

Community Assessment for Public Health Emergency Response (CASPER) Toolkit



Second Edition

Centers for Disease Control and Prevention

National Center for Environmental Health

Environmental Hazards and Health Effects

Health Studies Branch



Suggested Citation:

Centers for Disease Control and Prevention (CDC). Community Assessment for Public Health
Emergency Response (CASPER) Toolkit: Second edition. Atlanta (GA): CDC; 2012.

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Acknowledgement

The first edition of the Community Assessment for Public Health Emergency Response (CASPER) Toolkit was developed by the Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Environmental Hazards and Health Effects, Health Studies Branch (HSB) in 2009. HSB has now developed this second edition to expand instruction and refine methodological procedures, including describing and incorporating advances in technology and recognizing the release of the U.S. Census 2010 data. HSB acknowledges the following individuals for their collaboration and commitment in the development of the second edition of the CASPER toolkit:

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HSB also thanks CDC's Division of Reproductive Health, the developer of the Reproductive Health Assessment Toolkit, and The Task Force for Child Survival and Development, developer of the Child Needs Assessment. HSB used these two tools as models for the first edition of this toolkit.

We would also like to acknowledge the Kentucky Department for Public Health, the Green River District Health Department, the Pennyrite District Health Department, the Muhlenberg County Health Department, the Hopkins County Health Department, and local Kentucky emergency management officials for the CASPER examples included in this toolkit. The examples are related to the 2009 Kentucky ice storm.

Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Table of Contents

1. Executive Summary.....	1
2. Background.....	2
2.1 CASPER objectives.....	4
2.2 When to conduct a CASPER.....	4
2.3 Considerations prior to conducting a CASPER.....	5
<i>Table 1. Items to consider prior to conducting a CASPER.....</i>	<i>5</i>
2.4 Working with partners.....	7
3. Phase I: Prepare for the CASPER.....	9
3.1 The assessment area(s).....	9
3.1.1 Obtaining sampling frame information by using U.S. Census Bureau data.....	10
<i>Figure 1. U.S. Census Bureau 2010 summary file Web page.....</i>	<i>10</i>
<i>Figure 2. U.S. Census Bureau 2010 summary file showing “Geographies” filter.....</i>	<i>11</i>
<i>Figure 3. U.S. Census Bureau 2010 summary file showing option to select area.....</i>	<i>12</i>
<i>Figure 4. U.S. Census Bureau 2010 summary file showing option to select variables .13</i>	<i>13</i>
3.1.2 The two-stage cluster sampling method.....	14
3.1.3 Stage one: Selecting 30 clusters and mapping.....	14
<i>Figure 5. Excerpt from list of all census blocks in Caldwell County, Kentucky.....</i>	<i>15</i>
<i>Figure 6. U.S. Census Bureau TIGERweb.....</i>	<i>16</i>
<i>Figure 7. U.S. Census Bureau TIGERweb – selecting census tracts and blocks.....</i>	<i>17</i>
<i>Figure 8. U.S. Census Bureau showing submit query.....</i>	<i>18</i>
<i>Figure 9. Sample map of a selected census block created with the U.S. Census.....</i>	<i>19</i>
3.1.4 Stage two: Selecting seven households within each cluster.....	20
<i>Figure 10. Example of using systematic random sample to select seven housing units for interview.....</i>	<i>21</i>
3.2 Considerations in sampling to minimize bias.....	22
3.3 Data collection instrument.....	24
3.3.1 Data collection options.....	25
<i>Table 2. Considerations for planning: using paper forms versus electronic forms.....</i>	<i>26</i>
3.4 Forms and handouts for the field.....	26
3.4.1 Tracking form.....	26
3.4.2 Confidential referral form.....	27
3.4.3 Handouts.....	27
3.4.4 Introduction and consent script.....	27
3.5 Supplies and assessment materials.....	29

3.6 Field interview teams	30
<i>Table 3. Considerations for the number of CASPER field interview teams</i>	31
3.7 Training.....	31
3.8 Conducting the interview	32
3.8.1 Selecting an individual to respond in each selected household	32
3.8.2 Interview tips.....	32
<i>Table 4. Interview tips</i>	33
4. Phase II: Conduct the Assessment	35
4.1 Steps in the field.....	35
4.2 Considerations while in the field.....	36
<i>Table 5. Considerations for team members while in the field</i>	36
5. Phase III: Data Entry and Analyses	38
5.1 Data handling	38
<i>Table 6. Considerations for data entry and analysis</i>	38
5.2 Weighted analyses.....	39
<i>Figure 11. Sample dataset showing the number of interviews per cluster and the assigned weight for each house interviewed.</i>	40
<i>Figure 12. Epi Info™ 7 “classic mode” frequency analysis window showing selected variables and weight.</i>	41
<i>Figure 13. Epi Info™ 7 “classic mode” output window showing weighted frequencies</i>	41
<i>Table 7. Unweighted and weighted frequencies of current source of electricity following the Ice Storms, Kentucky, 2009.</i>	42
5.3 Calculation of 95% confidence intervals	42
<i>Figure 14. Classic mode of Epi Info 7</i>	42
<i>Figure 15. Selected variables for calculation of complex sample frequencies</i>	43
<i>Figure 16. Example of 95% CI output in Epi Info™ 7 “classic mode”</i>	43
5.4 Response rates	44
<i>Figure 17. Sample tracking dataset showing attempted and completed interviews</i> ...	44
<i>Table 8. Calculation of CASPER response rates</i>	45
6. Phase IV: Write the report.....	47
6.1. Considerations prior to writing the report	47
<i>Table 9. Considerations for writing the report</i>	47
6.2 Preliminary field report	48
6.3 Final report	50

7. CDC Support.....	51
8. Conclusion	52
9. References	53
10. Additional sources of information.....	55
Appendix A: Steps to merge the two Excel files downloaded from Census 2010 and to calculate cumulative housing units for selection of census blocks.....	58
Appendix B: Question bank.....	59
Appendix C: CASPER preparedness template	73
Appendix D: Example questionnaire	75
Appendix E: CASPER Tracking Form (sample)	76
Appendix F: Confidential referral form (sample)	78
Appendix G: Introduction and consent script (sample).....	79
Appendix H: Agenda for just-in-time training of field interview teams.....	77
Appendix I: Sample Interview teams tracking form.....	78
Appendix J: CASPER field Interview team evaluation	79
Appendix K: Sample final report	80
Appendix L: Summary of CASPER procedures.....	91

Common abbreviations

CASPER: Community Assessment for Public Health Emergency Response

CDC: Centers for Disease Control and Prevention

EPI: Expanded Program on Immunization

FEMA: Federal Emergency Management Agency

GIS: Geographic Information System

GPS: Global Positioning System

HSB: Health Studies Branch, Division of Environmental Hazards and Health Effects, National Center for Environmental Health, Centers for Disease Control and Prevention

MMWR: Morbidity and Mortality Weekly Report

PDA: Personal Digital Assistant

WHO: World Health Organization

Glossary of terms

Block—a subdivision of a census tract (or, prior to 2000, a block numbering area). A block is the smallest geographic unit for which the Census Bureau tabulates 100% data. Many blocks correspond to individual city blocks bounded by streets, but, especially in rural areas, blocks may include many square miles and may have some boundaries that are not streets.

Block group—a subdivision of a census tract (or, prior to 2000, a block numbering area). A block group is the smallest geographic unit for which the Census Bureau tabulates sample data. A block group consists of all the blocks within a census tract with the same beginning number.

CASPER—Community Assessment for Public Health Emergency Response: an epidemiologic tool designed to provide to decision-makers household-based information about an affected community's needs quickly and in a simple format.

Census—the enumeration of an entire population usually with details being recorded on residence, age, sex, occupation, ethnic group, and marital status. The United States conducts a census every 10 years; at the time of publication of this document, the most recent census was in 2010.

Census tract—a small, relatively permanent geographic entity within a county (or the statistical equivalent of a county) delineated by a committee of local data users. Generally, census tracts have between 2,500 and 8,000 residents and boundaries that follow visible features. When first established, census tracts are as homogeneous as possible with respect to population characteristics, economic status, and living conditions.

Cluster—for the purpose of CASPER, a cluster is a small group of households, or occupied housing units, within a geographic unit (e.g., a block or block group) that is within the sampling frame being assessed.

Cluster sampling—a form of probability sampling in which respondents are drawn from a sample of mutually exclusive groups (i.e., clusters) within a total population.

Completion rate—a type of response rate; the number of completed interviews, with reporting units divided by the goal number of completed interviews (for CASPER, this goal is usually 210). See *response rate*.

Contact rate—a type of response rate; the number of completed interviews divided by the total number of housing units at which contact was attempted. The denominator includes the number of completed interviews, incomplete interviews, refusals, and non-respondents (i.e., housing units in which no one was at home or that were unsafe to approach). See *response rate*.

Confidence interval—the range around a numeric statistical value obtained from a sample, within which the actual, corresponding value for the population is likely to fall, at a given level of probability (e.g., 95%).

Confidence limit—the minimum and maximum value of a confidence interval.

Confidentiality—condition or type of communication between two or more people in which the information is accessible only to those authorized to have access and may not be discussed or disclosed to third parties.

Cooperation rate—a type of response rate; the number of completed interviews divided by all eligible housing units that were contacted. The denominator includes the number of completed interviews, incomplete interviews, and refusals. See *response rate*.

Disaster—a serious disruption of the functioning of society, causing widespread human, material, or environmental losses and exceeding the local capacity to respond requiring external assistance.

Disaster epidemiology—use of epidemiology to assess the short- and long-term adverse health effects of disasters and to predict consequences of future disasters (See *epidemiology*).

Disaster-related health effects

Direct—health effects caused by the actual physical forces or essential elements of the disaster.

Indirect—health effects caused secondarily by anticipation of the disaster or by unsafe/unhealthy conditions that develop due to the effects of the disaster.

Eligible household—for the purposes of CASPER, a household within a selected cluster that is selected at random for interview and in which at least one adult (18 years or older) lives.

Epidemiology—the quantitative study of the distribution and determinants of health-related events in human populations.

Epi Info™—a statistical software package freely provided by CDC (<http://wwwn.cdc.gov/epiinfo/7/index.htm>) for entering and analyzing data.

Health Impact Assessment—a combination of procedures, methods, and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population.

Household—a household includes all the individuals who occupy a housing unit as their usual place of residence.

Housing unit—a house, an apartment, a mobile home, a group of rooms, or a single room that is intended to be occupied as separate living quarters.

Natural disaster—ecological disruption causing human, material, or environmental losses that exceed the ability of the affected community to cope by using its own resources, often requiring outside assistance.

Occupied housing unit—a usual place of residence of the person or group of people living therein at the time of Census enumeration, even if the occupants are only temporarily absent.

Probability weight—a factor/value applied to each element in a sample in order to adjust for differences in the likelihood of selection. For CASPER, this is a value assigned to each household (i.e., each interview) that represents the inverse probability of its selection from the sampling frame, given the sampling design. Results calculated by use of the probability weight are representative of the entire sampling frame.

Proportion—a type of ratio in which the numerator is included in the denominator. A proportion, or ratio of a part to the whole, is usually expressed as a decimal (e.g., 0.2), a fraction (e.g., 1/5), or a percentage (e.g., 20%).

Random number—a number selected by chance.

Random sample—probability sampling in which a subset of individuals (a sample) is chosen from a larger set (a population or sampling frame) randomly and entirely by chance, in such a way that each individual has the same probability of being chosen at any stage during the sampling process. See *sampling*.

Representative sample—a sub-group representing the total population, or sampling frame.

Response rate—the number of completed interviews divided by the total number of housing units sought or attempted. See *contact rate*, *completion rate*, and *cooperation rate*.

Sampling—the selection of a subset of individual observations within a population of individuals intended to yield some knowledge about the population of concern; sampling can be random or non-random, and representative or non-representative. See also *random sampling*, *stratified sampling*, *systematic sampling*, and *target sampling*.

Sampling design—the specification of the sampling frame, sample size, and the system for selecting and contacting individual respondents from the population.

Sampling frame—the entire population within the selected assessment area from which a sample is drawn. The *sample* is a subset of the larger *sampling frame*.

Stratified sample—a sample selected by grouping members of the population into relatively homogeneous subgroups and then applying random or systematic sampling within each stratum. See *sampling*.

Systematic random sample—a sample in which the target population is arranged according to an ordering scheme, with elements of it then selected at regular intervals through that ordered list. See *sampling*.

Target sample—a type of non-probability sample in which sample elements are chosen on the basis of some non-random characteristic (e.g., choosing the most severely damaged homes for interviews). See *sampling*.

Weight—the inverse of the probability that a given household will be included in the sample due to the sampling design. For the purpose of CASPER, the weight is the total number of housing units (HUs) in the sampling frame divided by the number of clusters selected (e.g., 30), multiplied by the number of interviews completed within the cluster.

$$\text{Weight} = \frac{\text{Total number of housing units in sampling frame}}{(\text{number of housing units interviewed within cluster}) * (\text{number of clusters selected})}$$

1. Executive Summary

Following any type of disaster, public health and emergency management professionals must be prepared to respond to and meet the needs of the affected public. 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. Without information on the community, public health officials may make decisions based on anecdotal information; such decisions may not accurately reflect the need of the entire community.

The Centers for Disease Control and Prevention (CDC), National Center for Environmental Health, Division of Environmental Hazards and Health Effects, Health Studies Branch (HSB) published the first edition of the CASPER toolkit in 2009 and widely distributed the toolkit to the public health community. HSB developed this second edition to address partner feedback on the first edition and include advancements in technology and refinements in the methodology. This second edition is an updated guideline for field staff conducting CASPER.

Public health department personnel, emergency management officials, academics, or other disaster responders who wish to assess household-level public health needs will find this toolkit useful for rapid data collection during a disaster response. CASPER may also be used for conducting Health Impact Assessments (HIAs) or other community-level surveys during non-emergency situations.

2. Background

Every U.S. state and territory is at risk for one or more natural disasters that can result in a serious disruption of the functioning of society and cause widespread human, material, or environmental losses that exceed the local capacity to respond, resulting in the need for external assistance (1). Disasters can occur without warning and cause significant infrastructure damage and devastating financial loss. They can pose health risks, including physical injuries, illnesses, potential disease outbreaks, short- and long-term psychological effects, and death. The destruction of homes, damage to such local infrastructure as the water supply, electricity, and health facilities, and the interruption of such services as garbage pickup and social support networks can affect the well-being of a community (2). These disruptions often require rapid action by public health and local officials to mitigate the resulting adverse health effects, prevent as much damage as possible, and restore delivery of public services. Responding appropriately and effectively to the public health threats of disasters, whether natural or man-made, requires timely and accurate information.

Epidemiology should be an important component during a disaster response because its methods can provide scientific situational awareness. Epidemiologic activities can be used to identify health problems, establish priorities for decision-makers, and evaluate the effectiveness of response activities. One epidemiologic strategy is the Rapid Needs Assessment (RNA), which dates back to the early 1970s when field personnel pioneered the adaptation of traditional techniques to develop more simplified sampling methods and disease surveillance systems (3). Scientists in the World Health Organization's (WHO's) Expanded Program on Immunization (EPI) and Smallpox Eradication Program experienced temporal and fiscal constraints while using traditional epidemiologic tools to identify needs and assess the immunization status of communities in developing countries (4). In the United States during the 1980s, the National Academy of Sciences' Advisory Committee on Health, Biomedical Research, and Development (ACHBRD) identified the EPI sampling techniques and surveillance methods

as ideal for providing reliable health information more quickly and at less cost than traditional epidemiologic methods (5). In 1999, WHO issued the book *Rapid Health Assessment Protocols for Emergencies* to address the need for common, standardized, technical tools for assessing damage, gauging health risks, and gathering information for decision-makers following a disaster (6). These protocols are designed to help those involved in RNA and to assist in planning appropriate responses. In recent years, RNA has been frequently used by emergency officials and public health responders to gather information about the status of an affected population, particularly during an emergency response (7). RNAs are a relatively inexpensive and practical public health tool. They represent a first line of epidemiologic response to most types of disasters (8).

CASPER is a specific set of tools designed to provide quick, inexpensive, accurate, and reliable household-based public health information about communities affected by natural or man-made disasters. It uses a validated sampling methodology to collect information at the household level on the health status and basic needs of a community affected by a disaster. HSB uses the acronym *CASPER* to distinguish it as a household-based needs assessment and to avoid confusion with other RNA methodologies, such as the Federal Emergency Management Agency's RNA (9). HSB is nationally recognized as a source of disaster epidemiology expertise in providing assistance to public health agencies conducting need assessments to minimize the health effects of disasters on communities. HSB's Disaster Epidemiology and Response Team provides epidemiology knowledge and leadership to local, state, tribal, territorial, federal, and international partners through all stages of the disaster cycle—preparedness, response, recovery, and prevention—to allow them to prepare for and respond to natural and man-made public health disasters. HSB developed the CASPER toolkit to assist in this process through standardization of the assessment procedures to determine the health status and basic needs of the affected community. This toolkit provides guidelines on the four major phases of CASPER: preparing for the CASPER, conducting the CASPER, analyzing the data, and writing the report.

2.1 CASPER objectives

The primary goals of CASPER are to obtain information rapidly about the needs of an affected community and to monitor changes of needs during the recovery period. In the disaster setting, the main objectives of CASPER are to

- determine the critical health needs and assess the impact of the disaster,
- characterize the population residing in the affected area,
- produce household-based information and estimates for decision-makers, and
- evaluate the effectiveness of relief efforts through conducting a follow-up CASPER.

To accomplish these objectives, responders need to employ a timely response by using a carefully constructed assessment design in a defined geographic area.

2.2 When to conduct a CASPER

A CASPER can be conducted any time that the public health needs of a community are not well known, whether during a disaster response or within a non-emergency setting. During a disaster, the local, state, or regional emergency managers or health department officials may decide to initiate a CASPER when

- the effect of the disaster on the population is unknown,
- the health status and basic needs of the affected population are unknown, or
- the response and recovery efforts need to be evaluated.

While CASPER is a quick, reliable, and accurate technique that provides household-based information about a community's needs, it is not intended to provide direct services to residents (such as cleanup or home repair) or to deliver food, medicine, medical services, or other resources to the affected area.

However, some households in need of services might be identified by use of CASPER and referrals made

to the appropriate agencies. CASPER also cannot determine why people are not returning to their community, nor can it establish current population estimates.

Although traditionally used during an emergency, CASPER can also be applied in non-emergency situations of the disaster life cycle. For example, during the recovery phase of a disaster, a CASPER can be conducted as a follow-up to a previous CASPER to assess the effectiveness of the response or program and determine ongoing needs (if any) in the community. Additionally, during the preparedness phase, a CASPER can be conducted to determine preparedness among the community such as evacuation and/or personnel readiness plans. CASPER has also been used to assess public health perceptions, determine current health status, and estimate the needs of a community during a non-emergency setting. For example, a CASPER can be conducted as part of a Health Impact Assessment (HIA) to assess a community's awareness and opinions concerning the impact of a project (e.g., a new transportation route) on health in the community. Regardless of the setting and objectives, once the decision to conduct a CASPER has been made, it can be initiated within 72 hours.

2.3 Considerations prior to conducting a CASPER

Prior to conducting a CASPER, public health officials should obtain detailed information about the assessment and planned activities. It is important to know the purpose, setting, and availability of resources *before* making the decision to conduct a CASPER ([Table 1](#)).

Table 1. Items to consider prior to conducting a CASPER

<i>Know the purpose</i>
<u>Who requested the CASPER?</u>
Knowing who requested the CASPER is important for clarifying the purpose.
<u>How is the CASPER information going to be used?</u>
Prior to conducting the CASPER, response officials' understanding of how the information will be used will help create a clear vision and narrow the data scope. Clear goals are imperative to ensuring that the appropriate data are collected to generate useful information for public health action.

Who are the relevant stakeholders?

Identify and include all relevant stakeholders in the beginning stages to ensure smooth partnerships throughout the CASPER planning, activities, and report distribution. Be sure the CASPER fits into the larger response activities during the emergency by working within the Incident Command Structure (ICS) or the Incident Management System (IMS).

When should the assessment be conducted?

A CASPER can be conducted any time that the public health needs of a community, and the magnitude of those needs, are not well known, whether during a disaster response or within a non-emergency setting (e.g., for a Health Impact Assessment). During a response, the most essential needs of a community can change quickly. Therefore, the objectives should match the timing of the CASPER.

Know your setting

What geographical area does the assessment cover?

When determining the assessment area(s), it is important for public health officials to determine what area of the state, city, or county is affected. Therefore, officials should acquire maps of the affected area (e.g., from the National Weather Service for areas affected by a hurricane) to gain a better understanding of the geographical location, boundaries, and landmarks of the affected community.

What are the demographics of the population to be assessed?

Obtain recent census information (<http://factfinder2.census.gov>) to identify the demographic characteristics of the affected population. Other important information to obtain includes the geographic location of vulnerable populations and the potential or actual environmental vulnerabilities in the community.

What information has been obtained from other assessments?

Obtain information from local responders or from other assessments conducted (e.g., flyovers and area damage assessments) because such information may be beneficial in determining your assessment area(s).

Know your resources

What resources are needed?

- Teams: determine how many interview teams are needed to cover the desired area in the desired amount of time.
- Expertise: determine any special expertise needed to conduct the CASPER (e.g., a data analyst, a Geographic Information System (GIS) expert, an environmental scientist, a mental health professional) and how many of each are necessary.
- Equipment: determine what type of equipment is necessary (e.g., Personal Digital Assistants [PDAs], GIS systems, vehicles, radios) and how many of each type are necessary.

What resources are available?

Determine what type and how many of the following resources are available locally: personnel, transportation, communication devices, Global Positioning System (GPS) devices, and computers with Internet access and Epi Info™ (or other statistical software). If the resources are not available locally, determine how many must be requested from other agencies (e.g., state agencies or federal agencies such as CDC) to conduct the CASPER successfully.

2.4 Working with partners

Working relationships between local, state, and federal partners, private or nongovernmental organizations, and educational institutions are built and fostered during the preparedness stage. They form the backbone for strong communication and collaboration during a response effort. These partnerships are integral to the successful completion of a CASPER. The number and type of partners in CASPER depends on the nature of the assessment. All partners should be interested in conducting a CASPER and in being beneficiaries of the assessment results. During the first phase of CASPER (Preparing for the CASPER), the role of each partner should be defined in terms of what each will contribute to the assessment. These contributions may include subject matter expertise, analytical support, materials, or ground information about the affected area. Potential partners for conducting a CASPER include, but are not limited to, the following:

- Local health departments
- State health departments
- Local and/or state Emergency Management Agencies (EMAs),
- The Centers for Disease Control and Prevention
(<http://emergency.cdc.gov/disasters/surveillance/>)
- The U.S. Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response (<http://www.phe.gov/preparedness/pages/default.aspx>)
- The Federal Emergency Management Agency (FEMA) Emergency Support Functions (ESF)#6
<http://www.fema.gov/pdf/emergency/nrf/nrf-esf-06.pdf>
- Neighboring states through the Emergency Management Assistance Compact (EMAC)
(<http://www.emacweb.org/>)
- Colleges and universities
- The American Red Cross (<http://www.redcross.org/>)
- The Council of State and Territorial Epidemiologists (<http://www.cste.org/dnn/>).

3. Phase I: Prepare for the CASPER

This toolkit provides a guideline for collecting information by use of a standardized assessment of housing units (HUs) in a specified area. Prior to conducting a CASPER, partners should decide if CASPER provides an appropriate sampling methodology on the basis of the objectives, timeframe, and available resources. The preferred sampling method for CASPER is the two-stage cluster sampling design in which 30 clusters are selected and then 7 interviews are completed in each of the 30 clusters. The goal is to complete 210 interviews within the assessment area, and the data collected are then analyzed to generate estimates. To provide the basis for valid estimates, the interviews must be conducted according to an appropriate sampling method. The following describes how to select the clusters and households for interviews.

3.1 The assessment area(s)

The assessment area(s) must be identified in the preparation phase. The assessment area(s) will serve as the “sampling frame” for CASPER—that is, the population from which the sample is drawn. At the completion of the CASPER, the results will be descriptive of the entire chosen sampling frame. The sampling frame can be defined by political boundaries (e.g., a county, a district, a city), by geographic boundaries (e.g., houses located in a specific direction from a landmark, such as a road or a river), or by selection of a specific community (e.g., the most affected area or a community without local health services). If areas that should be assessed differ drastically by the extent of damage, by social or geographic vulnerability, or by the nature of the jurisdictions responding to their needs, then separate sampling frames (i.e., separate CASPERs) for each specific area should be considered. As a general guide, a sampling frame should be no smaller than 800 housing units. For small sampling frames, consider attempting a full census or another non-clustered sampling method (e.g., simple random sampling or systematic random sampling).

Once the sampling frame has been defined, it must be divided into non-overlapping sections (referred to as *clusters*). U.S. census blocks are pre-defined and non-overlapping. Thus, census blocks are most commonly used as clusters in conducting a CASPER. For CASPER, selecting a sample requires a list of all clusters within the sampling frame, including the number of housing units within each cluster. This list can be obtained from the U.S. Census Website (<http://factfinder2.census.gov>) or by use of population-based shapefiles within such GIS software as ArcGIS, which was developed by the Environmental Systems Research Institute, Inc. (ESRI). Using GIS provides much more flexibility in the selection of a sampling frame by allowing the user to select portions of a county or counties to assess. If GIS capabilities are not available, then the sampling frame is restricted by the capabilities of the U.S. Census Website to entire county(ies) or zip code(s). Instructions for downloading the needed information from the Website are provided in section 3.1.1. Instructions for using GIS to select clusters are based on your specific GIS software, and therefore are not provided within this toolkit.

3.1.1 Obtaining sampling frame information by using U.S. Census Bureau data

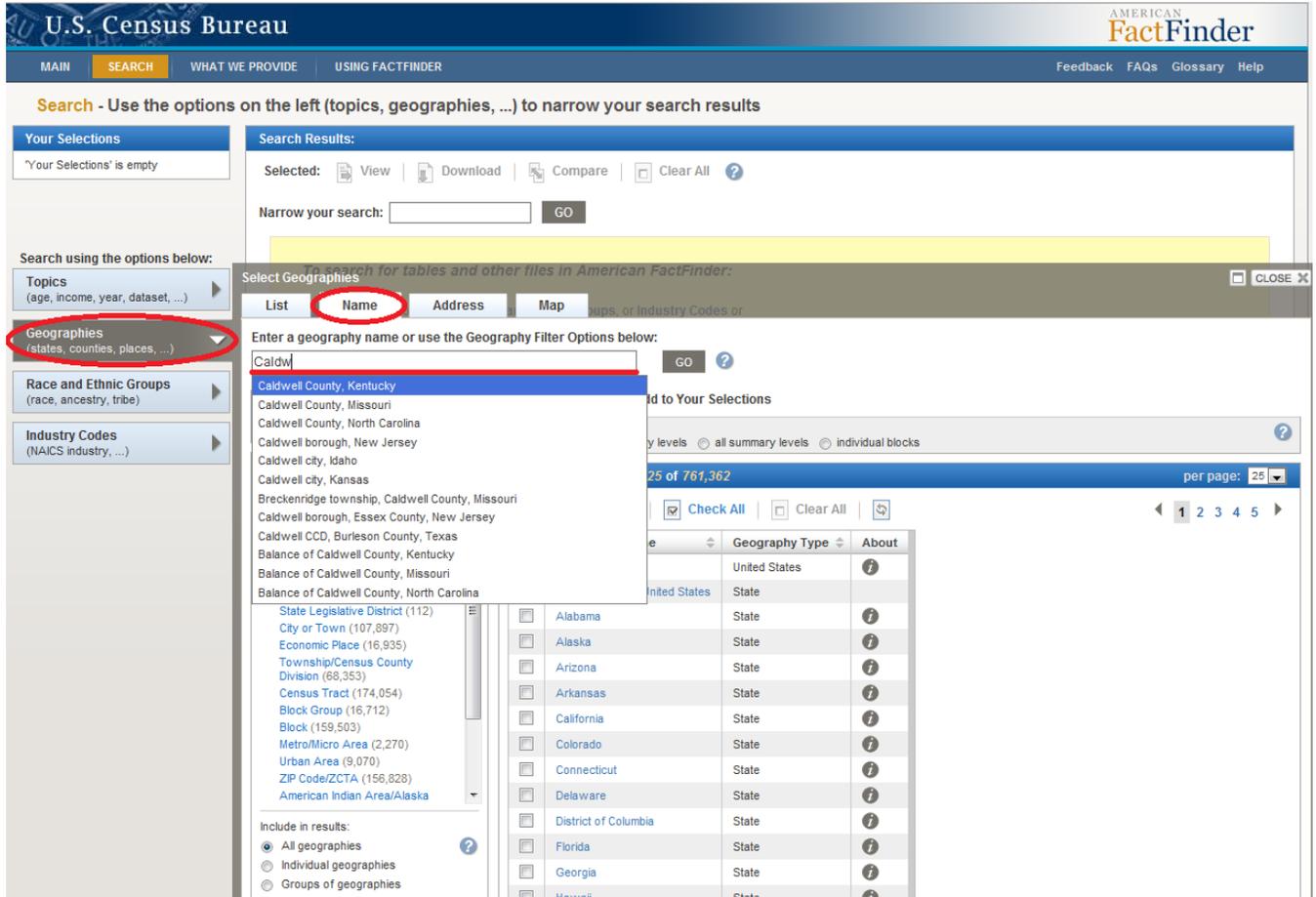
To obtain a list of all census blocks in a given county, proceed to the U.S. Census Website at <http://factfinder2.census.gov> (Figure 1).

Figure 1. U.S. Census Bureau—Census 2010 summary file Web page



From this page, select “Advanced Search”, “Show me all” to navigate to the American Fact Finder data portal. Select “Geographies” from the left-hand column, click the “Name” tab (the second tab), type the name of the county and state that you have selected as the sampling frame in the space provided (e.g., Caldwell County, Kentucky), and click “Go” (Figure 2).

Figure 2. U.S. Census Bureau—Census 2010 summary file showing “Geographies” filter option



Under the “Geography Filter Options” column, expand the “Geographic Type” option and click on “Block”. Then, select the box next to the line that says “All Blocks within [your selected] County” (e.g., “All Blocks within Caldwell County, Kentucky”) and click “add”; close the pop-up “Select Geographies” window (Figure 3).

Figure 3. U.S. Census Bureau—Census 2010 summary file showing option to select geographic area

The screenshot displays the American FactFinder interface. On the left, the 'Geography Filter Options' panel is expanded to 'Geographic Type', where 'Block (9)' is selected and circled in red. The 'Your Geography Filters' section shows 'Caldwell County, Kentucky' and 'Block' as selected filters. The 'Select Geographies' pop-up window is open, showing a table of results for Caldwell County, Kentucky. The first row, 'All Blocks within Caldwell County, Kentucky', is selected and highlighted in red, with the 'Add' button circled in red. The table lists various geographic areas within the county, including Fredonia CCD, Princeton CCD, and several census tracts.

Geography Name	Geography Type	About
All Blocks within Caldwell County, Kentucky	Block	
All Blocks within Fredonia CCD, Caldwell County, Kentucky	Block	
All Blocks within Princeton CCD, Caldwell County, Kentucky	Block	
All Blocks within Census Tract 9201, Caldwell County, Kentucky	Block	
All Blocks within Census Tract 9202, Caldwell County, Kentucky	Block	
All Blocks within Census Tract 9203, Caldwell County, Kentucky	Block	
All Blocks within Census Tract 9801, Caldwell County, Kentucky	Block	
All Blocks within Census Tract 9802, Caldwell County, Kentucky	Block	
All Blocks within Census Tract 9803, Caldwell County, Kentucky	Block	

Select the relevant variables, which are “H3: occupancy status” and “P1: total population”, confirm that the selections are from the 2010 SF1 100% data file in the “Dataset” column, click “download” (it will take a few minutes for the Website to build the spreadsheet), and “save” ([Figure 4](#)).

Figure 4. U.S. Census Bureau—Census 2010 summary file showing option to select variables

The screenshot shows the U.S. Census Bureau FactFinder interface. The search results page displays a list of variables with checkboxes for selection. Two variables are selected: H3 (Occupancy Status) and P1 (Total Population). The 'Download' button is circled in red, and a tooltip 'download selected items' is visible above it. The table below shows the details of the selected variables.

ID	Table, File or Document Title	Dataset	About
<input type="checkbox"/>	H17G TENURE BY AGE OF HOUSEHOLDER (TWO OR MORE RACES HOUSEHOLDER)	2010 SF1 100% Data	?
<input type="checkbox"/>	H17H TENURE BY AGE OF HOUSEHOLDER (HISPANIC OR LATINO HOUSEHOLDER)	2010 SF1 100% Data	?
<input type="checkbox"/>	H17I TENURE BY AGE OF HOUSEHOLDER (WHITE ALONE HOUSEHOLDER, NOT HISPANIC OR LATINO)	2010 SF1 100% Data	?
<input type="checkbox"/>	H18 TENURE BY HOUSEHOLD TYPE BY AGE OF HOUSEHOLDER	2010 SF1 100% Data	?
<input type="checkbox"/>	H19 TENURE BY PRESENCE OF PEOPLE UNDER 18 YEARS (EXCLUDING HOUSEHOLDERS, SPOUSES, AND UNMARRIED PARTNERS)	2010 SF1 100% Data	?
<input type="checkbox"/>	H2 URBAN AND RURAL	2010 SF1 100% Data	?
<input type="checkbox"/>	H20 OCCUPIED HOUSING UNITS SUBSTITUTED	2010 SF1 100% Data	?
<input type="checkbox"/>	H21 ALLOCATION OF VACANCY STATUS	2010 SF1 100% Data	?
<input type="checkbox"/>	H22 ALLOCATION OF TENURE	2010 SF1 100% Data	?
<input checked="" type="checkbox"/>	H3 OCCUPANCY STATUS	2010 SF1 100% Data	?
<input type="checkbox"/>	H4 TENURE	2010 SF1 100% Data	?
<input type="checkbox"/>	H5 VACANCY STATUS	2010 SF1 100% Data	?
<input type="checkbox"/>	H6 RACE OF HOUSEHOLDER	2010 SF1 100% Data	?
<input type="checkbox"/>	H7 HISPANIC OR LATINO ORIGIN OF HOUSEHOLDER BY RACE OF HOUSEHOLDER	2010 SF1 100% Data	?
<input type="checkbox"/>	H8 TOTAL RACES TALLIED FOR HOUSEHOLDERS	2010 SF1 100% Data	?
<input type="checkbox"/>	H9 HISPANIC OR LATINO ORIGIN OF HOUSEHOLDERS BY TOTAL RACES TALLIED	2010 SF1 100% Data	?
<input type="checkbox"/>	P1 RACE	2010 Redistricting Data SF (PL 94-171)	?
<input checked="" type="checkbox"/>	P1 TOTAL POPULATION	2010 SF1 100% Data	?
<input type="checkbox"/>	P10 RACE FOR THE POPULATION 18 YEARS AND OVER	2010 SF1 100% Data	?
<input type="checkbox"/>	P11 HISPANIC OR LATINO, AND NOT HISPANIC OR LATINO BY RACE FOR THE POPULATION 18 YEARS AND OVER	2010 SF1 100% Data	?
<input type="checkbox"/>	P12 SEX BY AGE	2010 SF1 100% Data	?
<input type="checkbox"/>	P12A SEX BY AGE (WHITE ALONE)	2010 SF1 100% Data	?
<input type="checkbox"/>	P12B SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)	2010 SF1 100% Data	?
<input type="checkbox"/>	P12C SEX BY AGE (AMERICAN INDIAN AND ALASKA NATIVE ALONE)	2010 SF1 100% Data	?

This action will provide a zip folder, which, upon extraction, will contain a text file (.txt), a comma-delimited file (.csv), and an Excel file (.xls) that can be opened by use of most spreadsheet software.

Merge ([Appendix A](#)) the single variable (“P1: population”) Excel file and the “H3: occupancy status” Excel file to create a dataset that shows all the selected variable information for each block (i.e., total population, as well as the occupied, vacant, and total housing units) ([Figure 5](#)).

3.1.2 The two-stage cluster sampling method

Including every house within a sampling frame in an assessment is expensive, time-intensive, and rare in the collection of detailed information from large populations. However, for smaller target populations, it may be more feasible to include every housing unit, in which case sampling is not necessary (10).

Representative data can be collected more quickly by use of probability sampling methods. The data that are collected from a probability sample can be statistically weighted to extrapolate results that are reflective of the entire sampling frame. The following conditions will determine when sampling is necessary:

- the total number of housing units in the assessment area is large,
- the number of interview teams is limited, or
- the survey must be completed in a short amount of time (one or two days) because the results are needed quickly.

The preferred sampling method for CASPER is a two-stage cluster design. Other sampling methods, such as simple random sampling, systematic sampling, and stratified sampling, require a list of every housing unit in the affected area as well as size estimates for sample size calculations; such sampling may not be feasible during a disaster (10).

3.1.3 Stage one: Selecting 30 clusters and mapping

In the first stage of the CASPER sampling method, 30 clusters (i.e., census blocks) are selected, with their probability proportional to the estimated number of housing units (HUs) in each cluster. In the second stage, seven HUs are randomly selected in each of the 30 clusters for the purpose of conducting interviews (7–13).

Therefore, as discussed in [Section 3.1.1](#), the CASPER sampling method requires a count of all eligible units divided into sections (i.e., clusters). The eligible unit for sampling can be occupied housing

units or total housing units (the latter category includes both occupied and vacant houses). Determining the eligible unit for sampling depends on the background information of the assessment area (e.g., a high number of vacant houses, rental condos, or recreational area, the amount of change since the last census) and the judgment of local authorities or leadership. If the assessment area is in a region known to have a high number of rental units, then it is recommended to use occupied HUs for sampling. [Figure 5](#) shows an Excel spreadsheet with an excerpt from the list of all census blocks in Caldwell County, Kentucky, downloaded from the U.S. Census Website. Each row contains a census block and each column contains a different variable (e.g., Population, Occupied HUs, Total HUs) for each census block. In this example, total HUs is the sampling unit.

Figure 5. Excerpt from list of all census blocks in Caldwell County, Kentucky

A	B	C	D	E	F	G	H	I
GEO.id	GEO.id2	GEO.display-label	Population	Occupied HL	Vacant HL	Total HUs	Cumulative HU	Random
1000000US210339202004024	2.1E+14	Block 4024, Block Group 4, Census Tract 9202, Caldwell County,	4	3	1	4	2927	
1000000US210339202004025	2.1E+14	Block 4025, Block Group 4, Census Tract 9202, Caldwell County,	3	1	0	1	2928	
1000000US210339202004026	2.1E+14	Block 4026, Block Group 4, Census Tract 9202, Caldwell County,	17	9	3	12	2940	2933
1000000US210339202004027	2.1E+14	Block 4027, Block Group 4, Census Tract 9202, Caldwell County,	15	9	2	11	2951	
1000000US210339202004028	2.1E+14	Block 4028, Block Group 4, Census Tract 9202, Caldwell County,	16	7	3	10	2961	
1000000US210339202004029	2.1E+14	Block 4029, Block Group 4, Census Tract 9202, Caldwell County,	16	4	2	6	2967	
1000000US210339202004030	2.1E+14	Block 4030, Block Group 4, Census Tract 9202, Caldwell County,	10	2	0	2	2969	
1000000US210339202004031	2.1E+14	Block 4031, Block Group 4, Census Tract 9202, Caldwell County,	8	4	2	6	2975	
1000000US210339202004032	2.1E+14	Block 4032, Block Group 4, Census Tract 9202, Caldwell County,	6	4	0	4	2979	
1000000US210339202004033	2.1E+14	Block 4033, Block Group 4, Census Tract 9202, Caldwell County,	8	5	0	5	2984	
1000000US210339202004034	2.1E+14	Block 4034, Block Group 4, Census Tract 9202, Caldwell County,	6	3	2	5	2989	
1000000US210339202004035	2.1E+14	Block 4035, Block Group 4, Census Tract 9202, Caldwell County,	13	4	0	4	2993	
1000000US210339202004036	2.1E+14	Block 4036, Block Group 4, Census Tract 9202, Caldwell County,	6	2	0	2	2995	
1000000US210339202004037	2.1E+14	Block 4037, Block Group 4, Census Tract 9202, Caldwell County,	12	5	1	6	3001	
1000000US210339202004038	2.1E+14	Block 4038, Block Group 4, Census Tract 9202, Caldwell County,	34	14	2	16	3017	3011
1000000US210339202004039	2.1E+14	Block 4039, Block Group 4, Census Tract 9202, Caldwell County,	12	5	1	6	3023	
1000000US210339202004040	2.1E+14	Block 4040, Block Group 4, Census Tract 9202, Caldwell County,	17	9	2	11	3034	
1000000US210339202004041	2.1E+14	Block 4041, Block Group 4, Census Tract 9202, Caldwell County,	17	5	0	5	3039	
1000000US210339202004042	2.1E+14	Block 4042, Block Group 4, Census Tract 9202, Caldwell County,	2	2	0	2	3041	
1000000US210339202004043	2.1E+14	Block 4043, Block Group 4, Census Tract 9202, Caldwell County,	1	1	0	1	3042	
1000000US210339202004044	2.1E+14	Block 4044, Block Group 4, Census Tract 9202, Caldwell County,	0	0	1	1	3043	
1000000US210339202004045	2.1E+14	Block 4045, Block Group 4, Census Tract 9202, Caldwell County,	0	0	0	0	3043	
1000000US210339202004046	2.1E+14	Block 4046, Block Group 4, Census Tract 9202, Caldwell County,	0	0	0	0	3043	
1000000US210339202004047	2.1E+14	Block 4047, Block Group 4, Census Tract 9202, Caldwell County,	7	2	0	2	3045	
1000000US210339202004048	2.1E+14	Block 4048, Block Group 4, Census Tract 9202, Caldwell County,	11	5	0	5	3050	

The final two columns of [Figure 5](#), “Cumulative HUs” and “Random”, are generated by the user to select the 30 census blocks. The column “Cumulative HUs” (highlighted in yellow) is equal to the cumulative sum of the column “Total HUs” and calculated in Microsoft Excel. To populate the column “Random”

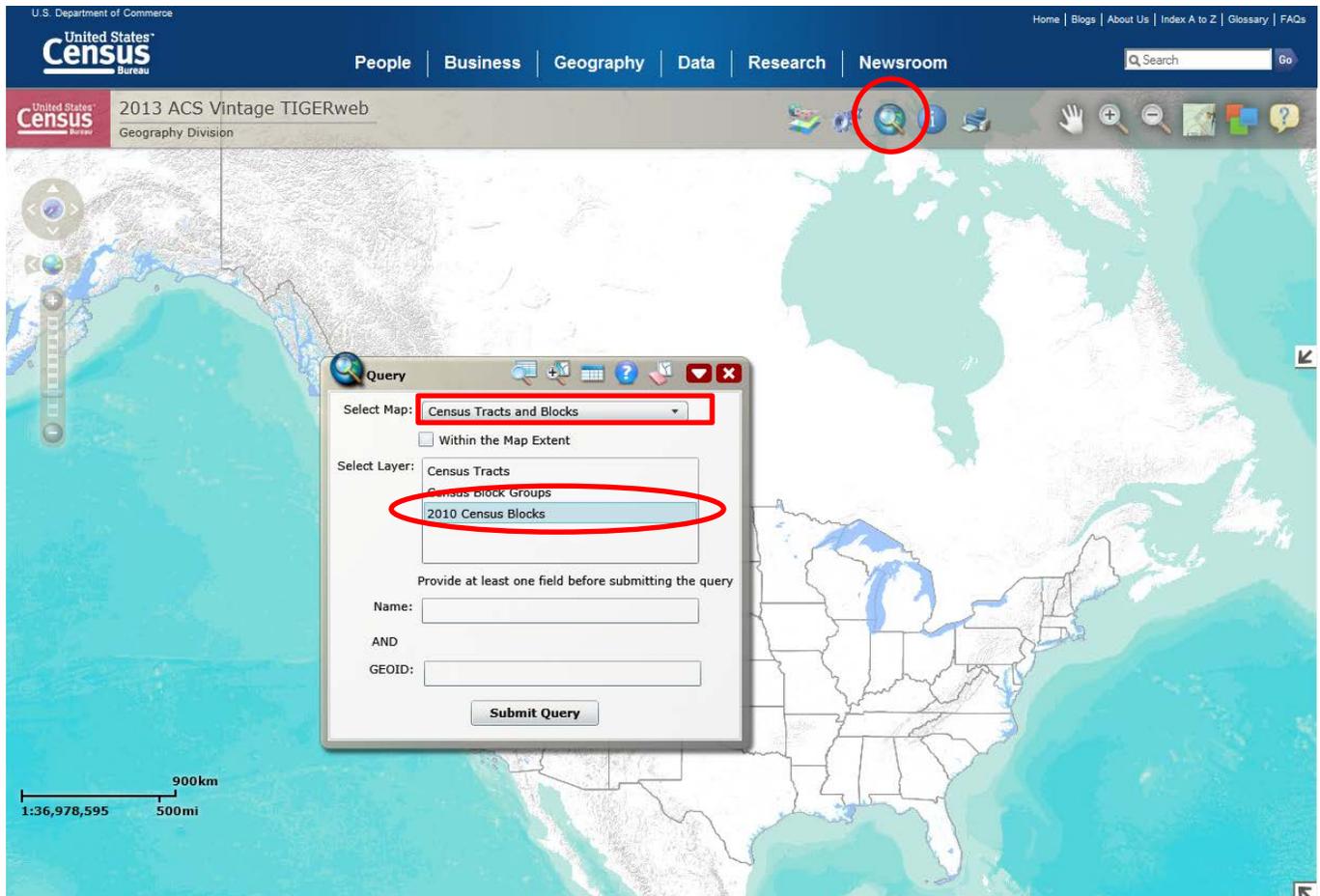
(highlighted in blue), use a random number generator (such as <http://www.random.org/integers/>) to obtain 30 random numbers between 1 and the total sum of HUs (which is the last cell in the column “Cumulative HUs”). Each random number selected should be matched to a corresponding “Cumulative HUs” row. For example, if number 2933 was selected randomly, census block 4026 would be selected because 2933 is within the “Cumulative HUs” 2929 and 2940 (highlighted in green). Repeat the procedure until you have selected all 30 census blocks for your sample. If two or more selected random numbers are within the range of the corresponding census block cumulative number, then that particular census block will be selected more than once.

Once the 30 census blocks are selected, create the maps of the selected clusters, including road names and key landmarks. These maps can be created by use of the U.S. Census Website at <http://tigerweb.geo.census.gov/tigerweb/> (Figure 6).

Figure 6. U.S. Census Bureau—TIGERweb

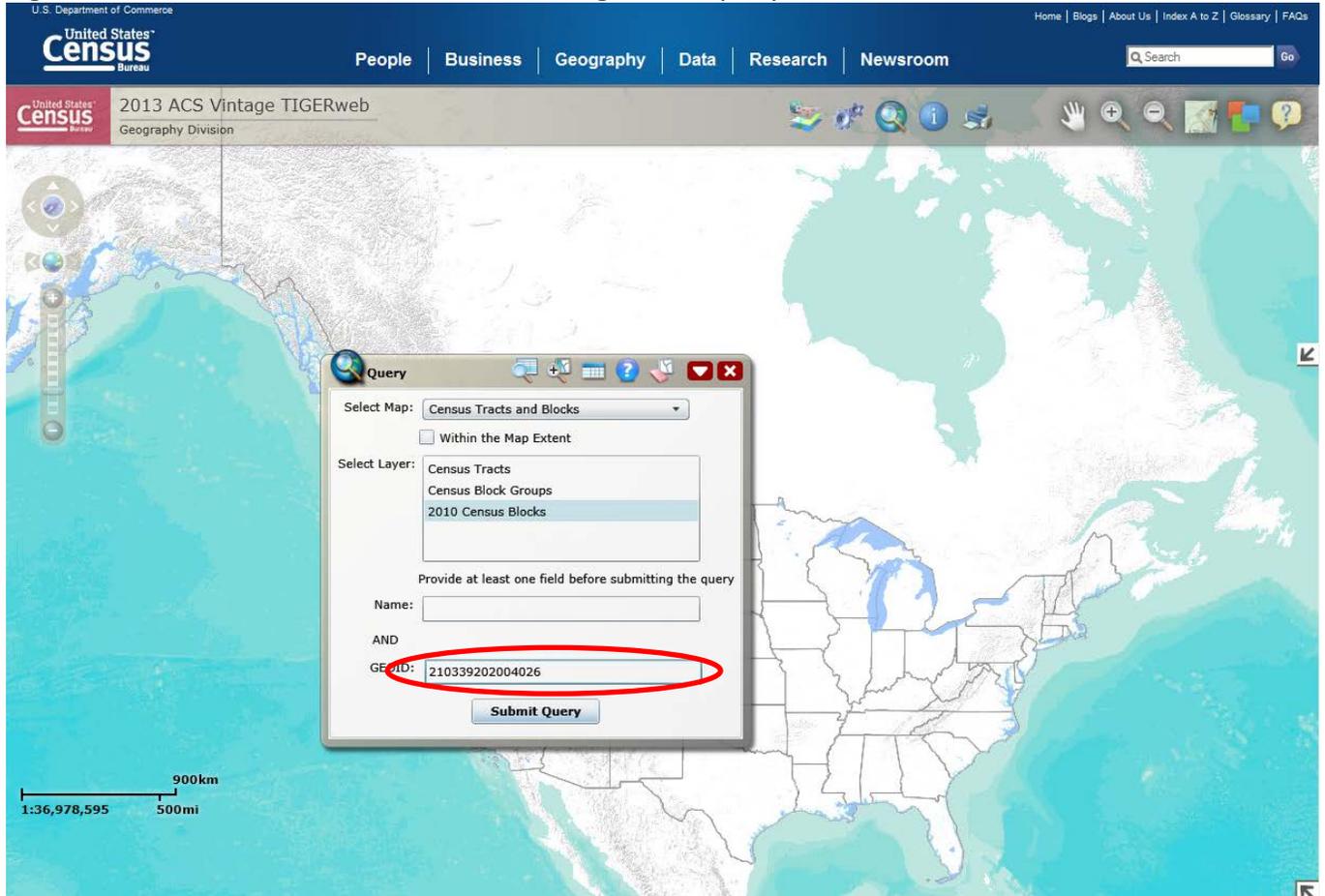
To create maps by using the U.S. Census TIGERweb, first check “Transportation” to ensure all roads are labeled. Click the “Query” globe located at the top in the grey toolbar. Select “Census Tracts and Blocks” and then highlight “2010 Census Blocks” under the Query tab (Figure 7).

Figure 7. U.S. Census Bureau TIGERweb – selecting census tracts and blocks



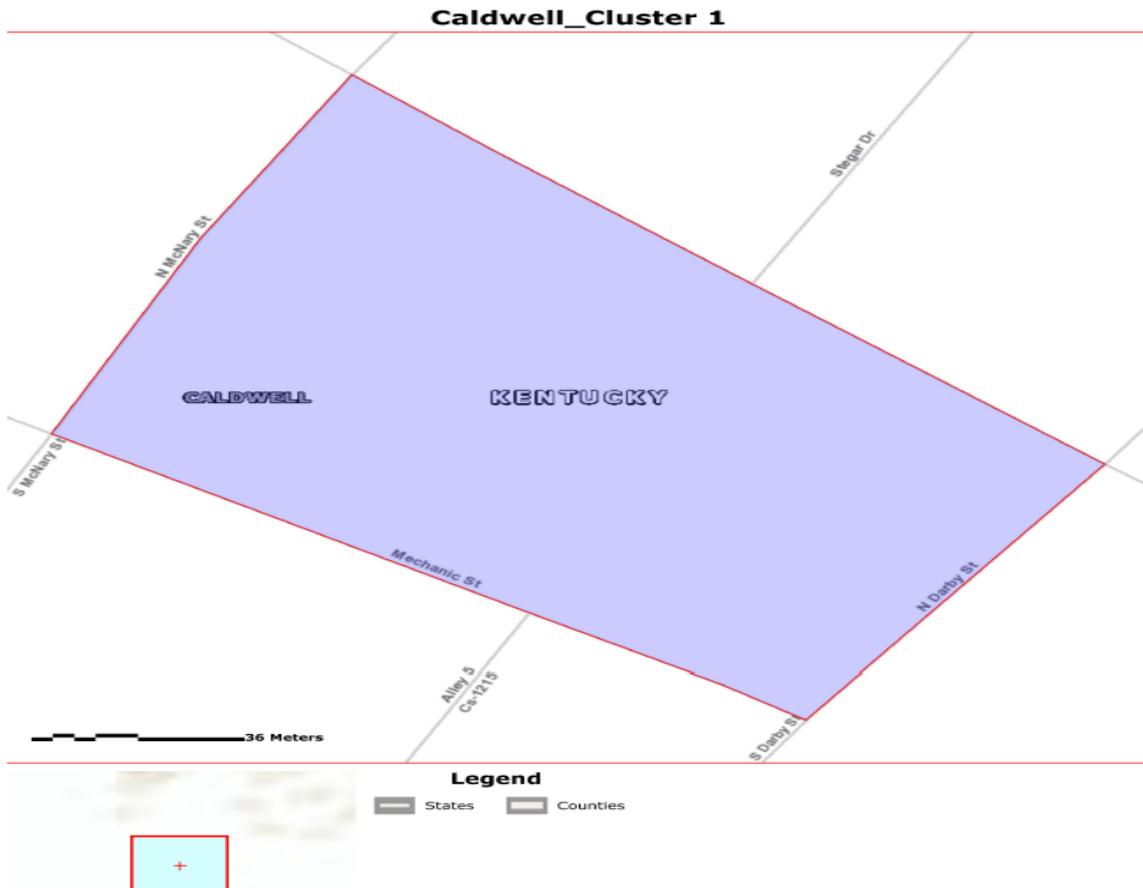
Locate the GEO.id from your excel file (Column A) of your first selected census block and copy the 15-digit number following the “US” (e.g., 210339202004026). Paste the 15-digit number into the “GEOID” box in the Query and click “Submit Query” (Figure 8).

Figure 8. U.S. Census Bureau TIGERweb showing submit query.



The selected block will now displayed. Click the “Print” icon at the top of the map. The print pop-up box will appear; title your map, and click “Print Map”. Print the map and/or print to PDF (i.e., save a copy to your computer). Repeat the procedure until all 30 selected cluster (block) maps are saved or printed ([Figure 9](#)).

Figure 9. Sample map of a selected census block created with the U.S. Census TIGERweb.



Note:

Alternatively, maps can be created with ESRI’s TIGER/Line data, which is available free of charge at http://arcdata.esri.com/data/tiger2000/tiger_download.cfm. Although the data are free and publicly available, you must purchase GIS software to manipulate the files.

Google Earth images provide satellite detail of the selected cluster if they are overlaid on the ESRI TIGER files. Google Earth software is also available free of charge at

<http://www.google.com/earth/download/ge/agree.html>

3.1.4 Stage two: Selecting seven households within each cluster

In the second stage of sampling, seven HUs within each of the 30 clusters are selected to be interviewed. It is very important that these seven housing units are selected *at random*. Typically, a single individual will conduct the first stage of sampling (choosing the 30 clusters), but it is the responsibility of the CASPER interview teams to randomly select the seven households within each cluster. Thus, when one is providing just-in-time training for the CASPER interview teams, it is essential to provide instruction on how to ensure that houses are selected at random.

The following two methods are suggested for selection of housing units from sampled clusters:

1) *Simple random sampling (SRS)*

Create a complete list of HUs within the cluster and use a random number generator to randomly select seven households. The steps for this method are as follows:

1. Upon arriving at the location, count all the HUs within the selected clusters by traveling around the cluster.
2. Number the housing units from 1 to N .
3. Using a random number table or random number generator provided to field teams, randomly select 7 households (see www.random.org for free tools).

While simple random sampling ensures that each household is chosen randomly and entirely by chance, this method may be less feasible and inefficient due to the difficulty of training volunteers and the time needed to count all HUs in a selected cluster.

2) *Systematic random sampling (recommended)*

Before arriving at a selected cluster, select a random starting point by using a printed map (see [Figure 10](#) for an example of systematic random sampling).

1. Using a detailed map (e.g, a printout of a cluster viewed in GoogleEarth) or upon arriving at a given cluster, count or estimate the number of housing units within the cluster.

2. Divide that number by 7; this will be the N . (Note: Do not get preoccupied in choosing the “correct” N ; any N is acceptable, so long as the number that is chosen is kept consistent throughout the cluster.)
3. Starting at the house nearest the randomly selected starting point, travel through the cluster in a serpentine method to select the N th house. That is, walk up one side of the street and then turn and walk down the other side in such a manner that every house within the selected cluster is passed.
4. Interview the N th house.
5. Continue traveling through the cluster in a serpentine fashion, selecting every N th house until seven interviews are complete. (Note: If seven houses are not selected by the end of the cluster, proceed through the cluster again, selecting every N th house).

Figure 10. Example of using systematic random sample to select seven housing units for interview. Starting with house #1, every 8th house is selected for interview.



Random selection of houses in the field is important in CASPER methodology. The most scientific and representative way would be to select only seven households and to continue returning to the selected seven households until an interview is complete at each one. If a housing unit is selected but no one answers the door, the interview team should plan on revisiting that housing unit later in the day in hopes of reaching someone at home. Having teams revisit housing units at which the door was unanswered will help keep the contact rates low and reduce the amount of interviewed housing units taken as a sample of convenience, thereby improving the representativeness of the sample to the sampling frame. However, it is important to balance what is scientifically ideal with the real-world disaster response situation. Because complete information needs to be gathered quickly, some replacement of households may be necessary. Teams should attempt to revisit previously sampled households up to three times, but it is understood that some replacement of selected households will occur. Regardless of the chosen sampling method to randomly select the eligible housing unit, there is no guarantee that the required number of housing units for interviews will be obtained (i.e., there may be fewer than seven completed interviews per cluster). This situation is adjusted for in the data analysis process through weighting (see [Section 5.2](#)). Overall, keeping the sample as complete and representative as possible requires sound judgment and quality training of interview teams.

3.2 Considerations in sampling to minimize bias

In the past, CASPER interview teams have had difficulty completing the goal of 210 interviews in 30 clusters. For example, teams have come across situations in which an entire cluster is inaccessible due to storm damage or restricted entries. In these situations, it is tempting to select a replacement cluster; however, this alternative is *not* recommended, and it negatively affects the representativeness of the data. Clusters should be chosen *without replacement*—meaning that the clusters originally selected are the clusters that are assessed—and this process may result in having fewer than 30 clusters interviewed due to inaccessibility. If CASPER planners are worried *a priori* that some clusters in a sampling frame may

not be accessible, they can increase the number of clusters selected. For example, CASPER leadership can decide to choose 35 census blocks, instead of the standard 30. If this method is chosen, it is essential that teams then visit *all 35 census blocks* and treat the design as 35x7 (sample size of 245) in data collection and analysis. In this situation, rather than choosing “replacement” clusters, you are oversampling clusters to get closer to the desired sample size of 210. (Note: Oversampling will not improve response rates but can increase sample size). It is also important to know that if a selected cluster is dropped because of accessibility or other issue during the assessment, then the survey will no longer be expected to be representative of the assessment area.

Another problem sometimes experienced in the field is that clusters may have fewer than seven households, making it impossible for interview teams to interview seven households from that cluster. Generally, this is not too much of an issue because smaller clusters have a lower probability of being selected and therefore those with fewer than seven houses will be kept to a minimum. If a sampling frame consists of a large proportion of small clusters (i.e., fewer than 10 households), interview teams will have difficulty finding seven households to interview in any cluster, resulting in a low completion rate. This may be particularly evident in rural areas, where there may be a large number of census blocks with fewer than 10 households. To avoid this situation, check the frequencies of housing units within the chosen sampling frame to identify this problem. If there appear to be many clusters with a small number of housing units, use the “block groups” census variable, instead of the “block”, as the cluster, or adjoin census blocks to create larger clusters. While it is generally recommended to use census blocks as clusters, the requirement is only that clusters be all-inclusive and non-overlapping.

Finally, situations may occur in which the affected area contains a high proportion of second homes or vacation rental properties. For example, some coastlines contain high-rise apartments in which few people live, but many units are privately owned and rented out for short-term use by vacationers. In these special cases, it is recommended that the census variable “occupied housing unit”

be used to determine the size of the cumulative number of the housing units in the clusters, rather than the variable “housing unit.” The Census Bureau defines a housing unit as a house, an apartment, a mobile home, a group of rooms, or a single room that is intended for occupancy as separate living quarters, whereas an occupied housing unit is defined as the usual place of residence of the person or group of people living in it at the time of enumeration, or if the occupants are only temporarily absent (14). Thus, vacation homes would be counted as a housing unit but not as an occupied housing unit. In the case of multiple family units (e.g., single high rise building), first randomly select a floor in the building by using a random number generator (e.g., in a 10 story building, randomly select a number between 1 and 10). Then proceed to that floor, enumerate the units on that floor, and randomly select the first unit to interview. Similarly in case of multiple apartment complexes (e.g., if there are units A, B, C, D, and E, assign the numbers 1–5 to the units and randomly choose a number between 1 and 5). Then proceed to that unit, randomly select a floor in that unit, enumerate the houses on that floor, randomly select the first house to interview and continue every Nth house until seven interviews are complete.

3.3 Data collection instrument

Local authorities, subject matter experts, and other key partners should agree on the scope and nature of the key questions that the CASPER will seek to answer. With input from these partners, the planning team should finalize the assessment questions and verify that the critical information needs will be met by the data collection instrument (questionnaire) as quickly as possible. CASPER sample questions and descriptions are provided in the question bank of this toolkit ([Appendix B](#)). HSB also has multiple questionnaires from previous CASPERs and templates available by request, including the preparedness template that can be used for disaster planning ([Appendix C](#)). The CASPER questionnaire should be simple and short, ideally limiting the interview to 10–15 minutes (generally, a two-page questionnaire). To decrease analysis time, avoid open-ended questions and request only information that will satisfy the objectives. In general, yes/no and multiple choice questions can capture the needed information more

efficiently. The following is a list of categories that should be covered in the questionnaire (see [Appendix D](#) for an example questionnaire):

- Location of the housing unit.
- Housing unit type and extent of damage to the dwelling.
- Household needs (i.e., first aid, food, water, ice, and medicine).
- Physical and behavioral health status of the household members.
- Greatest need.

Remember that all questions are asked of the respondent at the household level. This is often overlooked in those questions pertaining to health status and behavioral/mental health. While CASPER can address these concerns, these questions should be asked at the household, and not the individual, level (e.g., does anyone in the household have a cough?). While developing the questionnaire, consider the comfort level of both the interviewer and the respondent; asking questions that are too personal may result in a lower response rate. After developing the CASPER questionnaire, conduct a mock interview (e.g., with coworkers) to identify any confusing questions and to estimate the length of time it will take to complete the interview.

3.3.1 Data collection options

There are two options for collecting CASPER data: paper forms and handheld electronic devices. Both the paper and the electronic formats have their advantages and disadvantages; therefore, it is important to carefully consider the options prior to making a decision and producing the questionnaire. Generally, while the paper forms can be labor-intensive in the data entry process, the electronic media can be labor-intensive in the development stage. Additionally, the potential for error may be introduced at different times in the paper versus the electronic formats. [Table 2](#) provides considerations for both options. Regardless of the data collection option chosen, test your questionnaire prior to deployment in the field.

Table 2. Considerations for planning: using paper forms versus electronic forms

Paper Form	Electronic Form
<ul style="list-style-type: none"> No technical training 	<ul style="list-style-type: none"> Technical training required Potential to be awkward or slow for those teams not accustomed to the technology
<ul style="list-style-type: none"> Relatively cheap supplies 	<ul style="list-style-type: none"> May be expensive to purchase the hardware and software. May incur costly damage in the field if broken, dropped, or water-damaged
<ul style="list-style-type: none"> Requires paper, pens, and clipboards in the field 	<ul style="list-style-type: none"> Requires data collection devices and battery chargers in the field
<ul style="list-style-type: none"> No maintenance of supplies 	<ul style="list-style-type: none"> Necessitates maintenance and care of software and devices
<ul style="list-style-type: none"> Can be labor-intensive to enter data into database after fieldwork 	<ul style="list-style-type: none"> Can be labor-intensive to develop electronic questionnaire prior to fieldwork
<ul style="list-style-type: none"> Potential for error in manual transfer of data from paper to database 	<ul style="list-style-type: none"> Can provide real-time data quality checks
<ul style="list-style-type: none"> Relatively slow data management processes: requires data entry after field work 	<ul style="list-style-type: none"> Data management process is quicker; no data entry required after the field work
<ul style="list-style-type: none"> No limitation on the number of field teams (provided the necessary personnel are available) 	<ul style="list-style-type: none"> May limit the number of field teams due to availability of equipment

3.4 Forms and handouts for the field

3.4.1 Tracking form

In addition to the questionnaire, the interview teams should carry a tracking form to collect information about each housing unit selected, even those that are inaccessible ([Appendix E](#)). The tracking form is used to monitor the outcome of every interview attempt and it is the basis for calculating the response rates ([Section 5.3](#)). Interview teams should record each housing unit that is selected in the field and the interview outcome (e.g., completed interview, no answer). The second page ([reverse side](#)) of the tracking form should be used by the interview teams to take notes in the field on households that need to be revisited. Remember, when the CASPER is complete, there should be no way to link addresses to specific questionnaires.

Teams should use a separate tracking form in each cluster; some clusters may require use of more than one tracking form to include all the houses visited.

3.4.2 Confidential referral form

Field interview teams must be prepared to respond if they come across an urgent need that presents an immediate threat to life or health. Typically, teams that encounter a household with urgent needs should encourage or assist the household to call emergency services (911). In the event that calling 911 is not appropriate, the teams should complete a confidential referral form ([Appendix F](#)). This form is immediately communicated to the CASPER team coordinator for rapid follow-up and communication with previously identified health service providers in the area (e.g., mental health) or response agencies involved in addressing immediate needs during disasters, such as the American Red Cross or the Salvation Army.

3.4.3 Handouts

A handout should be prepared and provided to all interviewed households. This handout should provide a list of key contact names and numbers where people can get help and updated information about the disaster. This list could include the FEMA number to get insurance help or it could provide lists of shelters or places where members of the household can get medical care, etc.

Additional material may be distributed to households during data collection as a way to circulate public health information to the community (e.g., health education on carbon monoxide poisoning prevention, proper cleanup methods, and contact information for disaster services). This information should be given out regardless of participation status, and it should be given to interested community members who were not selected to be in the assessment.

3.4.4 Introduction and consent script

When interview teams arrive at a household, they should be prepared to give an introduction and obtain consent. The survey participant must give explicit verbal consent to participate in the CASPER interview.

It is helpful to have a script written for the interviewers to recite ([Appendix G](#)). The script can be memorized or read to potential respondents. Interviewers who are concerned about memorizing all the information should be instructed to begin with a brief introduction—ask “Do you mind if I read you a little more information about our survey here today?”, and then read the script in its entirety. The script should be kept brief and include the following elements:

1. An introduction of the interview team members and the agency responsible for the CASPER (e.g., the local or state health department).
2. An explanation of the purpose of the CASPER and potential benefits to the community.
3. A description of the interview and the amount of time it will take.
4. A description of any anticipated discomfort or inconvenience for the respondent, particularly if some questions may be of a sensitive nature (such as those regarding mental health or risk-taking behaviors).
5. An explanation that the survey is anonymous and will not be linked to personally identifying information.
6. A statement that taking part in the study is voluntary and that there will be no penalty or loss of benefits if household members do not wish to participate and that they can stop participating at any time with no penalty.
7. Name and phone number or e-mail of the person(s) a resident can contact if he/she has any questions about the CASPER or would like to verify interview team identification.
8. A clear participation request or invitation that requires an explicit answer (e.g., “Are you willing to participate in this survey?”).

Signed consent is typically not required for a CASPER because obtaining signatures leads to an increased confidentiality risk for the participant (i.e., the signed consent will be the only record linking the

participant to the questionnaire, and such linkage could result in a breach of confidentiality). Agencies should refer to their own Internal Review Board (IRB) for additional guidance on the consent document.

The script should be printed on official letterhead and given to each selected household, regardless of participation status, so that residents will have the information to refer to later. This form should include a phone number for the health department or agency responsible for the CASPER.

3.5 Supplies and assessment materials

Prior to conducting the CASPER in the field, gather all the supplies and assessment materials. As previously discussed, CASPER data collection can be performed by using paper or electronic forms, and different materials are required for each method ([Section 3.4.1](#)). Regardless of the data collection method, ensure that there are adequate supplies necessary to achieve the objectives (e.g., for paper questionnaires, there should be a minimum of 230 copies, and for electronic forms there should be at least one electronic device per field team). Most of the commonly used statistical software packages are sufficient for CASPER data entry and analysis. Epi Info™ is a software package that can be downloaded free of charge at <http://www.cdc.gov/epiInfo/>.

In general, supplies for *field interview teams* should include

- Cluster map(s),
- Adequate data collection supplies,
 - if paper collection, enough copies of the questionnaire with a minimum of three extra copies per team packet (e.g., if a team is assigned two clusters, the team should have 17–20 copies of the questionnaire) OR
 - if electronic collection, enough devices so that each team has one, plus a few paper copies of the questionnaire in case of equipment failure
- Two tracking forms per cluster to document ALL housing units visited,
- Approximately 30 copies of the consent form,
- Five referral forms per team,
- Sufficient public health information materials to hand out to each contacted household, plus any community member interested in receiving information,

- GPS devices (ideally, one per field team) and/or a commercial map of the area to improve navigation to each cluster,
- Name tag, badge, or a document that provides identification/authorization from the local or state health department,
- Wireless communication devices (e.g., cell phone, satellite radio),
- Office supplies to facilitate field data collection (e.g., pens, pencils, clipboards),
- Transportation (ideally one vehicle per team), and
- Snacks, water, hand sanitizer and first aid supplies to ensure team safety.

Additionally, supplies for the *leadership staff* remaining at headquarters include

- computers,
- reliable Internet access,
- computer software for data entry, data cleaning, and data analysis (e.g., Epi Info™, SAS®, Microsoft® Excel),
- base communication station (i.e., cell phone, land line, or satellite radio that all teams will call with updates),
- large map of the entire sampling area to assist in directing teams with questions from the field, and
- access to a copy machine and printer.

3.6 Field interview teams

Approximately 20 to 30 people should be identified to conduct the CASPER in the field; these individuals should be divided into teams of two, a total of 10 to 15 teams. The number of teams necessary depends on the amount of time allotted to conduct the CASPER; fewer teams require a longer time to collect the data, while more teams allow for a shorter data collection period. Another consideration is the availability of equipment needed: larger numbers of field interview teams require more equipment, such as vehicles and electronic data collection devices (if necessary). [Table 3](#) provides considerations for selecting the number of field teams.

Table 3. Considerations for the number of CASPER field interview teams

Small Number of Field Teams (<10)	Large Number of Field Teams (≥10)
<ul style="list-style-type: none"> • May be easier to identify enough staff 	<ul style="list-style-type: none"> • May be difficult to identify enough staff • Can foster broad participation across participating organizations
<ul style="list-style-type: none"> • Data collection will take more time 	<ul style="list-style-type: none"> • Data collection will be completed in less time
<ul style="list-style-type: none"> • Less equipment needed (e.g., vehicles, electronic devices, etc.) 	<ul style="list-style-type: none"> • Requires more equipment (e.g., vehicles, electronic devices, etc.)

Teams can include epidemiologists, state and local health department staff, students from local schools of public health or nursing schools, or other health professionals. Ideally, field interview teams should comprise a mix of individuals—males with females, state personnel with local personnel, experienced individuals with non-experienced individuals, and students with health professionals—for safety and for the purpose of ensuring an even distribution among the teams of local knowledge and field experience. Once the field interview teams are assembled, an initial meeting should be held to introduce members to one another so that they can exchange contact information and become familiar with each other’s roles and skills and so that the coordinating agency can provide or arrange for training.

3.7 Training

Training the field interview teams is one of the most important aspects of conducting a CASPER. Inaccurately collecting or reporting data can jeopardize the results and misrepresent the prevalence of injuries or illnesses and the extent of resources needed in the affected community. Therefore, field teams must be well trained to conduct an accurate and precise CASPER.

A three- to six-hour just-in-time training should be conducted either one day in advance or the morning of the first day of data collection in the field. Training should provide the interview team members with an understanding of the objectives of the CASPER. Training should include the background of the event, an overview of the objectives and method of CASPER, the roles and responsibilities of team members, safety instructions, and a briefing on future meeting times and places (see [Appendix H](#) for a sample agenda). At the end of the training, each interviewer should be thoroughly

familiar with the data collection instrument and the information being elicited by each question. Each interviewer should also be aware of potential hazards that may be encountered, such as flood water, downed power lines, unattended animals, and other hazardous situations, as well as hazards to look for among the households (such as improper generator use).

3.8 Conducting the interview

3.8.1 Selecting an individual to respond in each selected household

The information obtained through CASPER is obtained at the household level; one eligible household member (≥ 18 years of age) from the family is selected to speak for all household members. There is no specific formula for choosing the eligible individual to interview in selected housing units. The interview teams should use their judgment to determine the person to be interviewed. In general, any adult, regardless of gender, race, ethnicity, or religion, is eligible to participate in the assessment. If more than one adult person is present in the house, either can choose to serve as the respondent or an interviewer may randomly choose between them (e.g., choose the person with the birth date closest to the interview date). The selected respondent should understand that he/she is to report on the entire household—not just on himself or herself.

3.8.2 Interview tips

Prior to going to the field, team members should be assigned to specific roles (e.g., driving, navigating, completing the tracking form, interviewing, or data recording); it is recommended that the local member conduct the actual interview and make the initial contact with the selected household. The assigned interviewer should practice the questionnaire with his/her partner so that both are familiar and comfortable with the questions (e.g., wording of the questions, intent of the questions, skip patterns). Once the team is at a selected household, the interview should be conducted in an area outside of the home, an area that is protected from hazards; however, entry into a household is at the discretion of the

respondent and interview team members, so that an interview may be conducted inside a home as well.

The following tips ([Table 4](#)) provide a general guideline for making the interview successful.

Table 4. Interview tips

<i>Building rapport</i>
<p><u>Professional and neutral appearance</u></p> <p>Field team members should dress appropriately (e.g., modest clothing, flat shoes, no excessive jewelry) and refrain from eating, drinking, or chewing gum during the interview.</p>
<p><u>Establish legitimacy</u></p> <p>Introductions should be made according to the consent script, and identification badges should be visible at all times to the respondent. It is helpful to memorize your introduction, for doing so displays confidence and can set the tone for the interview.</p>
<p><u>Show empathy and respect</u></p> <p>All team members should convey a sense of empathy and respect. Good eye contact, confidence, and an approachable demeanor are all ways to achieve a positive interview experience. Express interest in the respondent’s answers and be an active listener while remaining patient if/when an interviewee is having a difficult time answering questions; remember, an interviewee is using his/her time to help ensure the success of the CASPER.</p>
<i>Minimizing response bias</i>
<p><u>Standardize questions</u></p> <p>It is important for field team members to ask questions in the same manner for each interview. Read questions exactly as they are written. Team members should understand that attempts to “improve” a question by altering a few words or not reading it in its entirety may change the entire meaning of the question and response. Similarly, “pre-filling” answers to questions (e.g., if the respondent answered a question in another conversation), omitting questions (e.g., if the team member “knows” the answer or thought he/she heard it), and finishing sentences are all unacceptable. Responses should be recorded verbatim as well (i.e., instead of “he said money was concern,” write “I would have to say my biggest concern is money”).</p>
<p><u>Allow the participant to think</u></p> <p>Silence is one of the most effective devices for encouraging a respondent to talk. By an interviewer’s finishing sentences or not allowing pauses in the interview, it is implied that the respondent’s answer is transparent, obvious, or unimportant. Give the respondent time to express himself or herself while keeping the interview at a steady pace.</p>

Encouraging the respondent

Clarification of questions

If the respondent needs clarification of the information desired, repeat the question first, and then elaborate if needed. If the respondent is not fully satisfied with the answer choices, encourage the respondent to select the one that fits best (without leading). If any confusion remains, team members should write down exactly what was said so that the confusion can be addressed with the leadership staff.

Probe, but DO NOT suggest an answer or lead the respondent

A probe is a standardized way to obtain additional information from a respondent. If necessary, elicit a response by asking the respondent to elaborate. For example, an interviewer can ask, "Is there anything else you would like to add". When probing for questions, do not direct respondent toward an answer, use overt encouragement, or remind respondents of an earlier remark if the answers differ from what you expect. Remain neutral and, if necessary, repeat the interviewee's response, a technique that can lead to clarification or improve recall.

At the end of the interview, team members should review the entire questionnaire before leaving the household to ensure that all questions have been answered. The team members should record any confusion or concern about questions and share the confusion or concern with leadership staff.

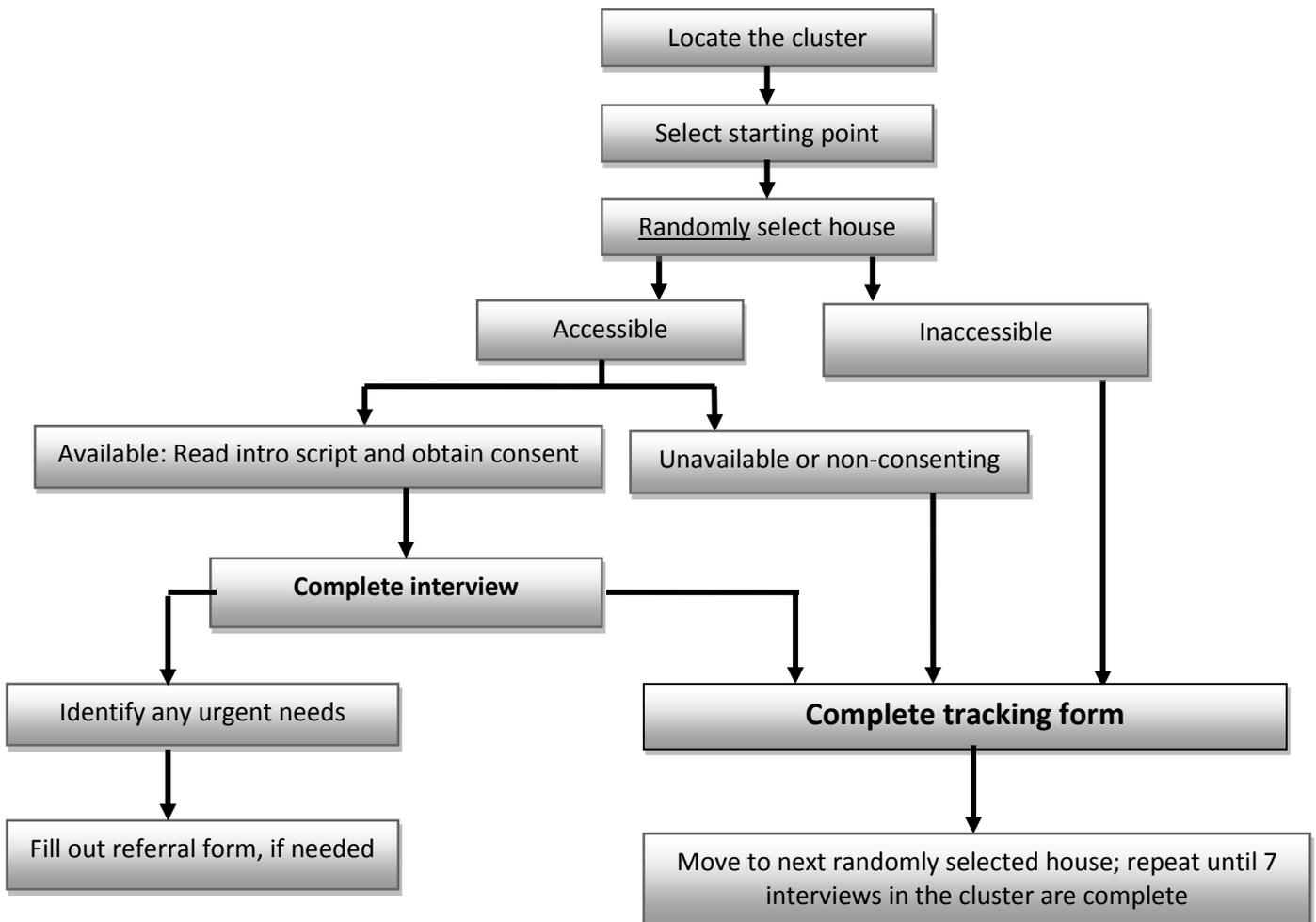
Remember to thank the respondent, leave information or any necessary referral forms, and refrain from leaving in haste. Immediately after leaving, review the questionnaire again for missing information and complete the tracking form.

4. Phase II: Conduct the Assessment

The face-to-face interview is the only feasible method for conducting a CASPER. Advantages of this method include a high response rate and the ability to distribute health information or other materials (such as resource lists) to the community. When teams are conducting a CASPER, the face-to-face interviews have the additional benefits of direct visual inspection of the disaster-affected area and allow some degree of connection between the affected community and local and/or federal staff who can assist them.

4.1 Steps in the field

Interview teams are required to follow several steps in the field. As a supplement to the just-in-time training, providing a written flowchart for teams to reference can prove helpful. The following flowchart shows the general steps in the field in conducting CASPER:



4.2 Considerations while in the field

Fieldwork often requires an astute awareness of the environment, the use of personal judgment, and a positive (and flexible!) outlook. Below are five considerations ([Table 5](#)) for team members to attend to in the field.

Table 5. Considerations for team members while in the field

Think safety

Despite all preparation prior to conducting CASPER in the field, unexpected problems might arise. Interview teams should be briefed about potential safety concerns, such as downed power lines, unsafe road blockages, unattended pets, and other potential hazards at all times. Team members should use personal judgment when assessing any safety concerns and contact the CASPER leadership for any concerns that may arise in the field. To ensure interview teams' safety, both the interview team and CASPER leadership should communicate frequently and record the timeline ([Appendix I](#)) throughout the process.

Remain flexible

As with all disaster relief efforts, it is important to remain flexible. As a field team member, there are various responsibilities that need to be shared, such as driving, interviewing, and tracking. Plans can always change; field interview teams may switch members, clusters may be swapped between teams, or a team may be asked to take on an additional cluster at the last minute. Keep a positive attitude and remain as flexible as possible.

Adhere to the methodology

To ensure data quality and representativeness, it is imperative to adhere to the CASPER method. Such adherence includes randomly selecting households within clusters and conducting interviews in a standard, structured manner. The just-in-time training will cover the guidelines, and all team members should adhere to the assessment procedure.

Be respectful

Field team members going into the community should remember to be respectful to the respondents and the community. Teams should be instructed to read the provided script in its entirety, answer any questions the household respondent may have, and allow the respondent to quit at any time if the respondent requests to do so. Cultural norms and practices should also be considered when one is selecting the time and day to conduct the interviews. Always remember that the respondent has just been affected by a disaster.

Understand personal limitations

Finally, each field team member should understand and accept his/her own personal limitations, whether those limitations reside in one's comfort level of entering a household, the time limitations of being in the field, or physical condition.

5. Phase III: Data Entry and Analyses

In Section 5.1, we describe how to handle the data from the questionnaire. Analysis of the tracking form is described in a later section ([Section 5.4](#)). We recommend using Epi Info™ software, which is user-friendly and available free of charge. For tutorials in creating the database, entering data, and running analyses, visit CDC’s Epi Info™ Website at <http://www.phconnect.org/group/epiinfo/forum/topics/epi-info-7-quick-start-guide> and follow the “Epi Info™ 7 Quick Start Guide.” However, any statistical software package that allows for statistically weighting data is acceptable.

5.1 Data handling

Electronic data handling requires basic skills in data entry, cleaning, and processing. Identifying individuals with these basic skills and considering the following items ([Table 6](#)) are both important to ensuring the quality of data collected during a CASPER.

Table 6. Considerations for data entry and analysis

Data entry
<u>How will data entry be handled if a CASPER is using a paper questionnaire?</u>
Data collected by use of a paper questionnaire should be entered into an electronic dataset by using software that is familiar, easily accessible, and maintainable. For any software, build the data entry platform prior to conducting fieldwork. Provide training for data entry staff so that they can become familiar with the program and learn the proper techniques to promote quality and accuracy when entering data.
<u>How will data entry be handled if a CASPER is using electronic devices?</u>
Merge all collected data from the electronic devices into a single file that can be analyzed by use of Epi Info™ or other statistical software.
Data analysis
<u>How will analyses be adjusted to reflect the complex sampling design?</u>
CASPER uses weighted frequencies to account for the two-stage cluster sampling method. Analyses without weighting will not represent the entire target population (i.e., sampling frame). Each household for whom an interview is completed is assigned a weight that is based on the household’s probability of being selected (Section 5.2).

5.2 Weighted analyses

Households selected in cluster sampling have an unequal probability of selection. To avoid biased estimates, *all data analyses should include a mathematical weight for probability of selection*. Once all data are merged into a single electronic dataset, a weight variable must be added to each surveyed household by use of the formula below:

$$\text{Weight} = \frac{\text{Total number of housing units in sampling frame}}{(\text{number of housing units interviewed within cluster}) * (\text{number of clusters selected})}$$

The sampling frame, referred to in the numerator, is defined as the entire assessment area in which CASPER is being conducted. The numerator is the total number of housing units in the sampling frame, and that number will be the same for every assessed household. To calculate the total number of houses in the sampling frame, follow the steps outlined in [Section 3.1.3](#) and sum the “housing units” column (e.g., 6292 houses in Caldwell County, Kentucky).

If sampling has been 100% successful and information was obtained from exactly seven households in exactly 30 clusters, the denominator will be $7 * 30 = 210$ for every housing unit. The sample, then, is self-weighting because all housing units in the sample had an equal probability of being selected. Likely, obtaining seven households in each of the 30 clusters will not be possible. When this occurs, the denominator will be different for each surveyed household, depending on the cluster from which the housing unit was selected. Households from the same cluster will have the same weight, but weights will differ between clusters. For example, if only five completed interviews occurred in a cluster, the denominator of the weight for each of the five surveyed households would be $5 * 30 = 150$.

The “number of clusters selected” will be 30, even if there are some clusters with zero interviews. The only exception is if the decision to oversample clusters was made a priori (see [Section 3.2](#)).

The table depicted in [Figure 11](#) displays the sampling weights for a CASPER conducted in Kentucky following the major ice storms in 2009. In stage one of sampling, 30 clusters were selected representing 19,370 housing units. The goal was to conduct 210 interviews, but only 187 were completed. For the purpose of calculating the “weight” column (highlighted in yellow), an additional column was added, “# interviews,” to represent the number of housing units interviewed within a cluster (highlighted in blue).

Figure 11. Sample dataset showing the number of interviews per cluster and the assigned weight for each house interviewed.

Tables		Illustrations		Charts		Sparklines		Filter						
D2		fx		=(19370/(C2*30))										
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Date	Cluster_ID	# Interviews	Weight	Q2PeopleLi	Q3PeopleSl	aTwo	b3to17	c18to64	d65	Q4safe	Q5secure	Q6Injured	N6aFall
2	2/7/2009	2	6	107.61	4	6		2	3	1	yes	yes	no	no
3	2/7/2009	2	6	107.61	3	2			2		yes	yes	no	no
4	2/7/2009	2	6	107.61	1	1				1	yes	yes	no	no
5	2/7/2009	3	6	107.61	2	2			1	1	yes	yes	no	no
6	2/7/2009	3	6	107.61	2	2			1	1	yes	yes	no	no
7	2/7/2009	3	6	107.61	2	1			1		yes	yes	no	no
8	2/7/2009	4	7	92.24	2	2	0	0	0	2	yes	yes	no	no
9	2/7/2009	4	7	92.24	2	2	0	0	2	0	yes	yes	no	no
10	2/7/2009	4	7	92.24	2	2	0	0	2	0	yes	yes	no	no
11	2/7/2009	4	7	92.24	2	2	0	0	0	2	yes	yes	no	no
12	2/7/2009	4	7	92.24	5	6	0	2	4	0	yes	yes	no	no
13	2/7/2009	4	7	92.24	6	8	0	4	4	0	yes	yes	yes	yes
14	2/7/2009	4	7	92.24	4	7	0	0	7	0	yes	yes	no	no
15	2/7/2009	5	6	107.61	5	14	1	8	5		yes	yes	no	no
16	2/7/2009	5	6	107.61	4	4		2	3		yes	yes	no	no
17	2/7/2009	5	6	107.61	8	8		5	2	1	yes	yes	no	no
18	2/7/2009	5	6	107.61	3	3			3		yes	yes	no	no
19	2/7/2009	5	6	107.61	2	2				2	yes	yes	no	no
20	2/7/2009	5	6	107.61	2	2			1	1	yes	yes	no	no
21	2/7/2009	10	5	129.13	2	1	0	0	0	1	yes	yes	no	no
22	2/7/2009	10	5	129.13	2	2	0	0	0	2	yes	yes	no	no

Once weights are assigned, frequencies can be calculated for each of the interview questions. To calculate frequencies in Epi Info™ 7 “classic mode”, read (import) the data file with the weight that was just created. Click on “Frequencies” along the left hand column. In the “frequency of” box, select each variable for which you would like results and, in the “weight” box, select the variable “WEIGHT” that was just created. Finally, click “OK” ([Figure 12](#)) and a report will be generated providing the estimates.

Figure 12. Epi Info™ 7 “classic mode” frequency analysis window showing selected variables and weight.

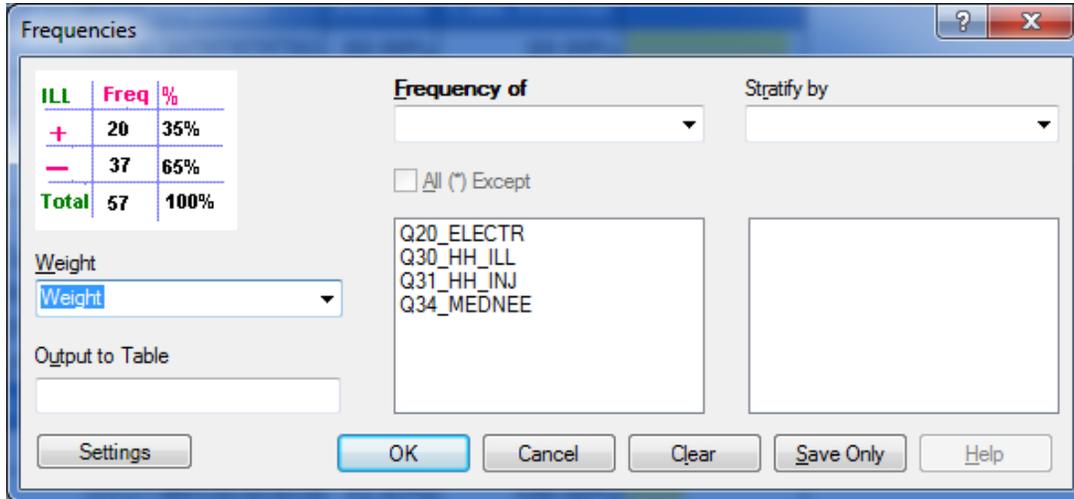
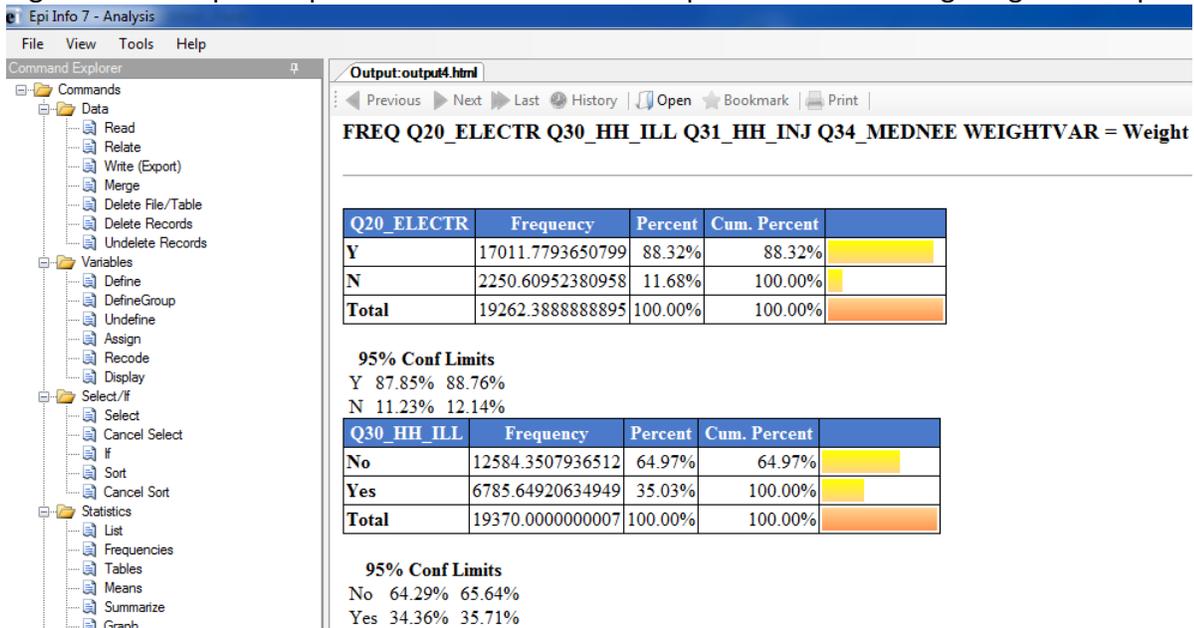


Figure 13 displays the Epi Info™ output window with the selected variables, followed by a table for each selection. These output tables should be saved for use in the report.

Figure 13. Example of Epi Info™ 7 “classic mode” output window showing weighted frequencies



To obtain unweighted estimates, follow the above instructions, but do not assign a variable in the “weight” box. Applying the weights provides projected estimates that can be generalized to every housing unit in the assessment area or sampling frame. Table 7 shows the unweighted and weighted frequencies for a specific question from the 2009 Kentucky Ice Storm CASPER.

Table 7. Unweighted and weighted frequencies of current source of electricity following the Ice Storms, Kentucky, 2009

<i>Characteristic</i>	<i>Unweighted</i>		<i>Weighted</i>		<i>95% CI</i>
	<i>Frequency</i>	<i>Percent</i>	<i>Frequency</i>	<i>Percent</i>	
<i>Source of Electricity</i>					
<i>Power company</i>	137	74.1	14190	74.0	61.9-86.0
<i>Gasoline generator</i>	29	15.7	3200	16.7	7.6-25.7
<i>None</i>	19	10.3	1789	9.3	3.8-14.8

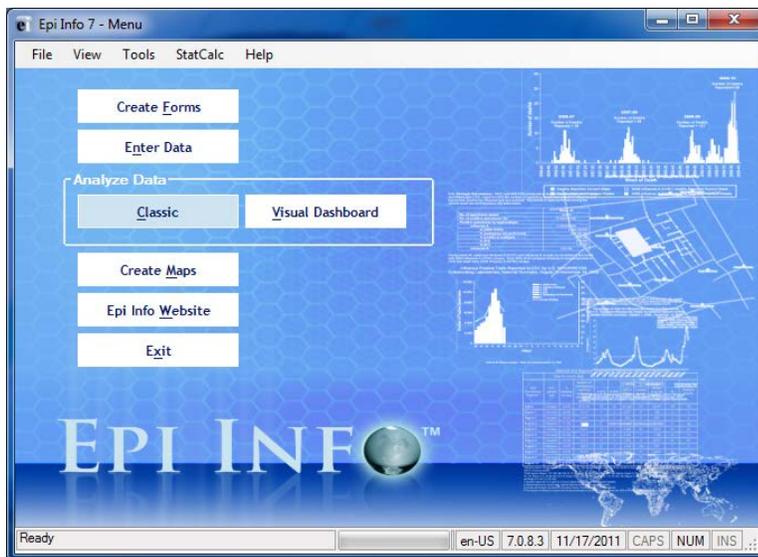
Remember that weighted analysis does not account for the changes that may occur in the number of households between the time of the census and the time of the assessment (e.g., the number of households per cluster may have changed between 2000, when the census was conducted, and 2009, when the CASPER was conducted). Therefore, despite attempts to present unbiased estimates, the frequencies reported might lack precision.

5.3 Calculation of 95% confidence intervals

The 95% confidence intervals (CIs) should be provided with the weighted estimates. These confidence intervals indicate the reliability of the weighted estimate. Follow these steps to calculate 95% confidence intervals in Epi Info™ 7:

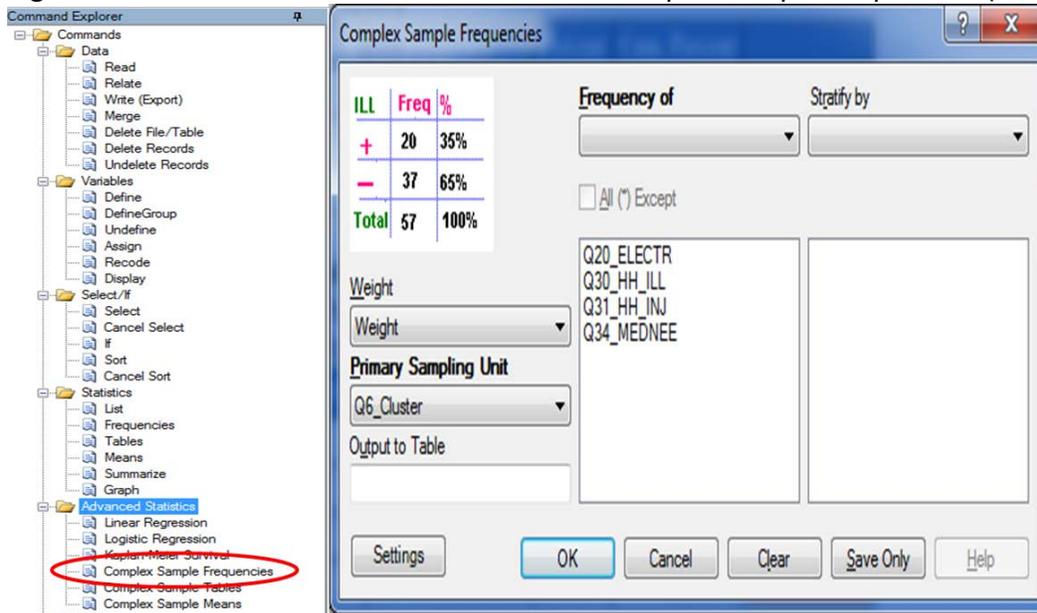
1. Open Epi Info 7 in classic mode ([Figure 14](#)).

Figure 14. Classic mode of Epi Info 7



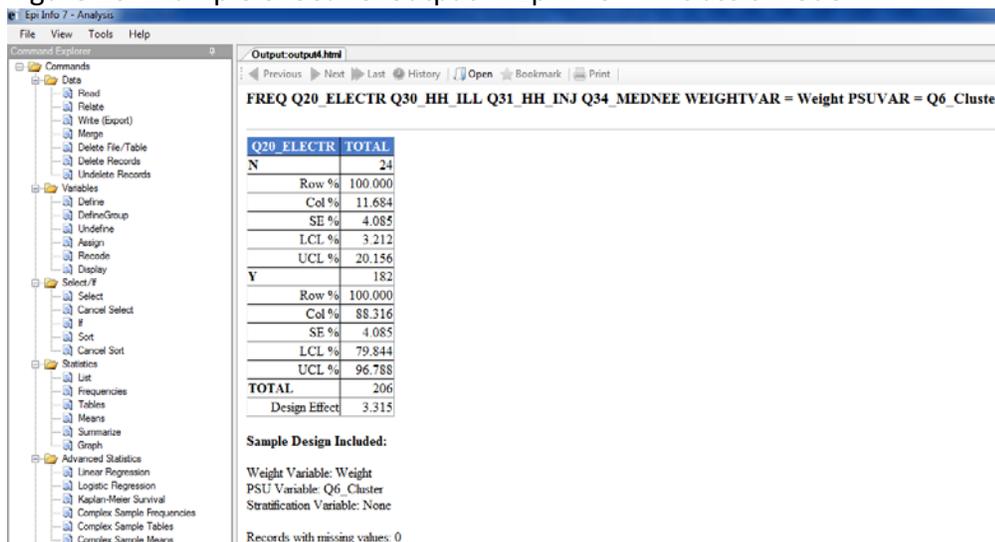
2. Read (import) the data file.
3. Select “Complex Sample Frequencies Command” under advanced statistics, and in the dialog box for Frequency, select the variable(s) in which you are interested ([Figure 15](#)).

Figure 15. Selected variables for calculation of complex sample frequencies (sample data)



4. Under the Weight drop-down menu, select the “weight” variable for calculating the weighted CI.
5. Under PSU, select the “Cluster Number” variable and Click OK ([Figure 16](#)).

Figure 16. Example of 95% CI output in Epi Info™ 7 “classic mode”



6. Right-click on the table and select “Export to Microsoft Excel”.

5.4 Response rates

Calculating response rates helps determine the representativeness of the sample to the population within the sampling frame. All the information used to calculate response rates is collected by the field interview teams on the tracking form ([Appendix E](#)). Thus, teams should be well-trained in using the tracking form to track all housing units that were selected for interview, including those for which no interview was completed or no contact was made.

To compile the tracking form data, tally the responses to each row on the tracking form. In some sections, it may be necessary to reconcile discrepancies. For example, an interviewer may appropriately select both “no answer” and “door was answered” for a single housing unit, because the interviewer returned to a housing unit previously selected but no one answered the door. Select only the final designation (“door was answered”) for tally and disregard the prior visits. These tallies can then be entered into a spreadsheet ([Figure 17](#)). Each column should represent a single cluster. If more than one tracking form was completed per cluster, consider forms for the same cluster cumulative and tally them onto the same column in the spreadsheet.

Figure 17. Sample tracking dataset showing attempted and completed interviews per cluster

A	B	C	D	E	F	G	H	I	J	K	L
	County	Caldwell									
	Cluster	1	2	3	4	5	6	7	8	9	10
	Interviewer	Team 11	Team 11	Team 7	Team 7	Team 7	Team 6	Team 11	Team 6	Team 2	Team 8
	Date of Interview	10/26/2009	10/26/2009	10/26/2009	10/26/2009	10/25/2009	10/25/2009	10/25/2009	10/26/2009	10/25/2009	10/25/2009
No Access	House Accessible	7	9	12	19	21	10	14	9	19	8
	House Inaccessible	0	0	0	0	0	0	0	0	0	0
	Front Door Inaccessible	0	0	0	0	0	0	0	0	0	0
Type of Dwelling	No Housing Structure	0	0	0	0	0	0	0	0	0	0
	Mobile Home	1	0	0	0	0	0	0	0	0	2
	Single Family Home	6	9	12	0	0	10	14	9	8	6
	Apartment	0	0	0	19	21	0	0	0	9	0
Damage	None or Minimal	7	9	12	19	21	9	14	9	17	6
	Damaged	0	0	0	0	0	1	0	0	0	2
	Destroyed	0	0	0	0	0	0	0	0	0	0
No Answer	Previously Vacant	0	0	2	0	0	2	0	1	0	0
	Evacuated before Disaster	0	0	0	2	0	0	0	0	0	0
	Abandoned after Disaster	0	0	1	2	1	0	0	0	0	0
	Nobody Home after 3rd Visit	2	0	0	0	0	0	0	1	0	1
Interview	Language Barrier	0	0	0	0	0	0	0	0	0	0
	Refused to Participate	0	0	0	0	0	1	0	0	1	0
	Interview begun, not finished	0	0	0	0	0	0	0	0	0	0
	Interview Completed	5	7	4	7	7	7	7	7	6	7
Total Number of Houses Sampled/Attempted	7	9	12	19	21	10	14	9	19	8	

There are three separate response rates that are calculated for CASPER: the completion rate, the cooperation rate, and the contact rate ([Table 8](#)).

Table 8. Calculation of CASPER response rates

Completion rate =	$\frac{\text{Number of completed Interviews}}{\text{Number of interviews goal (usually 210)}}$
Cooperation rate =	$\frac{\text{Number of completed interviews}}{\text{All HUs where contact was } \textit{made}}$ <p style="text-align: center; margin: 0;">(including completed interviews, incomplete interviews, and refusals)</p>
Contact rate =	$\frac{\text{Number of completed interviews}}{\text{Number of HUs where contact was } \textit{attempted}}$ <p style="text-align: center; margin: 0;">(including completed interviews, incomplete interviews, refusals, and non-respondents)</p>

The completion rate represents how close interview teams came to collecting the goal number of interviews (typically n=210). Completion rates below 80% (typically n=168) result in an unacceptably low number to represent the sampling frame. When planning a CASPER, you should allot enough time for teams to complete the 210 interviews. It is recommended to have a few field interview teams available if they need to return to low-responding clusters the following day(s) to finish data collection. See [Section 3.2](#) for more tips on increasing sample size.

The cooperation rate is the proportion of households at which contact was made and the household agreed to complete an interview. It represents both the eligibility and the willingness of the community to complete the CASPER interview. It is calculated by dividing the number of completed interviews by the total number of households at which contact was made (i.e., completed interviews, incomplete interviews, and refusals). The lower the number of contacts made, the more the sample becomes one of convenience.

The contact rate is the proportion of all households at which contact was attempted and the household successfully completed an interview. Higher contact rates indicate better representativeness of the sample to the population. Lower contact rates indicate that field interview teams had to attempt interviews at many households (i.e., knock on many doors) in order to obtain the necessary number of interviews. The contact rate is calculated by dividing the number of completed interviews by the total number of households at which contact was attempted (i.e., non-response, completed interviews, incomplete interviews, and refusals). The lower the contact rate, the more the sample becomes one of convenience at the second stage.

6. Phase IV: Write the report

The final phase of CASPER is writing the report. This is an important phase because it is the delivery of the information collected from the CASPER. Several aspects of the report can be completed during the preparation phase of the CASPER—deciding who will write the report, gathering background information for the report, and creating table shells. Completing such aspects early will ensure a more timely report and enable the CASPER team to deliver a preliminary report within 72 hours. It is recommended that two reports be developed: (1) a preliminary report or presentation provided to key stakeholders within a day or two after data collection, and (2) a final report that may be more widely distributed at a later time. Both types of reports are detailed in this section.

6.1. Considerations prior to writing the report

An essential element is a plan for the report, including what data will be reported. Such a plan will help guide the type of data collected and ensure a quick turnaround of results (see [Table 9](#)).

Table 9. Considerations for writing the report

Who will write the written report?

Designate a person who will be in charge of the report(s). This should be someone familiar with the entire process and a person who was involved in the preliminary meetings, sampling, and analysis. Once designated, this individual can begin the writing process prior to completion of data collection (e.g., draft the background and methods and create table shells).

To whom should the results be submitted?

The target audience should always be considered when one is drafting a report. Will the report be sent to the state, to emergency managers, to epidemiologists, to politicians, and/or the media? Knowing your audience will determine the format to use, how much information to include, the report length, and the technical level. To ensure that partners have the results in a timely manner to make quick decisions to address any needs, a preliminary report should be provided within 72 hours of data collection. A more comprehensive report written after additional data cleaning and analysis should be provided within a few weeks.

How will you report the data?

When determining the format for reporting the results, decide if summary bullets or a full written report with tables or charts is suitable.

What action will be taken on the basis of the results?

The results should be presented so that they prompt action. Actions are derived from the current health status or needs of the population presented in the results. Actions may include, but are not limited to, prioritization of resources, public health messaging, enhanced health surveillance, or public health interventions.

How will field team experience in conducting the CASPER be included?

A debriefing meeting (see [Appendix J](#) for sample debriefing agenda) with all of the team members will be useful for obtaining observational information, anecdotes, or concerns that were not captured on the questionnaire for inclusion in the report(s).

Written summaries of the results of the CASPER require care and attention. Critically review the data and perform the necessary statistical calculations to produce estimates of the affected population. If appropriate, graph the results. This information will help partners better understand the needs and health status of the affected community. As with any report, results should be in a simple, easy-to-read format that reflects the original objectives.

6.2 Preliminary field report

The preliminary report is a draft version of the final report; it should contain initial results and recommendations to share with stakeholders. This report should note that results are in a preliminary or draft format, and the report should have limited distribution. The following information should be included:

- An *introduction*, which briefly describes the background of the disaster (e.g., date occurred, affected population) and details of the CASPER request (e.g., who requested, who conducted, timing of assessment) and the aims and objectives of the CASPER.
- A *methods* section, including a simple description of the sampling frame (i.e., target population), the two-stage cluster design, the unit of analysis, the questionnaire, the number and training of field interview teams, and the data analysis procedures.
- A *results* section, including the three response rates, the number of households represented by the sampling frame, and main findings.
- A *conclusion* section, discussing the main findings, the limitations of the CASPER, and preliminary recommendations based on the initial conclusions. Recommendations should be targeted and tangible so that they prompt action.

Other report types should be considered in conjunction with the preliminary report, such as a one-page bulleted list of highlights, a press release(s), and an oral presentation. It is strongly recommended that partners and stakeholders be informed of the preliminary results as soon as possible in order to ensure timely responses by other agencies and maximum transparency to the public. It is recommended that a presentation accompany the delivery of the preliminary report. All partners and, as appropriate, community organizations should be invited to the meeting. The meeting should mirror the preliminary report and include background, method, results, and conclusion sections. Consideration should be given to the best way to present the results in an oral presentation. This is a good opportunity to discuss implementation of the recommendations, next steps, and lessons learned.

6.3 Final report

The final report should be based on the preliminary report, but it should also contain additional, detailed information. It can be written several weeks after the preliminary report. This report will likely be more widely distributed. A final report will include the following:

- An *executive summary* that highlights the report.
- An *introduction* (likely copied from the preliminary report).
- A *method* section (likely copied from the preliminary report).
- A *results* section, including key findings from the preliminary report, as well as additional analyses not included in the preliminary report (i.e., qualitative data or analysis of open-ended questions). The results may include weighted and unweighted frequencies, weighted and unweighted percentages, and confidence intervals (correcting any inaccuracies from the preliminary report).
- A *conclusion* section, including the discussion from the preliminary report, as well as incorporating feedback received, additional information and final recommendations created in collaboration with partners, and any actions taken as a result of the CASPER (e.g., enhanced public health messaging). An acknowledgements section that includes all individuals and organizations who helped with each stage of the CASPER should be added to the final report.

[Appendix K](#) provides an example of a final report. The final report incorporates every phase of the CASPER and may be widely distributed. Copies should be provided to all interested parties, including state or local public health authorities, emergency operations centers, incident command staff, and other agencies.

7. CDC Support

HSB helps prepare agencies to respond to disasters and minimize the health effects of disasters on communities by providing disaster epidemiology (including CASPER) training throughout the year to state and local public health staff (e.g., emergency response staff, epidemiologists, public health advisors). Trainings typically occur over 2 days and are conducted to 1) increase local emergency response capacity, 2) improve disaster epidemiology skills, and 3) share lessons learned. If you represent a state or local health department and would like to be considered for a CDC-sponsored disaster epidemiology training, please consult your leadership and then contact HSB to request a training. Additionally, HSB is always available to provide technical assistance in

- CASPER experience in the field, including tips, how-to, and lessons learned,
- sampling methodology, including sampling strategies and sampling with GIS software,
- data analysis support, and
- in-field assistance for local CASPER teams.

If you would like technical assistance, please contact HSB. Technical assistance may take place as a field deployment (e.g., CDC Epi-Aids, FEMA Mission Assignments, in-kind travel) or remotely (e.g., conference calls, e-mails, Webinars).

To contact HSB, please mail, call, or fax

Centers for Disease Control and Prevention, National Center for Environmental Health,

Division of Environmental Hazards and Health Effects

Health Studies Branch (HSB)

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8. Conclusion

CASPER is an important tool for identifying the community needs, both in disaster and non-disaster situations. Assessments conducted by use of the cluster sampling methodology described above can have an important impact on prioritization of community needs. However, well-organized step-by-step procedures ([Appendix L](#)), standardized questionnaires, and training are necessary to ensure quality data and an appropriate use of the results. In addition, standardization of the CASPER procedure makes it possible to compare results across multiple jurisdictions.

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Appendix A: Steps to merge the two Excel files downloaded from Census 2010 and to calculate cumulative housing units for selection of census blocks

1. Open H3: occupancy status Excel file
2. Delete the first two columns (A and B) and first two rows (1 and 2) of H3 Excel file
 - a. *Note:* column “D” (Total Housing Units or Total HUs) will be labeled as column “B”.
3. Open and delete the first two columns (A and B) and two rows (1 and 2) of P1: total population Excel file
4. Copy column “D” (total population) from P1 file and paste it into the H3 file (*Note:* First verify that the H3 and P1 files are sorted the same. That is, each census block is on the same row in both files.)
5. Label the columns in the H3 file and reorder accordingly (total population, occupied HUs, vacant HUs, and total HUs)
6. Add two new columns in the H3 file for cumulative housing units (cumulative HUs) and random number(random) and highlight both columns so that they are easy to identify
7. Click in cell “F2” under cumulative HUs and type in the first Total HUs number, which can be found in cell “E2”.
8. In cell “F3”, type the formula “=F2+E3” and press “Enter”
9. Copy the formula to all column “F” cells by clicking and holding in cell “F3” and dragging the cursor to the last row in the column. Then, let go of the click and select “Fill → Down”, which is located in the Editing tools portion of the Home tab.

Appendix B: Question bank

The purpose of this question bank is to provide potential questions that can be used in a CASPER questionnaire. Additional questions may need to be created to satisfy the purpose of the CASPER. The questions in this bank have been previously used in CASPER questionnaires and, in an effort to encourage standardization and the potential for meta-analysis across CASPERs, the following wording and response options are suggested. Further, this list is intended to serve as a bank of questions, not a template. Some of the questions solicit similar information; however, the wording is slightly different. For example, both questions [D3](#) and [D4](#) ascertain the number of people who slept at the home the previous night.

The questions are grouped in the following sections:

1. [Identification and physical location.](#)
2. [Demographics and functional needs.](#)
3. [Damage and repair.](#)
4. [General utilities.](#)
5. [Carbon monoxide exposure.](#)
6. [Animal safety.](#)
7. [Supplies, relief, and emergency preparedness.](#)
8. [Health status.](#)
9. [Medical care and prescriptions.](#)
10. [Communication.](#)

General notes

- All questions should have a response marked; therefore, always provide an option for “don’t know” and “refused”.
- When asking “Since the [*disaster*]”, it is best to be as specific as possible (e.g., the actual disaster date, the date of evacuation, the date of return).
- Keep skip patterns to a minimum to avoid interviewer confusion.
- Limit lists to only what is necessary and analyzable; consider how data will be analyzed to help determine what variables are needed and thus, what questions should be included.
- The comprehension level should be appropriate for the community; giving examples increase comprehension (e.g., “10 sq ft is approximately the size of an infant’s playpen”).

1. Identification and physical location

<i>General Information</i>	<i>Response Option</i>	<i>Variable Name</i>
P1. Date	MM/DD/YYYY	Date
P2. Team ID	Alphanumeric	ID
P3. Interviewer initials	Alphanumeric	Interviewer
P4. City	Alphanumeric/Prefilled	City
P5. County	Alphanumeric /Prefilled	County
P6. Cluster number	## (1-30)	Cluster
P7. Block number	####	Block
P8. Number of households in cluster*	####	NumHH
P9. Survey Number	###	Survey
P10. Type of structure*	1=Single family 2=Multiple unit 3=Mobile home 4=Other, _____	Structure

*Captured on the tracking form but can also be captured in the questionnaire for analysis purposes.

2. Demographics and functional Needs

Question	Response Option*	Variable Name
D1. Is this your primary residence?	0=No 1=Yes	PrimRes
D2. How many people lived in your household before the [disaster]?†	##	ResBefore
D3. How many people slept in your home last night?	##	ResAfter
D3b. If NONE , where did you and members of your household sleep?	1=Shelter 2=Special needs shelter 3=Hotel/motel 4=Family/friends home 5=Other, _____	Stay Stay_txt
D4. How many people from other households slept in your home last night?	##	NumSlept
D5. How many people living in your household are less than 2 years old?	##	P_LT2
2–17 years old?	##	P_2to17
18–64 years old?	##	P_16to64
more than 64 years old?	##	P_65
D6. How many people living in your household are male?	##	Male
female?	##	Female
D7. Is anyone in your household pregnant?	0=No 1=Yes	Preg
D7b. If YES , how many?	#	Preg#
D8. What is your race? (check all)	1 = American Indian/Alaskan Native 2 = Asian 3 = Black or African American 4 = Native Hawaiian or Other Pacific Islander 5 = White	Race
D9. Are you Hispanic or Latino?	0=No 1=Yes	Hispanic
D10. Is there an adult in your household who does not speak English?	0=No 1=Yes	NonEnglish
D11. What is your current marital status	1=Married/unmarried couple 2=Separated/divorced 3=Widowed 4=Never married	Marital
D12. Do you or does a member of your household have serious difficulty hearing?	0=No 1=Yes	Deaf
D13. Are you or a member of your household blind or have serious difficulty seeing, even when wearing glasses?	0=No 1=Yes	Blind

D14. Because of a physical, mental, or emotional condition, do you or does a member of your household have serious difficulty concentrating, remembering, or making decisions? (5 years old or older)	0=No 1=Yes	Concentrate
D15. Do you or does a member of your household have difficulty walking or climbing stairs? (5 years or older)	0=No 1=Yes	Climbing
D16. Do you or does a member of your household have difficulty dressing or bathing? (5 years old or older)	0=No 1=Yes	DifficultBathing
D17. Because of a physical, mental, or emotional condition, do you or does a member of your household have difficulty doing errands alone such as visiting a doctor’s office or shopping? (15 years old or older)	0=No 1=Yes	DifficultErrands
D18. How often in the past 12 months would your household say they were worried or stressed about having enough money to pay your rent/mortgage? Would you say you were worried or stressed –	1=Always 2=Usually 3=Sometimes 4=Rarely 5=Never	Worried_Rent
D19. How often in the past 12 months would your household say they were worried or stressed about having enough to buy nutritious meals? Would you say you were worried or stressed –	1=Always 2=Usually 3=Sometimes 4=Rarely 5=Never	Worried_Meal
D20. Do you own or rent this residence?	1=Own 2=Rent 3=Other, _____	Own Own_txt
D21. Did your household evacuate your home any time during or before the [disaster]?	0=No 1=Yes	Evacuate
D21b. If NO , what prevented your household from evacuating?	1=No need 2=No place to go 3=Lack of transportation 4=Stayed w/pet 5=Other, _____	EvacNo
D21c. If YES , where did your household evacuate to?	1=Shelter 2=Hotel 3=Friend/Family home 4=Second home 5=Other, _____	EvacLoc
D21d. If YES , when date did your household evacuate?	MM/DD/YYYY	EvacDate
D21e. If YES , on what date did your household return home to sleep?	MM/DD/YYYY	EvacRet
D22. Are you and members of your household currently in temporary housing?	0=No 1=Yes	TempRes

*In addition to the suggested response options, all questions should include **88=Don’t Know, 99=Refused**

†For non-emergency situations, may rephrase to “How many people live in your household?”

3. Damage and repair*

Question	Response Option*	Variable Name
DR1. How would you describe the damage to your home?	0=None or minimal 1=Damaged, but habitable 2=Damaged, uninhabitable 3=Destroyed	Damage
DR1b. If DAMAGED , do you need a tarp?†	0=No 1=Yes	Tarp
DR2. Do you feel your home is currently physically safe to live in?	0=No 1=Yes	Safe
DR2b. If NO , why not? (check all that apply) Structural hazards Surface dust Air quality Fear of future [disaster] Other, _____	0=No 1=Yes 0=No 1=Yes 0=No 1=Yes 0=No 1=Yes 0=No 1=Yes	_Struc _Dust _Air _Fear _Other
DR2c. If NO , when do you expect this home to be physically safe to live in?	1=Less than 1 month 2=2-3 months 3=4-6 months 4=More than 6 months 5=Never	_WhnSafe
DR3. How high did the flood waters reach inside your home?	## feet	FloodHgt
DR4. What is the condition of your home now?	1=Home uninhabitable—not living at home 2=Clean up—not living at home 3=Clean up—living at home 4=Living in the home (no cleanup) 5=Home never damaged or finished clean-up 6=Other, _____	Condition
DR6. Where does your household expect to be living in one month?	1=In this residence 2=With family/friends 3=Buy/rent different residence in this state 4=Buy/rent different residence outside of state 5=Shelter 6=Other, _____	Live1Mo
DR7. Do you see mold or smell a moldy/musty odor in your home?	0=No 1=Yes	Mold
DR8. Is there 10 sq ft or more of water damage and/or mold anywhere inside your home?‡	0=No 1=Yes	MoldDam
DR9. Since the [disaster], have you had any significant loss to your crops?	0=No loss 1=Yes, minor loss 2=Yes, significant loss 3=Not applicable	CropLoss

DR10. Does your household have insurance to cover cleanup?	0=No 1=Yes	InsClean
DR11. Does your household have insurance to cover repair?	0=No 1=Yes	InsRepair
DR12. Does your household need financial assistance for cleanup of your home?†	0=No 1=Yes	FinClean
DR13. Does your household need financial assistance to repair your home?†	0=No 1=Yes	FinRepair
DR14. Does your household have the means (e.g., financial, physical) to cleanup your home?	0=No 1=Yes	MeanCln
DR15. Does your household have the means (e.g., financial, physical) to repair your home?	0=No 1=Yes	MeanRep

*In addition to the suggested response options, all questions should include **88=Don't Know, 99=Refused**

†It is recommended to only ask this question if supplies/funds are readily available

‡Consider providing an example, such as “10 sq ft is approximately the size of an infant’s playpen”

4. General utilities

Question	Response Option*	Variable Name
U1. Do you currently have the following services in your home?†		
Running water	0=No 1=Yes 2=Never Had	Water
Electricity	0=No 1=Yes 2=Never Had	Electric
Garbage pickup	0=No 1=Yes 2=Never Had	Garbage
Natural gas	0=No 1=Yes 2=Never Had	Gas
Sewage service	0=No 1=Yes 2=Never Had	Sewage
Telephone (landline)	0=No 1=Yes 2=Never Had	Phone
Cell phone	0=No 1=Yes 2=Never Had	Cell
U2. What is your current source of electricity?	0=No electricity 1=Generator 2=Power company 3=Never had	Electric
U3. What is your current source of heat?	0=No heat 1=Electricity 2=Propane/gas 3=Wood 4=Coal/charcoal 5=Other, _____ 6=Never had	Heat Heat_txt
U4. Do you have a working indoor toilet?	0=No 1=Yes 2=Never Had	Toilet
U4b. If NO , do you have access to a working toilet?	0=No 1=Yes 2=Never Had	_access

*In addition to the suggested response options, all questions should include **88=Don't Know, 99=Refused**

†It is not necessary to include all options; modify the list on the basis of the objectives of the CASPER.

5. Carbon monoxide exposure

Question	Response Option*	Variable Name
E1. Since the [disaster], have you used a generator?	0=No 1=Yes	GenUse
E1b. If YES , where is/was the generator located?	1=Inside 2=Garage 3=Outside, <25 feet 4=Outside, ≥25 feet	GenLoc
E1c. If OUTSIDE , is/was the generator near an open or broken window?	0=No 1=Yes	GenWin
E2. Since the [disaster], have you used a charcoal or gas grill/camp stove?	0=No 1=Inside w/windows open 2=Inside w/windows closed 3=Outside	Grill
E2b. If OUTSIDE , is/was the grill/camp stove near an open or broken window?	0=No 1=Yes	GrillWin
E3. Since the [disaster], have you used a pressure washer with the actual engine in the house/garage?	0=No 1=Yes	PresWash
E4. Do you have a carbon monoxide detector?	0=No 1=Yes	CODetect
E4b. If YES , is it working?	0=No 1=Yes	COWork

*In addition to the suggested response options, all questions should include **88=Don't Know, 99=Refused**

6. Animal safety

Question	Response Option*	Variable Name
A1. Since the [disaster], have you noticed an increase in mosquitoes around your home or neighborhood?	0=No 1=Yes	Mosquito
A2. Are you or your household members doing anything to protect yourselves from mosquitoes?	0=No 1=Yes	Protect
A2b. If YES , what type of protective measures are you using? (check all that apply)		
Wearing repellent	0=No 1=Yes	Repellent
Eliminating standing water	0=No 1=Yes	ElimWat
Wearing protective clothing (long shirt/pants)	0=No 1=Yes	ProtClth
Other _____	0=No 1=Yes	ProtOth
A3. Since the [disaster], have you or anyone in your household noticed an increase in snakes around your home or neighborhood?	0=No 1=Yes	Snakes
A4. Since the [disaster], have you or anyone in your household noticed an increase in alligators around your home or neighborhood?	0=No 1=Yes	Alligators
A5. Since the [disaster], have you or anyone in your household been bitten by an animal or insect other than mosquitoes?	0=No 1=Yes	Bitten
A5b. If YES , what animal?	Text	_Animal

*In addition to the suggested response options, all questions should include **88=Don't Know, 99=Refused**

7. Supplies, relief, and emergency preparedness

Question	Response Option*	Variable Name
S1. Does your household have adequate drinking water (besides tap) for the next 3 days? (1 gallon/person/day)	0=No 1=Yes	Water
S2. What was your households primary source of drinking water <i>before</i> the [disaster]?	1=Well 2=Public/municipal (tap) 3=Bottled	WBefore
S2b. What is your households primary source of drinking water right now?	0=No drinking water 1=Well 2=Public/municipal (tap) 3=Bottled	WNow
S2c. If using WELL or MUNICIPAL water, is your household treating the water?	0=No 1=Yes, boiling 2=Yes, chemical	WTreat
S3. Has your household received bottled water as part of the disaster relief effort?	0=No 1=Yes	WatAid
S4. Do you have access to adequate food for everyone in your household for the next 3 days?	0=No 1=Yes	Food
S5. Has your household prepared an Emergency Supply Kit with supplies like water, food, flashlights, and extra batteries that is kept in a designated place in your home?	0=No 1=Yes	SupplyKit
S6. Has your HH prepared a first aid kit with emergency supplies to take with you if you had to leave quickly?	0=No 1=Yes	FirstAidKit
S7. Does your household currently have a 7-day supply of medication for each person who takes prescribed meds?	0=No 1=Yes 77=No prescriptions	SupplyMeds
S8. Does your household have any of the following emergency plans?		
Emergency communication plan such as a list of numbers and designated out-of-town contact	0=No 1=Yes	_commPlan
Designated meeting place immediately outside your home or close by in your neighborhood	0=No 1=Yes 77=N/A	_meetHome
Designated meeting place outside of your neighborhood in case you cannot return home	0=No 1=Yes 77 = N/A	_meetOut
Copies of important documents in a safe location (e.g., water proof container)	0=No 1=Yes	_documents
Multiple routes away from your home in case evacuation is necessary	0=No 1=Yes	_routes
S9. Has your household received food as part of the disaster relief effort?	0=No 1=Yes	FoodAid

S10. Have you or a member of your household received any type of aid as part of the relief effort?	0=No	1=Yes		Aid
S10b. If NO , why not? (check all that apply)				
No aid needed	0=No	1=Yes		_NoNeed
Did not know aid was available	0=No	1=Yes		_Knowledge
No transportation to aid/relief location	0=No	1=Yes		_NoTrans
Other, _____	0=No	1=Yes		_NoOth
S10c. If YES , what type of aid? (check all that apply)				
Food	0=No	1=Yes		_Food
Water	0=No	1=Yes		_Water
Shelter	0=No	1=Yes		_Shelter
Clothing	0=No	1=Yes		_Clothes
Financial assistance	0=No	1=Yes		_Money
S11. Does your household currently have access to transportation if needed?	0=No	1=Yes	2=Never Had	Transport
S12. Does your household have access to fuel†?	0=No	1=Yes	2=N/A	Fuel
S13. Do you, or does anyone in your household, need clothes?	0=No	1=Yes		Clothes
S14. What is your greatest need at this time?‡	Text			GreatNeed

*In addition to the suggested response options, all questions should include **88=Don't Know, 99=Refused**

†Could specify “for your transportation”, “for your generator”, etc.

‡Typically the final question on the CASPER questionnaire and the only open-ended response

8. Health status and disabilities

Question	Response Option*	Variable Name
H1. Since the [disaster], have you or a member of your household been injured?†	0=No 1=Yes	Injury
H1b. If YES , what was/were the injury(s)?‡ Animal bite	0=No 1=Yes	_Bite
Abrasion/laceration	0=No 1=Yes	_Cut
Broken bone	0=No 1=Yes	_Broken
Fracture	0=No 1=Yes	_Fracture
Head injury	0=No 1=Yes	_HeadInj
Strain/sprain	0=No 1=Yes	_Strain
Other, _____	0=No 1=Yes	_InjOth
H1c. If YES , what part of the body was injured? Arm(s)	0=No 1=Yes	_Arm
Back	0=No 1=Yes	_Back
Body/torso	0=No 1=Yes	_Body
Foot/feet	0=No 1=Yes	_Foot
Head	0=No 1=Yes	_Head
Leg(s)	0=No 1=Yes	_Leg
Neck	0=No 1=Yes	_Neck
H3d. If YES , were you or the member of your household injured while repairing the residence or retrieving items?	0=No 1=Yes	InjRepair
H3e. If YES , what caused the injury?‡	Check all or Open-ended	InjCause
H2. Has everybody in your household had a tetanus (DTaP/Tdap/Td) shot in the past 10 years?	0=No 1=Yes	Tetanus
H3. Has any member of your household died as a result of the [disaster]?	0=No 1=Yes	Died
H3b. If YES , how many?	#	Died#
H3c. If YES , how did they die? Burn injury	0=No 1=Yes	_Burn
Carbon monoxide poisoning	0=No 1=Yes	_CO
Concussion/brain injury	0=No 1=Yes	_Head
Drowning	0=No 1=Yes	_Drown
Electrical injury	0=No 1=Yes	_Electro
Heart attack/heart disease	0=No 1=Yes	_Heart
Motor vehicle-related accident	0=No 1=Yes	_MVA
Other, _____	0=No 1=Yes	_DieOth
H4. Since the [disaster], has anybody in your household experienced‡ Cough	0=No 1=Yes	Cough
Fever	0=No 1=Yes	Fever
Nausea/stomach ache/diarrhea	0=No 1=Yes	Nausea

Rash	0=No 1=Yes	Rash
Severe headache w/dizziness	0=No 1=Yes	Headache
Sore throat/cold	0=No 1=Yes	SoreThrt
Worsening of chronic illness	0=No 1=Yes	Chronic
If YES , what type(s) of illness(es)	Text	Chr_txt
Other, _____	0=No 1=Yes	IllOth
H5. Has anybody in your household become ill since the [disaster]?	0=No 1=Yes	Illness
H6. Have you or a member of your household ever been told by a healthcare professional that he/she has‡		
Asthma	0=No 1=Yes	Asthma
Diabetes	0=No 1=Yes	Diabetes
Developmental disability	0=No 1=Yes	DevDisable
Hypertension	0=No 1=Yes	Hyperten
Immunosuppressed	0=No 1=Yes	Immunosuppressed
Physical disability	0=No 1=Yes	Disable
Psychosocial/mental illness	0=No 1=Yes	Mental
Other, _____	0=No 1=Yes	ChronOth
H7. Since the [disaster], has anybody in your household experienced an increase in‡		
Agitated behavior	0=No 1=Yes	Agitated
Anxiety or stress	0=No 1=Yes	Anxiety
Depressed mood	0=No 1=Yes	Depressed
Difficulty concentrating	0=No 1=Yes	Concentrate
Loss of appetite	0=No 1=Yes	LossApp
Trouble sleeping/nightmares	0=No 1=Yes	TroubSleep
Alcohol/drug use	0=No 1=Yes	Alcohol
Witnessed or experienced violence	0=No 1=Yes	Violence
Other, _____	0=No 1=Yes	MHOth
H8. Since the [disaster], have you or any member of your household been unable to perform your/their daily tasks?	0=No 1=Yes	DailyTask
H9. Since the [disaster], are emotional concerns preventing you or any member of your household from taking care of yourself/themselves or others?	0=No 1=Yes	MH

*In addition to the suggested response options, all questions should include **88=Don't Know, 99=Refused**

‡Question can be modified to include location; i.e., "...in or around your home?"

‡Some examples given; list all relevant concerns for specific disaster.

9. Medical care and prescriptions

Question	Response Option*	Variable Name
M1. Since the [<i>disaster</i>], have you or has anybody in your household required medical care?	0=No 1=Yes	MedCare
M2. Since the [<i>disaster</i>], are you able to get the care you need for everyone in your household?	0=No 1=Yes	CareNeed
M2b. If NO , why not?	0=No need 1=Clinic/physician closed 2=Pharmacy closed 3=No transportation 4=Money/cost 5=Other, _____	_NoNeed _NoClinic _NoPharm _NoTrans _Cost _NoOth
M3. Is there anyone in your household who currently requires urgent medical care?	0=No 1=Yes	MedNow
M4. Since the [<i>disaster</i>], is everybody in your household getting the prescription medications they need?	0=No 1=Yes 2=N/A	Prescript
M4b. If NO , why not?		
Clinic/physician closed	0=No 1=Yes	_NoClinic
Pharmacy closed	0=No 1=Yes	_NoPharm
No transportation	0=No 1=Yes	_NoTrans
Money/cost	0=No 1=Yes	_Cost
Medicare/Medicaid/Insurance problems	0=No 1=Yes	_Insurance
Other, _____	0=No 1=Yes	_NoOth
M5. Do the people in your household who need prescribed medicine have enough for the next 3–7 days?	0=No 1=Yes 2=N/A	Meds
M6. Do you or does any member of your household need		
Daily medication (other than birth control or vitamins)	0=No 1=Yes	DailyMeds
Dialysis	0=No 1=Yes	Dialysis
Home health care	0=No 1=Yes	HomeHlth
Oxygen supply	0=No 1=Yes	Oxygen
Wheelchair/cane/walker	0=No 1=Yes	Wheelchair
Other type of special care, _____	0=No 1=Yes	SpCcare

*In addition to the suggested response options, all questions should include **88=Don't Know**, **99=Refused**

10. Communication

Question	Response Option*	Variable Name
C1. Since the [disaster], have you or members of your household received any information about boil water advisories in your area?	0=No 1=Yes	Boil
C1b. If YES , what was the PRIMARY source of information?†	1=TV 2=Radio 3=Text message 4=Neighbor, word of mouth 5=Internet, _____ 6=Flyer/poster 7=Local newspaper 8=Other, _____	InfoSource Web_txt OthSource
C2. Have you or members of your household received warnings about [specific concern, i.e., carbon monoxide]?‡	0=No 1=Yes	[depends]
C3. Have you or members of your household looked for information or answers to questions regarding the [disaster] and its effects?‡	0=No 1=Yes	SearchInfo
C4. Where would you first look for reliable information regarding the [disaster] and cleaning up after the [disaster]?	1=TV 2=Radio 3=Text message 4=Neighbor, word of mouth 5=Internet, _____ 6=Flyer/poster 7=Local newspaper 8=Other, _____	FindInfo
C5. Have you or members of your household received any other health advice, cleanup tips, or other information related to the [disaster]?‡	0=No 1=Yes	OthInfo
C5b. If YES , was the information received helpful?	0=No 1=Yes	Helpful
C6. Are you aware of the following materials [show materials, mention website/campaign, etc] to better prepare you and your family for a natural disaster or other significant event?	0=No 1=Yes	Campaign
C6b. If YES , was the information received helpful	0=No 1=Yes	Helpful

*In addition to the suggested response options, all questions should include **88=Don't Know, 99=Refused**

†Can ask as “check all that apply”; consider what data would be most useful for future prevention messaging (primary source versus all sources checked).

‡Can ask Part B to question: “If **YES**, what was the primary source?” – include all relevant/potential sources in answer (see C1b for example).

Finally, we would like to ask you about your household communication methods

Q26. What is your households main source of information regarding disaster or emergency events? *(check only one)*

- TV
- Radio
- Text message
- Automated call (e.g., reverse 911)
- Local newspaper
- Neighbor/friend/family/word of mouth
- Poster/flyer
- Church or other groups
- Internet
- Other, _____ DK Refused

Q31. Are you aware of the following materials [*show materials, mention website/campaign, etc*] to better prepare you and your family for a natural disaster or other significant event?

Yes No DK

Q31b. If **YES**, was the information received helpful?

Yes No DK

Q31c. If **YES**, where did you learn about the information?

- TV Radio Poster/flyer Newspaper
- Internet, _____ Other, _____
- DK Refused

Thank you for your time!

Appendix E: Community Assessment for Public Health Emergency Response Tracking Form

County:Cluster # (i.e., 1-30): # of Houses in the Cluster.....Interviewer:Date of Interview: / /.....

Instructions: Use one tracking form per cluster. Check where appropriate, but try to choose only one best option for each of the five categories. Go as far down the list as possible for each site you visit. Use neighbors to find information if no resident is available.

Sampled Housing Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1) ACCESS																	
House is Accessible	<input type="checkbox"/>																
House is Inaccessible	<input type="checkbox"/>																
2) TYPE OF DWELLING																	
No housing structure	<input type="checkbox"/>																
Mobile Home	<input type="checkbox"/>																
Single Family Home	<input type="checkbox"/>																
Apartment or Condo	<input type="checkbox"/>																
Other	<input type="checkbox"/>																
3) DAMAGE																	
None or Minimal	<input type="checkbox"/>																
Damaged	<input type="checkbox"/>																
Destroyed	<input type="checkbox"/>																
4) ANSWER																	
Door was answered	<input type="checkbox"/>																
Appears as though someone is home but no answer	<input type="checkbox"/>																
Appears vacant	<input type="checkbox"/>																
Nobody home after...	1 st visit	<input type="checkbox"/>															
	2 nd visit	<input type="checkbox"/>															
	3 rd visit	<input type="checkbox"/>															
5) INTERVIEW																	
Language Barrier	<input type="checkbox"/>																
Refused to Participate	<input type="checkbox"/>																
Interview begun, not finished	<input type="checkbox"/>																
Interview Completed	<input type="checkbox"/>																
Survey # (i.e., 1-7) from Completed Questionnaire:																	

Community Assessment for Public Health Emergency Response Sample Tracking Form (reverse side)

Instructions: Use this page to keep notes on which houses may need return visits.

Sampled Housing Unit:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.

Appendix F: Confidential referral form (sample)

Community Assessment for Public Health Emergency Response
[Disaster name]

Confidential Referral Form

Date: __/__/____ Time: __:__

Cluster No.: _____

Interviewer's Initials: _____

Name: _____

Address: _____

Contact Information:

Home telephone: _____ - _____ - _____

Cell phone: _____ - _____ - _____

E-mail: _____

Summary of Need:

Referral Made: Yes No

Referred to: _____

Appendix G: Introduction and consent script (sample)

Community Assessment for Public Health Emergency Response

Hello, we are _____ and _____ with the [insert name of local or state health department]. We have some information we would like to leave with you related to [topic of material (e.g., some health concerns, carbon monoxide, proper cleanup)] following the recent [disaster (e.g., hurricane, ice storm, tornado)].

Also, we are talking to residents in [name of county(s)] county who have been affected by the [disaster] about their health and other needs so that we can get a better idea of what kind of help people need. Your house is one of many that have been randomly chosen to be in this survey. If you agree to participate, we will ask you some general questions about your house and the people who live there and questions about certain kinds of environmental hazards. The survey should take no more than [time a mock interview using the final questionnaire and insert time here] to complete. We will keep your answers private. You can refuse to take part in the survey or refuse to answer any of the questions. Nothing will happen to you or your household if you choose not to take part in the survey.

You may have questions about this survey. If so, you can ask anyone here right now. If you would like to confirm that we were sent by the [insert name of local or state health department], you can call [insert contact person name, department, and phone number].

Are you willing to participate in this survey?

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

Thank you very much for your time.

Appendix H: Agenda for just-in-time training of field interview teams

Community Assessment for Public Health Emergency Response

1. Background of the disaster (or reason for CASPER)
2. Purpose of the CASPER
 - a. Rapidly obtain data for decision-making efforts
 - b. Specific goals of current CASPER
3. Brief methodology overview: What is CASPER?
 - a. Two-stage cluster sample
 - b. Importance of field teams in the success of CASPER
4. Organization of teams
 - a. Introduction of all CASPER field team members (name, background, experience)
 - b. Assign specific assessment areas and hand out packets
 - c. Exchange phone numbers
5. Selecting households
 - a. Introduce cluster maps
 - b. Describe household selection process
6. Review questionnaire
 - a. Interviewing tips
 - b. Clarification of specific questions (e.g., intent of question, explanation of skip patterns)
7. Completing forms
 - a. Tracking form review
 - i. Ensure all personnel understand the need to fill out the tracking form for EVERY HOUSE where contact was attempted.
 - b. Introduction and consent script review
 - c. Review of public health materials/handouts
 - d. Situations requiring immediate referral
8. Safety briefing
9. Logistics
 - a. Meeting and/or call-in time(s) and place(s)
 - b. Transportation
 - c. Food and water
 - d. Identification badges for all field team members
 - e. Contact information/communication
 - f. Instructions for potential media encounters
 - g. Debriefing time/location

Appendix I: Sample Interview teams tracking form

Team ID (#)	Names	Cell phone #	Assigned Cluster(s) #	County/District	Dispatch time to cluster	Arrival time	Completion time	Dispatch time to base	Arrival time to base
1	Helen Tamara,	703-111-1515	10	Webster	9:15 am	9:30 am	11:00 am	4:10 pm	5:30 pm
	Carlos Garcia,		17	Webster	11:05 am	11:15 am	12:30 pm		
			30	Union	1:45 pm	2:00 pm	4:00 pm		
2									
3									
4									
5									
6									
7									
8									
9									
10									

Appendix J: CASPER field interview team evaluation

1. In your opinion, what went well? What did not go well?
2. To what extent do you think this assessment will be useful to your community in responding to this emergency?
3. Did you think you were prepared (e.g., training, food, safety, communications, supplies) for your assignment?
4. Would you want to participate on a team in the future?
5. If we were to do this assessment again, what improvements can be made?
6. Did you learn anything from this experience?
7. Were there specific situations that you encountered that you want to tell us about relating to
 - a. Orientation of field teams?
 - b. Assessment methods?
 - c. Questionnaire?
 - d. Supplies and equipment?
 - e. Food?
 - f. Safety?
 - g. Communications?
 - h. Transportation?
8. Please provide any additional comments

THANK YOU FOR YOUR SERVICE TO YOUR COMMUNITY

Appendix K: 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

*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.

precise analysis and interpretation. The information gained is then shared in a simple format 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 Pennyryle 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 Pennyryle 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
<i>Food and Water</i>					
Inadequate drinking water	9	4.8	923	4.8	1.0–8.5
Inadequate food	8	4.3	887	4.6	0–9.2
<i>Source of Drinking Water</i>					
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*	--
<i>Current Source of Electricity</i>					
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
<i>Current Source of Heat</i>					
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	--
<i>Had working toilet</i>	181	96.8	18809	97.1	94.9–99.3
<i>Had working phone</i>	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
<i>Injury</i>					
Injured since storm	9	4.8	885	4.6	1.5–7.6
<i>Illness</i>					
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)	--
<i>Mental Health</i>					
Emotional concerns, anxiety, sleep problems, or memory problems	30	16.0	2926	15.3	8.3–22.1
<i>Medication</i>					
Not getting needed medication	11	5.9	1102	5.7	1.7–9.7
<i>Special Needs</i>					
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	--
<i>Transportation</i>					
Available if needed	185	99.5	19179	99.5	98.4–100.5

Appendix L: Summary of Community Assessment for Public Health Emergency Response (CASPER) Procedures

