Conducting Surveys When Disasters Strike

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Abstract

Catastrophic events, whether natural disasters or human activities with tragic impact on societal affairs, disrupt the lives of survey participants and alter the plans of agencies conducting surveys. The effects on surveys can range from cancellations to redesigns to the initiation of new survey research. This paper provides an overview of the effects of disasters on surveys, illustrated with examples from NORC's experience.

1. Introduction

Webster's New World Dictionary defines "Disaster" as "any happening that causes great harm or damage; serious or sudden misfortune; calamity." The entry goes on to say that a disaster implies a loss of life or property, or that is ruinous to an undertaking. In this session we review some types of disaster as they affect the survey community. There are two types of responses that we will discuss. First, disasters affect surveys in progress, and the survey community must adapt to carry out its mission. Second, and perhaps more importantly, the survey community has tools to aid in understanding the seriousness of the disaster and in developing research support to assist the victims of current and future disasters. This paper gives an overview of these topics, highlighted with examples from the experience of the National Opinion Research Center (NORC). The other papers in this session provide more detailed discussions of specific applications resulting from specific disasters to illustrate the impact disasters have on survey research and the impact survey statisticians can have on the world.

Section II of this paper lists various types and causes of disasters. The overview is by no means complete. Section III discusses some of the ways disasters affect ongoing surveys, and how the survey community copes. Section IV discusses ways in which the survey community can respond to the disaster itself and its recovery efforts.

2. Types of Disasters

The news media are full of disaster stories. Many disasters are caused by natural phenomena. Such disasters include those in the following list, with specific examples in parentheses.

- Hurricanes (Katrina, 2005)
- Tsunamis (December, 2004)
- Floods (Northeast, 2006; Mississippi River, 2001)
- Earthquakes (Pakistan, 2005; San Francisco, 1906)
- Fires (Chicago, 1873; San Francisco, 1906; Southern California, 2003)
- Blizzards (Buffalo, 1977)
- Tornadoes (Xenia, Ohio, 1974)
- Volcanoes (Mt. St. Helen's, 1980)
- Drought/Famine (Dust Bowl, 1930s; East Africa in recent decades)
- Disease (Ebola, 1996; HIV/AIDS in recent years)

Some of these phenomena cause widespread damage and loss of life. Some are often more localized, and the impact may be of short duration. For some, such as blizzards, disaster status may depend on whether it occurs in an area that is equipped to handle it. Certainly these natural phenomena can qualify as disasters in some instances.

Many disasters have direct human causes:

- War
- Terrorism (9/11)
- Genocide (Rwanda, 1994)
- Riots (Los Angeles, 1992)
- Assassinations (Kennedy, 1963; King, 1968; Ferdinand, 1914)
- Sanctions
- Errors (Chicago freight tunnel flood, 1992)

Most would agree that war has disastrous consequences to many peoples and undertakings. Terrorism and genocide are considered disasters to many cultures, but, alas, not necessarily to the perpetrators. Assassinations are limited loss of

life, but the results can be very disruptive to a country's or a group's undertakings. In spite of noble intentions at times, sanctions and the resulting economic hardships could conceivably be considered disasters, as could budget cuts that disrupt critical programs. As man's technological capacity increases, so does the potential for disastrous human error.

Sometimes a combination of factors causes disasters, or the cause may not be obvious, as is often the case in accidents. Failure to plan is often a contributing factor in these types of disasters.

- Accidents (AA flight 191, 1979)
- Utility failures (NE blackout, 2003; Chernobyl, 1986)

3. Effects on Ongoing Surveys

Disasters can affect any of a number of survey components. First and foremost, disasters affect the survey respondents. The survey unit may be persons, households, buildings, establishments, enterprises, or specific types of institutions such as schools or hospitals. The respondents and survey units can be impacted in a variety of ways, all of which affect response rates and eligibility rates.

- Casualties (dead, injured, sick, out of business, destroyed)
- Movers (refugees, homeless, transfers)
- Loss of cooperation (fearful, preoccupied)
- Inaccessible (under water, closed roads, cordoned off, curfew area)
- Failure of necessary technology/utility (phone service, power)

These same issues affect interviewers. For example, the events of 9/11 caused tension in our telephone centers, which were far removed from the attacks. Some of our Muslim interviewers actually received threats. Even if interviewers are not directly affected, they often do not want to disturb people who are hurting. Because the field interviewers are so dispersed, many U.S. disasters personally affect an interviewer somewhere, even if the rest of the company is safe.

These same factors also impact other employees in the home office. Survey operations may also suffer losses of inanimate survey components:

- Completed questionnaires/paper materials (lost, stuck, moldy, burnt)
- Lab specimens (lost, contaminated, ruined)
- Electronic media

There are a number of specific actions a survey organization can take when an ongoing survey is impacted by a disaster.

- Cancel the study
- Postpone the study or portions of data collection
- Redefine the target population or the scope of the project
- Revise the approach and follow-up
- Revise the materials
- Change mode of data collection
- Outsource specific tasks
- Increase locating efforts
- Use proxy respondents
- Impute missing data
- Reweight
- Revise the estimator
- Develop methods/comment codes for atypical observations

The Wolter and Singleton paper in this session describes a specific study, the National Immunization Survey, and NORC's management of the survey following hurricanes Katrina and Rita. A number of other papers at these meetings also discuss specific actions taken on specific studies following Katrina. The remainder of this section describes other ways in which NORC has dealt with specific disasters affecting ongoing surveys, with a special emphasis on data collection.

The biggest impacts to field work happened as a result of hurricanes Katrina and Rita, from multiple perspectives: the impact on the respondents, the impact on our employees, and the impact to the surveys. The issues were similar across projects. Interviewers and respondents were either directly affected by the hurricane damage or had friends and relatives who were, so they had personal issues to contend with before any thought could be given to a survey. Transportation into the affected areas was non-existent. Hotels were booked for the local evacuees and not available for interviewers.

Higher gas costs hit the survey budgets. Communication was very difficult since only cell service was working, but interviewers had difficulty finding places to charge their phones. A small number of respondent fees, laptops, and other project equipment were lost.

Following Katrina, our initial concern was for our employees, to make sure they were safe. We were cautious about resuming data collection activities in the affected areas, with the safety of our employees as a foremost consideration. Information was sketchy, but we tried to learn as much as possible to maintain a balance of safety while collecting quality data.

The National Social Health and Aging Project (NSHAP) was being conducted in the field at that time. We initially had three interviewers working this project in New Orleans, but two of our interviewers' homes were completely destroyed. After we were assured of their safety, they were evacuated to the Atlanta area, where they performed other work for NORC. One interviewer, who was able to begin work in New Orleans after dealing with her personal situation, began to check out areas that might be accessible. She turned out to be our New Orleans star, showing special empathy for the respondents. Since her project offered a $100 respondent fee, she was also able to help the respondents financially. Over the course of the project, she did all the remaining accessible cases in that area because we could not get other interviewers in to help.

The NSHAP interviewers were required to collect biomarkers as part of the interview. They had strict requirements to store collected biomarkers in refrigerators or freezers until specific days of the month, and then ship them to the respective laboratories. The saliva samples, in particular, needed to be shipped frozen. Power outages and the inability to ship packages caused us to lose some of the biomarkers.

Later that fall, as we monitored various recovery activities, we learned that many sample persons had relocated and had filed forwarding addresses through the national postal service database. We sent the respondents a soft letter showing concern for their well-being, explaining that they could call an 800 number and we would interview them wherever they might have relocated in the US.

A number of our interviewers for the Residential Energy Consumption Survey (RECS) were in training in Chicago when Katrina hit. We helped those who could not return home to find places to stay, often with relatives in other parts of the country. The redirected interviewers were able to work in their new areas. As the areas closer to New Orleans opened, we assessed the situation and gradually worked them back to interview. The RECS project required interviewers to measure the outside of the respondents' houses, which created other logistical and safety issues. On the design and estimation side of RECS, we worked with the client to salvage as many primary sampling units as possible, reweighting as necessary, to estimate all the strata.

In general, NORC's field managers try to frontload data collection before the hurricane season arrives, but that is not always possible on all studies. Since the season is so long, we always run the risk of one area or another getting hit. The National Longitudinal Study of Youth, for example, constantly adjusts its data collection schedule on the Atlantic and Gulf coasts to minimize hurricane disruptions. We have learned to give affected field interviewers and respondents time to recover before returning to interview.

The events of September 11, 2001, had the most profound emotional impact on our field interviewers. This compelling description came from one of NORC's field managers:

> "The biggest impact on me as a Field Project Manager was the attack on the World Trade Center. I was supervising the New York City area at the time for the SCF [Survey of Consumer Finances] project. Everything came to a screeching halt for a respectable period, but we immediately jumped into action with plans to adjust to the circumstances. Individual calls were held with the field managers and field interviewers in that area to assess their mental and physical well-being, and then group calls were held to allow interviewers and managers to vent their feelings about going out in the field again after such a traumatic event. Both Central Office staff and the field worked with the client to develop a new letter to respondents addressing the situation in a "soft" fashion,

> empathizing with the crisis situation in [New York City], but stating the importance of continuing research and life as we knew it from that point in time. Fed-Ex was used as much as possible. Because many of our respondents were in the high income status, we had to work around the fact that some of their businesses had just been wiped out or affected greatly. Others had lost loved ones. I got on the phone myself to call respondents and explain the importance of their participation despite the recent events and to show respect for their own personal situation. We used our best and brightest conversion personnel to handle the remaining sample, and training sessions were held with them in regard to the best practices to use in regard to communication with [New York] respondents."

While we faced tremendous challenges in finding respondents and overcoming the mental trauma of 9/11, we found that there was a window of time in which we had a new kind of cooperation based on patriotism. While not trying to shamelessly take advantage of that spirit, we did use it to reemphasize the importance of research in our American society. Each and every opinion is important in a democratic society, just as the right to vote is important. Our staff rose to the occasion, and we came out with an even better response rate than we had expected.

Following the anthrax attacks in 2001, we conducted extensive educational training in our mail center for dealing with anthrax, as a precaution. The anthrax attacks occurred while we were collecting data for the Racial and Ethnic Approaches to Community Health study. The advance letter stating that we were calling on behalf of the Centers for Disease Control and Prevention and wanted to discuss disease problems in their community had to be rewritten to avoid scaring people unnecessarily.

This year the National Longitudinal Study of Youth and General Social Survey were mildly affected by the floods in the eastern U.S. Transportation was limited in some areas, so the emphasis was shifted to phone data collection. (These surveys use both modes in the field.) Microsoft Streets and Trips helped interviewers find alternate routes and directions around flooded areas. However, respondents were somewhat consumed with dealing with the flood and not interested in participation at that time.

In 2003, a wildfire devastated parts of three large counties in southern California: San Diego, Los Angeles, and San Bernardino. Even interviewers who were not evacuated could not go outside because the air was so bad. Data collection in that area was postponed, and eventually interviewers from other areas were brought in to help make up for lost time.

Blizzards can actually help us find people at home. Respondents are usually more willing to participate when they are homebound. Even if face-to-face interviewing is required, a blizzard can often be a good time to call respondents and make appointments.

When NORC developed a small area estimation software system for the Illinois Department of Employment Security, we found that the comment codes used by the agency in collecting data for the Current Employment Statistics survey could be used to programmatically determine how atypical sample data should be handled for the local estimates. In Illinois, it is generally the case that a fire affects one sample establishment and not other population establishments, so the sample unit coded as "fire" is treated as a certainty unit with a weight of one. On the other hand, establishments affected by the Mississippi River flood of 2001 were atypical of their recent history, but typical of other establishments in the area at that time and allowed to remain in the sample without change in value or weight.

Power failures have disrupted operations in our telephone centers and central offices, for up to 3 days at a time. We were evacuated from our Chicago Loop office on 9/11 and during the Chicago underground flood of 1992. Fortunately, we were able to recover from these incidents without major cost implications for our customers.

4. Responses for Disaster Recovery

Statisticians and the survey community are uniquely equipped to aid in disaster research and recovery in specialized ways. Our research skills can have an immediate impact by:

- Measuring and monitoring the affected populations
- Investigating causes
- Monitoring public opinion
- Evaluating recovery efforts
- Managing data for service providers and others in authority

Fritz Scheuren, an NORC colleague, has personally and voluntarily been involved in measuring the extent and specific causes of genocidal activity in Bosnia and other troubled areas. The Silva and Ball paper in this session describes activities of this sort. The American Statistical Association Committee on Scientific Freedom and Human Rights provides an opportunity for statisticians to get involved in this type of volunteer work.

In NORC's early years, the Roosevelt administration hired NORC to monitor morale on the homefront during World War II. NORC is certainly not unique in having monitored public opinion on issues with disruptive impact.

The Plyer paper in this session, while not strictly survey in nature, illustrates another approach for using our statistical skills in managing data to aid in the recovery in New Orleans from hurricane Katrina.

In the longer term, disaster research can aid policy-makers in planning for future disasters and their impacts on physical and emotional health, infrastructures, institutions, and the economy. Disaster research is a specialty area unto itself. The National Science Foundation and National Institute of Mental Health, among others, have sponsored new research projects to help understand how people react to surveys, how people cope, how disease problems evolve from disasters, and how victims can better be served. David Banks discusses one such post-Katrina project at a roundtable luncheon at these meetings. Some statisticians and epidemiologists have made disaster research, or subsets such as human rights research, their specialty.

NORC first conducted its first National Tragedy Survey following the assassination of President Kennedy in 1963. NORC conducted a second National Tragedy Survey following 9/11. The main purpose of the studies was to investigate the psychological impact of the incidents on the U.S. public. In both cases, the data were collected very rapidly after the event, often using NORC employees in non-traditional roles, to capture the immediacy of the reactions.

If the previous sections stimulated your compassion for disaster victims and your creativity for managing around disasters, this section is intended to channel your compassion and creativity and to spur your spirit of volunteerism. We can make a difference in our uncertain world.