Supporting Statement (Part B: Collections of Information Employing Statistical Methods) of the Request for OMB Review and Approval for Community Assessment for Public Health Emergency Response (CASPER)

0920-NEW

Generic Clearance

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Health Studies Branch (HSB)
Division of Environmental Hazards and Health Effects (DEHHE)
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B.1 Respondent Universe and Sampling Methods

The respondent universe for a Community Assessment for Public Health Emergency Response (CASPER) is comprised of any member of a household within the chosen geographic area of interest (sampling frame) (Attachment K) who is aged 18 years or older. The nature of the local population will vary based on geography, as well as the size of the affected area. It is difficult to specifically define the types of potential respondents because of the extreme diversity of locations where and situations under which CASPERs are conducted. CASPERs are a type of community assessment, so respondents would be residents of a household (includes owned or rented homes, condos, apartments, trailer homes, etc.) that is within the community or geographic area of interest that is being assessed..

The organization or agency conducting or requesting assistance with a CASPER determines the objectives and sampling frame for the CASPER before sample selection begins. To conduct a traditional CASPER, the minimum number of households within a sampling frame is 800. The goal for a CASPER is to complete 210 household-level interviews; this is accomplished by choosing 30 clusters (usually census blocks) from the sampling frame and conducting seven household-level interviews in each cluster. The interviews are conducted with a single member of each household who is 18 years of age or older, and each interviewee answers the household-level interview for their household. A minimum of 168 completed interviews will provide enough power and maintain the statistical integrity of the sample. The following is an example of a minimum response rate for a CASPER as defined in the *Standard Definitions – Final Dispositions of Case Codes and Outcomes Rates for Surveys* by The American Association for Public Opinion Research, 2011: Response Rate = Complete Interview/(Complete Interview + Partial Interview) + (Refusal + Non-Contact + Other) + (Unknown if Occupied Housing Unit + Unknown Other) = 188/(188+0) + (99+178+11) + (27+0) = 0.37.

CASPER analysis is designed for a 95% confidence for estimating a proportion within 10% with power of greater than 80%.[20] A power of 80% is obtained with the minimum sample size of 168. This applies no matter how large the population is, as long as it is large enough. The minimum population frame of 800 obviates the need for a finite population correction factor.

This quote from Brogan, Flagg, Deming, and Waldman 1994 further illustrates the features of the cluster design.[20] "The EPI [expanded program on immunization] cluster survey design was adapted from previous work by Serfling and Sherman [21] on designing immunization surveys to be conducted by local health departments in the United States. The primary objective of the EPI cluster survey, as originally proposed, is to estimate the proportion P (a population parameter) of children of a given age in a given geographic area who are vaccinated. A 95% confidence interval on P is desired such that its half-width is 0.10 or smaller or, equivalently, that P, the point estimate of P, should be within + 0.10 of P at the 95% confidence level. P is assumed to equal 0.50 for the purpose of calculating sample size, yielding a conservative (maximum) estimate of 96 as the required sample size under the assumption that a simple random sample of children is drawn from the population of inference [22, p. 75].

However, since simple random sampling of child populations is not feasible, the EPI surveys use cluster sampling, which requires the simple random sample size of 96 children to be inflated by an estimated design effect [22]. With an assumed design effect of 2, the required sample size is 192 children. Thus, 30 sample clusters, each containing seven sample children, is the typical EPI design."

2. Sampling method

CASPERs follow a specific epidemiologic method. Occasionally, this method is modified, and this will be discussed in the "Unusual problems requiring specialized sampling procedures" section below. The preferred

sampling method for CASPER is a probability-based, two-stage cluster design (30x7 cluster sampling methodology).

In the first stage of the CASPER sampling method, 30 clusters (e.g., census blocks from the most recent census) within the sampling frame are selected, with their probability for being chosen proportional to the estimated number of housing units in each cluster. Sometimes before the second stage of sampling, a press release (Attachment L) from the organization or agency conducting or requesting assistance for the CASPER is distributed to notify the residents of the community that a CASPER is being conducted in their area. In the second stage, each trained, two-person interview team (usually a minimum of 10 teams) randomly selects seven housing units for the purpose of conducting interviews in each of the 30 clusters. There are several methods that can be used to randomly select a household; however, the most common method for CASPER is systematic random sample. Teams are instructed to count the number of housing units within a cluster, divide that number by 7 to obtain an N. A team starts at the house nearest to a randomly selected starting point, travels through the cluster in a serpentine fashion to select every Nth house. Interview teams continue to travel through the cluster in a serpentine fashion, selecting every Nth house until seven interviews are complete. A structured, household-level questionnaire (Attachment C) is used to conduct in-person interviews by the interview teams. At each household, the interview team requests verbal consent (Attachment J) and conducts the interview with one person aged 18 years or older from each household.

The data that are collected from CASPER can be statistically weighted to extrapolate population estimates based on the sample.

3. Estimation procedures

All data analysis will be statistically weighted to extrapolate population estimates that are reflective of the entire area of interest (sampling frame) (see Attachment N for further description of statistical weighting). The analysis will be conducted by or under the supervision of a CDC epidemiologist and/or statistician and will involve the generation of descriptive statistics and in some cases regression analysis.

4. Unusual problems requiring specialized sampling procedures

Circumstances requiring specialized sampling are expected to be infrequent and if known at the time of submission, will be disclosed in individual generic requests.

Clusters should be chosen without substitution—meaning that the clusters originally selected are the clusters that are assessed. 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 might 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 "substitute" 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).

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. This is infrequent because smaller clusters have a lower probability of being selected. 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. If this occurs the "block groups" census variable is chosen for clusters rather than "census blocks", or census blocks are joined 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.

A minimum of 800 households is recommended to conduct the 30x7 cluster sampling methodology. If there are fewer than 800 households, other sampling strategies should be considered such as a census or simple random sampling. Other sampling strategies may also be considered based on the objectives of the CASPER, exposure patterns, or political reasons. These may include but are not limited to systematic sampling and stratified sampling.

There are also times that conducting multiple CASPERs should be considered, including if the original sampling frame is geographically too big to conduct a single CASPER in a reasonable timeframe (2-3 days) or the sampling frame is too heterogeneous for the generated population estimates to accurately represent multiple very different populations within a single sampling frame.

Additionally, there are occasions where it is of benefit to ask individual-level questions. These questions will need to be analyzed separately from household-level questions because of the difference in sample weights that will need to be applied during analysis.

B.2 Data Collection Methods

On the first day after arrival, the CDC team will conduct just-in-time training regarding how to conduct a CASPER, including CASPER methodology, logistics, interview techniques, safety in the field, and data analysis. This training is provided to anyone involved with the CASPER, both headquarter team members who will managing logistics and processing data and field team members who will be conducting interviews. This can include volunteers and the requesting public health entity's employees participating in the CASPER. Members of the field teams can be CDC personnel, other federal employees (e.g., USPHS, FDA), employees of the requesting public health entity, and individuals recruited locally by the requesting public health entity.

The sampling frame and clusters are selected in the first stage of the CASPER sampling method (see B.1.2). Field teams are assigned clusters within which to conduct interviews. Once the field team arrives at an assigned cluster, they randomly select seven housing units for the purpose of conducting interviews. There are several methods that can be used to randomly select a household; however, the most common method for CASPER is systematic random sample (see B.1.2). At each chosen household, a structured, household-level questionnaire (Attachment C) is used to conduct in-person interviews by the interview teams. At each household, the interview team requests verbal consent (Attachment J) and conducts the interview with one person aged 18 years or older. They will read each question to the interviewee and record the interviewee's response on the form. Some most responses will be recorded with a check box, others might be numbers for counts or free text.

In addition to the primary questionnaire, there are two other forms, the tracking form and referral form, in addition to the questionnaire used to collect information during a CASPER. The interview teams should carry a tracking form to collect information about each housing unit selected, even those that are inaccessible. The tracking form is used to note the households that need to be revisited, monitor the outcome of every interview attempt, and calculate the response rates (completion rate, cooperation rate, and contact rate) (Attachment D). These rates are the only information permanently retained from the tracking form; the tracking forms are destroyed after calculation of the response rates. Referral forms are used to document urgent needs that present an immediate threat to life or health. Only information regarding the general category of the urgent need (e.g., injury or ran out of important medication) is retained from these forms. The original form is passed to the local person assigned to manage urgent needs and no copy is retained by CDC (Attachment E).

B. 3 Methods to Maximize Response Rates and Deal with Non-Response

To maximize response rates, the organization requesting the CASPER may issue a press release that informs the community when the CASPER will be conducted and why participating in the CASPER is important (Attachment L). We also train the interview teams on the best way to approach people when going door-to-door for interviews, and we send the teams out with answers to frequently asked questions and sometimes with informational pamphlets to increase awareness of the situation and advise residents of safety precautions or resources for help.

Within each cluster, seven households are randomly selected. Interviews team are instructed to revisit households up to three times if a housing unit is selected but no one answers the door. If no one answers after the third visit, the households should be substituted with the next randomly selected household.
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 (non-response)].

Non-response is adjusted for in the data analysis process through weighting. If less than 168 households are interviewed, the data is analyzed and reported; however, population estimates will not be calculated. Discussion will be provided about the potential differences between responding and non-responding households.

B.4 Tests of Procedures or Methods to be Undertaken

Questionnaires (Attachment C) are developed in collaboration with the organization or agency conducting or requesting assistance with a CASPER. Especially concerning CASPERs conducted during an emergency response, questionnaires are often changed right up to the moment before their use to accommodate the rapidly changing situation and need for information.

Prior to this request, CASPERs were covered under the OMB-approved Emergency Epidemic Investigations ICR (OMB No. 0920-0008; expiration 7/31/2014). The tremendous experience with past CASPERs has provided opportunity for CDC to use and refine CASPER methodologies and procedures. For example, standard questions that have performed well in past CASPERs are retained and used when creating new CASPER questionnaires.

B.5 Individuals Consulted on Statistical Aspects and Individuals Collecting and/or Analyzing Data

People who are consulted on methodology and design
- Josephine Malilay, CDC/ONDIEH/NCEH/EHHE, 770-488-3465, jym7@cdc.gov
- Sara Vagi, CDC/OPHPR/DSLR, 404-639-0879, hgq2@cdc.gov
- Dana Flanders, Emory University and CDC/ONDIEH/NCEH/EHHE, 770-488-3472, wdf1@cdc.gov

People who design the data collection
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- Amy Schnall, CDC/ONDIEH/NCEH/EHHE/HSB, 770-488-3422, ghu5@cdc.gov
- Rebecca Noe, CDC/ONDIEH/NCEH/EHHE/HSB, 770-488-3437, rhn9@cdc.gov
- Sherry Burrer, CDC/ONDIEH/NCEH/EHHE/HSB, 770-488-3412, hhf8@cdc.gov

People who collect the data

- The people that collect the data differ for each individual CASPER, and may include, but are not limited to the following: state, local, territorial, or tribal health departments.
- Occasionally, CDC EIS Officers or people from the group who designed the data collection will also participate in data collection

People who will analyze the data
- Amy Wolkin, CDC/ONDIEH/NCEH/EHHE/HSB, 770-488-3402, ajf9@cdc.gov
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- May also include a CDC EIS Officer; a person from a state; local, territorial, or tribal health department; or one of the people above who were consulted on the methodology and design of the CASPER