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Detecting Change in Community Traffic Safety Attitudes

In keeping with its mission, the National Highway Traffic Safety Administration assists traffic safety professionals who develop, implement, and evaluate traffic safety programs. NHTSA recently released a report that provides information about methods for collecting traffic safety attitudes in communities. Historically, evaluations of community traffic safety programs have collected data from a subset of a population using nonprobability intercept surveys, usually at Department of Motor Vehicle (DMV) offices, rather than more rigorous probability surveys. While probability sampling is often preferable, it is not always feasible to use when collecting data from communities. Thus, evaluators of community traffic safety programs could benefit from statistically sound practices for using nonprobability sampling methods and secondary data sources. The report may serve as a tool to build on basic knowledge of evaluators who have taken courses in basic statistics. This information may be particularly useful in evaluations of traffic safety programs where one wants to evaluate whether a program changed community members' attitudes or awareness. The report details methods for improving the quality of survey data using nonprobability sampling techniques and secondary data sources.

Sampling From a Population

Sampling is the process of selecting people from a population of interest, whether at the community, State, or national level. Populations of interest may be broad, such as all adults, or may be specific, such as caregivers who transport children at least once a week. Ideally, the method of sampling allows researchers to generalize the results of their study back to the population. Because attitudes are frequently related to demographic characteristics, a sample should reflect the population by having the same characteristics as the population, such as having the same proportions by sex, age, race, and ethnicity.

Probability sampling refers to an approach whereby all members of the population have a known and non-zero chance of being selected into the survey. Probability sampling best allows survey results to be generalized to the larger population. For example, address-based sampling is a probability sampling approach that involves a random sample of addresses from a U.S. Postal Service list of all known addresses. As such, everyone living in a home that receives mail has a chance of being selected.

Most evaluations of community traffic safety programs have used nonprobability sampling. Often, data collection involves the use of intercept surveys, where interviewers approach potential participants as they pass by in a public place (like a shopping mall or a DMV). In general, the results from nonprobability sampling methods are more biased and less precise than probability sampling methods; generalizing from these methods of sampling is challenging. As the goal of most surveys is to generalize the results, nonprobability sampling should generally be avoided. However, nonprobability sampling methods are frequently used over probability sampling to lower cost, obtain responses faster, or target hard-to-reach populations.

The report presents two nonprobability sampling methodology plans: opt-in online panel surveys with quota sampling and intercept surveys with quota sampling. Each nonprobability methodology plan provides thorough description of the sampling method, factors to consider when assessing the appropriateness of the approach, breakdown of the steps involved in conducting a study using the sampling approach, and a comparison of the nonprobability sampling method with a probability-based approach (address-based sampling). Table 1 below provides a summary of factors to consider when assessing the appropriateness.

Opt-In Online Panels With Quota Sampling

Opt-in online panel surveys, also referred to as volunteer web panel surveys, typically recruit participants through web advertisements or email invitations. Some of these panels are quite large claiming more than a million participants. However, many participants may be inactive, and there may not be sufficient panelists for any given community. Quota sampling can be combined with an opt-in online panel survey to make the sample characteristics closely match those of the population and to improve the generalizability of the results. Researchers start by dividing a population into groups based on known characteristics of the population, such as race or age. Samples are taken from each group to meet a quota that is often determined using U.S. Census data. For example, if the community's driving population is 55% female and 45% male, researchers would sample from male and female drivers until a sample of 100 drivers would have 55 female drivers and 45 male drivers. This technique ideally produces a sample of people with proportions like those of the broader population.

Table 1: Factors to Consider When Assessing the Suitability of Each Sampling Approach

	Opt-in Online Panel Survey With Quota Sampling	Intercept Survey With Quota Sampling
Target Population	General population, subset of population, or a hard-to-reach population	General population
Study Area Size	Medium or large (e.g., large population counties)	Small (e.g., cities or small population counties)
Cost	Low	Cost can vary
Fielding Period	Fast	Fielding period can vary
Flexibility of Data Collection Mode	Web is the primary data collection mode	Surveys can be administered onsite or self-administered

Intercept Surveys With Quota Sampling

An intercept survey can be conducted through a variety of modes (e.g., paper, tablet or laptop, face-to-face) and is appropriate for collecting survey responses from the general population when the population size of a local area is small. Ideally the intercept survey is administered at a substantial number of diverse sites randomly selected from a larger list of possible sites. Like opt-in online panels, intercept surveys can employ quota sampling to obtain a pre-determined number of participants from each group.

Secondary Source Data

In cases where researchers cannot collect primary data to evaluate programs, there are many options for secondary data collected by government agencies and private organizations that can be useful for evaluation. Federal data, for example, is a very broad category that includes NHTSA data sets such as the Fatality Analysis and Reporting System (FARS) and the National Emergency Medical Services Information System (NEMSIS) but also information from other parts of the federal government such as the U.S. Census Bureau. Table 2 lists advantages and disadvantages of three types of sources.

Conclusion

While primary data collected via probability sampling is ideal, it is not always feasible. Using one of the approaches described here could increase the rigor of community traffic safety program evaluation. As discussed in *The Art of Appropriate Evaluation: A Guide for Highway Safety Program Managers* (2008), investing in a quality evaluation can save time and dollars over the long haul identifying where to focus resources. In addition, reporting and sharing the results can benefit the broader traffic safety community.

Table 2. Sources for Secondary Data

Advantages	Limitations
Federal Data	
• Publicly and freely available • Can also be analyzed at the county level where the population is large enough and data is available	• Individual-level data may not always be available at the desired geographic level • Depending upon source, data may not be complete
Highway Safety Plans	
• Data may directly correspond to the specific research questions that local traffic officials have • Certain measures, (e.g., crash rates and attitudes) are reported over time	• Data collection and quality vary widely by State • Types of analyses that can be conducted with the data will depend on the type of data
Vision Zero Action Plans	
• Results can be easily accessed online • Can provide city or county level data • Interactive maps may be publicly available and online as well	• Little information is available about survey methodology • Surveys can suffer from selection bias from sampling method

See the Report:

Fors Marsh Group. (in press). *Detecting change in community traffic safety attitudes* (Report No. DOT HS 813 242). National Highway Traffic Safety Administration.

Suggested Reading:

Pullen-Seufert, N. C., & Hall, W. L. (2008, December). *The art of appropriate evaluation: A guide for highway safety program managers* (Report No. DOT HS 811 061). National Highway Traffic Safety Administration. https://rosap.ntl.bts.gov/view/dot/1864

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