THE NATIONAL CENTER FOR HEALTH STATISTICS LINKED TELEPHONE SURVEY:
A POTENTIAL HEALTH DATA SOURCE

Cecelia B. Snowden, National Center for Health Statistics

Introduction

In July, 1956, legislation was enacted authorizing the U. S. Public Health Service to conduct continuing surveys of illness and disability in the U. S. The National Health Interview Survey (NHIS), the first of the series of data collection systems organized to implement the legislation, was planned during the fall and winter of that year. Many studies have been undertaken to evaluate its efficiency and new designs have been implemented. One distinct feature of the latest (1985) redesign was the conversion from a list/area frame to a geographical based area frame. Unlike the old combined list/area frame, the construction of the NHIS area frame does not depend on personal identifier information collected during the decennial census. Thus, the new design is not subject to the Census Bureau's confidentiality restrictions.

The Center's current data systems are designed to produce general purpose health statistics. The Center's principal means of obtaining special purpose data is through supplements to the NHIS. Typically a gap of three to four years occurs between the time a special data need is identified and the date that the NHIS supplement is ready for analysis. Other Center population-based surveys, including the National Survey of Family Growth, the National Medical Utilization and Expenditures Survey and the National Health and Nutrition Examination Survey, are conducted at even longer intervals. The NHIS, the larger of the four population based surveys is a multistage design with continuous sampling of the civilian noninstitutionalized population of the United States. The frame contains 198 primary sampling units (PSU's) consisting of a county, small groups of contiguous counties or standard statistical areas. Within PSU's are segments that contain an expected eight households (total of approximately 46,000 households). Each weekly sample that represents the civilian noninstitutionalized population is additive over time.

Sirken (1983) presented the background for a series of projects planned to evaluate the NCHS population-based surveys. These projects will evaluate the practical feasibility of alternative strategies for integrating current separate survey designs for NCHS population-based surveys in such a way that the NHIS would serve as a sampling frame for the other surveys. In addition to linking the four established surveys, public health issues arise for which current statistical data are needed in a relatively short period of time. Examples of issues for which health data are needed quickly include the following:

- Assessment of new health products and technologies, such as the insulin pump and heart bypass surgery;

- The effect of health legislation or health programs on health practices or access to health care;

- The effects on health of external factors, such as unemployment due to economic recession or climate;

- Sudden changes in health program priorities, such as flu epidemics, AIDS, and Legionnaire's Disease;

- Emergence of new information on side effects of environmental contaminants, such as leaded gasoline; recently banned or controversial drugs, such as Oraflex; or other health-related substances, such as liquid protein diets.

Linking a telephone survey to the NHIS sample population using data already collected presents the Center with a means for targeting surveys to such specific health issues and/or specific population subgroups. This paper discusses a telephone survey linked (LTS) to the NHIS. The goal of this particular study is to evaluate the potential for using the NHIS respondents as a sampling frame for issues requiring a short survey turnaround time.

The LTS offers the ability to conduct independent studies at a lower cost than face-to-face interview surveys as well as some advantages over Random Digit Dial (RDD) telephone surveys (Figure 1). The data collected in the face-to-face NHIS interview can be used to oversample subdomains, screen for special populations, and check for data consistency. In a linked telephone survey, non-respondents' characteristics are also known which allow for adjustments to reduce bias and increase reliability (Figure 2). Other advantages include a benefit from high NHIS response rate, shared cost of surveys, elimination of screening cost for businesses and special places, the potential to extend the frame to non-telephone households and the use of information on next-of-kin already collected.

Study Design and Procedures

The study is designed for testing and measuring specific methodological techniques for improving the quality and timeliness of the data, estimation procedures for producing national estimates for the United States from LTS, along

with procedures for estimating response rates, design effects, statistics of interest and their associated sampling errors for a national LTS. Other issues include adequacy of the sampling frames in terms of coverage and data quality, effects of alternative sampling units on response rates and alternative respondent contact methods, data collection costs and sampling errors. The sampling frame will be constructed from household/person identifier data collected during the regular face-to-face NHIS interview. From this frame two samples of 2000 persons (Sample A)and 1500 families (Sample B) will be selected. A subset of each sample will be contacted in advance by variations of a letter with a subset of each receiving no advance letter. For Sample A, the selected persons will be interviewed with extensive tracking procedures implemented if those persons have moved. Tracking procedures will be implemented if randomly selected persons in Sample B have moved and they will be subsequently interviewed. Sample A will be used to demonstrate the feasibility of using LTS to obtain data about critical health issues that affect individuals in a population subgroup. The Sample B will be used to demonstrate the ability to obtain data for a group such as a family or household. Specifically, this study effort will evaluate the following areas:

Frame deterioration - the amount of migration that can be expected in sample households chosen for telephone follow-up at varying lengths of time after the NHIS interview, including the amount of migration in selected subpopulations and the quality of data already collected.

Timeliness - including the time elapsed between the NHIS interview and LTS interview, the time needed to accumulate the sample at NCHS's central data processing center, the time needed to manually abstract auxiliary information that is not coded onto computer tape, the effect of method of contact (advance letter, no advance letter) on the length of data collection period, the effect of migration on the timeliness of data collection, and the availability of NHIS sampling weights for data analysis. Included also are recommendations for reducing the time component for producing the needed estimates; possible modifications to current NHIS operating procedures to facilitate more rapid LTS data collection such as problems associated with getting data from Census Bureau field offices to Research Triangle Park.

Nonresponse effects - including interview nonresponse or refusal to participate in LTS, breakoffs, nonresponse due to sample persons who are lost to follow-up.

Cost benefits and penalties - the cost of linking LTS to NHIS may vary according to the mode of contact, the choice of sampling frames, the length of time the sample is accumulated, the amount of screening necessary and quality of screening data already collected in NHIS to identify persons in target sample.

Operational features - including difficulties in using the sampling frame, efficient methods of abstracting sampling data, availability of NCHS staff or the feasibility of using contractor's staff to abstract information, delays caused by errors in coding sample selection factors, development of sampling computer programs, questionnaire development, and procedures for tracking persons who have moved.

Sampling errors - including a comparison with expected sampling errors for a RDD survey based on equivalent survey resources.

Improving data quality - although studies have been conducted that do give estimates for respondents and nonrespondents. However, nonresponse evaluation has generally involved the extrapolation from other data sources, specifically studies that give information about nonrespondents' behavior. There are assumptions in applying data from independent sources to make estimates of nonresponse bias. Other methods include adjustment by imputation procedures. LTS is particularly suited to evaluate nonresponse bias and the quality of information from respondents. LTS offers access to health records for both respondents and nonresponse in the LTS from previously collected data. Understanding sources of nonresponse leads to control and reduction, prediction in future surveys and its effects. Methods can be developed that measure the different components of nonsampling errors through a comparison of results already obtained in the face-to-face NHIS interview. Sampling error can be reduced by ratio adjustment using these data also.

References

Bureau of Census and National Center for Health Statistics: The Results of the 1984 NHIS/RDD Feasibility Study: Final Report, February, 1985.

Sirken, M. G. and M. S. Greenberg, "Redesign and Integration of a Population Based Health Survey Program," Contributed Paper 44th Session of the International Statistical Institute, Madrid, Spain, September, 1983.
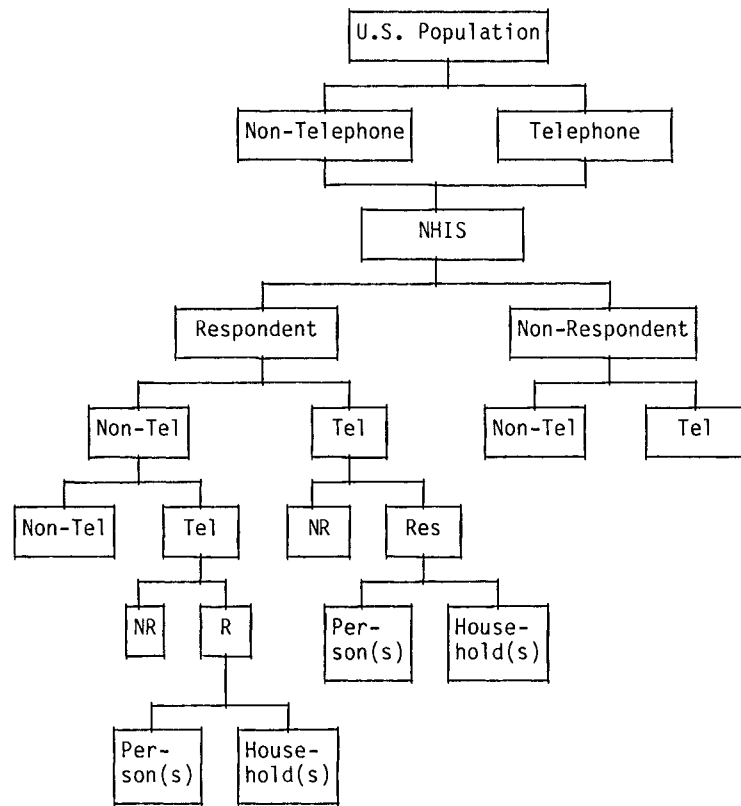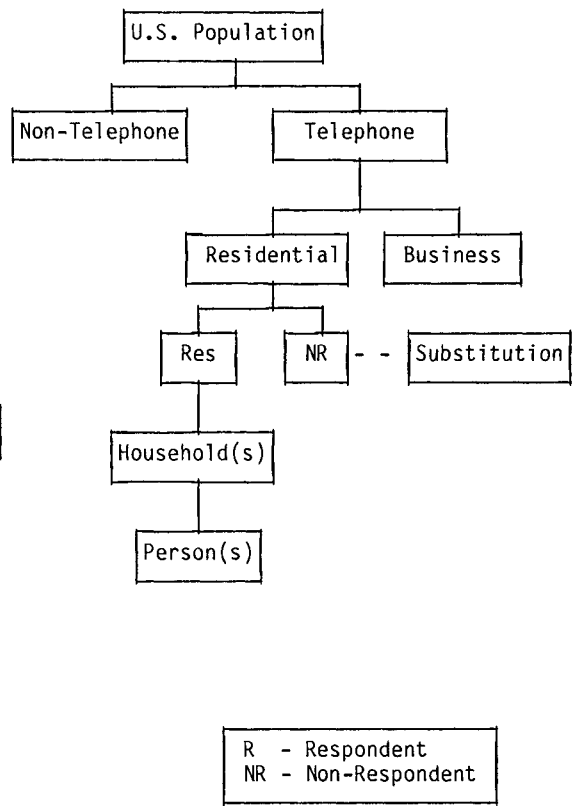
Figure 1
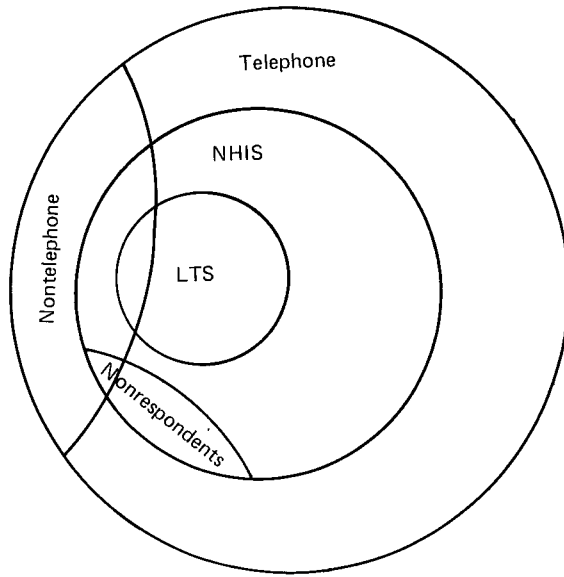
U.S. population
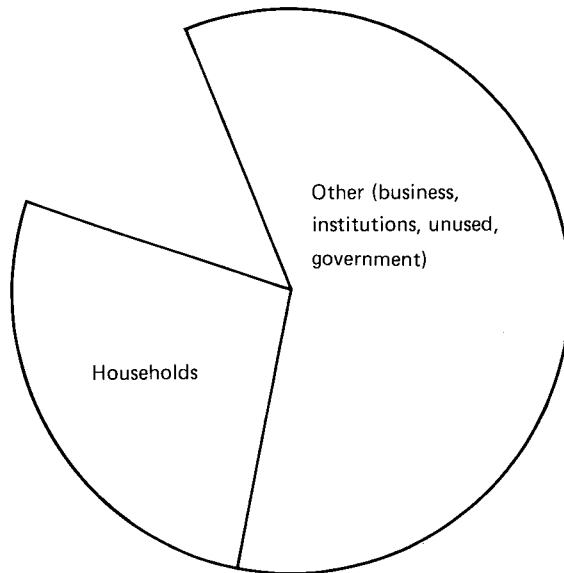
U.S. telephones

FIGURE 2

LINKED TELEPHONE SURVEY

RANDOM DIGIT DIAL

R - Respondent
NR - Non-Respondent