2. SIPP Sample Design and Interview Procedures

This chapter provides new users of the Survey of Income and Program Participation (SIPP) with basic information about the organizing principles of SIPP, sample selection, and the data collection process. The chapter also briefly reviews interview procedures.

SIPP is a longitudinal survey that collects information on topics such as income, participation in government transfer programs, employment, and health insurance coverage. The initial survey design consisted of a new sample, called a panel, every year; each panel was planned to cover 32 months. In practice, a number of panels have been shorter. A result of the initial design was that multiple SIPP panels were in the field simultaneously. A redesign introduced with the 1996 Panel abandoned the overlapping panel structure and extended the length of the 1996 Panel to 4 years. The 2004 Panel originally was set to have 12 waves with a full set of topical modules, however due to budget constraints, topical modules were not collected for waves 9-12. The 2008 SIPP panel began in September 2008 and will run through December 2013. In January 2010, a prototype of a new re-engineered automated survey instrument using Event History Calendar (EHC) is expected to be field-tested. The new re-engineered SIPP is expected to be conducted annually beginning January 2013.

Organizing Principles

SIPP is administered in panels and conducted in waves and *rotation groups.* Within a SIPP panel, the entire sample is interviewed at 4-month intervals. These groups of interviews are called *waves.* The first time an interviewer contacts a household, for example, is Wave 1; the second time is Wave 2, and so forth. As discussed in Chapter 3, each wave contains *core* questions that are asked each time, along with *topical* questions that vary from one wave to the next.

Sample members within each panel are divided into four subsamples of roughly equal size; each subsample is referred to as a rotation group. One rotation group is interviewed each month.[1] During the interview, information is collected about the previous 4 months, which are referred to as *reference months*. Thus, each sample member is interviewed every 4 months, with information about the previous 4-month period collected in each interview (see Table 2-2).

[1] The month in which the interview takes place is called the interview month.

Panels

The original design of SIPP called for an initial selection of a nationally representative sample of households, with all adults in those households being interviewed once every 4 months over a 32-month period. In addition, interviews were to be conducted with any other adults living with original sample members at subsequent waves. The first sample, the 1984 Panel, began interviews in October 1983. The 1985 Panel began in February 1985. Subsequent panels began in February of each calendar year, resulting in concurrent administration of the survey in multiple panels. Because of budget constraints, actual panel duration has varied. The original goal was to have panels covering eight waves (32 months). In several instances, panels were terminated after seven waves (28 months). Three panels were terminated even earlier: 1988 (six waves), 1989 (three waves) and 2000 Panel (2 waves). With certain exceptions (Table 2-1), each panel overlapped part of the previous panel, with the result that there were two or three active panels at any given time. The overlap allows analysts to combine records from different panels, thus having larger samples (and lower standard errors) for cross-sectional analyses.[2] The overlapping feature of the SIPP design was dropped with the 1996 redesign. Standard errors have remained small since the redesign because the 1996 and subsequent panels have target sample sizes of at least 37,000 interviewed households for Wave 1, almost twice the size of the previous panels.

In preparation for the redesign, the Census Bureau canceled the 1994 and 1995 Panels and extended the 1992 and 1993 Panels (Table 2-1). The last 1993 Panel interview took place in January 1996 to ensure that data would remain continuous.

The 2004 Panel was originally slated for 12-waves with topical modules. However, in early 2006 the 2004 Panel was almost canceled after wave 7 due to Census budget shortfalls. SIPP users and proponents intervened, saving SIPP. The 2004 Panel continued but topical modules originally planned from October 2006 - January 2008 were not conducted, and, additionally, sample was cut by half for this time period. The 2008 Panel began in September 2008 is planned to have 13 waves and had an original workload of 52,301 households.

In 2010, a prototype of a new automated re-engineered survey instrument is expected to be tested in the field.

The 2013 Panel beginning in January 2013 will be fielded annually, using Event History Calendar (EHC) to aid in the 12 month recall and will be processed by a new post-data collection processing system. Refer to SIPP's website for more information about the 2013 re-engineering, http://www.census.gov/sipp/.

[2] Combining data across panels allows for larger sample sizes and, consequently, smaller standard errors for some types of estimates. It also helps alleviate two types of bias common to longitudinal surveys: time-in-sample effects and attrition bias.

Table 2-1. Summary of the 1984 - 2008 SIPP Panels

Panel[a]	Date of First Interview	Date of Last Interview	Number of Wave 1 Eligible Households	Number of Waves	Short Waves[b]
1984	Oct. 83	Jul. 86	20,897	9	2,8
1985	Feb. 85	Aug. 87	14,306	8	2
1986	Feb. 86	Apr. 88	12,425	7	3
1987	Feb. 87	May 89	12,527	7	-
1988	Feb. 88	Jan. 90	12,725	6	
1989	Feb. 89	Jan. 90	12,867	3	
1990	Feb. 90	Sep. 92	19,800	8	
1991	Feb. 91	Sep. 93	15,626	8	
1992	Feb. 92	May 95	21,577	10	-
1993	Feb. 93	Jan. 96	21,823	9	
1996	April 96	Mar. 00	40,188	12	
2001	Feb. 01	Jan. 04	50,500	9	
2004	Feb. 04	Jan. 08	51,379	12	
2008	Sept. 08	Dec. 12	52,031	13	

[a] No new panels in 1994 and 1995.
[b] Short waves contained three rotations instead of the standard four.
Source: SIPP Quality Profile, 3rd Ed. (U.S. Census Bureau, 1998a).

Waves and Rotation Groups

One full 4-month cycle of administering the questionnaire to the entire panel is a *wave*. The 1984 through 1993 Panels were designed to have eight waves each, although more often than not the number of waves actually administered was different (Table 2-1).

Rotation groups are random subsamples of approximately equal size. Each month, the members of one rotation group are interviewed; over the course of 4 months, all rotation groups are interviewed, providing data for the full set of 4 months. For many survey items, SIPP collects data for each of the 4 calendar months preceding the interview month. Those 4 months together are called *reference months*, or the reference period. Table 2-2 provides an illustration of the reference months for the various rotation groups in each wave of the 1996 Panel, Table 2-3 for the 2001 Panel and Table 2-4 for the 2004 Panel.

The reference period length and the timing of the interviews were designed to address several concerns: respondent recall error, which increases as the recall period lengthens; respondent burden, which increases with the number of times they are interviewed; and the costs of frequent interviews. By spreading the interviews for each wave evenly over 4 months, the rotation group structure allows the Census Bureau to keep a skilled and experienced team of interviewers in the field year round. This eases management burden and allows Census Bureau interviewers to master the complexities of the SIPP questionnaire and to maintain that mastery. Each SIPP panel prior to 1990 had fewer than eight waves or contained one wave that consisted of fewer than four rotation groups (Table 2-1). As discussed in Chapter 3, the questionnaire administered at each

wave contains *core questions*, those asked at every interview, along with sections containing *topical questions* that vary from one wave to the next. Respondents in the skipped rotation groups have no gap in core data, but they do not provide core data for the full duration of the panel, and they lack topical data for the wave in which they were skipped. Analysts should be alert to the consequences of the skipped rotations: some topical information is not available for the full sample, and the length of time an analyst can follow adults from the original sample is reduced for selected rotation groups.

Reference Periods

The reference period for most core items is the 4-month period preceding the month of the interview for the given wave. Data for most core items are collected for each of the preceding 4 months. Some data on labor force characteristics are collected with weekly resolution. Subsequently, weekly labor force characteristics are recorded on a monthly basis. Beginning with the re-engineered SIPP of 2013, the reference period will be the preceding year. However, data collected monthly in previous SIPP Panels will continue to be collected monthly using Event History Calendar methodology.

After the basic demographic information, one of the first items in the SIPP interview illustrates the availability of time-specific data in SIPP. The respondent is asked if he or she had a health insurance plan at any time during the previous 4 months. If the answer is yes, SIPP asks if the respondent had coverage in each of the individual 4 months. Thus data are collected for 4 individual months at each wave. Over the course of a 13-wave panel, data are collected for 52 consecutive months for each panel member. For the 1996 Panel and beyond, the rotation groups were interviewed in order. Specifically, for the 1996 Panel, wave 1, rotation group 1 was interviewed in April 1996, rotation group 2 in May 1996 rotation group 3 in June 1996, and rotation group 4 in July 1996. For pre-96 panels, however, the specific months varied slightly among rotation groups, that is, panel members in rotation group 2 were interviewed first; rotation group 1 was actually the fourth rotation group surveyed in that panel.[3] (Rotation:2, 3, 4, 1) See Table 2-4.

For the 2001 Panel, Wave 1, rotation group 1 was interviewed in February 2001. See Table 2-4. For the 2004 Panel, Wave 1, rotation group 1 was interviewed in February 2004; wave 1, rotation group 2 in March 2004; wave 1, rotation group 3 in April 2004; and, wave 1, rotation group 4 in May 2004. See Table 2-3. For the 2008 Panel, wave 1, rotation group 1 was interviewed in September 2008; wave 1, rotation group 2 in October 2008; wave 1, rotation group 3 in November; 2008; and wave 1, rotation group 4 in December 2008. See Table 2-2.

[3] An explanation for the relabeling of rotation groups in earlier panels is provided in Chapter 2 of the 2nd edition of the SIPP Users' Guide (U.S. Census Bureau, 1991).

Table 2-2. 2008 Panel: Rotation Groups, Waves (W), and Reference Months[4]

Reference Month	Rotation Group 1	2	3	4
May 08	W1 1			
June 08	W1 2	W11		
July 08	W1 3	W1 2	W1 1	
Aug. 08	**W1 4**	W1 3	W1 2	W1 1
Sept. 08	W2 1	**W1 4**	W1 3	W1 2
Oct. 08	W2 2	W2 1	**W1 4**	W1 3
Nov. 08	W2 3	W2 2	W2 1	**W1 4**
Dec. 08	**W2 4**	W2 3	W2 2	W2 1
Jan. 09	W3 1	**W2 4**	W2 3	W2 2
Feb. 09	W3 2	W3 1	**W2 4**	W2 3
Mar. 09	W3 3	W3 2	W3 1	**W2 4**
April 09	**W3 4**	W3 3	W3 2	W3 1
May 09	W4 1	**W3 4**	W3 3	W3 2
June 09	W4 2	W4 1	**W3 4**	W3 3
July 09	W4 3	W4 2	W4 1	**W3 4**
Aug. 09	**W4 4**	W4 3	W4 2	W4 1
Sept. 09	W5 1	**W4 4**	W4 3	W4 2
Oct. 09	W5 2	W5 1	**W4 4**	W4 3
Nov. 09	W5 3	W5 2	W5 1	**W4 4**
Dec. 09	**W5 4**	W5 3	W5 2	W5 1
Jan. 10	W6 1	**W5 4**	W5 3	W5 2
Feb. 10	W6 2	W6 1	**W5 4**	W5 3
Mar. 10	W6 3	W6 2	W6 1	**W5 4**
April 10	**W6 4**	W6 3	W6 2	W6 1
May 10	W7 1	**W6 4**	W6 3	W6 2
June 10	W7 2	W7 1	**W6 4**	W6 3
July 10	W7 3	W7 2	W7 1	**W6 4**
Aug. 10	**W7 4**	W7 3	W7 2	W7 1
Sept. 10		**W7 4**	W7 3	W7 2
Oct. 10			**W7 4**	W7 3
Nov. 10				**W7 4**

Reference Month	Rotation Group 1	2	3	4
Sept. 10	W8 1	*See Wave7 data in bottom*		
Oct. 10	W8 2	W8 1	*of first column*	
Nov. 10	W8 3	W8 2	W8 1	
Dec. 10	**W8 4**	W8 3	W8 2	W8 1
Jan. 11	W9 1	**W8 4**	W8 3	W8 2
Feb. 11	W9 2	W9 1	**W8 4**	W8 3
Mar. 11	W9 3	W9 2	W9 1	**W8 4**
April 11	**W9 4**	W9 3	W9 2	W9 1
May 11	W10 1	**W9 4**	W9 3	W9 2
June 11	W10 2	W10 1	**W9 4**	W9 3
July 11	W10 3	W10 2	W10 1	**W9 4**
Aug. 11	**W10 4**	W10 3	W10 2	W10 1
Sept. 11	W11 1	**W10 4**	W10 3	W10 2
Oct. 11	W11 2	W11 1	**W10 4**	W10 3
Nov. 11	W11 3	W11 2	W11 1	**W10 4**
Dec. 11	**W11 4**	W11 3	W11 2	W11 1
Jan. 12	W12 1	**W11 4**	W11 3	W11 2
Feb. 12	W12 2	W12 1	**W11 4**	W11 3
Mar. 12	W12 3	W12 2	W12 1	**W11 4**
April 12	**W12 4**	W12 3	W12 2	W12 1
May 12	W13 1	**W12 4**	W12 3	W12 2
June 12	W13 2	W13 1	**W12 4**	W12 3
July 12	W13 3	W13 2	W13 1	**W12 4**
Aug. 12	**W13 4**	W13 3	W13 2	W13 1
Sept. 12		**W13 4**	W13 3	W13 2
Oct. 12			**W13 4**	W13 3
Nov. 12				**W13 4**

[4] Note: The cell entry W1 1 represents Wave 1, reference month 1. The last reference month of each wave is in boldface type. For rotation group 1, the reference months for Wave 1 were May 2008 through Oct. 2008.

Table 2-3. 2004 Panel: Rotation Groups, Waves (W), and Reference Months[5]

Reference Months	Rotation Group 1	2	3	4
Oct. 03	W1 1			
Nov. 03	W1 2	W11		
Dec. 03	W1 3	W1 2	W1 1	
Jan. 04	**W1 4**	W1 3	W1 2	W1 1
Feb. 04	W2 1	**W1 4**	W1 3	W1 2
Mar. 04	W2 2	W2 1	**W1 4**	W1 3
April 04	W2 3	W2 2	W2 1	**W1 4**
May 04	**W2 4**	W2 3	W2 2	W2 1
June 04	W3 1	**W2 4**	W2 3	W2 2
July 04	W3 2	W3 1	**W2 4**	W2 3
Aug. 04	W3 3	W3 2	W3 1	**W2 4**
Sept. 04	**W3 4**	W3 3	W3 2	W3 1
Oct. 04	W4 1	**W3 4**	W3 3	W3 2
Nov. 04	W4 2	W4 1	**W3 4**	W3 3
Dec. 04	W4 3	W4 2	W4 1	**W3 4**
Jan. 05	**W4 4**	W4 3	W4 2	W4 1
Feb. 05	W5 1	**W4 4**	W4 3	W4 2
Mar. 05	W5 2	W5 1	**W4 4**	W4 3
April 05	W5 3	W5 2	W5 1	**W4 4**
May 05	**W5 4**	W5 3	W5 2	W5 1
June 05	W6 1	**W5 4**	W5 3	W5 2
July 05	W6 2	W6 1	**W5 4**	W5 3
Aug. 05	W6 3	W6 2	W6 1	**W5 4**
Sept. 05	**W6 4**	W6 3	W6 2	W6 1
Oct. 05		**W6 4**	W6 3	W6 3
Nov. 05			**W6 4**	W6 3
Dec. 05				**W6 4**

Reference Months	Rotation Group 1	2	3	4
Oct. 05	W7 1	*See Wave 6 data in bottom*		
Nov. 05	W7 2	W7 1	*of first column*	
Dec. 05	W7 3	W7 2	W7 1	
Jan. 06	**W7 4**	W7 3	W7 2	W7 1
Feb. 06	W8 1	**W7 4**	W7 3	W7 2
Mar. 06	W8 2	W8 1	**W7 4**	W7 3
April 06	W8 3	W8 2	W8 1	**W7 4**
May 06	**W8 4**	W8 3	W8 2	W8 1
June 06	W9 1	**W8 4**	W8 3	W8 2
July 06	W9 2	W9 1	**W8 4**	W8 3
Aug. 06	W9 3	W9 2	W9 1	**W8 4**
Sept. 06	**W9 4**	W9 3	W9 2	W9 1
Oct. 06	W10 1	**W9 4**	W9 3	W9 2
Nov. 06	W10 2	W10 1	**W9 4**	W9 3
Dec. 06	W10 3	W10 2	W10 1	**W9 4**
Jan. 07	**W10 4**	W10 3	W10 2	W10 1
Feb. 07	W11 1	**W10 4**	W10 3	W10 2
Mar. 07	W11 2	W11 1	**W10 4**	W10 3
April 07	W11 3	W11 2	W11 1	**W10 4**
May 07	**W11 4**	W11 3	W11 2	W11 1
June 07	W12 1	**W11 4**	W11 3	W11 2
July 07	W12 2	W12 1	**W11 4**	W11 3
Aug. 07	W12 3	W12 2	W12 1	**W11 4**
Sept 07	**W12 4**	W12 3	W12 2	W12 1
Oct. 07		**W12 4**	W12 3	W12 2
Nov. 07			**W12 4**	W12 3
Dec.07				**W12 4**

[5] *Note:* The cell entry W1 1 represents Wave 1, reference month 1. The last reference month of each wave is in boldface type. For rotation group 1, the reference months for Wave 1 were Oct. 2003 through Jan. 2004.

Table 2-4. 2001 Panel: Rotation Groups, Waves (W), and Reference Months[6]

Reference Months	Rotation Group 1	2	3	4
Oct. 00	W1 1			
Nov. 00	W1 2	W11		
Dec. 00	W1 3	W1 2	W1 1	
Jan. 01	**W1 4**	W1 3	W1 2	W1 1
Feb. 01	W2 1	**W1 4**	W1 3	W1 2
Mar. 01	W2 2	W2 1	**W1 4**	W1 3
April 01	W2 3	W2 2	W2 1	**W1 4**
May 01	**W2 4**	W2 3	W2 2	W2 1
June 01	W3 1	**W2 4**	W2 3	W2 2
July 01	W3 2	W3 1	**W2 4**	W2 3
Aug. 01	W3 3	W3 2	W3 1	**W2 4**
Sept. 01	**W3 4**	W3 3	W3 2	W3 1
Oct. 01	W4 1	**W3 4**	W3 3	W3 2
Nov. 01	W4 2	W4 1	**W3 4**	W3 3
Dec. 01	W4 3	W4 2	W4 1	W3 4
Jan. 02	**W4 4**	W4 3	W4 2	W4 1
Feb. 02	W5 1	**W4 4**	W4 3	W4 2
Mar. 02	W5 2	W5 1	**W4 4**	W4 3
April 02	W5 3	W5 2	W5 1	**W4 4**
May 02	**W5 4**	W5 3	W5 2	W5 1
June 02	W6 1	**W5 4**	W5 3	W5 2
July 02	W6 2	W6 1	**W5 4**	W5 3
Aug. 02	W6 3	W6 2	W6 1	**W5 4**
Sept. 02	**W6 4**	W6 3	W6 2	W6 1
Oct. 02		**W6 4**	W6 3	W6 2
Nov. 02			**W6 4**	W6 3
Dec. 02				**W6 4**

Reference Months	Rotation Group 1	2	3	4
Oct. 02	W7 1	*See Wave 6 data in bottom*		
Nov. 02	W7 2	W7 1	*of first column*	
Dec. 02	W7 3	W7 2	W7 1	
Jan. 03	**W7 4**	W7 3	W7 2	W7 1
Feb. 03	W8 1	**W7 4**	W7 3	W7 2
Mar. 03	W8 2	W8 1	**W7 4**	W7 3
April 03	W8 3	W8 2	W8 1	**W7 4**
May 03	**W8 4**	W8 3	W8 2	W8 1
June 03	W9 1	**W8 4**	W8 3	W8 2
July 03	W9 2	W9 1	**W8 4**	W8 3
Aug. 03	W9 3	W9 2	W9 1	**W8 4**
Sept. 03	**W9 4**	W9 3	W9 2	W9 1
Oct. 03		**W9 4**	W9 3	W9 2
Nov. 03			**W9 4**	W9 3
Dec. 03				**W9 4**

[6] *Note:* The cell entry W1 1 represents Wave 1, reference month 1. The last reference month of each wave is in boldface type. For rotation group 1, the reference months for Wave 1 were Oct. 2000 through Jan. 2001.

Table 2-5. 1996 Panel: Rotation Groups, Waves (W), and Reference Months[7]

Reference Months	Rotation Group 1	2	3	4
Dec 95	W1			
Jan. 96	W1 2	W11		
Feb. 96	W1 3	W1 2	W1 1	
Mar. 96	**W1 4**	W1 3	W1 2	W1 1
April 96	W2 1	**W1 4**	W1 3	W1 2
May 96	W2 2	W2 1	**W1 4**	W1 3
June 96	W2 3	W2 2	W2 1	**W1 4**
July 96	**W2 4**	W2 3	W2 2	W2 1
Aug. 96	W3 1	**W2 4**	W2 3	W2 2
Sep. 96	W3 2	W3 1	**W2 4**	W2 3
Oct. 96	W3 3	W3 2	W3 1	**W2 4**
Nov. 96	**W3 4**	W3 3	W3 2	W3 1
Dec. 96	W4 1	**W3 4**	W3 3	W3 2
Jan. 97	W4 2	W4 1	**W3 4**	W3 3
Feb. 97	W4 3	W4 2	W4 1	**W3 4**
Mar. 97	**W4 4**	W4 3	W4 2	W4 1
April 97	W5 1	**W4 4**	W4 3	W4 2
May 97	W5 2	W5 1	**W4 4**	W4 3
June 97	W5 3	W5 2	W5 1	**W4 4**
July 97	**W5 4**	W5 3	W5 2	W5 1
Aug. 97	W6 1	**W5 4**	W5 3	W5 2
Sep. 97	W6 2	W6 1	W**5 4**	W5 3
Oct. 97	W6 3	W6 2	W6 1	**W5 4**
Nov. 97	**W6 4**	W6 3	W6 2	W6 1
Dec. 97		**W6 4**	W6 3	W6 2
Jan. 98			**W6 4**	W6 3
Feb. 98				**W6 4**

Reference Months	Rotation Group 1	2	3	4
Dec. 97	W7 1	*See Wave 6 data in bottom*		
Jan. 98	W7 2	W7 1	*of first column*	
Feb. 98	W7 3	W7 2	W7 1	
Mar. 98	**W7 4**	W7 3	W7 2	W7 1
April 98	W8 1	**W7 4**	W7 3	W7 2
May 98	W8 2	W8 1	**W7 4**	W7 3
June 98	W8 3	W8 2	W8 1	**W7 4**
July 98	**W8 4**	W8 3	W8 2	W8 1
Aug. 98	W9 1	**W8 4**	W8 3	W8 2
Sep. 98	W9 2	W9 1	**W8 4**	W8 3
Oct. 98	W9 3	W9 2	W9 1	**W8 4**
Nov. 98	**W9 4**	W9 3	W9 2	W9 1
Dec. 98	W10 1	**W9 4**	W9 3	W9 2
Jan. 99	W10 2	W10 1	**W9 4**	W9 3
Feb. 99	W10 3	W10 2	W10 1	**W9 4**
Mar. 99	**W10 4**	W10 3	W10 2	W10 1
April 99	W11 1	**W10 4**	W10 3	W10 2
May 99	W11 2	W11 1	**W10 4**	W10 3
June 99	W11 3	W11 2	W11 1	**W10 4**
July 99	**W11 4**	W11 3	W11 2	W11 1
Aug. 99	W12 1	**W11 4**	W11 3	W11 2
Sep. 99	W12 2	W12 1	**W11 4**	W11 3
Oct. 99	W12 3	W12 2	W12 1	**W11 4**
Nov. 99	**W12 4**	W12 3	W12 2	W12 1
Dec. 99		**W12 4**	W12 3	W12 2
Jan. 00			**W12 4**	W12 3
Feb. 00				**W12 4**

[7] *Note:* The cell entry W1 1 represents Wave 1, reference month 1. The last reference month of each wave is in boldface type. For rotation group 1, the reference months for Wave 1 were Dec. 95 through Mar. 96

Sample Design

SIPP uses a complex sample design that has important implications for the estimation of standard errors. Because the SIPP design is not a simple random sample, the standard errors reported by most off-the-shelf statistical software will underestimate the true standard errors of estimates from SIPP. (See Chapter 7 for details.) A detailed description of the SIPP sample design and standard error calculations can be found in the third edition of the *SIPP Quality Profile* (U.S. Census Bureau, 1998a).

Selection of Sampling Units

The Census Bureau employs a two-stage sample design to select the SIPP sample. The two stages are (1) selection of primary sampling units (PSUs) and (2) selection of address units within sample PSUs. Census Bureau interviewers follow an established procedure to identify sample members within the selected address units.

Primary Sampling Units

The frame for the selection of sample PSUs consists of a listing of U.S. counties and independent cities, along with population counts and other data for those units from the most recent census of population. Counties either are grouped with adjacent counties to form PSUs or constitute a PSU by themselves.

Following the formation of the PSUs, the smaller ones, called non-self-representing (NSR) PSUs, are then grouped with similar PSUs in the same state to form strata; census data for a variety of demographic and socioeconomic variables are used to determine the optimum groupings. A sample of NSR PSUs is selected in each stratum to represent all PSUs in the stratum. All of the larger PSUs are included in the sample and are called self-representing (SR) PSUs.

Selection of Addresses in Sample PSUs

SIPP selects addresses from five separate, non-overlapping sampling frames maintained by the Census Bureau. They are unit (formerly called the address enumeration districts [EDs] frame); area (area EDs frame); group quarters (special places frame); housing unit coverage; a coverage improvement frame, and a new-construction (or permit) frame. The first three frames are based on census counts from the most recent decennial census; unit and area frames are determined by a process called "address screening", which has been done at the block level since 1990. The unit frame lists addresses of housing units located in census blocks in areas that issue building permits and in which at least 96 percent of the addresses are complete (with street name and house number). The area frame contains addresses from the remaining census blocks that are not in permit-issuing areas, or where more than 4 percent of the addresses in the blocks are missing. Those addresses are mostly in rural areas. The group quarters frame includes boarding houses, hotel rooms, and institutions that are found in the decennial census but are not counted as

housing units. Together, the three frames provide almost 90 percent of the sample addresses for each SIPP panel.

The coverage improvement frame is used to include addresses of housing units that were missed in the census count but were found in postenumeration surveys. The percentage of sample addresses from this frame is typically small (0.1 percent of the sample addresses in the 1986 Panel).

The new-construction frame is used to provide coverage of new structures for which building permits have been issued since the last decennial census in areas covered by the unit frame. This frame is updated continually, and the percentage of addresses sampled from it increases each year until data from another decennial census become available.

Within each sample PSU, the addresses in the sampling frames are grouped into clusters. The clusters are then sampled, and the selected cluster of addresses is included for interviewing.[8] In the unit frame, the 1996 Panel had clusters of one housing unit; for prior panels, clusters of two neighboring addresses were used. In the area and group quarter frames, clusters are constructed with the expectation of four housing units or housing unit equivalents. With the area frame, the sampled clusters are visited by SIPP interviewers prior to the scheduled interviewing. The interviewers list all residential addresses within the selected clusters. With the new-construction frame, the 1996 Panel has a 50-50 mixture of four- and eight-unit clusters. Previously, clusters of four housing units were formed. No clustering is used with the coverage improvement frame. The coverage improvement frame is used to include addresses of housing units that were missed in the census count but were found in postenumeration surveys. The percentage of sample addresses from this frame is typically small (0.1 percent of the sample addresses in the 1986 Panel).

Identifying Household Members Within Sampled Addresses

At the time of the first interview, the Census Bureau interviewer visits sampled addresses, verifies the addresses, determines whether they contain occupied housing units, and identifies the housing units located at each address. A housing unit is defined as a living quarters with it's own entrance and cooking facilities. The people living in a housing unit constitute a household (see below). Interviews are conducted at all households in sampled addresses. However, SIPP does not treat the household as a continuous unit to be followed in the panel. SIPP is a person-based survey; as discussed below, SIPP follows original sample members regardless of household composition. The interviewer compiles a roster for each sampled household, listing all people living or staying at the address. Next, the interviewer identifies those who are household members by determining if the address is their usual residence (Table 2-6).[9] SIPP designates all

[8] In a few cases, where the clusters contain many more housing units than expected, a subsample of addresses is selected.

[9] In most cases, a person is a member of a household if the sample unit is that person's usual place of residence at the time of the interview. The person may be present or temporarily absent. A person staying in the sample unit who has no usual place of residence elsewhere is a household member. A usual place of residence is the place where a person normally lives and sleeps. This must be specific living quarters held for the person to which he or she is free to return at any time.

people who are considered members as original sample members. Over the course of the panel, original sample members are followed and interviewed every 4 months.[10]

Table 2-6. Household Membership

Question	YES (Is Member of Household)	NO (Not Member of Household)
Person staying at SIPP address at time of interview		
Members of family, visitors, etc. ordinarily sleeps here	Y	
- here temporarily, no living quarters held elsewhere	Y	
- here temporarily, living quarters held elsewhere		N
In Armed Forces, stationed locally and sleeps here	Y	
In Armed Forces, stationed elsewhere and here on leave		N
Student temporarily attending school here, living quarters held elsewhere		N
- married and accompanied by own family	Y	
- student nurse attending school nearby	Y	
Absent person who usually lives at SIPP address		
Inmate in an institutional special place regardless of whether living quarters are being held here		N
Temporarily on vacation, in hospital, and living quarters held	Y	
Absent for work, living quarters held here	Y	
Absent for work, living quarters held here and elsewhere but comes here infrequently		N
Unmarried college student working away from home during break, living quarters held here	Y	
In Armed Forces, stationed elsewhere	Y	
In school elsewhere, living quarters held-not married or with own family	Y	
- married and accompanied by own family		N
- attending school overseas		N
- student nurse living at school		N
Exceptions and doubtful cases		
Person with two residences, sleeps most often in other location		N
Person with two concurrent residences, sleeps here most often	Y	
Citizen of foreign country temporarily in U.S., living on premises of an embassy, ministry, legation, chancellery, or consulate		
Citizen of foreign country temporarily in U.S.- studying here and no other usual residence in U.S.	Y	
- living and working here and no other usual residence in U.S.	Y	
- visiting or traveling in U.S.		N

Source: SIPP Information Booklet, 1990 Panel (Waves 1to 8) and 1991 Panel (Waves 1 to 8), Form SIPP-7004A 1-9-89).

[10] In the 1993 Panel only, SIPP followed all original sample members regardless of age. All other panels have followed only people 15 years of age or older who were original sample members.

Oversampling

Originally, SIPP did not oversample any groups within the population. Over the years, however, budget constraints dictated a reduction in the SIPP panel size. As a result, analysts found it difficult to conduct meaningful analyses of government programs for the low-income population because the sample sizes for the subpopulations were too small. In response to those concerns about the diminished usefulness of SIPP data, the Census Bureau pursued budget initiatives to increase the sample to its original size and to oversample the low-income population.

Oversampling occurs when certain groups or units are sampled with higher probabilities than others. Analysts then have enough cases to complete analysis of subpopulations or subgroups of the population. The share of an oversampled group in the resulting sample is greater than its share in the population from which it was drawn. Although this imbalance addresses the need for increased sample sizes for certain subpopulations, analysts looking at the entire sample will need to use weights in their analyses to redress the imbalance (Chapter 8).[11]

Oversampling in the 1990 Panel

As detailed in the SIPP Quality Profile and discussed in Allen et al. (1993), oversampling was used with the 1990 Panel, which included about 3,900 predominantly low-income households from the truncated 1989 Panel (see Tables 2-1 and 2-7). In the 1990 Panel, the Census Bureau included all housing units from Wave 1 of the 1989 Panel in which the head of household was black, Hispanic, or female with no spouse present living with relatives (FHNSP). Such households tend to have higher poverty rates than the general population. The 1990 Panel also included a small sample of other housing units for the 1989 Panel. Table 2-7 shows the components of the 1990 Panel.

Table 2- 7. Composition of the 1990 Panel

Components	Number of Eligible Households
Households in addresses originally to be interviewed first in the 1990 Panel	19,700
Households associated with sample addresses first interviewed in February through May 1989 (in the 1989 Panel) and at the time headed by a black, Hispanic, or FHNSP[a]	2,700
Households in one-ninth of all other 1989 Panel sample addresses	1,200

[a] Female head of household with no spouse present living with relatives.
Source: Allen, Petroni, Singh, 1993.

[11] Weights are needed even if there is no oversampling. See Chapter 8.

Oversampling in the 1996 and 2001 Panels

The Census Bureau also oversampled the low-income population for the 1996 and the 2001 Panels,[12] using 1990 decennial census information. Housing units within each PSU were split into high-and-low income strata. If the housing unit received the Census long form that included income questions, the unit's poverty status was determined directly; for other housing units, poverty status was assumed on the basis of responses to Census short-form items predictive of poverty rates. The stratum in each PSU. Compared with the number of cases produced without oversampling, this oversample produce an 19 percent increase in the number of cases in and near poverty at Wave 1.[13]

Even greater gains occurred in some subgroups, such as blacks and Hispanics in poverty, with a gain in the number of sample cases as high as 24 percent. However, the increases in effective sample sizes were somewhat smaller after allowance was made for the increased variance associated with differential weighing. Also, the sample sizes for the higher income and higher age groups were reduced.

Oversampling in the 2004 Panel

The Census Bureau used similar oversampling methods in the 2004 Panel to that of the 1996 and the 201 Panels. The Census Bureau used 2000 decennial census data and sampled the low-income stratum at 1.38 times the rate of the high-income stratum in each PSU. This resulted in a 15 percent increased in the number of cases in and near poverty than without oversampling.

Following Rules

SIPP is a true longitudinal survey that tracks people over time. With few exceptions, original sample members are interviewed every 4 months over the duration of the panel. When original sample members move to new addresses, interviewers attempt to locate them and continue to interview them every 4 months.

The SIPP rules call for following original sample members who move, provided they are not institutionalized, do not live in military barracks, or do not move abroad. Prior to the 1993 Panel, and resuming with the 1996 Panel, original sample members under age 15 who moved were not followed. Thus, data were collected for them in subsequent waves only if they either continued to live with an original sample member 15 years or older or were age 15 by the last day of the reference period in which they moved. With Wave 4 of the 1993 Panel, SIPP and to the end of the 1993 Panel, SIPP began following all children who were in original sampled households (*SIPP Quality Profile*, 1998, pp. 3-6), including babies born to sample members during the panel. For the 1996+ Panels, we decided to not follow children of 100-level sample persons who

[12] For a more detailed discussion of the 1996 oversample design, see Huggins and King (1997)

[13] Low-income strata were sampled at a rate of 0.00062389. High-income strata were sampled at a rate of 0.00037489. The oversampling rate therefore comes to 1.6642.

move in later waves without 100-level persons 15 years and older. The field costs outweighed the benefit of the additional children kept in sample. We estimated picking up only about 100 children in the 1996 panel.

When original sample members move into households with other individuals not previously in the survey, the new individuals become part of the SIPP sample for as long as they continue to live with an original sample member. Similarly, when new individuals move in with original sample members after the first interview, they too become part of the SIPP sample for as long as they continue to live with an original sample member. If no original sample members live at an address where a previous interview was conducted, SIPP does not collect information from the new occupants of that address. Figure 2-1 illustrates the following rules in practice.

Interviewers rely on several sources of information to locate movers. At the first interview, the interviewer obtains the name, address, and telephone number of a person who could furnish the new address should the entire household move. If necessary, interviewers may contact neighbors, employers, mail carriers, real estate companies, rental agents, or postal supervisors to locate original sample members who have moved.

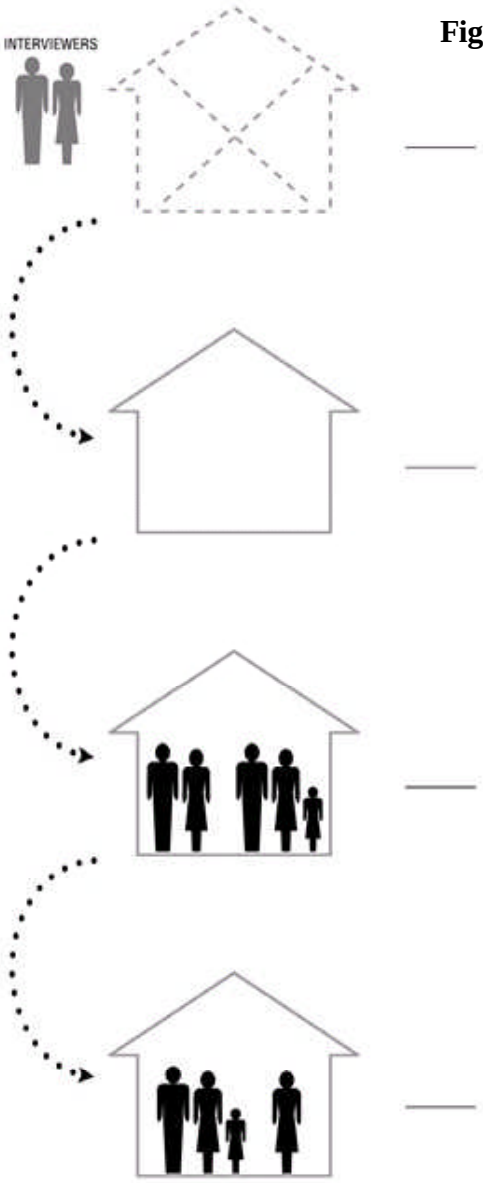
If an entire household moves, the interviewer tries to find the original sample members and interview them at their new address(es) if they remain in the locality. If the household relocates into or close to a different PSU, a SIPP interviewer in that area may interview them. For example, if a couple moves from Boston to Seattle, a SIPP interviewer in the Seattle area will likely interview the couple for the remaining waves of their panel. Should the entire household move more than 100 miles away from a SIPP PSU, attempts will be made to interview by telephone. If the household cannot be reached, the sample members will be dropped from the survey. Specifically, they will be treated as Type D noninterviews (Type D noninterviews are discussed later in the chapter).

If only some original sample members move, the interviewer completes interviews with all eligible household members at both the original address and the address(es) of those who have moved. If an original sample member leaves a SIPP household and the remaining original sample members cannot provide a new address, the interviewer will try to find the person through the means discussed above. Similar to what happens with a household, if an individual original sample member moves within the United States but more than 100 miles away from a SIPP PSU, a telephone interview will be attempted. When that is not possible, the person is treated as a Type D noninterview.

SIPP does not interview original sample members if they move outside the United States, become members of the military living in barracks, or become institutionalized (e.g., nursing home residents, prison inmates). The Census Bureau attempts to track such individuals, however. Should they return to the noninstitutionalized resident U.S. population, the Census Bureau will resume trying to interview them.[14]

[14] A member of the armed forces who lives in a barracks is not eligible for an interview; a member of the armed forces who lives elsewhere is eligible.

Figure 2 – 1 Following Rules



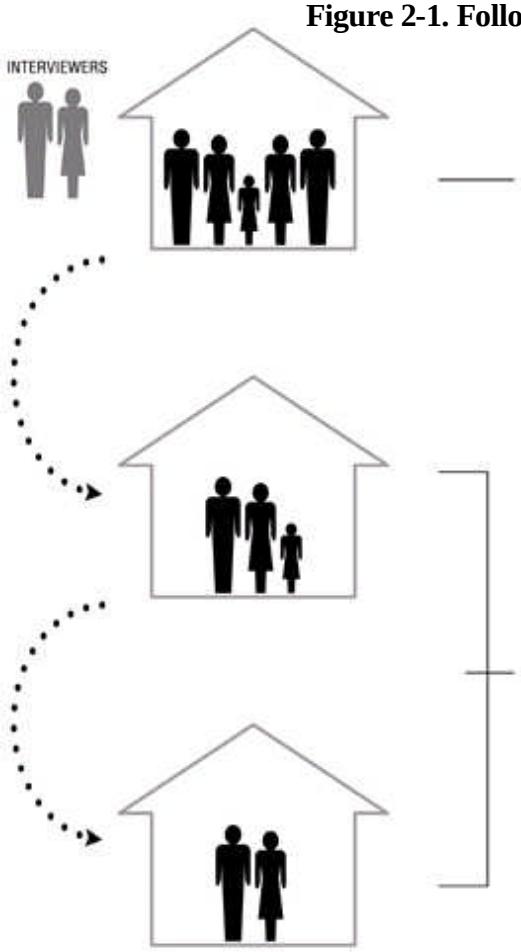
Demolished address unit – no interview.

Vacant address unit - no interview

Five people (mom, dad, son, daughter, and cousin) reside at this address and thus constitute a household. **Wave 1** interview conducted for all five people.

Son joined Army and is living in barracks. He is not followed because military bases are outside the scope of the SIPP sample. However, a record exists in the **Wave 2** interview reflecting proxy responses by another member of the household. Interviewer takes data on the four people who remain at this address.

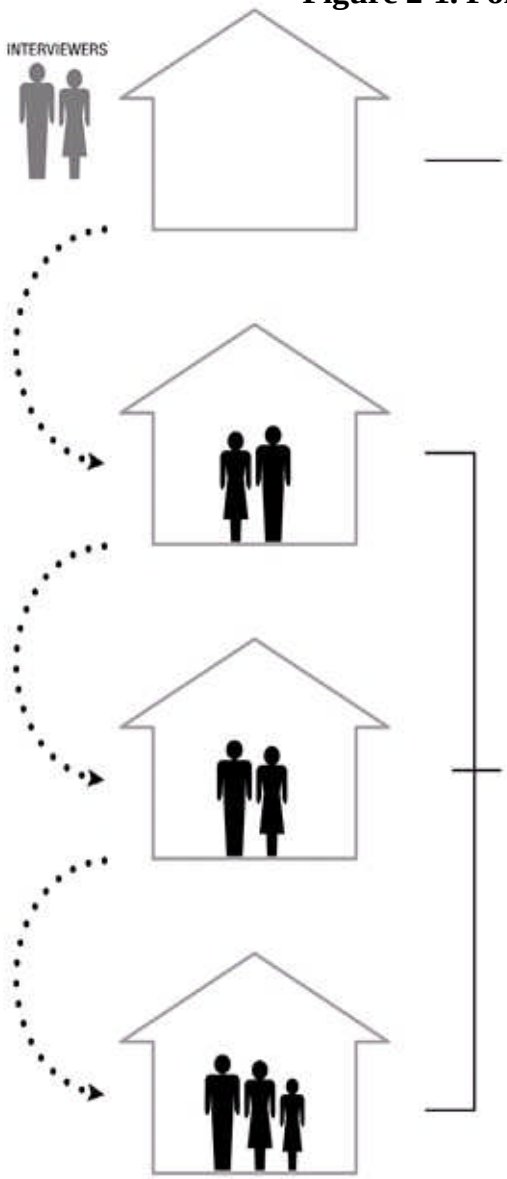
Figure 2-1. Following Rules *(continued)*



Daughter got married; he and husband live with her parents and cousin at time of **Wave 3** interview. The husband is interviewed at the same time that others in the house are interviewed. There is no further information taken on the son (who joined the Army and is living in barracks, which is outside the SIPP universe).

Daughter and her husband moved to a new address and formed their own household at the time of **Wave 4**. The interviewer takes data on mom, dad, and cousin in the first household; and daughter and daughter's husband in the second household.

Figure 2-1. Following Rules (*continued*)

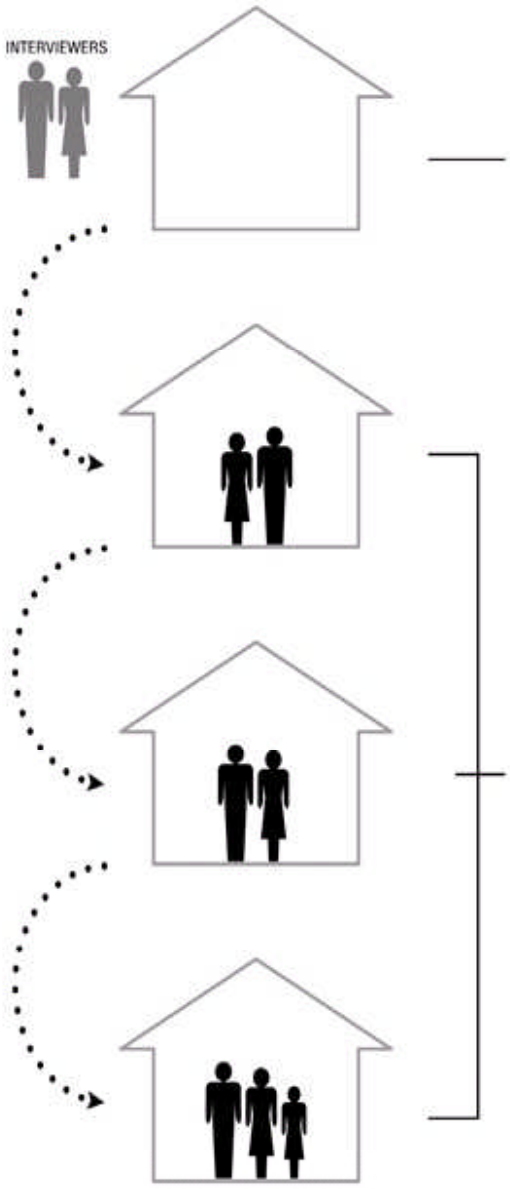


The cousin, who is over15[a], moved and now lives with her mother and father, who were not in the sample originally. Therefore, for this **Wave 5** interview, the interviewer takes data from seven people (mom and dad in the first household, daughter and daughter's husband in the second household, and cousin, cousin's mother, and cousin's father) in the third household.

In **Wave 6**, there is no change from the previous wave.

[a] For Waves 4+ of the 1993 Panel **only**, SIPP followed original sample persons under 15 years old who moved to other households with or without another original SIPP panel member over 15. In all other panel years, SIPP did not follow original sample persons under 15 years old who moved to other households with or without another original SIPP panel member over 15. In this example, therefore, the cousin is followed because she is over 15. In the 1993 Panel, the cousin would have been followed without regard to age.

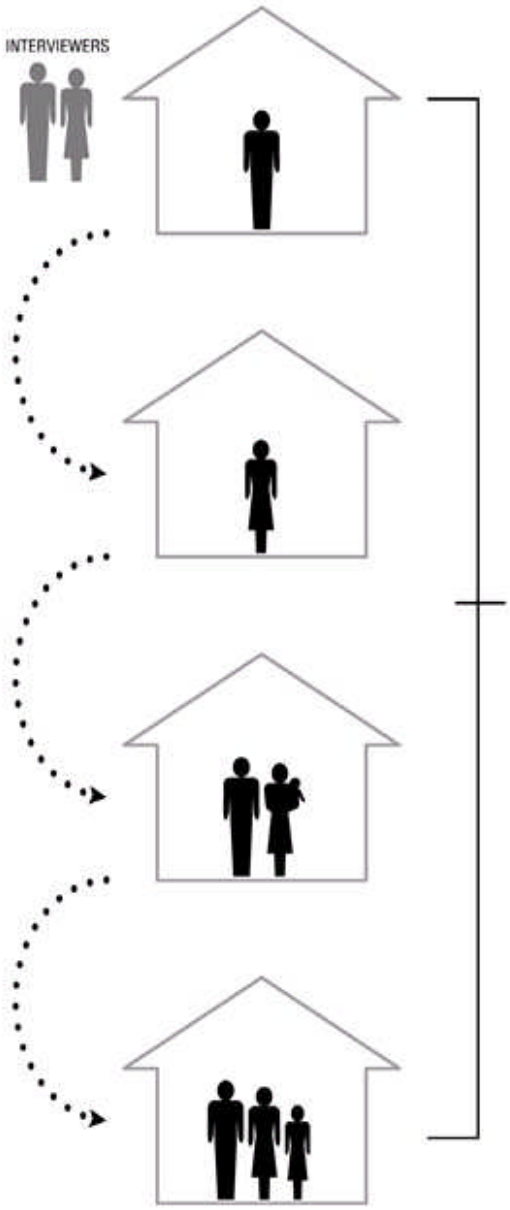
Figure 2-1. Following Rules (*continued*)



At the time of **Wave 7**, the interviewer discovers that mom and dad have moved out of their old home.

The interviewer locates mom and dad and interviews them at their new address. The daughter and her husband are interviewed at their previous address, as are the cousin and the cousin's parents. Altogether, the interviewer takes data from seven people (mom, dad, daughter, daughter's husband, cousin, cousin's mother, and cousin's father) in three households.

Figure 2-1. Following Rules (*continued*)



Mom and dad have separated at the time of **Wave 8.** Mom is in the same address as in the previous wave, but dad is in a new location; thus they form separate households. Meanwhile, the daughter and husband now have a baby and the cousin's household has remained the same. The interviewer takes data for eight people (mom, dad, daughter, daughter's husband, daughter's baby, cousin, cousin's mother, and cousin's father) in four households.

The interviewer obtains the name, address, and telephone number of a person who could furnish the new address should the entire household move. If necessary, interviewers may contact neighbors, employers, mail carriers, real estate companies, rental agents, or postal supervisors to locate original sample members who have moved.

Difference Between Movers and Those Who Are Temporarily Away

There is an important difference between a mover and a person who is temporarily away. A mover no longer lives at the sample address. On the other hand, a person is temporarily away if the household is that person's usual place of residence, according to the membership rules given in Table 2-6, and specific living quarters are held for the person to which he or she is free to return at any time. The following two examples may help to illustrate the distinction:

- A college student living on campus with a room held at home is still a household member at the sample address. In this case, the interviewer would try to interview that student or obtain a proxy interview with the household reference person. If the hypothetical college student originally lived in New York and, upon graduation, moved to Los Angeles to live on his or her own, the student would be considered to have moved as of the graduation date. The student's new address in Los Angeles would become his or her new household, and, if the student was an original sample member, he or she would be treated in the same way as any other original sample member who moved to the new address.

- If a household member is in the hospital following an operation but is expected to come home, that person is still a household member at the original address. If an individual interview is not feasible, the interviewer might do a proxy interview for that person. If, however, the person moved into a nursing home, he or she would not be eligible for a SIPP interview, whether individual or proxy. At each interview, the interviewer asks the status of any primary sample member who entered an institution between Wave 1 and the current wave. If the interviewer learns that the person has returned to the noninstitutionalized population, an interview is attempted.

Interview Procedures

At Wave 1, interviews are attempted for all members of selected housing units who are 15 years of age or older.[15] The Census Bureau prefers that all SIPP sample members 15 years of age or older who are present at the time of the interview answer for themselves unless they are physically or mentally unable to do so. For those who are absent or incapable of responding, SIPP will accept a proxy interview, usually with another household respondent.

After Wave 1, the interviewer compiles (or updates) a separate household roster for each housing unit, listing all people living or staying at the unit, including anyone who may have joined the household, such as a new spouse or baby, and the dates they entered the household. The

[15] Detailed information about interview procedures is available from the Census Bureau in the SIPP interviewer's instruction manual (U.S. Census Bureau, 1993).

interviewer then decides whether each person is a household member by using rules that determine whether the person is a usual resident of the unit (Table 2-6). Key to SIPP data collection is identification of a *reference person* for the household, an owner or renter of record. The interviewer lists other people in the household according to their relationship to the reference person.

Also noted are people who left the household and their dates of departure. If some but not all sample members have moved since the last interview, the interviewer completes interviews at the original address and also obtains the new address(es) of the individuals who moved. For those remaining at the same address, the interviewer verifies that certain previously collected information still applies, completes the questionnaire for each person 15 years of age or older, and collects certain information for children under age 15. Information is also collected for all new household members. Movers are interviewed at their new addresses, along with other household members they are living or staying with at the time.

Most interviews conducted through 1991 were in the form of personal visits. In 1992, SIPP switched to maximum telephone interviewing to reduce costs. Wave 1, 2, and 6 interviews were still conducted in person, but other interviews were conducted by telephone to the extent possible. SIPP telephone interviews and personal visits are carried out by the same interviewer interacting with the same respondents. Interviewers typically make phone calls from their homes. For security and confidentiality reasons, they are not allowed to use cellular or cordless telephones in the interviews. If a standard telephone is not available, the interviews must be conducted face-to-face. Repeated failure to reach a respondent by telephone may also require an in-person visit to the listed address.

When respondents are not able to furnish all requested information at the interview, interviewers arrange to get the answers by telephone if the respondents are willing. Callbacks can also help correct inconsistencies found during questionnaire editing. With the 1996 redesign, computer assisted interviewing (CAI) was begun. Thus, automatic consistency checks for selected data occur during the interview. Both the paper survey and the CAI instrument have skip patterns that help the interviewer avoid asking irrelevant questions (see Chapter 3 for more on skip patterns). In the paper survey, interviewers would encounter points at which they had to look at previously given answers before deciding whether or not to ask certain questions. With CAI, the instrument skips directly to the next applicable question.

Nonresponse

All surveys experience some degree of nonresponse. As discussed in Chapter 6, in a longitudinal survey such as SIPP, as the number of waves increases, nonresponse may result in a corresponding increase in bias. Since nonrespondents may differ from respondents in terms of the variables collected in the survey, the occurrence of nonresponse gives rise to concerns about bias in the survey results. Weighting adjustments are made in an attempt to reduce or eliminate bias (Chapter 8), but concerns about nonresponse bias remain.

The rate of sample loss[16] in SIPP generally declines from one wave to the next. The total number of sample members lost, also known as total sample attrition, always increases over time. Wave 1 nonresponse rates for SIPP have been from 4.9 percent to 14.9 percent[17]. There is also a sizable sample loss at Wave 2, with a lower rate of additional attrition occurring at each subsequent wave. Prior to the 1992 Panel, SIPP lost roughly 20 percent of the original sample by the panel's completion. The sample loss rate for the 1996 Panel was 35.5 percent by the end of the 12th, or final, wave. For the 2001 Panel, the loss rate was 31.9 percent by the end of Wave 9. The 2004 Panel sample loss rate was 36.6 percent by the end of wave 12. Chapter 6 in this volume and the *SIPP Quality Profile* provide more detailed discussions of the implications of nonresponse for data quality. SIPP deals with the various types of nonresponse by weighting adjustments or imputation (Chapters 8 and 4).

The Census Bureau distinguishes between household and person nonresponse. Household nonresponse occurs either when the interviewer cannot locate the household or the when interviewer locates the household but cannot interview any adult household members. Person-level nonresponse occurs when at least one person in the household is interviewed and at least one other person is not, usually because that person refuses to answer the questions, or is unavailable and no proxy is taken.

The Census Bureau categorizes household nonresponse as Types A and D when the respondent(s) is/are no longer able or willing to continue in the survey. Type B nonresponse occurs in Wave 1 when the address unit is vacant or in some way unfit for residence; in subsequent waves, Type B nonresponse occurs when people enter institutions. Type C non-response occurs in Wave 1 when the housing unit has been demolished or converted to some other use; in subsequent waves, Type C nonresponse occurs when all sample members in a household are outside the scope of the survey, e.g., deceased, living abroad, or living in the armed forces barracks. Person-level nonresponse is categorized as Type Z.

Type A Household Nonresponse

Type A household nonresponse occurs when the interviewer finds the household's address, but obtains no interviews. Those households contain people eligible for SIPP interviews, but every eligible member of the household is a noninterview. Examples of Type A nonresponse include the following:

- The interviewer finds no one at home despite repeated visits.
- All eligible household members are away during the entire interview period (e.g., an extended vacation).

[16] The accumulation of cases that are no longer being interviewed because of as yet unrecovered refusals or as yet unfound movers

[17] Nonresponse rates have not been stable, ranging from 4.9 percent for the 1984 Panel wave 1 to 14.9 percent for the 2004 Panel wave1.

- Household members refuse to participate in the survey.

- The interviewer cannot reach the housing unit because of impassable roads, such as from a natural disaster.

- Interviews cannot be taken because of serious illness or death in the household. When this type of household nonresponse occurs in Wave 1, SIPP makes no attempt to interview the household members at subsequent waves. For Type A nonresponse that occurs in subsequent waves, however, interviewers try to obtain interviews on the following wave. *New* Type A noninterviews represent the first time a Type A household nonresponse occurred. *Old* Type A nonresponse represents unsuccessful attempts to convert a Type A noninterview from the previous wave.

Type D household nonresponse concerns original sample members who move to an unknown or uninterviewable address; it applies only to Wave 2 and beyond. Those noninterviews occur when a household or some members of a household are living at an unknown new address or at an address located more than 100 miles from a SIPP sample area and cannot be contacted by telephone.

Person Nonresponse

There are two forms of person-level, or Type Z, nonresponse. The first applies to those instances in which a sample person was in the household during part (or all) of the reference period and was part of the household on the date of the interview but refused to answer, or was not available for the interview and a proxy interview was not obtained. The second form of Type Z noninterview occurs when a person was part of the household during part of the 4-month reference period but then moved and was no longer a household member on the date of the interview.[18] While household nonresponse is usually handled by weighting adjustments, Type Z cases are handled by imputation (i.e., they are matched to donors, and data from the donor case are substituted for the missing interview-see discussion of imputation and weighting in Chapters 4 and 8). Nearly half of SIPP Type Z nonrespondents are not interviewed at any of the waves.

Item Nonresponse

Item nonresponse is an additional source of missing data; it occurs when a respondent does not answer one or more questions, even though most of the questionnaire is completed. Respondents might refuse to answer a particular question or set of questions. Sometimes, item nonresponse

[18] If the person was an original sample member, information will be taken for the portion of the reference period in which he or she was still at the address, and an effort will be made to locate the person. If the person was not an original sample member, information will be taken for the portion of the reference period in which he or she was still at the address, after which the person will not be pursued.

occurs when respondents do not have the information requested.[19] Although interviewers are trained to attempt to persuade respondents to answer all applicable questions, and will call back if a respondent can provide data at a later time, those efforts are not always successful. Item nonresponse can also result from the post interview data editing process when respondents provide inconsistent information or when an interviewer incorrectly records a response. In many cases, the Census Bureau handles item nonresponse by imputation, that is, by assigning values for the missing items (Chapter 4).

[19] The information provided may also be inconsistent with edit specifications, and the response is thus deleted during the processing stage. Or, interviewers may forget to ask for the information or record it incorrectly, resulting in an edit failure. See Chapter 4 on editing and imputation

Table 2-8. Household Sample Loss Rates for the 1990 - 2004 Panels

	1984 Panel	1985 Panel	1986 Panel	1987 Panel	1988 Panel	1989 Panel	1990 Panel	1991 Panel	1992 Panel	1993 Panel	1996 Panel	2001 Panel	2004 Panel
Number of Wave 1 Households	20,897	14,306	12,425	12,527	12,725	12,867	19,600	15,626	21,577	21,823	40,188	50,500	52,031
Wave	**Sample Loss Rates**												
1	4.88	6.69	7.34	6.69	7.47	7.58	7.3	8.4	9.3	8.9	8.4	13.3	14.9
2	9.42	10.77	13.44	12.57	13.08	12.54	12.6	13.9	14.6	14.2	14.5	21.9	21.9
3	12.28	13.26	15.23	14.15	14.70	13.79	14.4	16.1	16.1	16.2	17.8	24.7	25.6
4	15.37	16.27	17.08	15.87	16.46	---	16.5	17.7	18.0	18.2	20.9	25.9	27.6
5	17.42	18.78	19.31	18.06	17.99	---	18.8	19.3	20.3	20.2	24.6	27.5	29.8
6	19.38	19.72	20.04	18.90	18.27	---	20.2	20.3	21.6	22.2	27.4	28.2	31.2
7	20.99	20.47	20.65	18.97	---	---	21.1	21.0	23.0	24.3	29.9	28.9	32.5
8	21.99	20.78	---	---	---	---	21.0	21.4	24.7	25.5	31.3	30.3	33.1
9	---	---	---	---	---	---	---	---	26.2	26.9	32.8	31.9	34.0
10	---	---	---	---	---	---	---	---	26.6	---	34.0	---	35.5
11	---	---	---	---	---	---	---	---	---	---	35.1	---	36.9
12	---	---	---	---	---	---	---	---	---	---	35.5	---	36.6