Attachment F: Sample Final Report*

Community Assessment for Public Health Emergency Response (CASPER) after the major ice storms, Kentucky 2009

BACKGROUND

On January 26, 2009, a massive ice storm hit Kentucky causing 36 deaths and leaving 770,000 people without power across the state. The storm continued for three days with ice over an inch thick reported in many locations and snow accumulating across the state. Property damage was widespread and basic communication was drawn to a halt due to fallen trees and power lines weighed down by the ice. Public health officials were concerned of the health status and needs of the western portion of Kentucky where communication with the state health department was nonexistent due to the storm. To address these concerns, on February 2, 2009, the Kentucky Department for Public Health (KY DPH) requested assistance from the Centers for Disease Control and Prevention (CDC) in conducting a needs assessment in the severely affected areas in the Pennyrile District of Western Kentucky. The purpose of the CASPER was to determine health and safety needs of residents living in Western Kentucky who were severely impacted by the ice storm.

METHODS AND MATERIALS

CDC and KY DPH conducted a Community Assessment for Public Health Emergency Response (CASPER) along portions of western Kentucky that were severely affected by the ice storm. On the basis of regional and local information, the KY DPH leadership decided to conduct the assessment in four severely impacted counties in the Pennyrile District of Western Kentucky (i.e., Livingston, Caldwell, Lyon, and Crittenden counties) where communication had been severely hindered due to the storm. CASPER is an epidemiologic technique designed to provide household-based information about an affected community's needs following a disaster. CASPER rapidly obtains accurate and timely data in a relatively inexpensive manner through precise analysis and interpretation. The information gained is then shared in a simple format

*This is a sample report. While the information in this sample report is based on real events, it is not a complete account of the work conducted by the Kentucky Department of Health and the Centers for Disease Control and Prevention in response to the ice storms.

with decision-makers to inform response efforts. CDC developed a one-page questionnaire in coordination with the KY DPH. The questionnaire was designed to capture 1) demographic information; 2) concerns about injuries and illnesses, including mental health concerns; 3) medication availability and access to care; 4) information about basic utilities, transportation, generator usage, and risky behaviors for carbon monoxide exposure; 5) supply needs, such as food and water; and 5) communication usage, including information on warnings and gathering health advice (see questionnaire: Appendix D).

A two-stage sampling method was used to select a representative sample of 210 households to be interviewed across the four selected counties. In the first stage, 30 clusters (census blocks) were selected with probability proportional to the number of housing units within the census block according to the 2000 Census. In the second stage, interview teams randomly selected seven households from each of the 30 clusters. The interview teams were provided with detailed maps of each selected cluster and instructed to select the housing units for the seven interviews by use of a standardized method for randomization.

A three-hour training session on interview techniques, safety issues, household selection, tracking methods, and referrals was given on February 5, 2009 to the 15 two-person interview teams. Teams consisted primarily of Kentucky public health staff from the local western Kentucky region and Epidemic Intelligence Service Officers from the Centers for Disease Control and Prevention. Each team attempted to conduct seven interviews in each of the 30 census blocks selected for the sample, with a goal of 210 total interviews. Residents of the selected households who were at least 18 years of age or older were considered eligible respondents. Additionally, the field team members distributed flyers provided by KY DPH, with information regarding kerosene and chainsaw safety, food safety, and carbon monoxide poisoning. Teams were instructed to complete confidential referral forms whenever they encountered urgent needs and to forward the forms to the KY DPH for immediate follow up.

Epi Info™ 3.5.1, a free statistical software package produced by the CDC, was used for data entry and analysis. We conducted weighted cluster analysis to report the estimated number of households affected in the assessment area. To account for the probability that the responding household was selected, we created sampling weights based on the total number of occupied

houses according to the 2000 Census, the number of clusters selected, and the number of interviews completed in each cluster. This weight was used to calculate all weighted frequencies and percentages presented in this report. The contact rate was calculated by dividing the completed interviews by the total number of households where contact was attempted; the cooperation rate was calculated by dividing completed interviews by the total number of households where contact was made; and the completion rate was calculated by dividing the number of completed interviews by 210 (i.e., the goal for completed interviews in this CASPER).

RESULTS

On February 7, 2009, the interview teams were able to conduct 187 interviews, yielding a completion rate of 89% (Table 1). The 187 interviewed households were a sample of the 19,497 total households in Livingston, Caldwell, Lyon, and Crittenden counties. Unweighted frequencies, percentages, and projected population estimates based on weighted analyses can be found in Table 2 through Table 5.

Household demographics, evacuation behaviors, and utilities are shown in Table 2 and Table 3. Twenty-two (22%) percent of households with pets claimed that owning a pet prevented them from seeking alternative shelter or tending to their own health needs. At the time of the CASPER, 12 days after the storm began, the majority of residents felt safe and secure in their homes (97%) and neighborhoods (92%). However, 9% of households did not have any source of electricity and 17% of households were using generators as their source of electricity. Approximately half (52%) of households were using bottled water as their source of drinking water. The remaining households were using well or municipal water, and 77% of those households were not treating their water. Additionally, 5% of households reported they did not have enough water or food for the next three days.

An estimated 58% of households reported using a generator at some point since the ice storm (Table 4). Of those households, less than half (39%) had reported owning a carbon monoxide detector and only 73% of those with detectors reported it was currently working. In addition, approximately 1% of households were using their generator indoors, 3% in the garage, and 5% outdoors but near an open window. However, no severe headaches or dizziness was reported

among these respondents (data not shown). Approximately 80% of households using a generator reported running them within 25 feet of their house. Additionally, of the 38% of households who had used a charcoal/gas grill since the storm, almost a third self-reported improper usage, with 21% using grills inside, and 9% of those using grills outside reported using them near an open window or a door.

Self-reported health status, current needs, and access to care are shown in Table 5. Since the ice storm, 5% of households reported at least one person who was injured and 17% reported at least one person in the household who experienced one or more illnesses. Nausea, stomach ache, or diarrhea were the most commonly reported illnesses, with 4% of households reporting at least one person experiencing symptoms (25% of households reported one or more illnesses), followed by 3% of households reporting at least one person with cough with fever (19% of households reported one or more illnesses), and 2% of households reporting at least one person with severe headache with dizziness (11% of households reported one or more illnesses). Three percent of households indicated that someone in their home needed supplemental oxygen, and 6% reported they were not getting needed medication. In addition to these injuries and illnesses, 15% of households reported at least one person with mental health concerns.

DISCUSSION

The data presented here represent reports from the CASPER surveys conducted in Livingston, Caldwell, Lyon, and Crittenden counties on February 7, 2009. To create sampling weights, information from the 2000 Census was used to determine the household probability of being selected. Some areas may have experienced significant population changes since 2000, and thus, Census data may not be representative of the current population in those areas. Changes in population since the previous census may result in less reliable generalizations of weight analyses to the sampling frame. The discrepancy between the 2000 Census and the current status would not, however, affect the unweighted frequencies presented in this report. Further, local knowledge of the Pennyrile District report relatively minor changes in population over the past decade. The contact rate, 54.4%, indicates that the field interview teams had to sample more households within the clusters to complete the necessary number of interviews,

and this additional sampling might affect the representativeness of the results. In other words, interview teams completed, on average, one interview for every two houses selected. Additionally, there is no available information from a baseline or comparison group that can be used to interpret the percentages of illnesses reported.

This CASPER met the stated purpose of determining health and safety-related needs of residents living in the severely affected regions of Western Kentucky to inform KY DPH storm-response efforts based on the public health recommendations (see below). Although these communities were still recovering from the ice storm, overall, most residents felt safe and secure in their homes and neighborhoods and reported having enough food and water for the next three days. Additionally, most residents reported the capability to procure personal medication and transportation, if needed. As of the day they were interviewed (i.e., February 7, 2009), many residents in the Pennyrile District were still waiting for power to be restored by the electric company, but several of them were using generators to power their homes. More than half the residents had used a generator at some time since the ice storm. There were many reports of improper or unsafe generator use that should be addressed in public health messages to prevent carbon monoxide poisoning. Further, the majority of those using well or municipal water were not treating their water. Additional information is needed to determine which counties were under boil-water advisories at the time of the CASPER to assess the number of households who may have been unaware they were consuming water that should have been boiled.

RECOMMENDATIONS On the basis of the results of the CASPER, the following actions are recommended:

1. Emphasize carbon monoxide exposure risks and employ early communication of prevention messages by using appropriate media.

Since a high percentage of households reported improper generator and/or charcoal grill usage, messaging about carbon monoxide exposure should be communicated to the affected area. These messages should be distributed through a variety of media because a lack of electricity, poor road conditions, and questionable telephone service might prevent people from accessing their usual sources of information. Therefore, carbon monoxide exposure prevention messages

communicated after the storm should include radio announcements for those who have battery-powered radios and, if cellular service is available, providers should be contacted as soon as possible about the possibility of sending mass public service text messages. Ideally, these messages should be prepared or obtained in advance of the disaster and, for future events, should be communicated before the storm hits and as soon as possible after the storm.

2. Emphasize safe generator use

Safe generator location should be the main focus of these prevention messages. However, during the course of the CASPER, several people indicated that they were aware of recommendations to use generators away from the house but did not do so because they were afraid of having the generator stolen or ruined by rainfall. Also, short extension cords sometimes limit the user's ability to place the generator at a safe distance from the house. Therefore, in addition to specific information about unsafe generator placement behaviors (e.g., indoors, in a basement or a garage, near an open window), prevention messages should include specific advice, such as procuring a lock and chain, to secure the generator to a tree or other solid structure; placing the generator on a flat surface that is not subject to puddling; sheltering the generator under an outside table to prevent water damage and electrocution; obtaining a long extension cord rated for outdoor use; and obtaining a carbon monoxide detector that is either battery-powered or AC-powered with a battery back-up. Additionally, vendors should be encouraged to provide safety information at the point of sale and to advise customers to purchase locks, chains, long extension cords for outdoor use, and carbon monoxide detectors, along with the generator.

3. Discuss other unsafe heating sources

A number of unconventional heating sources (e.g., charcoal grills and gas stoves) were used during the power outages. Prevention messages should include specific information to the effect that these heating sources are unsafe.

4. Consider establishing pet-friendly shelters

Over 20% of respondents reported that they did not seek alternative shelter due to their pets. Future efforts to provide pet-friendly shelters are encouraged.

5. Respond to the needs of oxygen-dependent people

Kentucky has a high rate of lung disease; a noteworthy number of households indicated the immediate need for supplemental oxygen. State health officials should immediately respond to these needs and, in the future, should be prepared to respond to the needs of oxygen-dependent residents (e.g., ensuring enough oxygen canisters are available for those in need, providing a place with a source for charging oxygen devices, and developing a plan to identify and contact those in need).

6. Communicate available mental health resources

Sixteen percent of respondents in Livingston, Caldwell, Lyon, and Crittenden counties reported mental health concerns. It is unclear from these data what (if any) portion of these mental health concerns can be attributed to the ice storm specifically. Nonetheless, county officials should promote community awareness of available mental health resources.

TABLES

Table 1. Questionnaire response rates for the February 2009 Western KY CASPER

Questionnaire response	Percent	Rate
Completion*	89.0	187/210
***Contact**†*	54.4	187/344
***Cooperation**‡*	97.9	187/191

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

† Percent of questionnaires completed in relation to all households where contact was attempted

‡ Percent of questionnaires completed in relation to all households where contact was made

Table 2. Self-reported housing type, perceived safety of respondents and pet ownership, Western KY CASPER, February 2009

Characteristic	Frequency (n=187)	% of households	Projected households	Projected %	95% CI
Housing Structure					
Single family	148	82.2	15451	82.6	74.4–90.8
Multiple unit	14	7.8	1336	7.1	0–15.0
Mobile home	18	10.0	1915	10.2	5.0–15.5
Safety					
Feel safe in house	181	96.8	18797	97.0	94.4–99.7
Feel secure in area	171	92.9	17629	92.4	87.4–97.4
Pets					
Have pets	114	61.0	11993	61.9	52.0–71.8
Pet prevented from seeking shelter	25	21.9%*	2660	22.2%*	--

* Of households with pets (n=114)

Table 3. Self-reported basic utilities, Western KY CASPER, February 2009

Characteristic	Frequency (n=187)	% of households	Projected households	Projected %	95% CI
Food and Water					
Inadequate drinking water	9	4.8	923	4.8	1.0–8.5
Inadequate food	8	4.3	887	4.6	0–9.2
Source of Drinking Water					
Bottled	91	49.2	10000	52.1	41.3–62.9
Well	11	5.9	1050	5.5	1.5–9.5
Public/municipal	83	44.9	8110	42.4	32.1–52.6
Not treating water	70	74.5*	7081	77.3*	--
Current Source of Electricity					
Power company	137	74.1	14190	74.0	61.9–86.0
Gasoline generator	29	15.7	3200	16.7	7.6–25.7
None	19	10.3	1789	9.3	3.8–14.8
Current Source of Heat					
Electricity	69	37.7	7066	37.2	27.7–46.7
Propane/gas	93	50.8	9939	52.4	43.2–61.5
Wood	11	6.0	1026	5.4	1.5–9.3
Kerosene heater	3	1.6	286	1.5	--
Other	7	3.7	668	3.4	--
Had working toilet	181	96.8	18809	97.1	94.9–99.3
Had working phone	174	93.5	17879	92.8	87.2–98.3

* Of households whose primary source of drinking water was well or public/municipal (n=94)

Table 4. Self-reported carbon monoxide exposure risk behaviors, Western KY CASPER, February 2009

Characteristic	Frequency (n=187)	% of households	Projected households	Projected %	95% CI
Generator Use	**105**	**56.1**	**11248**	**58.1**	**47.8–68.3**
Inside	1	1.0*	95	0.9*	--
Garage	4	3.8*	382	3.4*	--
Outside	97	92.4*	10481	93.2*	--
Near open window	6	6.2†	549	5.2†	--
Charcoal Grill/Gas Grill/Camp Stove Use	**68**	**38.0**	**7300**	**38.3**	**30.0–46.5**
Inside w/window open	7	10.4‡	922	12.6‡	--
Inside w/window closed	7	10.4‡	922	12.6‡	--
Outside	53	79.1‡	5487	75.2‡	--
Near open window	5	9.0**	465	8.5**	--
Have CO detector	**69**	**36.9**	**7609**	**39.3**	**29.2–49.4**
Working CO detector	49	71.0††	5557	73.0††	--

* Of the households who reported using a generator (n=105)
†Of the households who reported using a generator outside (n=97)
‡Of the households who reported using a grill/stove (n=68)
**Of the households who reported using a grill/stove outside (n=53)
††Of the households with a CO detector (n=69)

Table 5. Self-reported health status, current needs and access to care, Western KY CASPER, February 2009

Characteristic	Frequency (n=187)	% of households	Projected households	Projected %	95% CI
Injury					
Injured since storm	9	4.8	885	4.6	1.5–7.6
Illness					
Become ill since storm	32	17.1	3372	17.4	10.4–24.3
Nausea/stomach ache/diarrhea	8	4.3 (25.0 of ill)	817	4.2 (24.2 of ill)	--
Cough with fever	7	3.7 (22.0 of ill)	668	3.4 (19.8 of ill)	--
Severe headache w/dizziness	4	2.1 (12.5 of ill)	382	2.0 (11.3 of ill)	--
Chronic illness worsened	2	1.1 (6.3 of ill)	191	1.0 (5.7 of ill)	--
Mental Health					
Emotional concerns, anxiety, sleep problems, or memory problems	30	16.0	2926	15.3	8.3–22.1
Medication					
Not getting needed medication	11	5.9	1102	5.7	1.7–9.7
Special Needs					
Home health care	1	0.5	95	0.5	--
Oxygen	6	3.2	627	3.2	--
Dialysis	1	0.5	95	0.5	--
CPAP	1	0.5	95	0.5	--
Breathing treatment	1	0.5	95	0.5	--
Transportation					
Available if needed	185	99.5	19179	99.5	98.4–100.5