National Network of Public Health Institutes

CASPER Method for Primary Data Collection in Community Health Assessments:

A North Carolina Case Study

Mathew Simon and Kasey Decosimo, North Carolina Institute for Public Health at the University of North Carolina, Gillings School of Global Public Health and Melissa Schigoda, National Network of Public Health Institutes

Introduction

The National Network of Public Health Institutes (NNPHI) and its member public health institutes are engaged in numerous community health improvement initiatives with a broad range of partners, including public health departments, hospitals, and community-based organizations. As neutral conveners with expertise in facilitation, data collection and analysis, and partner/community engagement, public health institutes provide support to a range of organizations in their collaborative community health improvement efforts.

In support of this work, NNPHI and its members co-created a Community Health Improvement Work Group that focuses on building and sustaining capacity among institutes to support community health improvement efforts, as well as marketing and promoting the services they offer to health departments, hospitals and other community partners. The following case study is a part of a series that grew out of the Community Health Improvement Work Group's efforts. The aim is for public health institutes to share their experience in selecting, adapting and employing existing tools and strategies for community health improvement. This case study was presented via a webinar, which was recorded and is available online here.

This case study focuses on the Community Assessment for Public Health Emergency Response (CASPER) method for primary data collection utilized by the North Carolina Institute for Public Health (NCIPH) to inform the public health needs identified in Community Health Assessments (CHAs). This method allows NCIPH to relatively quickly and inexpensively collect household level data that can accurately be generalized to the larger population. NCIPH is also developing a mobile app for collecting the data that decreases the time needed to analyze survey data and the risk of data entry errors, and eliminates the need for highly technical surveyor training or expensive GPS units and ArcGIS software. This mobile app will be available to the public in spring 2015 (See "Mobile App under Development by NCIPH" for more details").

Background

North Carolina has a rich history of community health improvement work dating back to 1974 and CHAs have been required to meet state public health accreditation standards since 2002. Additionally, many public health departments in the state recognize the importance of using a statistically valid method to collect health data due to their participation in the Rapid Response Project.

In 2004 the North Carolina Division of Public Health (NCDPH) implemented the Rapid Response Project "to incorporate geographic information systems (GIS) technology into public health preparedness and response efforts in the state. In 2006-07, seventeen local health departments received funding, training, and GIS equipment with the support of federal preparedness grant funds administered through NCDPH to increase epidemiology capacity by allowing for the spatial analysis and centralization of public health data."[1] NCDPH developed GIS sampling tools and distributed the software along with handheld Global Positioning System (GPS) units to seven public health preparedness regions throughout the state. They also trained all regional staff on how to implement a rapid needs assessment data collection method that later came

1. (Horney JA, Ramsey S, Smith M, Johnson M, MacDonald PDM. (2011) Implementing mobile geographic information system technology in North Carolina to enhance emergency preparedness: Evaluation of associated trainings and exercises. Journal of Emergency Management. 9(5): 47-55).

to be called CASPER by the Centers for Disease and Control (CDC). Funding for this effort was provided by a Homeland Security Grant, ESRI and Trimble.

While the Rapid Response Project helped health departments recognize the importance of using a statistically valid method to collect health data, the sustainability of the project faced challenges. Without disasters to respond to the skills of the staff members who had been trained through the project began to deteriorate. Also, cuts to national preparedness funds and state budgets greatly reduced the technical assistance available to local health departments. Technical assistance providers routinely received requests for additional assistance that they could not fill. In 2009, NCIPH began to fill this void by offering technical assistance to health departments on GIS and the CASPER method for primary data collection using federal preparedness funds. Since 2010, NCIPH has provided technical assistance related to implementing CASPER on over twenty-four projects in 31 counties. CASPER was used for CHAs rather than emergency response in 17 of those projects opening the gateway for a new CHA data collection option.

CASPER

Community Assessment for Public Health Emergency Response (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."[2] The Centers for Disease Control (CDC) published the first edition of the CASPER Toolkit in 2009 and the second edition in 2012. While it was developed specifically for use in communities affected by disaster, the North Carolina Department of Public Health and Guilford County pioneered the use of CASPER to collect primary data about public health needs as part of a Community Health Assessment, and NCIPH continued this work beginning in 2010. CASPER involves conducting door-to-door surveys or a random sample of households (See "Step. 2 Select the Survey Sample" for details) using a questionnaire (See "Step 1. Develop the Questionnaire" for details).

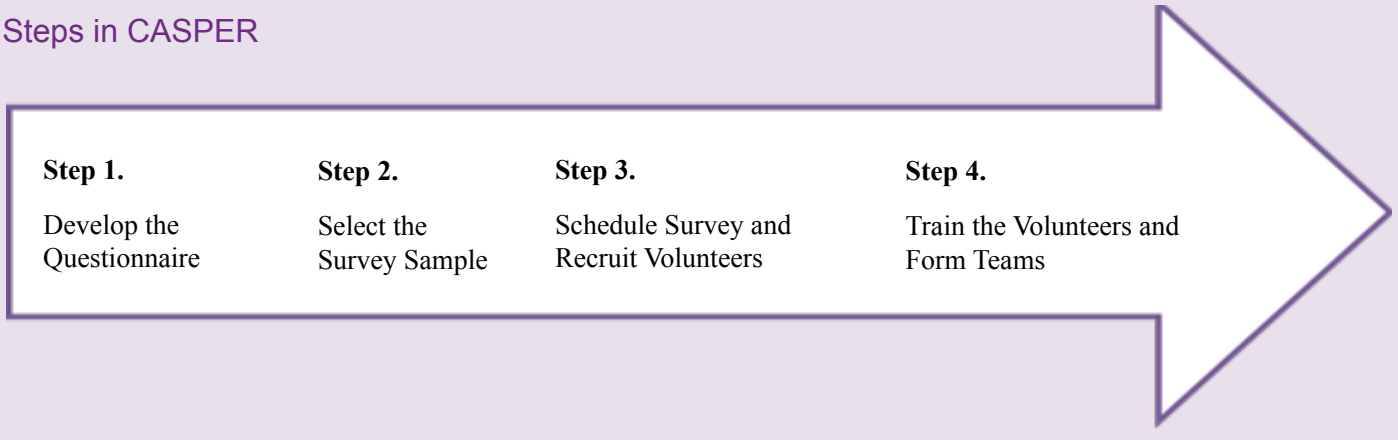
Data Collection Tools: Paper, GPS, and Tablet with Mobile App

There are three main options for data collection tools when conducting a door-to-door survey: 1) paper forms, 2) GPS units and 3) a mobile app on a tablet. When using paper forms, surveyors manually write-out the responses from the person being surveyed on the form and then the information is later entered into a computer. This increases the time needed for data processing and the risk of data entry errors. Using GPS eliminates these concerns, but it can be very expensive. A low-end GPS unit costs a minimum of $1,000. Also, GPS units can require significant technical training. A mobile app on the other hand offers many benefits. The cost for a tablet is only $300 and its more intuitive, touchscreen technology requires minimal training.

Door-to-door surveys can be resource intensive, but have many advantages over other methods. First, they give everyone in the community an equal chance to participate, which means the data is more representative and that results can be generalized to the entire county. Second, door-to-door surveys typically have higher response rates than other types of surveys. The higher rate of participation lowers the likelihood that bias might be introduced into the results. Data gathered through door-to-door surveys is also higher quality and more complete with fewer missing values or skipped questions than data gathered through other methods. This is because administering the questionnaire in person allows trained interviewers the opportunity to answer any questions the person being interviewed may have and provide any necessary clarifications. Lastly, door-to-door surveys increase community awareness about the work the health department and/or hospital is doing, which often helps improve the public image of the organization.

2. http://www.bt.cdc.gov/disasters/surveillance/pdf/casper_toolkit_version_2_0_508_compliant.pdf

Steps in CASPER



Step 1. Develop the Questionnaire

NCIPH provides technical assistance to health departments as they develop the questionnaire with the questions they are hoping to answer about their community health needs. The questions primarily aim to gather county-level information that cannot be obtained from existing sources. For instance, the survey includes questions about community concerns, services needing improvement, health care access and barriers to access, health conditions and behaviors and other topics like emergency preparedness. Deriving questions from the CDC Behavioral Risk Factor Surveillance System (BRFSS) is also advised for those counties where BRFSS data is not available or not up to date. NCIPH has found that the ideal number of survey questions is fifty or fewer. They aim to keep the interview under twenty minutes to minimize the impact of survey fatigue, which occurs when participants start to lose interest, causing the quality of their responses to decline. The North Carolina Department of Public Health has a template for a community health opinion survey for those interested in conducting a CHA (See "Example Documents and Other Resources").

Step 2. Select the Survey Sample

The sample of households used in the CASPER method is a "two-stage cluster sample." Cluster sampling involves dividing the specific population of interest into geographically distinct groups or clusters, such as neighborhoods or families. Because the information is readily available in the United States, many people use census blocks or block groups for their clusters. In the first stage, a random sample of clusters (census blocks or block groups) are selected from within the county with a probability proportionate to population size. Then, in the second stage, a random sample of households are selected from each cluster to be surveyed. A typical two-stage cluster sample will include 30 clusters with 7 households selected from each for a total of 210 households. In rural areas, NCIPH recommends 40 clusters with 5 households selected from each for a total of 200 households. This sampling method has been validated in peer reviewed journals for rapid health needs assessments and estimation of population-level public health needs. Peer reviewed literature has shown that this method can produce valid and precise estimates that are generalizable to the entire county.

Two-stage cluster sampling offers several advantages over stratified sampling (where the population is divided into distinct groups based on demographic indicators, such as race or ethnicity, and then random samples are obtained from each group) and simple random sampling (where a random selection of individuals are selected from the overall population). By staging selection in two steps first by specific geographic areas, two-stage cluster sampling reduces travel and administrative costs by focusing surveys within clusters rather than having them spread out all over the county. A simple random sample would also require a list of every single adult in the entire county, which can be difficult to obtain. To achieve similar results to a two-stage cluster sample, a convenience sample obtained at a health fair or other central location like a shopping center would need to include at least twice as many surveys as the two-stage cluster sample, and even then it might not be generalizable to the entire county. The key limitation to convenience sampling is a bias where the sample is not representative of the entire population and you would not be able to generalize the results to the county population.

Mobile App under Development by NCIPH

Because of the many advantages to using a mobile app for data collection (See "Data Collection Tools" for more details), NCIPH searched for a pre-existing app that would work well for the CASPER process, but found none. While there are a lot of apps already on the market for data collection, none would allow them to use their own spatial data without cost-prohibitive licensing requirements, so NCIPH decided to build their own app and project management tools. Software development is still underway and being improved based on the results of pilot testing and user feedback.

The next version of the app will be released along with an accompanying training series in the spring of 2015. After completing the training series, people will be able to download the app and register to use it.

The spring 2015 version of the app will include the following features:

- Integration with mobile version of Epi Info that will allow questionnaires to be developed and data to be analyzed in Epi Info on desktop computers.
- Offline mode that will allow full functionality even with low data connectivity
- Navigation to preselected survey sites using Google Maps
- Automatic backup of survey results and syncing with central database in the cloud
- Project Management tools to streamline survey prep and execution including:
    - o Survey site selection feature that will eliminate the need for ArcGIS and GIS expert for identifying random clusters
    - o Real-time map feature that will track and locate teams in the field to monitor progress
    - o Real-time data analysis feature that will allow project managers to analyze results as they are uploaded

Step 3. Schedule Survey and Recruit Volunteers

Depending on your geographic location in the country, NCIPH recommends scheduling the survey between March-October, to avoid inclement weather, and including at least three hours for volunteer training before beginning the survey. NCIPH asks health departments to recruit their own volunteers to conduct the door-to-door survey but NCIPH also recruits graduate students from the School of Public Health. The survey requires 20-30 volunteers divided into 10-15 teams of two for three to four days of surveying. The exact number of teams necessary depends on the amount of time in the field and may be dependent on the amount of supplies and equipment available.

Recruiting volunteers can be one of the biggest challenges in this process; NCIPH recommends using incentives like gift cards if possible. It is also helpful to provide food for the volunteers and reimburse for gas mileage. Finally, it is a nice gesture to formally recognize their support in the CHA report or at a public meeting.

There are a number of places you can go to recruit volunteer surveyors. College students at local universities and military recruits at local military bases may be required to do community service. Local Community Emergency Response Teams, the United Way, churches and other community groups can all be good sources of volunteers as well.

Step 4. Train Volunteers and Form Teams

The training your volunteer surveyors is critical to the success of the project. There is a significant learning curve for surveyors, so ask them to commit to at least two days to surveying. Schedule enough time for a 2-3 hour just-in-time training the first day of the survey that covers field safety, interview techniques and sampling methods in the field while giving volunteers time to practice by interviewing each other using the questionnaire.

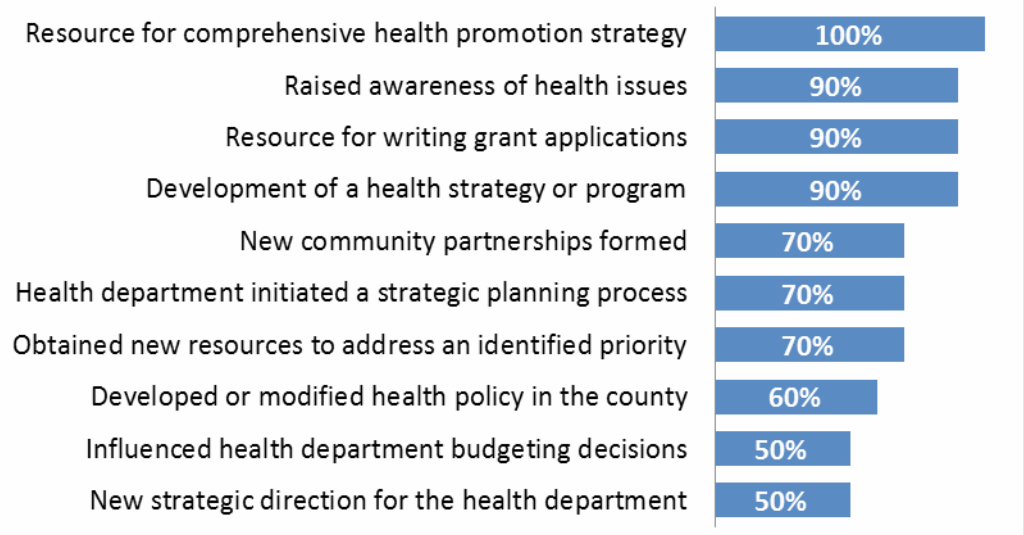
Word Cloud of Prevalent Health Priorities

Pairing your volunteer surveyors into strong teams is also vital for success. Pairing two students together who are shy or pairing two out-of-towners together is not recommended. Always include a local on a team if possible. NCIPH has found that that a county health education staff member or someone who has experience with home visits and a student who is good with technology often make a good team. To increase your response rates, make teams that are diverse in terms of race, ethnicity, age, gender, etc. Avoid sending three people on a team as it can be intimidating for respondents.

Results

Once the data has been collected, an epidemiologist or graduate student who is knowledgeable of statistical methods conducts a basic weighted frequency analysis of the data and reports on the results. The data collected in the field are then used by the CHA team, along with a variety of secondary data and sometimes other sources of primary data (like interviews or focus groups), to determine health priorities for the community. The most prevalent health priorities in the community health assessments that NCIPH has provided technical assistance for include obesity, cancer, chronic disease and diabetes.

Impact of the Community Health Assessment Findings



In the spring of 2014, NCPHI followed up with ten of the health departments that they had worked with on door-to-door, Community Health Opinion Surveys to explore the impact of this work. Health departments were asked: "To what extent do you think the CHA has impacted your health department and the community?" All of the health departments said that the CHA was a resource for development of a comprehensive health promotion strategy. Ninety percent said that the CHA impacted the development of a health strategy or program, was a resource for writing grant applications and raised awareness of health issues. Seventy percent said that the CHA was used to obtain new resources to address an identified priority, contributed to the health department initiating a strategic planning process and contributed to the formation of a new community partnership. Sixty percent said that the CHA impacted the development or modification of a health policy in the county, and fifty percent said that the CHA led to a new strategic priority for the health department and influenced department budgeting decisions.

Cost

NCIPH typically charges $12,000-$15,000 for technical assistance, training, data analysis and reporting for the door-to-door, Community Health Opinion Survey. This includes sample development, map production, spatial data preparation, coding the questionnaire in Epi Info, just-in-time training for volunteer surveyors, managing data collection efforts, data analysis and reporting. The health department or hospital is responsible for recruiting volunteers, travel costs for volunteers and lunch and/or breakfast for volunteers. For a full service CHA that includes primary and secondary data collection, steering committee facilitation, community forums and report writing, NCIPH typically charges $60,000-$90,000.

Toolkits

- CDC Community Assessment for Public Health Emergency Response (CASPER) Toolkit
- Spatial Health Assessment Research Program's (SHARP's) Survey Site Selection Toolkit

Example Documents and Other Resources

- CDC Community Health Assessment and Health Improvement Planning Webpage
- NCDPH Community Health Assessment Resources (includes example questionnaires)
- NCDPH Community Health Assessment Reports (includes latest county assessments from NC)
- 2013 Wake County Community Health Assessment (example assessment that utilized CASPER)
- NCIPH Community Health Assessment Marketing

Trainings

- NCIPH Trainings on Community Assessment
- NCIPH Trainings on GIS

Data Collection and Analysis Software

- Epi Info
- Epi Info Companion for Android
- MagPi

Staff Capacity Utilized

In order to successfully utilize the CASPER method for primary data collection, NCIPH utilizes health department staff as well as students in the following roles:

- **Epidemiologist –** conducts a basic weighted frequency analysis of the data from the survey and reports on the results. This typically takes 80-100 hours. Graduate students can be utilized for this role.
- **GIS Specialist/Cartographer/Demographer** – performs sample selection in ArcGIS, makes field maps to help teams with navigation in the field and acquires Census data from which the sample is selected.
- **Volunteer Recruiter and Coordinator** – recruits, trains and coordinates the volunteer surveyors. A staff person from the local health department usually serves in this role. NCIPH shares expectations and suggestions for managing the process at the outset of the process.
- **Surveyors** – goes door-to-door to administer the survey and answers any questions the respondent may have. The process typically requires at least ten teams of two surveyors for three to four days of surveying. Public Health Nurses make great surveyors. Students or other local volunteers can also be utilized in this role.

Summary of Lessons Learned

1. **Primary data collection takes time.** Set aside at least three to five months for data collection planning, implementing, analysis and reporting. Be sure to start recruiting volunteers as early on in the process as possible.

2. **Significant resources are needed to recruit volunteers.** This is the biggest challenge. Incentives like gift cards can help increase community participation. Also, it helps if you provide food, reimburse for gas mileage and formally recognize their support in the CHA report or at a public meeting.

3. **There are a number of places you can go to recruit volunteers.** College students in the area may need community service to graduate. If there's a military base in the area, they may have new recruits that are required to do community service. You can try reaching out to a local Community Emergency Response Team, the United Way, churches or other community groups.

4. **The quality and training of your volunteer surveyors is critical.** There is a significant learning curve for surveyors, so ask them to commit to at least two days. Schedule enough time for a good 2-3 hour just-in-time training that covers field safety, interview techniques and sampling methods in the field and gives them time to interview each other using the questionnaire.

5. **Forming good teams with your volunteer surveyors is very important as well.** Don't send two students out together who are shy or not confident. Don't pair out-of-towners together. Always include a local on a team. The perfect team is a county health education staff member or someone who has experience with home visits and a student. To help your response rates make teams that are diverse as possible, considering race, ethnicity, gender and age. Avoid sending three people on a team as it can be intimidating for respondents.

6. **The ideal number of survey questions is fifty or fewer.** The goal is to keep the interview to no longer than twenty minutes. Beyond that and you will encounter survey fatigue. Participants might lose interest, not pay attention or start to give you the answers that you want to hear to get you off their porch.

7. **Marketing your institute's community health assessment services can drum up new business.** While NCIPH mostly relies on word of mouth and referrals to expand their business, one year they sent out letters to health directors who had an upcoming CHAs due. As a result, NCIPH was able to help several new health departments with their assessments.

Acknowledgements

Funding for this case study was provided by the Centers for Disease Control and Prevention under Cooperative Agreement Number OT13-1302.

About the North Carolina Institute for Public Health

The North Carolina Institute of Public Health (NCIPH) is part of the University of North Carolina Gillings School of Global Public Health. Since 1999 NCIPH has been the home of public health continuing education for the School. NCIPH assists and partners with others to collaborate on research, evaluation, technical assistance and training projects; connect to public health practice partners; and translate research to practice. NCIPH also publishes and presents scholarly, practice-based work; links students to research projects and practica; and trains the current and future public health workforce. Learn more at sph.unc.edu/nciph.

About the National Network of Public Health Institutes

Created in 2001 as a forum for public health institutes, today the National Network of Public Health Institutes (NNPHI) convenes its members and partners at the local, state, and national levels in efforts to address critical health issues. NNPHI's mission is to support national public health system initiatives and strengthen public health institutes to promote multi-sector activities resulting in measurable improvements of public health structures, systems, and outcomes. Learn more at www.nnphi.org.