2. OVERVIEW OF THE MCBS SAMPLE DESIGN

2.1   Introduction

The MCBS is a continuous, multipurpose panel survey of Medicare beneficiaries that provides data on access to health care, health status and functioning, usual source of care, satisfaction with health care, health insurance, and health care use and costs. The target population of MCBS consists of aged and disabled beneficiaries residing in the 50 states, the District of Columbia, and Puerto Rico. A panel of beneficiaries is interviewed three times a year. MCBS operates in 4-month rounds. The first MCBS sample was selected in 1991 and consisted of beneficiaries alive and eligible as of January 1, 1991. A total of 15,411 beneficiaries were selected for this sample; and the first MCBS interviews were conducted in the fall of 1991. Each year a supplemental sample is selected to include newly eligible beneficiaries and to account for sample attrition. First interviews for each supplement are conducted in the fall of the year in which the supplement is selected. To date, these supplemental samples are the 1992 panel (Round 4), the 1993 panel (Round 7), the 1994 panel (Round 10), the 1995 panel (Round 13), the 1996 panel (Round 16), the 1997 panel (Round 19), the 1998 panel (Round 22), and the 1999 panel (Round 25). The current MCBS contract covers data collection through Round 37.

2.2   Sample Structure

2.2.1   Overview

The MCBS sample design is a stratified area probability design with three stages of selection. The first stage of sampling consisted of the selection of 107 primary sampling units. The second stage of sampling consisted of selection of ZIP code clusters within each sampled PSU; and the third stage consisted of sampling Medicare beneficiaries within each sampled ZIP cluster. Details of each sampling step are described below.

2.2.2   Primary Sampling Units

Formation of PSUs

PSUs consist of metropolitan sampling areas (MSAs) or clusters of non-metropolitan counties in the 50 states, the District of Columbia, and Puerto Rico. The MCBS sample of PSUs was originally based on the 1980 Westat Master Sample of 100 PSUs. Several modifications were made to the Master Sample to meet HCFA requirements. The primary modifications included the following:

- Addition of Puerto Rico to the sampling frame and sample;

- Modification of sample PSUs to make them correspond to Census PSU definitions; and

- Increase in the number of certainty PSUs.

These modifications are discussed in the paragraphs that follow.

Originally Puerto Rico was not represented in the Westat Master Sample. For the MCBS sample, three Puerto Rico PSUs were brought into the sample according to HCFA requirements (Waksberg 1990). One PSU (San Juan) was made a certainty selection.

Other modifications included adding and deleting PSUs so that the MCBS PSUs would be counted the same way as Census PSUs. Specifically, the sample of 100 PSUs in the Master Sample was expanded to contain 107 PSUs. This revision has involved adding 12 PSUs and deleting five. Details of these procedures are described in Waksberg (1990).

Twelve new certainty PSUs were added to the 1980 Master Sample. For the most part, PSUs were designated as new certainties when they had grown rapidly enough that they were expected to become certainties in the 1990 Master Sample. Orlando, FL, was designated as a certainty because of the large number of retirees in the area. Finally, New Orleans was designated as a certainty because of the difficulty of establishing a stratum of the appropriate size.

Stratification and Sample Selection

The strata were constructed to be internally homogeneous with respect to socioeconomic characteristics and of roughly equal population size. Large metropolitan areas were sampled with certainty, resulting in 33 "certainty" PSUs. From each of the remaining 37 "noncertainty" strata, 2 PSUs were sampled, for a total of 107 PSUs.

PSUs from the noncertainty strata were selected with probability proportionate to the 1980 Census population. Stratification information came from various pre-1980 sources.

2.2.3 Secondary Sample of ZIP Codes

The second sampling stage consists of ZIP code areas within each sampled PSU. To simplify linking with county-level data, sampling units for the second stage consist of ZIP codes areas within a single county. ZIP code areas that cross county borders are split by county into separate units called ZIP fragments. These ZIP fragments are then combined with other ZIP codes into clusters in such a way that a reasonable number of Medicare beneficiaries are achieved for each cluster. Each year, the set of sampled ZIP clusters is supplemented to include newly created ZIP code areas.

For sampling new ZIP codes, HCFA provides a file of new ZIP codes to Westat. Westat selects a sample of new ZIP clusters in the MCBS PSUs and augments the "Master ZIP File" with the newly selected codes. HCFA then provides Westat with a file of beneficiaries in all sampled ZIP codes.

The ZIP cluster sample selected in 1991 consisted of 4,423 sampled ZIP fragments in 1,163 clusters. The 1992 sample included ZIP clusters sampled for coverage improvement as well as newly created ZIP codes. Through 1999, 356 ZIP clusters were added to the sample including 993 ZIP fragments for a total of 1,519 ZIP clusters comprising 5,416 ZIP fragments.

2.2.4 Samples of Medicare Beneficiaries

At the third sampling stage, Medicare beneficiaries are sampled within each selected ZIP cluster. Eligible beneficiaries on HCFA's sampling frame include those who were first eligible for

Medicare Part A and/or Part B before January 1 of the previous year and are still alive and eligible on January 1 of the sampling year. Those who were first eligible between January 1 of the previous year and January 1 of the sampling year are also eligible for the MCBS.

To reduce the problems associated with unduplication of samples across years, a different 5 percent sample of Medicare beneficiaries is selected from each year beginning in 1994. Each 5 percent sample is defined by a different set of the 8th and 9th positions of the health insurance claim numbers.

The beneficiary sample is stratified within seven age categories: 0-44, 45-64, 65-69, 70-74, 75-79, 80-84, and 85+ years. The target sample size for the continuing annual sample is 12,000 responding beneficiaries, including 1,000 beneficiaries in each of the disability age categories and 2,000 beneficiaries in each of the remaining categories. To permit detailed analysis of their special health care needs, the young disabled (0-44 years) and the very old (80-84, 85+ years) are oversampled.

The first MCBS sample contains 15,411 beneficiaries. The sample sizes for 1992 and 1993 samples are 2,410 and 2,436, respectively. Since the initiation of the rotating panel design in 1994, the sample size for the annual supplement has been about 6,000 per year. The annual supplements include 6,390 beneficiaries in 1994, 6,349 beneficiaries in 1995, 6,506 beneficiaries in 1996, 6,599 beneficiaries in 1997, 6,450 beneficiaries in 1998, and 6,399 beneficiaries in 1999.

2.3 Rotating Panel Design

The MSBS was initially designed as a longitudinal survey with no predetermined limit on how long sample members would be followed. After 2 years of interviews, it became apparent that the heavy respondent burden imposed by the lengthy sequence of interviews was adversely affecting the cumulative response rate. Although the initial rate of response for the 1991 sample was 87 percent, the cumulative response rate had dropped to 70 percent by Round 8 and to 65 percent by Round 12.

In 1994, it was decided to move to a rotating panel design. Figure 21 illustrates the transition to the rotating panel design. The 1994 supplemental sample was the first supplement selected according to the rotating design. For 1994 through 1998, each annual supplement was selected to be nationally representative of the population of beneficiaries who are alive and eligible as of January 1 of the current year. Under this design sampled beneficiaries remain in the sample for 4 years and are then

released. To maintain sample sizes in the continuing sample, approximately 6,000 beneficiaries are needed in each annual supplement. Beneficiaries in the 1991, 1992, and 1993 supplements were phased out of the sample over 2 years from Round 13 (fall 1995) to Round 19 (fall 1997). Approximately one-third of the beneficiaries in these panels was released each year. Round 19 was the first interview in which the rotating panel design was fully in effect.

2.4   ORD Supplements

Since 1996, the supplements have included special one-time augmentations for HCFA's Office of Research and Demonstrations (ORD) analyses of Medicare HMOs. These ORD/HMO supplements are interviewed only once at the fall interview round, and the data are included in the access to care files. The supplement consists of additional sampled cases in selected target areas, as well as additional beneficiaries in risk HMO plans nationally. For 1996, the target areas were South Florida and Southern California; for 1997, the target areas were Philadelphia and Phoenix; for 1998, the target areas were Denver, Minneapolis, and South Florida. The 1999 ORD supplement only included a national sample of risk HMO beneficiaries, and no supplement in target areas.