	3.3
Flyer/Poster	2	3.3
TV	1	1.6
Other**	16	26.2
Don't know/refused	6	9.8

*Households could identify more than 1response.
**Other includes FEMA, insurance providers, heard information at lodge, and from park rangers.

Table 5. Shelter sites household source of behavioral and mental health services — KY Flooding 2022

Shelter site households (n = 61)		
	Frequency	%
Since the flood, have you or a member of your household received behavioral/mental health services		
Yes	15	27.7
No need	33	60.0
Couldn't get	4	7.3
Don't know/refused	3	5.5
Grief counseling		
Yes	11	19.6
No need	37	66.1
Couldn't get	4	7.1
Don't know/refused	4	7.1
Source of counseling*		
Counselor/Licensed therapist	11	18.0
Preferred method for behavioral/mental health assistance*		
In person — Local	35	57.4
Telehealth (online, phone)	24	39.3
In person — Out of town	3	4.9
Barriers to counseling*		
No difficulties	22	36.1
No need for services	22	36.1
Transportation	7	11.5
Unaware of resources	5	8.2

*Households could identify more than 1response.

Stressors and Behavioral Health Needs

Households at shelter sites were asked, since the flood, how often would you say your household was worried or stressed about having enough money. Approximately a quarter of households reported they were *always* (22.0%) or *sometimes* worried or stressed about having enough money to pay bills (25.4%). When asked about meals, 22.0% of households reported they were *always* and *sometimes* worried or stressed about having enough money for meals. Regarding rent, 13.6% of households at shelter sites reported they were *always* and 18.6% of households reported *sometimes* being worried or stressed about paying rent.

Of households living at shelter sites, 27.7% reported they received services for behavioral or mental health (18.0% from a therapist) and 19.6% received grief counseling (Table 5). When asked about barriers to seeking services for behavioral health concerns, 36.1% reported no difficulty accessing, or no need for counseling services. However, some barriers to receiving counseling services noted were transportation (11.5%) and being unaware of resources (8.2%). When asked how they or their household would like to receive behavioral health assistance, 57.4% reported they would like to receive it locally and 39.3% reported they would like telehealth.

Households living at shelters sites were asked if they or members of their household had experienced any of several different mental health indicators since the flood (Table 6). Households indicated they or some member of their household had experienced nightmares (62.3%), difficulty concentrating (47.5%), loss of appetite (36.1%), agitation (36.7%), witnessed violent behavior or threats (9.8%), or suicidal thoughts/self-harm (6.6%).

Individuals surveyed were asked of themselves only, how often over the past 2 weeks they felt down, depressed, or hopeless? Over half (55.4%) reported either "several days" (28.6%) or "nearly every day" (26.8%), and 7.1% reported "more than half the days." Participants were asked over the last 2 weeks how often they had little interest or pleasure in doing things; 23% reported "several days" and 21.3% reported "nearly every day." Participants were also asked over the last 2 weeks how often they felt nervous, anxious, or on edge: 44.1% reported "several days" and 23.7% reported "nearly every day." These questions originated from the PHQ2. Finally, they were asked over the last 2 weeks, how often had they been unable to stop or control worrying with 35.6% reporting "several days" and 33.9% reporting "nearly every day." These questions originated from the GAD-2. Approximately a third of participants (36.1%) reported their mental health was "not good," which includes, stress, depression, and problems with emotions for at least half the days or more out of the past 30 days.

https://doi.org/10.1017/dmp.2024.136 Published online by Cambridge University Press

Table 6. Shelter sites household stressors and behavioral health needs since the flood — KY Flooding 2022

Shelter site households (n = 61)		
	Frequency	%
Stressors or behavioral/mental health symptoms since the flood		
Worried/stressed about having enough money to pay bills?		
Always	13	22.0
Usually	5	8.5
Sometimes	15	25.4
Rarely	4	6.8
Never	22	37.3
Worried/stressed about having enough money for meals?		
Always or sometimes	13	22.0
Usually	5	8.5
Some	15	25.4
Rarely	4	6.8
Never	22	37.3
Worried/stressed about paying rent?		
Always	8	13.6
Usually	5	8.5
Sometimes	11	18.6
Never	34	57.6
Nightmares	38	62.3
Difficulty concentrating	29	47.5
Loss of appetite	22	36.1
Agitated behavior	22	36.7
Witnessed violence	6	9.8
Suicidal ideation	4	6.6
Reporting their mental health as "not good" (including feelings of stress, depression, or problems with emotions for the at least half the days or more out of the past 30 days).	22	36.1
In the past 2 weeks, how often have you felt down, depressed, or hopeless?		
Nearly every day	15	26.8
More than half the days	4	7.1
Several days	16	28.6
Not at all	21	37.5
In the past 2 weeks, how often have you had little interest or pleasure in doing things?		
Nearly every day	13	21.3
More than half the days	2	3.3
Several days	14	23.0
Not at all	32	52.5
How often have you felt nervous, anxious, or on edge?		
Nearly every day	14	23.7
More than half the days	5	8.5
Several days	26	44.1
Not at all	26	23.7
How often have you been unable to stop or control worrying		
Nearly every day	20	33.9
More than half the days	3	5.1
Several days	21	35.6
Not at all	15	25.4

Discussion

Six weeks after the floods, we surveyed approximately 40% of families who were currently displaced from their homes and living at 3 shelter sites — Jenny Wiley, Buckhorn, and Mine Maid. Families living at shelter sites were displaced from their homes and represented the community members hardest hit by this flood event in eastern Kentucky. Half of households at shelter sites had their homes destroyed and were no longer livable, and nearly 75% of households' homes had not been repaired at all, being located in some of the worst flood-affected areas in eastern Kentucky. During the flood, most households living at shelter sites evacuated their homes during the flood, had no warning, or were warned primarily by seeing the water rise. Although some households were warned of the flood by phone weather alert, very few received warning from the television, radio, or social media. These findings reveal a need for increased and targeted communication prior to another public health event or natural disaster to increase community preparedness levels, promote better education about evacuation procedures, and decrease potential loss of life and resources.

Many households living at shelter sites reported difficulty accessing the internet, television, cell service, and radio for communication messaging; limiting access of these highly impacted households to useful recovery resources. Although many households heard messaging about mold clean up and disaster recovery centers, over a quarter of households heard no health or clean up messaging. The top communication source for how households heard warnings about the flood or rising water was by word of mouth, followed by social media (although minimally).

Our study provides unique experiences of communities living in shelters in rural areas after the deadliest floods in Kentucky history. This work represents experiences of 61 families living in shelters 6 weeks after flooding, which may provide different perspectives as compared to some of the existing literature on individuals' experiences in shelters,[8] flooding in non-rural areas,[9,10] work representing a smaller number of people surveyed,[11] or lessons learned pieces.[12,13]

Improving Communication and Messaging

These findings reveal the need to assure there are adequate communication modalities quickly made available in family shelter settings to improve access to health and clean-up messaging. This should include first making available or improving broadband service, as well as targeting radio, television, and written communication for consumption of shelter residents to increase the capacity for relaying important information that will allow households to communicate and receive messages more effectively. Expanding

https://doi.org/10.1017/dmp.2024.136 Published online by Cambridge University Press

this to community-level activity may also increase preparedness levels prior to another public health emergency, as communities will be better equipped to receive targeted messaging and communication.

Challenges in receiving messaging from sources such as the internet, cellular services, or broadband internet during disasters in rural communities make it imperative to think strategically about effective communication.[14,15] While larger structural changes are needed, such as increasing access to broadband in rural communities, it will also be important to think about technology disparities in ability to access computers and smart phones that differentially impact rural communities.[15,16] Using non-electronic forms of communication such as written materials and messaging from trusted community members may be a critical and more effective means of disseminating important information before, during, and after natural disasters.[17,18]

Improving Access to Housing Assistance and Logistical Resources

Churches, FEMA, Red Cross, family, friends, and non-profit organizations provided some of the main sources of ongoing assistance to households living at shelter sites after the flood. Some of the main barriers households reported to receiving assistance included difficulty navigating the paperwork process and transportation. Providing more financial, organizational, and logistical resources to connect sources of support to families living at shelter sites may improve their short and long-term recovery conditions.[19] On a larger scale, a key component to disaster preparedness is a need for adequate resources to support preparedness efforts, which includes support for planning, housing resource centers, staffing, trainings, exercising preparedness plans, and improving technical assistance for disaster relief.[19]

Improving Access to Physical and Mental Health Services

Households living at shelter sites experienced worse overall health and physical health conditions than before the flood event, such as allergies, asthma, high blood pressure, and COPD. Additionally, many households experienced worsened emotional and mental health conditions like nightmares, difficulty concentrating, agitation, and loss of appetite. Individuals also reported recent feelings of depression, anxiety, and overall problems with mental health. While some households at shelter sites reported seeking behavioral health services and grief counseling, primarily from a licensed therapist, there was also a higher preference for counseling in-person and locally if mental health assistance was ever needed, followed by telehealth.

These findings show a need for access and availability to physical and mental/behavioral health services for household members living at shelter sites. Planning for surge capacity and assuring that mental health resources are available and accessible for families in shelters soon after disaster events is recommended to address the concerns raised by this survey. Targeted social media campaigns, educational resources, and efforts made through trusted sources like churches, non-profit organizations, and schools are avenues to address overall health (including mental health) in disaster situations[19] for families with no recourse other than shelter living for extended periods.

Improving access to communication and messaging, housing assistance and logistical resources, and physical and mental health resources are all avenues to ensure communities are prepared to respond and recover from disasters. Partnership and efforts from the Kentucky Department for Public Health and community partners from Pathways, Mountain Comprehensive Care Center, and University of the Cumberlands were integral in conducting the work described in this paper. These results may be used to help improve future communication messaging, promote the public's health, and strengthen preparedness capacity of eastern Kentucky as well as other rural communities. This work may inform insights into allocating resources for future flooding events and evaluating and implementing best practices for communication, resources, and physical, and mental health services in disaster shelter settings.

Limitations

The data generated from the shelter sites are only a snapshot in time and are not representative of all households displaced from the flood, which should be considered when interpreting the results of the ongoing recovery efforts. Interview teams were only able to conduct interviews for 4 days and could not survey as many households using this convenience sample methodology. These results are self-reported by 1 (or more) individual(s) representing an entire household; therefore, results may be biased, as the interviewee may not be aware of everything about each household member they are representing.

Supplementary material. The supplementary material for this article can be found at http://doi.org/10.1017/dmp.2024.136.

Funding statement. There are no funding sources to disclose.

References

1. **National Weather Service**. Historic July 26th-July 30th, 2022, Eastern Kentucky Flooding. Accessed May3, 2023. Historic July 26th-July 30th, 2022, Eastern Kentucky Flooding (weather.gov).
2. **Childress R**, **Estep B**, **Honeycute Spears V**, et al. Siblings, grandparents, coal miners. These are the 45 victims of the 2022 Eastern KY floods. Accessed July 14, 2023. Who are the victims in the 2022 Eastern Kentucky floods? | Lexington Herald Leader.
3. **Gov.** Beshear: $123 Million Available May 1 to Meet Housing Needs Following Natural Disasters. Accessed May 30, 2023. kentucky.gov/Pages/Activity-stream.aspx?n=GovernorBeshear&prId=1761.
4. **Ready.** Coping with Disaster. Accessed November 20, 2023. Coping with Disaster | Ready.gov.
5. **Substance Abuse and Mental Health Services Administration**. Greater Impacts: How Disaster Affects People of Low Socioeconomic Status. Accessed November 20, 2023. Greater Impact: How Disasters Affect People of Low Socioeconomic Status (samhsa.gov).
6. **Centers for Disease Control and Prevention.** The CDC Field Epidemiology Manual. Natural and Human-Made Disasters. Accessed November 20, 2023. Natural and Human-Made Disasters | Epidemic Intelligence Service | CDC.
7. **National Oceanic and Atmospheric Administration**. 2022 U.S. Billion-dollar Weather and Climate Disaster in Historical Context. Accessed November 20, 2023. 2022 U.S. billion-dollar weather and climate disasters in historical context | NOAA Climate.gov.
8. **Milburn AB**, **McNeill CC**, **Clay L**, et al. Health-Care and Supportive Services in General Population Disaster Shelters. *Disaster Med Public Health Prep*. 2023;**17**:e457. doi:10.1017/dmp.2023.114
9. **Ermagun A**, **Smith V**, **Janatabadi F.** High urban flood risk and no shelter access disproportionally impacts vulnerable communities in the USA. *Commun Earth Environ.* 2024;5.
10. **Escobar Carías MS**, **Johnston DW**, **Knott R**, et al. Flood disasters and health among the urban poor. *Health Econ.* 2022;**31**(9):2072–2089. doi:

10.1002/hec.4566. Epub 2022 Jun 30. PMID: 35770835; PMCID: PMC9546021.
11. **Ponnambily J.** Lived experience of the disaster victims of South Indian floods 2015: a concatenated disaster crisis model using henomenographical Framework Analysis. *Indian J Contin Nurs Educ.* 2018;**19**(2): 44–53.
12. **Wu J**, **Huang C**, **Pang M**, et al. Planned sheltering as an adaptation strategy to climate change: Lessons learned from the severe flooding in Anhui Province of China in 2016. *Sci Total Environ.* 2019;**694**:133586. doi: 10.1016/j.scitotenv.2019.133586.
13. **Kuang D**, **Liao KH**. Learning from floods: linking flood experience and flood resilience. *J Environ Manage.* 2020;**271**:111025. doi:10.1016/j.jenvman.2020.111025.
14. **Graves JM**, **Abshire DA**, **Amiri S**, et al. Disparities in technology and broadband internet access across rurality: implications for health and education. *Fam Community Health.* 2021;**44**(4):257–265.
15. **Pew Research Center**. For 24% of Rural Americans, High-speed Internet is a Major Problem. Accessed November 5, 2023. For 24% of rural Americans, high-speed internet is a major problem | Pew Research Center.
16. **Pew Research Center**. Some Digital Divides Between Rural, Urban, Suburban American Persist. Accessed November 1, 2023. Some digital divides between rural, urban, suburban America persist | Pew Research Center.
17. **Weather Awareness for Rural Nation.** Weather Awareness for a Rural Nation (WARN) Taskforce. Accessed November 27, 2023. Home - Weather Awareness for a Rural Nation (WARN) Taskforce - Virtual Lab (noaa.gov).
18. **National Oceanic and Atmospheric Administration**. Weather Awareness for a Rural Nation (WARN): Developing Weather Safety Tools for Amish Communities. Accessed November 27, 2023. Weather Awareness for a Rural Nation (WARN): Developing weather safety tools for Amish communities | National Oceanic and Atmospheric Administration (noaa.gov).
19. **Federal Emergency Management Agency**. National Disaster Housing Strategy. Accessed November 27, 2023. DRAFT NDHS (fema.gov).

https://doi.org/10.1017/dmp.2024.136 Published online by Cambridge University Press