THE SURVEY OF INCOME AND
PROGRAM PARTICIPATION

# RECIPIENCY HISTORY AND LEFT-CENSORED SPELLS OF PROGRAM PARTICIPATION IN THE SIPP

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The SIPP is a longitudinal survey that follows individuals over a period of approximately two and a half years, collecting monthly information on participation in social programs, as well of course, a large array of other items. This paper presents information about estimating durations of program participation using data from the SIPP. For illustration, the focus is on the program Aid to Families with Dependent Children or AFDC.

The data presented here are from the 1987 panel, the longitudinal panel and the recipiency history module from wave 2 of that panel. All estimates presented here are unweighted and are not intended to be interpreted as unbiased duration estimates.

Figure 1 illustrates the interview pattern of the SIPP 1987 panel. X's represent interview months and o's reference months. The sample in SIPP is divided into four rotation groups, each interviewed in a different month in order to smooth interviewing workloads over time. So, in figure 1 we see that rotation group 2 was the first to be interviewed in Feb. 1987. Individuals in this group provided information about Oct, Nov and Dec of 1986 and Jan of 1987. This staggered pattern continues over the life of the panel until May of 1989, when the last interview, of the first rotation group, gathers information about Jan - April of 1989.

In all of these interviews information about program participation is collected on a monthly basis. So, for this approximate 2 1/2 year period we observe individuals enter and leave various government programs, such as AFDC, and we can attempt to estimate the length of time people tend to spend participating in these programs. However, when we attempt to do this we encounter some problems, most importantly, the problem of censored data.

Data can be censored on the right, on the left, or both. Figure 1 illustrates right-censored data. Person i, whose program participation in AFDC is shown at the bottom of the panel by the capital letter P's, participated in AFDC from Nov 1988 to March 1989, that is, for 5 months.

Depending upon the timing of the final interview, her spell of participation may be right-censored. In this case, with the staggered design, the duration participating differs by rotation group. If she were interviewed in the first rotation group we see the spell end in the reference period, we observe all five months of participation and we see that the spell was completed.

In all other rotation groups, this spell would be considered right-censored. In rotation 2 we would count 3 months duration. In rotation 3 we would count 4 months duration. In rotation 4, we would observe all of the months participating, 5 months, but we would not observe the end of the spell. We would not know that the spell was complete and would classify it as a right-censored spell.

Right-censored data present a problem for estimates of durations, simple estimates of mean durations are biased by right-censoring. But there are relatively straightforward methods of handling right censoring; such as life table models. Other types of duration analyses such as hazard modelling are not affected by right censoring.

Note that all estimates of durations presented here are biased by right-censored data. No efforts have been made in this analysis to take right censoring into account.

Figure 2 illustrates a left-censored spell of AFDC participation. Person i in this case has participated in AFDC from Nov 86 to Mar 87, a period of 5 months. If this person were interviewed in rotation group 2 the spell is not left-censored, because we observe the beginning of the spell. All other rotation groups censor the spell, although, rotation group 3 captures the full duration of the spell, all 5 months are recorded, the analyst cannot know the spell began at that time and will label this spell left-censored.

Estimates of spell durations based on left-censored spells are biased. Though there are some ways of handling left-censored data, typically analysts deal with these spells by throwing them away. Since many spells in AFDC are longer than 2 years, this practice results in a large loss of information. Most importantly, persons who spend long periods of time in a program, are not included in our analyses.

In order to correct this problem of left-censoring, a history of recipiency is collected for all individuals who report program participation in the first wave of the survey. This set of questions ascertain a beginning date for each spell of program participation and thus provide a bounding date for all left-censored observations.

In the 1984 panel questions about welfare history were included in a topical module with questions about child support. In 1986 and subsequent modules the second wave consisted of a collection of personal history topical modules; they were recipiency, employment, work disability, education and training, family background, marital, migration, and fertility history. The major intent of these modules was to provide information on statuses in progress at the beginning of the panel reference period.

The recipiency history module collects information on participation in government programs prior to the first interview reference period, also shown in figure 2. The 'RH' represents when the recipiency history module is administered.

As shown, currently, all personal history topical modules are collected in the second wave of interview. The recipiency history module, asked of all persons interviewed in wave 1, lists the income sources received, and asks the respondent to provide a beginning date.

In figure 2 we can see that in wave 2, person i would have provided Nov. 1986 as the date when recipiency of AFDC began. In all rotations the date information can be used in order to compute the length of spell observed when interviewing commenced.

Because it is collected in the second interview the questionnaire structure is quite clumsy. Also, consistent and accurate recall is difficult for the respondent. The difficulty of asking about beginning dates of durations that were in process four months ago, and may or may not be in process in this reference period, should be apparent.

## I. Spells of Recipiency: AFDC

Figure 3 shows frequency distributions of spell durations for all spells observed in the panel, regardless of censoring, and for non-left-censored spells. Beginning dates have not been included in these spells at this point.

All of the spells reported in month 1 of the reference period are left-censored, that is, we do not observe the beginning of the spell. In the 1987 panel we found 436 persons who reported participating in AFDC in month 1. Similarly, all of the spells reported in month 28 are right-censored, that is, we do not observe their completion. An important point to note in this figure representing length of spells, are the high number of spells of 28 month duration. All of these spells are both left- and right-censored.

Of all the left-censored spells that we have in our sample, 156 of them are also right-censored, that is, we do not observe either the beginning or the end of the spell of participation. This represents 36 percent of all left-censored spells. These are the longest of recipiency spells and would usually be deleted from most analyses of program participation spells.

Typically, when analyses of durations in a given state are conducted left-censored spells are ignored. Particularly for this exercise, where our window of observation is so short, eliminating left-censored observations is not trivial. Removing left-censored spells from our calculations leaves us with 416 spells of participation in AFDC observed beginning in our 28-month reference period.

The distribution of non-left-censored spells is also shown in Figure 3. Since, by definition, none of these spells can be 28 months long, the vast majority of these are very short with a mean duration of only 7 months. This mean is highly influenced by the length of the reference period. Figure 3 shows the distribution of all spells and the distribution of non-left-censored spells. The area between the two curves represents the information thrown away when left-censored spells are ignored.

Spells on AFDC tend to be relatively long. In some cases it is the longest spells that are of greatest interest to program analysts. In order to alleviate the problems that arise from discarding the left-censored spells, we use the information in the recipiency history module to calculate durations for the left-censored spells.

## II. Recipiency History Topical Module

By attaching the beginning dates collected in the topical module to monthly information collected in the core, the duration of all left-censored spells can be calculated. For AFDC the mean duration of all left-censored spells is 76 months, or over 6 years. Recall that these estimated durations include right-censored spells, and are therefore, biased estimates of durations.

Of these left-censored spells, many are also right-censored. On average, spells that are also right censored are 99 months in duration (over 8 years) while those that we observe ending in the 28 month reference period, completed spells, are shorter, 60 months long (or 5 years) on average.

If we combine left-censored spells with all spells we observe beginning in the 28-month reference period, we have a total of 722 spells with mean duration of about 36 months, or 3 years.

Figure 4 shows the information we really miss from excluding left-censored spells from our analyses. While non-left-censored spells are restricted to 27 months, the left-censored spell, when dates are attached, are seen to be very long indeed relative to the window of observation in the SIPP survey. Again, in the figure, the difference between the curves represents the left-censored spells that we often lose.

### A. Data quality

As useful as these data may be for allowing us to improve our estimates of durations in programs, another important issue is the quality of the data. Many respondents have difficulty providing the information required in the recipiency history module. They cannot provide the dates which we are requesting. The dates are then imputed at census using a hot deck procedure based on such characteristics as age, race, sex, education, labor force status, and income.

The imputation rates for the 1986, 1987, and the 1988 panel are quite high (table 1), over 70 percent in some cases. These highest rates apply to the responses about the MONTH of beginning dates. In some cases these responses are changed in our edit programs in order to achieve more consistent responses.

Table 2 shows that imputation rates also vary by income source. For some sources, such as Federal Supplemental Security Income (SSI), Black Lung payments, Veterans compensation and food stamps imputation rates for months are over 30 percent. Participation in these particular programs is often of very long duration. Imputation rates for the year in which the recipiency began are quite low. Programs for which both month and year are imputed at a high rate are state administered SSI, Black lung, National Guard, and Medicare.

For the AFDC program imputation rates are; 27 percent (beginning month), 2 percent (beginning year), and 11 percent (both month and year imputed).

Imputation rates for month responses are higher as duration lengthens, and thus less important (table 3). As we go back in time the month in which the recipiency began is less likely to be recalled by the respondent. Of course, it is also less crucial to our estimate of duration, since a 2-month mistake in beginning date is less important for a spell that lasts 10 years than for one that lasts only 1 year.

## III. Future plans and conclusions

An additional finding of this examination of the seemingly left-censored spells is that a relatively large number of spells that are left-censored have no dates provided in the module. Of the 436 spells that seem to be left-censored 130 are still not bounded by the information we collect. In some cases, this results from the imputation of AFDC recipiency in wave 1. Most of these cases, however, are due to the fact that only the person authorized in the household to receive payments is listed as receiving AFDC, and, thus, only that person is asked to supply a date in wave 2.

Also disturbing is the fact that some respondents report starting dates after the spell is reported for a given month within the reference period. Several left-censored spells are reported in the history module as beginning in a month following the first month of the reference period. In other cases the date assigned is the last month in the reference period. Many of these, though not

all, are imputed. Part of the problem is the difficulty in responding to the questions, another is that all wave 2 editing and imputation is done without wave 1 information available.

In order to obtain more consistent responses future plans include moving the recipiency history module, as well as the employment history module, to the first wave of the survey. While the first spell retrospective questions will remain together in a section, the questions about beginning dates will be moved into the core.

The new design is such that, when a person reports receiving a particular income type four months ago, which is the first month of the reference period, an additional question about when the recipiency began is asked.

After reporting the amounts in each month a check item will be asked to determine if the item was received in the first month of the reference period. Then for the income types of interest, beginning dates will be asked, both month and year. It is hoped that this will yield more accurate and consistent responses about this important information.

To summarize, we have demonstrated the potential problems that the analyst faces when attempting to estimate durations of program recipiency using the SIPP. We have described the problems arising from the presence of left-censored data and we have shown the important role of this information in analyses of durations of spells on programs.

In addition we've shown some measure of the quality of the data. That imputation rates are quite high, but that the highest rates occur in responses to the month when the spell began and particularly for programs that have very long durations. In these situations that information is less important.

Finally, we have suggested that at least some of the high nonresponse rates are due to the placement of the questions in the second wave of the survey and presented our plans to move the questions to the first wave and incorporate them in such a way that the respondent will find it easier to provide accurate information. Our hope is that the quality of this important information will be improved and become more accessible to researchers interested in dynamic analyses of program recipiency.

Figure 1: Design of the 1987 SIPP Panel

```
---------------- 86----||--------- 87----------------...|| ...  --- 88-||------ 89------||
ROTATIONS   S  O  N  D  J  F  M  A  M  J  J  A  S  .........  O  N  D  J  F  M  A  M  ...
-------------------------------------------------------------------------------------------

ONE                    o  o  o  o  X1 o  o  o  X2 .........  o  o  o  X6 o  o  o  X7

TWO            o  o  o  o  X1 o  o  o  X2 o  o  o  .........  X6 o  o  o  X7

THREE             o  o  o  o  X1 o  o  o  X2 o  o  .........  o  X6 o  o  o  X7

FOUR                 o  o  o  o  X1 o  o  o  X2 o  .........  o  o  X6 o  o  o  X7

-------------------------------------------------------------------------------------------
AFDCi                                                                  P  P  P  P  P
-------------------------------------------------------------------------------------------
```

Xn = interview month, wave n
o = reference month
P = AFDC participation of person i

Figure 2: Recipiency History Topical Module

```
---------------- 86----||--------- 87----------------...|| ...  --- 88-||------ 89------||
ROTATIONS   S  O  N  D  J  F  M  A  M  J  J  A  S  .........  O  N  D  J  F  M  A  M  ...
-------------------------------------------------------------------------------------------

ONE                    o  o  o  o  X1 o  o  o  RH .........  o  o  o  X6 o  o  o  X7

TWO            o  o  o  o  X1 o  o  o  RH o  o  o  .........  X6 o  o  o  X7

THREE             o  o  o  o  X1 o  o  o  RH o  o  .........  o  X6 o  o  o  X7

FOUR                 o  o  o  o  X1 o  o  o  RH o  .........  o  o  X6 o  o  o  X7

-------------------------------------------------------------------------------------------
AFDCi             P  P  P  P  P
-------------------------------------------------------------------------------------------
```

Xn = interview month, wave n
o = reference month
P = AFDC participation of person i
RH = Recipiency History Topical Module

FIGURE 3.

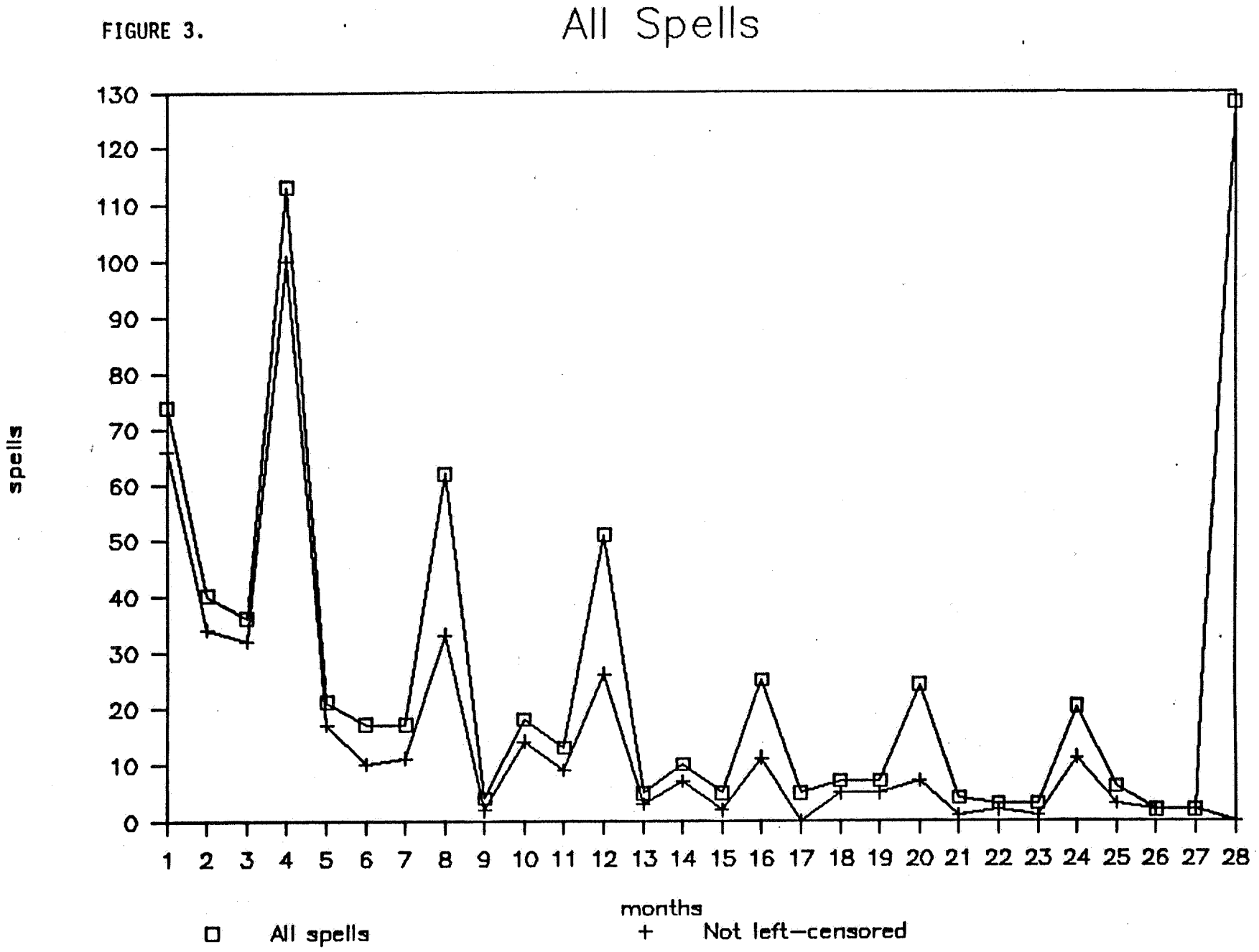
All Spells
spells
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
months
All spells
Not left-censored

FIGURE 4.

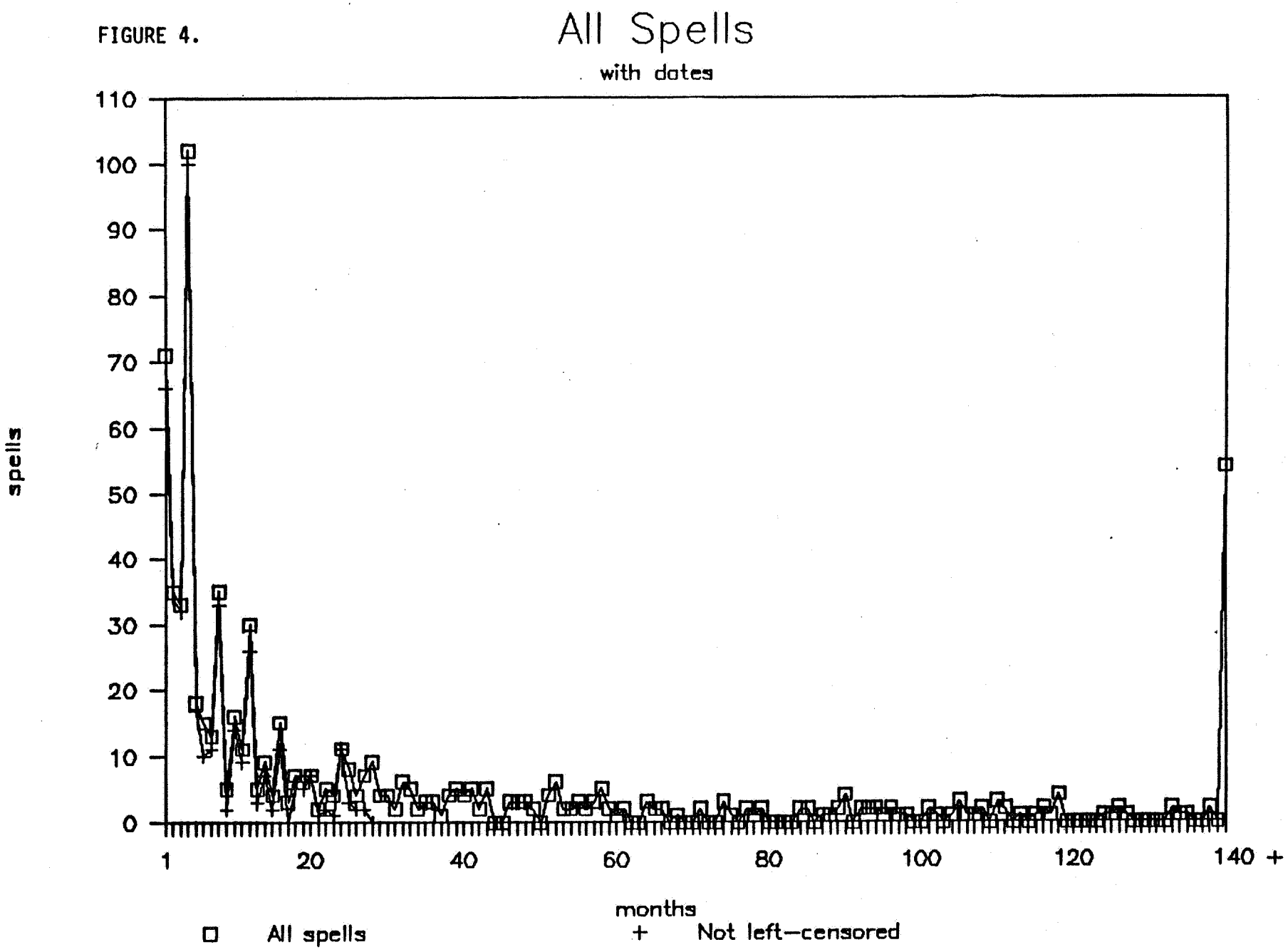
All Spells
with dates
spells
110
100
90
80
70
60
50
40
30
20
10
0
1
20
40
60
80
100
120
140 +
months
All spells
Not left-censored

Table 1: Recipiency history topical module: 1986, 1987 and 1988

| Source Code | | Imputation Rates 1986 | 1987 | 1988 |
|---|---|---|---|---|
| 8006 | Month | 36.9 | 37.4 | 33.5 |
| 8008 | Year | 16.2 | 15.8 | 14.9 |
| 8012 | Month | 51.2 | 52.5 | 42.4 |
| 8014 | Year | 33.2 | 35.0 | 21.3 |
| 8018 | Month | 59.5 | 64.6 | 49.3 |
| 8020 | Year | 46.6 | 52.3 | 29.6 |
| 8024 | Month | 65.0 | 73.6 | 53.0 |
| 8026 | Year | 51.6 | 58.6 | 31.1 |
| 8030 | Month | 78.6 | 76.9 | 38.5 |
| 8032 | Year | 64.3 | 53.8 | 30.8 |
| 8058 | Ever applied food stamps | 4.8 | 5.7 | 6.9 |
| 8060 | Ever authorized food stamps | 2.6 | 3.6 | 4.3 |
| 8062 | Month | 65.0 | 61.8 | 64.2 |
| 8064 | Year | 21.8 | 21.7 | 20.6 |
| 8066 | How long | 17.1 | 15.2 | 15.8 |
| 8072 | How many times | 11.0 | 9.6 | 12.1 |
| 8080 | Ever applied AFDC | 6.9 | 8.2 | 8.9 |
| 8082 | Ever received AFDC | 2.0 | 5.2 | 3.7 |
| 8084 | Month | 51.6 | 54.9 | 56.1 |
| 8086 | Year | 16.6 | 20.0 | 18.3 |
| 8088 | How long | 17.1 | 17.2 | 15.5 |
| 8094 | How many times | 13.2 | 13.8 | 11.8 |
| 8100 | Ever applied SSI | 4.4 | 5.2 | 5.7 |
| 8102 | Ever received SSI | 3.8 | 8.2 | 5.7 |
| 8104 | Month | 72.0 | 70.3 | 74.9 |
| 8106 | Year | 43.6 | 47.0 | 45.7 |
| 8108 | How long | 36.7 | 38.9 | 39.0 |
| 8118 | Medicaid beginning/ month | 50.5 | 52.9 | 56.1 |
| 8120 | Year | 28.0 | 25.1 | 30.4 |
| 8126 | Covered by health insurance | 11.2 | 9.9 | 9.7 |
| 8132 | Not covered/ month | 45.8 | 49.9 | 51.0 |
| 8134 | Year | 8.7 | 8.6 | 11.9 |
| 8142 | Public housing | 31.6 | 30.6 | 24.8 |
| 8150 | On waiting list | 12.9 | 16.0 | 15.8 |

Table 2: Imputation Rates by Income Source:

| | ISS codes | Total | Percent imputed Month | Year | Both |
|---|---|---|---|---|---|
| Social Security | 1 | 4092 | 26.1 | 1.0 | 12.1 |
| Railroad Retirement | 2 | 106 | 22.6 | 0.9 | 24.5 |
| SSI | 3 | 421 | 46.3 | 0.2 | 23.3 |
| SSI (state only) | 4 | 15 | 13.3 | 0.0 | 40.0 |
| Unemployment compensation | 5 | 512 | 6.3 | 5.9 | 13.7 |
| Supplemental unemploy. | 6 | 20 | 5.0 | 0.0 | 5.0 |
| Other unemployment | 7 | 9 | 0.0 | 11.1 | 22.2 |
| Veterans comp/pension | 8 | 345 | 42.0 | 1.2 | 18.0 |
| Black Lung | 9 | 24 | 33.3 | 0.0 | 41.7 |
| Workers compensation | 10 | 129 | 12.4 | 3.1 | 14.7 |
| AFDC | 20 | 329 | 26.1 | 2.4 | 10.9 |
| General assistance | 21 | 95 | 25.3 | 3.2 | 16.8 |
| Indian, Cuban, Refugee | 22 | 2 | 0.0 | 0.0 | 50.0 |
| Foster child care | 23 | 14 | 14.3 | 0.0 | 14.3 |
| Other welfare | 24 | 20 | 40.0 | 0.0 | 30.0 |
| WIC | 25 | 156 | 9.0 | 2.6 | 11.5 |
| Foodstamps | 27 | 757 | 32.0 | 2.4 | 14.8 |
| Child support | 28 | 464 | 22.6 | 1.1 | 17.0 |
| Alimony | 29 | 72 | 20.8 | 0.0 | 18.1 |
| Pension, company or union | 30 | 1047 | 22.4 | 0.6 | 16.0 |
| Pension, Federal | 31 | 231 | 17.3 | 0.9 | 13.4 |
| Pension, military | 32 | 156 | 14.7 | 0.0 | 13.5 |
| Pension, National Guard | 33 | 4 | 25.0 | 0.0 | 0.0 |
| Pension, state | 34 | 215 | 22.3 | 0.5 | 14.0 |
| Pension, local | 35 | 110 | 20.0 | 0.0 | 11.8 |
| G.I. Bill | 40 | 29 | 10.3 | 0.0 | 17.2 |
| VA educational assist | 41 | 14 | 21.4 | 0.0 | 21.4 |
| Medicare | 172 | 2630 | 14.9 | 5.3 | 73.5 |
| PELL Grant | 176 | 170 | 2.9 | 1.8 | 71.2 |

Table 3: Imputation Rates of MONTHS by Beginning Years; All Programs

| Year | Responses | Imputations | Rates |
|---|---|---|---|
| 1937 | 1 | 1 | 100.0 |
| 1938 | 2 | 1 | 50.0 |
| 1940 | 2 | 2 | 100.0 |
| 1941 | 1 | 1 | 100.0 |
| 1942 | 2 | 1 | 50.0 |
| 1943 | 2 | 1 | 50.0 |
| 1944 | 5 | 3 | 60.0 |
| 1945 | 26 | 16 | 61.5 |
| 1946 | 31 | 18 | 58.1 |
| 1947 | 15 | 12 | 80.0 |
| 1948 | 7 | 6 | 85.7 |
| 1949 | 2 | 2 | 100.0 |
| 1950 | 3 | 2 | 66.7 |
| 1951 | 2 | 2 | 100.0 |
| 1952 | 4 | 3 | 75.0 |
| 1953 | 4 | 3 | 75.0 |
| 1955 | 10 | 5 | 50.0 |
| 1956 | 5 | 2 | 40.0 |
| 1957 | 7 | 6 | 85.7 |
| 1958 | 13 | 6 | 46.2 |
| 1959 | 22 | 11 | 50.0 |
| 1960 | 40 | 31 | 77.5 |
| 1961 | 32 | 12 | 37.5 |
| 1962 | 89 | 48 | 53.9 |
| 1963 | 51 | 25 | 49.0 |
| 1964 | 62 | 33 | 53.2 |
| 1965 | 184 | 112 | 60.9 |
| 1966 | 109 | 52 | 47.7 |
| 1967 | 164 | 72 | 43.9 |
| 1968 | 206 | 132 | 64.1 |
| 1969 | 181 | 97 | 53.6 |
| 1970 | 249 | 141 | 56.6 |
| 1971 | 261 | 152 | 58.2 |
| 1972 | 449 | 288 | 64.1 |
| 1973 | 390 | 221 | 56.7 |
| 1974 | 436 | 239 | 54.8 |
| 1975 | 568 | 307 | 54.0 |
| 1976 | 439 | 234 | 53.3 |
| 1977 | 567 | 295 | 52.0 |
| 1978 | 418 | 204 | 48.8 |
| 1979 | 504 | 252 | 50.0 |
| 1980 | 639 | 332 | 52.0 |
| 1981 | 635 | 315 | 49.6 |
| 1982 | 875 | 419 | 47.9 |
| 1983 | 777 | 336 | 43.2 |
| 1984 | 782 | 367 | 46.9 |
| 1985 | 1410 | 774 | 54.9 |
| 1986 | 1775 | 560 | 31.5 |
| 1987 | 743 | 0 | 0.0 |