

USE OF LAST PHYSICIAN VISIT TO CHARACTERIZE HEALTH CARE UTILIZATION

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INTRODUCTION

Research presented in this paper is part of ongoing work on the 1996 redesign of the National Health Interview Survey (NHIS) questionnaire. Given the current interest in health care reform, research concerning the redesign of the NHIS questionnaire has placed some emphasis on data related to health care utilization. The NHIS has several characteristics that make it a unique source of this kind of data. The NHIS has been ongoing since 1957 and currently collects data on a sample of about 49,000 households each year.¹ As a population-based survey, the NHIS can provide data on the health care utilization patterns of the entire population, rather than only those persons who receive care from particular types of health care providers. In addition, the NHIS provides data on a wide spectrum of issues including health status, demographic and socioeconomic characteristics, health insurance coverage, and health behaviors so that health care utilization can be analyzed in conjunction with a number of other characteristics of the individual.

Although the NHIS offers important strengths as a source of data on health care utilization, the difficulties of collecting data from interview surveys such as the NHIS are well-documented.^{2,3} Information that can be accurately obtained from the NHIS is limited to those items about which individuals have knowledge and can recall. Thus, the level of detail of questions and length of recall period are important issues for the design of the NHIS questionnaire. The National Center for Health Statistics (NCHS) has a long history of methodological research in this area.^{4,5} Past research has indicated that recall of physician encounters falls off after a relatively short time period.

In response to these findings, the NHIS currently bases estimates of physician utilization on ambulatory health care encounters that occur during the 2 weeks prior to the interview. Information is collected on characteristics of health care contacts such as place of contact, type of health care provider seen, reason for contact, and services received. However, because only about 15 percent of the population report a visit within that 2-week period, the number of visits included in the sample is relatively small. The resulting event data can only be used to make aggregate estimates for population

groups and cannot be used to characterize individuals. Another disadvantage of the current method is that the amount of detail that can be obtained about each contact with the health care system is limited to information known to a proxy respondent since information about the whole family may be provided by only one respondent. Although it is believed that a proxy would know if a contact occurred, the proxy would be less likely to know the details of the contact.

Questions about an individual's last physician visit were considered for inclusion in the NHIS since they offer some potential advantages for obtaining information about the characteristics of physician contacts. If questions were asked on the last visit during the year prior to interview then the number of persons providing data on physician contacts would increase from 15 percent to 75 percent of the sample. This increase in numbers of observations would make the use of self-response feasible, thus addressing concerns that proxy data are less accurate than self-response and allowing more detailed questions about the contact. In addition, elimination of questions for all family members would reduce individual respondent burden.

Several draw backs to this approach were anticipated. It would still only provide aggregate data and could not be used to characterize individuals. The effect of increasing the recall time was unclear as was the generalizability of information on the last physician visit. There was reason to believe that last contacts are not representative of all contacts. Although some of the difference might be reduced with appropriate weighting, the magnitude of the remaining bias was not known. Despite these drawbacks the interest in obtaining more detailed information on health care utilization from the NHIS was sufficient to warrant further exploration of this option.

The objective of this paper is to evaluate questions on last physician visit by comparing national estimates of visit characteristics derived from questions on last contact with those derived from questions on contacts during the 2-weeks prior to interview. Differences in estimates and their standard errors have been quantified and implications for the NHIS questionnaire design discussed.

METHODS

The data used for this analysis are from the 1972

National Health Interview Survey which included questions on all doctor visits within the 2 weeks prior to interview as well as questions on the last doctor visit within the past year for those who did not have a visit within the 2-week recall period.⁶ 1972 was the only year that questions on last physician contacts were included on the NHIS. The interviewed sample for 1972 consisted of 44,000 households containing about 133,000 persons. Adults present at the time of the interview were interviewed individually. A related household member answered questions for children and for adults not home at the time of the interview. Data used in this analysis include information on physician contacts during the 2 weeks prior to interview, information on the last physician contact within the 12 months prior to interview, and the number of physician contacts during the 12 months prior to interview. Visit characteristics considered were place of visit, type of physician seen, and reason for visit.

The percent of all visits with a specific characteristic was estimated using two methods. The first approach is the one that is currently presented in NCHS reports and is considered the "gold standard" for the purposes of this presentation. The percent of all visits with a specific characteristic was estimated as the percent of all visits reported during the two-weeks prior to the interview with the characteristic of interest. The estimate is based on 2-week recall of the number of visits and the characteristics of each visit. The estimate includes information obtained from both self-respondents and proxy-respondents. In the 1972 NHIS about 22,000 visits during the two weeks prior to interview were reported by 17,000 persons.

The second estimate of the percent of all visits with a specific characteristic was derived from questions on the characteristics of the last visit reported during the 12 months prior to interview and the number of visits reported for the 12-month period. Last visits are not a random sample of all visits and are not of interest in themselves. However, an approximate estimate of the percent of all visits with a characteristic was obtained by weighting characteristics of the last visit by the individual's number of visits during the 12 months prior to interview as follows:

$$p(wlv) = (\sum w_i x_i y_i / \sum w_i y_i) * 100$$

where

$p(wlv)$ is the percent of visits with a characteristic

w_i is the sample weight for person i

$x_i = 1$ if person i has the characteristic
 $= 0$ otherwise

y_i = number of doctor visits reported by person i during the 12 months prior to the interview.

In the 1972 NHIS these data were available for about 89,000 persons. The second estimate of the percent of all visits with a specific characteristic was based on 12-month recall of the number of visits and the characteristics of the last visit.

A third set of estimates calculated was the percent of last visits with a characteristic with no weighting by number of visits reported during the 12 months prior to interview. These estimates have been presented to illustrate the differences between characteristics of all visits and characteristics of last visits.

It should be noted that estimates based on 2-week recall and estimates based on last visits differ with respect to the time period to which they refer. For the data collection year 1972, estimates based on 2-week recall apply to the 12-month time period, mid-December 1971 to mid-December 1972. Estimates based on last visits relate to a 12-month period prior to interview that could have occurred within the 2-year time period January 1971- December 1972. Similarly, estimates based on weighted last visits apply to last visits during the 2-year period 1971-72 weighted by the number of visits during the 12 months prior to interview, a period that also spans the 2-years 1971-72. Comparisons between estimates of the characteristics of physician visits based on 2-week recall and weighted last visits have been made under the assumption that characteristics of physician visits did not differ over the 2-year period 1971-72.

The computer program SUDAAN was used to calculate proportions and standard errors, taking into account the complex survey design of the NHIS.⁷ The SUDAAN procedure Crosstab was used to calculate estimates based on the 2-week recall of all visits and the SUDAAN procedure Ratio was used for estimates based on last visit weighted by number of visits in the 12 months prior to interview. The SUDAAN procedure Crosstab was also used to estimate the percent of last visits with a characteristic.

Estimated bias of the percent of all visits with a characteristic based on weighted last visits was calculated as :

$$\text{bias} = p(wlv) - p(2wk)$$

where

$p(wlv)$ is the percent based on weighted last visits
 $p(2wk)$ is the percent based on 2-week visits.

The estimated relative bias of the estimate was calculated as :

$$\text{relative bias} = ((p(wlv) - p(2wk)) / p(2wk)) * 100.$$

The percent difference in the standard error of visit characteristics based on weighted last visits was calculated as:

$$\text{difference in se} = ((se(wlv) - se(2wk)) / se(2wk)) * 100.$$

where

$se(wlv)$ is the standard error based on weighted last visits.

$se(2wk)$ is the standard error based on 2-week visits.

RESULTS

Table 1 compares characteristics of physician contacts based on each of the three methods of estimation. Comparison of results based on the last physician contact during the previous 12 months with results based on all contacts during the 2-weeks prior to interview illustrates the point that last visits are not representative of all visits. The results are consistent with the hypothesis that last visits underrepresent sick visits. The results differ most strikingly with respect to reason for visits. The percent of last visits for general checkups was more than twice that for all visits (23 and 9 percent). This relationship was consistent across 4 age groups, under 15 years, 15-44, 45-64, and 65 years and over (data not shown). Diagnosis or treatment was cited as the reason for 71 percent of last visits, a level 15 percent lower than for all visits (83 percent). Consistent with this finding, specialists were one-third less likely to be seen for last visits than all visits (13 and 19 percent).

Estimates of physician characteristics based on weighted last visits were generally more similar to estimates based on 2-week recall. For some characteristics the estimates were virtually identical whereas for others differences remain (table 1).

Table 2 presents estimates of bias for percents based on weighted last visits. The percent of visits that occur in doctors offices was overestimated by about 5 percentage points and the percent of visits to emergency rooms, hospital outpatient clinics, and other places were each underestimated by 1-2 percentage points. The percent of all visits for general checkups was overestimated by about 3 percentage points and the percent of visits for diagnosis and treatment was underestimated by a similar amount. The percent of visits to specialists was underestimated by 2 percentage points and visits to primary care physicians and obstetrician/gynecologists were each overestimated by about 1 percentage point.

The direction and magnitude of estimated bias tends to be similar across age groups (data not shown). However, visits to specialists were underestimated to a greater extent with increasing age. For persons 65 and over the percent of visits to specialists was underestimated by 4 percentage points whereas for children under 15, visits to specialists were only underestimated by 1 percentage point (data not shown).

The estimated relative bias in visit characteristics based on weighted last visits is also shown in table 2.

The relative bias was about 10 percent or less for most estimates. However, the relative bias was about 40 percent for the percent of visits for a general checkup and the percent of visits to emergency rooms. The relative bias for the percent of visits to emergency rooms was large because only about 4 percent of all visits were to emergency rooms. Among the elderly the relative bias for specialist visits was 20 percent (data not shown).

Part of the rationale for considering questions on last visits was to increase the number of observations, thereby reducing the standard errors of estimates. Standard errors for estimates based on weighted last visits were all smaller than for estimates based on 2-week recall, as expected. However, the reductions in standard errors due to increased numbers of observations was tempered by the additional variability due to the weighting by the number of visits reported during the previous 12 months. The reductions in standard errors generally ranged from about 10 to 20 percent (table 2). The reduction in variance associated with the increased number of observations was not sufficiently large to offset the bias of estimates based on weighted last visits. The estimated mean square error associated with estimates based on weighted last visits was larger than for estimates based on 2-week recall for all characteristics.

DISCUSSION

The results of this analysis indicate that questions on last visits do not appear to offer sufficient advantages to warrant their inclusion in the NHIS. Last visits overrepresent well visits as illustrated by comparing the percent of last visits for general checkups with the percent of all visits in the past 2-weeks for general checkups (23 percent and 9 percent). Weighting last visits by number of visits during the 12 months prior to interview did not sufficiently correct for this bias. Previous research has shown that fewer visits are reported by respondents for a 12-month recall period than a 2-week recall period.^{8,9} Analysis of data from the Health Field Study has also shown that the quality of reporting of the last visit characteristics drops off as length of recall period increases.¹⁰ In addition to recall bias associated with the 12-month recall period, estimates based on weighted last visits also have the disadvantage of increasing the complexity of the estimation of visit characteristics. A limitation of this analysis is that the data on last visits and number of visits during the 12 months prior to interview included proxy responses. The use of self-reported data might reduce the bias of estimates based on weighted last visits.

In the redesign of the NHIS several other approaches are under consideration to provide additional information on the use of ambulatory health care. Estimates for events as well as estimates for individuals are needed. With respect to event data an increase in the recall period for physician contacts from 2 to 4 weeks is being considered to increase the number of physician contacts in the sample. Analyses of data from the Health Field Study will provide information to evaluate the effect on recall bias of a 2-week increase in recall period.¹¹ Other possible approaches are to increase the overall sample size and design the questionnaire so that data can be combined across multiple years for events with low frequencies.

With respect to characterizing the health care utilization of individuals, questions are under consideration that ask whether specific health care events have occurred during the 12 months prior to interview. Use of a sample adult and sample child for each household is being considered with elimination of proxy reporting for certain questions for adults to improve the accuracy of responses and allow more detailed questions. In addition, probes to improve the accuracy of responses to questions on the number of ambulatory care contacts during the 12 months prior to interview are being investigated.

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Table 1. Percent of physician visits with specific characteristics according to method of estimation:
United States, 1972

	Percent of visits			Standard errors		
	2-week recall	last visits	weighted last visits	2-week recall	last visits	weighted last visits
Type of physician						
Primary care	74.0	80.1	75.3	0.52	0.27	0.44
OB/GYN	6.8	7.1	7.5	0.25	0.14	0.22
Specialist	19.2	12.9	17.2	0.46	0.19	0.36
Place of visit						
Doctor's office	80.0	84.5	84.7	0.52	0.39	0.47
Hospital clinic	8.8	6.3	7.6	0.45	0.27	0.37
Emergency room	3.8	3.1	2.1	0.18	0.10	0.10
Other place	7.5	6.0	5.6	0.30	0.23	0.25
Reason for visit						
Treatment/ diagnosis	83.3	70.9	80.6	0.38	0.34	0.35
General checkup	8.8	22.6	12.0	0.27	0.33	0.25
Other reason	7.9	6.5	7.4	0.26	0.13	0.23

Table 2. Estimates of bias, relative bias, and percent reduction in standard errors of percent of physician visits with specific characteristics based on weighted last visits

	Bias	Relative bias	Percent difference in s.e.
Type of physician			
Primary care	1.3	1.8	-15.0
OB/GYN	0.7	10.3	-14.0
Specialist	-2.0	-10.4	-21.7
Place of visit			
Doctor's office	4.7	5.9	-10.4
Hospital clinic	-1.2	-13.6	-17.8
Emergency room	-1.7	-44.7	-47.2
Other place	-1.9	-25.3	-17.0
Reason for visit			
Treatment/ diagnosis	-2.7	-3.2	-8.7
General checkup	3.2	36.4	-7.4
Other reason	-0.5	-6.3	-12.7