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Indicators of Americans' health are mainly derived from personal interviews and medical records. The indicators give a limited view of health: Acute and chronic conditions are counted only if they prompted activity restriction or medical attention. The health actions enumerated are usually curative ones and involve health service contacts. This is only the "tip of the iceberg", since many health problems are self-treated or not treated at all, and many health actions are preventive.

How can indicators of morbidity, disability, and health actions be obtained, which reflect more fully individuals' health experiences? One strategy is to have individuals report symptoms and health actions (curative and preventive) as they occur.

A daily record, or diary, is a prospective procedure well-suited to that goal. Diaries have been used extensively in consumer expenditure surveys (Sudman and Ferber, 1971, 1974; Walsh, 1977) and also in studies of food consumption and time use. They are relatively rare in health research. Health diaries have been used for three purposes: (a) in methodological studies to compare reporting levels for retrospective and prospective data; (b) as memory aids to improve the recall of health events in a later interview; and (c) as a principal data source.

This paper reviews previous health diary studies. It presents evidence on advantages and disadvantages of health diaries, which have been suggested. Lastly, a 1978 study in Detroit which uses a health diary is described, with attention to how its advantages are exploited and its possible disadvantages controlled.

REVIEW OF HEALTH DIARY STUDIES

Table 1 summarizes features of all prior health diary studies known to the author (n=15). These characteristics are shown: place, dates, study population, reporter (who gave health information), respondents (for whom information obtained), duration of diary, purpose of diary, diary contents, timing of any interviews used in study, compensation, and diary format (journal or ledger). [Table 1 is available from the author.] A brief review follows:

A diary was first used in the Baltimore Morbidity Survey conducted in the Eastern Health District of Baltimore from 1938 to 1943. It served as a memory aid when an interviewer came to query health events in the past month (Downes and Collins, 1940). In 1948, a diary was the main data instrument in the East York-Leaside Sickness Survey (Smith and Mosley, 1951). This survey was precursor to the 1950-1951 Canadian Sickness Survey, in which respondents kept a health calendar for one year. The calendar served as a memory aid during monthly interviews (Peart, 1952). In 1948, Muller et al. (1952) used a diary principally as a memory aid. During monthly interviews, diary entries were reviewed, then transcribed to a summary form for data analysis.

The first methodological study using health diaries was conducted in San Jose in 1952 (Allen et al., 1954; Mooney, 1962). Some respondents kept a daily health record for 2 or 4 months. Others were interviewed once a month for 4 months. The San Jose study was a pretest for a 1954-1955 statewide survey. Roughly half of the sampled California households received a health calendar by mail. A month later,

an interviewer visited and conducted a retrospective interview, using the calendar as a memory aid.

In the 1960's, four studies used a diary as the principal data source: (1) Madison, Wisconsin families in 1961 (Mechanic and Newton, 1965), (2) Boston families in 1964-65 (Alpert et al., 1967; Kosa et al., 1967), (3) Rochester, New York families in 1969 (Haggerty et al., 1975; Roghmann and Haggerty, 1972a, 1972b, 1973, 1974), (4) South Wales families in 1967-68 (Robinson, 1971).

Building on Mooney's work, several studies have compared the yield of diaries with various retrospective strategies: (1) Three instruments (a diary and two interviews) were pre-tested for the Tecumseh Community Study (Wilcox, 1963). The diary was not used thereafter. (2) Laurent et al. (1972) compared three instruments in Detroit: a diary, a "standard" interview, and an interview with numerous probes. (3) Sudman and colleagues have conducted studies using two diary forms, comparing their reporting levels with a retrospective interview (Sudman et al., 1974; Sudman and Lannom, 1977).

Several contemporary studies use health diaries. (1) The National Medical Care Expenditure Survey (1977-1978) had households keep a log of medical expenses. The log served as a memory aid during monthly interviews. (See Wright et al., 1976 for methodological results of NMCES pre-test diaries.) (2) A 1978 study of Detroit adults used the diary as a main data instrument. The study is described in Verbrugge (1979) and later in this paper. (3) A forthcoming study of Army personnel will use a health diary. Details are available from G.D. Bishop, Walter Reed Army Institute of Research, Washington D.C.

To summarize the main characteristics of the 15 studies: (1) In the past decade, interest in health diaries has been mainly methodological. Analysis is devoted to comparison among instruments, and responses are pooled in order to compute rates. Two interesting units of analysis are thereby lost: the individual, and the day. When diaries are used as memory aids, the data are poorly utilized, since daily reports are not directly coded or analyzed. (2) With one exception, the studies occurred in North America and are limited to populations which are urban and mainly white. (3) The record-keeper has usually been a female adult, who records health events for herself and all other members of the household. (4) Diary periods have ranged from 1 week to 5 years. A common period is 4 weeks. (5) Most diaries ask for reports of "minor" symptoms (which did not prompt restricted activity or medical care), "major" symptoms (which did), restricted activity, and medical care. (6) Respondents usually have an initial interview about health. An interview at the end of the diary period is uncommon. (7) Most studies have not compensated respondents. (8) Two general forms of diaries are common: A journal with a standard set of questions which the respondent answers each day; a ledger with a separate page for each type of health event (e.g. doctor visit), the respondent entering events sequentially as they occur.

ADVANTAGES AND DISADVANTAGES OF HEALTH DIARIES

Researchers generally believe that a daily health record will reduce recall error, but they worry about the reporting burden that a diary study places on

respondents. Using results from the studies cited, I present evidence on the main advantages and disadvantages claimed for health diaries. Four advantages are discussed: high levels of reporting, reduction of recall error, validity, and utility for analysis of individual health and health dynamics. Five possible disadvantages are covered: respondent cooperation, conditioning effects, data quality, survey cost, and complexity of data collection and processing.

Reporting Levels, Recall Error, and Validity

Compared to retrospective interviews, health diaries produce higher reporting for most items. This is attributed to lower recall error in diaries, and it is interpreted as a sign of more valid data.

Reporting Levels. Table 2 summarizes results of methodological studies which compare diaries and interviews. [Table 2 is available from the author.]

Despite the variety of rates computed from the studies, there are consistent results. Comparing a diary and retrospective interview: (1) The diary produces higher incidence rates. The excess appears for both acute conditions and chronic ones which were symptomatic during the study period. Even when an interview contains extensive probes about recent health problems, the diary produces higher rates. (2) A standard interview and a diary obtain similar prevalence rates and counts of chronic conditions. These conditions are not necessarily symptomatic in the study period. But an interview with extensive probes about chronic conditions elicits much higher counts than the diary. (3) Compared to a standard interview, the diary excels in counts of diffuse symptoms for which people do not know the underlying medical condition, and in counts of recently noticed conditions. The second result may simply reflect higher reporting for acute conditions. (4) The diary has especially high rates for nondisabling illnesses, those which do not prompt restricted activity or medical attention. The excess is greatest for acute nondisabling conditions. (5) The diary has higher acute disability rates, but slightly lower chronic disability rates. ("Disability" means days a person cut down on usual activities, incl. staying in bed.) It is not known why the diary fares poorly for chronic disability rates. (6) The evidence for health actions (doctor visits, dentist visits, hospitalization, medications) is uneven. The diary sometimes produces higher rates and counts, sometimes equal or lower ones.

Several other results are not shown in Table 2. (7) The diary elicits more reports of acute and chronic conditions of low-impact (Laurent et al., 1972:24-28). ("Low-impact" means a condition causes little pain, treatment, disability, or medical attention.) An interview with extensive probes picks up more low-impact chronic conditions, but it is less successful than the diary for reports of low-impact acute conditions. (8) Considering types of acute conditions (e.g. respiratory, accidents), the diary produces excess rates for virtually every type (Wilcox, 1963:100).

In summary: Compared to retrospective interviews, diaries increase reports of most symptoms and disability. The differences are largest for minor health problems --acute symptoms which do not cause disability or medical attention. Diaries are similar to interviews in counts of chronic conditions, and not obviously better, or worse, for reports of health actions.

In general, diaries are well-suited for information about health events experienced during the diary period, but are not best for information about chronic conditions of low-impact. Diaries excel in incidence but not prevalence.

Recall Error. Recall error has two main forms: forgetting a health event entirely, and remembering an event but displacing it in time. The first, called "omission" by Sudman et al. (1974), causes underreporting and reduces rates. The second, called telescoping, can inflate or deflate rates. Respondents may incorrectly include a health event in the time period queried, or exclude it. Inflation is thought to be more common.

In diary studies, forgetting is unlikely because the diary relies on very short-term memory --events being reported within a few hours of their occurrence. As shown above, diaries produce higher rates and counts than interviews for most health indicators. The fact that the ratio of diary to interview reports is larger for "minor" events than for "major" ones suggests that diaries reduce forgetting errors.

Telescoping is entirely eliminated from diary data. (This assumes that respondents comply with instructions to make entries daily and do not skip days, then try to recall events much later.)

Validity. Are diary reports therefore more valid (true)? Two strategies are commonly used to assess the validity of self-reported health events. One test is to compare self-reports with clinical or hospital records, which are viewed as accurate. But when no criterion data are available, one simply assumes that the method which produces the highest reporting is the most accurate.

Criterion validity tests are possible for only a few health events --when people utilize health services, and a clinic or medical record is generated. There is ample research on criterion validity for retrospective interviews. Overall, self-reports of doctor visits, hospitalization, and diagnosed chronic conditions show a net undercount (Balamuth, 1965; Cannell, 1965; Madow, 1967, 1973; National Center for Health Statistics, 1966).

Is undercount less for diaries than retrospective interviews? Only one study has much evidence, and the results are not clearcut. Sudman et al. (1974) compare clinic records of doctor and hospital visits with diary reports, and with interview reports. For the Chicago sample, diaries show less undercount than interviews. But for the Marshfield sample, diaries and interviews produce similar undercount.

Criterion validity tests are not feasible for reports of symptoms, disability, or health actions which occur outside the health services sector. (An exception is work loss, if the employer keeps records of absence and reason-for-absence.) For these events, the relative validity of diary and interview reports is decided by using the assumption "Higher reporting is more accurate". Since diaries generally produce higher reports than interviews, one assumes they measure better the health problems that people experience and the disability taken for those problems. Diary data are much more valid for acute and nondisabling conditions, and somewhat more valid for other conditions.

Analytic Advantages of the Diary

Health diaries allow a more complete view of people's health problems and health actions than is possible from retrospective interviews. The data are ideally suited to analysis of individual

health and health dynamics. An "individual" and a "day" can be units of analysis, as well as the units commonly used for rate computation (the "population" and longer time periods than a day).

Individual-Level Analysis. Diary data are more likely to sustain individual-level analysis than retrospective data covering the same time interval (e.g. one month). Diaries will have substantially higher counts of "minor" symptoms and associated disability and health actions; higher counts of disability days; and sometimes higher counts of chronic conditions and health services use.

What are the magnitudes to be expected from a diary? [In the full paper, the average number of symptoms, disability days, and health actions found in prior studies are stated.] Based on these figures, one can be confident that a month-long diary will produce sufficient counts (and variability) of symptoms, disability, and "home" health actions to sustain individual-level analysis. It is unlikely to produce adequate variation in doctor/dentist contacts, and certainly not for hospitalization.

Diary Content. The majority of symptoms that people experience are not documented in medical records, and most curative behaviors occur without medical consultation (cf. White et al., 1961). If one wants a full view of health as experienced by individuals, one needs to know about all symptoms that people feel, and how some of these prompt curative behaviors, while others do not. A diary is ideal for learning about the "whole iceberg" of individual health. It can obtain information on items common to interview surveys (illness, injury, taking prescription drugs, medical contacts) and items seldom found there (diffuse symptoms, lay consultation, use of home remedies, preventive health behaviors, actions for maintenance of nonsymptomatic chronic conditions).

Time Sequences. Diaries provide a time-series of data for each individual. This has rich analytic potential for analyses over the whole diary period or for day-by-day analyses.

Diaries allow numerous perspectives of morbidity: For the whole diary period, one can count symptoms, conditions (illness or injury with 1+ symptom), symptom days (day with 1+ symptoms), condition days, symptom episodes (set of consecutive days with a particular symptom), condition episodes. Other counts are possible; only the most obvious ones are mentioned here. Various perspectives should be tried only if there is a sound theoretical or programmatic reason for them. Two studies have published reports using a variety of perspectives for diary data (Dominion Bureau of Statistics, 1960; Roghmann and Haggerty, 1972a).

For day-by-day analysis, the time-series data allow researchers to study fluctuations in an individual's health and also causal relationships among variables. How the daily symptom counts vary over the diary period, and how illness events cluster in time, can be studied. And, since events are clearly ordered in time, causal statements can be made with confidence. Roghmann and Haggerty (1972b) exploit the daily reports in fascinating ways. Much more can be done with daily reports. In particular, the relationship of stress to illness can be studied --on a day by day basis-- to add to a research literature now using wider time frames than the day.

Respondent Cooperation

Prior studies have achieved very high rates of agreement to keep a diary and also of diary completion. Table 3 shows response rates at several stages of health diary studies. [See last page here.]

The largest loss of sampled respondents is at the very beginning, in refusals to have a personal interview that precedes recruitment to (and announcement of) the diary. Every study with personal interviews experiences this loss. The Survey Response Rates for diary studies are similar to those for personal-interview studies.

Response rates for health diaries are very high: 86-98% of interviewed respondents agree to keep the diary. Attrition during the diary period is low: Only 0-12% of respondents who agree to keep the diary drop out during the diary period (with one exception). Agreement and attrition rates do not vary much among the studies, and they appear unrelated to the length of the diary period. Long periods do not "scare off" respondents initially or decrease their willingness to stay in the study.

Conditioning Effects

Two conditioning effects are of concern in prospective studies: sensitization and fatigue. While keeping a diary, respondents may become "sensitized" to their health. As a result, they may be more aware of symptoms or do more, or different, health actions than before. Second, as the diary period lengthens, respondents may tire of keeping the records and become less thorough in reporting health events.

If the conditioning effects occur, they influence reporting levels and ultimately the counts and rates used in analysis. It is generally believed that sensitization boosts reports of symptoms, disability, and health actions. This boost may be temporary (e.g. at the beginning of the diary period) or persistent (constant across the period). Fatigue acts to reduce reports over time.

One other factor can cause large changes in health reporting over time: season of year. Acute illnesses are most common in winter months and if part of the diary period is in winter, reports of symptoms, shorter-term disability, and some health actions will be elevated.

To see if conditioning or seasonal effects occur, researchers have examined health reporting over segments of the diary period. Sudman et al. (1974) find that all measures of morbidity, disability, and health actions drop over the 3-month period. The drop is sharpest for "routine" doctor visits. For a 2-month period, Mooney (1962: Tab. 34) finds drops in symptom reports and sick-days-without-disability. There is no drop for disability rates. In both studies, most rates drop 5-25% over the 2-3 month period.

How are these declines explained? Sudman et al. attribute all drops to fatigue, except the routine doctor visits. They suspect that respondents were sensitized and made an "extra" visit early in the diary period. Mooney cites fatigue as the cause of all drops (1962:46). [In the full paper, there is also a short discussion of data from Kosa et al., 1967.]

It is impossible to know whether these interpretations are correct or not. For sound explanations, one needs first to state models for the three effects, then to compare the data with those models. A model may show a linear or nonlinear pattern over time; and models for different effects may have competing patterns or complementary ones. Even with explicit models in mind, testing them is difficult, since the

data show the net result of the three effects. For example, is the drop in routine doctor visits found by Sudman et al. (1974) really due to initial sensitization, or is it due to fatigue, or to both? To date, no researcher has stated models of sensitization and fatigue, or suggested how the three effects (incl. season) can be independently estimated. At the very least, models are important mental clarifiers, forcing caution into data interpretation.

An interesting alternative to developing and testing models is to gather data on sensitization and fatigue from respondents themselves. Respondents can be asked if their symptom perception and health behavior changed during the diary period, and if they tired of filling out the diary. In addition, office records of editing problems can be used to measure fatigue indirectly. With such indicators, one can ask questions like: Do rates decline over time for fatigued respondents, but not for non-fatigued ones?

In summary: Levels of health reporting tend to drop over time in diary studies. The drops appear regardless of the time of year a study occurs; this suggests that conditioning effects are present. They are not especially large. Specific interpretations of these declines are questionable until models and measurement strategies for conditioning effects are developed.

Data Quality

When diaries are returned, some pages are not filled out at all, some items are incomplete, and some entries are unclear. Missing data of any kind are difficult to correct because respondents forget daily health events. Despite researchers' concerns, most health diary studies have a fine record of data quality

Measures of missing data vary among the studies, and no study discusses data quality in detail. [The full paper reviews levels of missing data in prior health diary studies.] These figures suggest that missing pages are infrequent if diary-keepers are monitored and encouraged throughout the diary period. Because diaries are self-administered and have open-ended items (such as symptom names), they do produce more missing items and unclear entries than personal interviews conducted by trained interviewers. Quality-control procedures (e.g. calling respondents about missing items) can reduce these types of missing data.

Survey Costs

A health diary study costs more than one with a single retrospective interview, but it is comparable in cost to repeated interviews over the same time interval. If special quality-control procedures are introduced, costs rise and diary studies are likely to cost more than repeated-interview studies.

Sudman et al. (1974) compare interviewer costs for two designs: (a) an initial retrospective interview followed by a 3-month diary, with 3 visits to retrieve and edit the diary, and (b) 4 retrospective interviews, each separated by a month. Average costs per respondent are almost the same, differing by less than one dollar. If the diary study called for mail return (instead of pickup visits), the cost would certainly be less for (a) than (b).

Besides interviewer costs, total survey costs include office-staff time, coding, and computer processing. Diary studies like (a) are probably no more costly in these aspects than multiple-

interview studies like (b).

But to assure high-quality data, special attention should be given to diary-keepers and to diary records during the study. Diary-keepers should be contacted regularly to encourage their continuation. Other contacts may be necessary to query items that fail edit and to retrain respondents who have persistent difficulty in filling out the diary. Diary portions should be returned frequently and edited rapidly to spot missing items and unclear entries. If quality-control procedures like these are used, a diary study will probably cost more than a multiple-interview study.

Complexity of Data Collection and Processing

There is nothing intrinsically "complex" about collecting, editing, and coding diary data. Complexity in any study depends largely on the number of data instruments, contacts with respondents, and open-ended items.

The more instruments and/or contacts, the more complex an office record-keeping and editing system must be. Most diary studies are "complex" because they use multiple instruments (e.g. initial interview plus diary portions collected each month) and involve several contacts with each respondent. Panel studies and studies with multiple sources of information for a respondent (e.g. medical records plus an interview) are also "complex" in this respect.

Open-ended items require more coding time than closed items. Diary studies are "complex" for coding if respondents name their symptoms and conditions, rather than use a checklist. Coding symptoms and conditions is complex whether the source is a diary, interview, or medical record. Coding schemes for them are becoming standardized (see Meads and McLemore, 1974, for symptoms; Natl. Center for Health Statistics, 1967, 1978, for conditions).

Other Issues

Researchers have voiced other concerns about health diaries: (1) motivation of respondents during the diary period; (2) complexity of the diary form; (3) unwillingness of respondents to disclose some symptoms or conditions (social desirability); (4) the adequacy of a respondent's reports about the health of other household members (proxy effects); and (5) nonuniform definitions of "illness" across individuals. The first problem appears in longitudinal studies of all types; the second, in studies which use self-administered forms. The third and fourth problems are general issues that health researchers have discussed and studied for many years. The fifth is really an issue of theoretical rather than methodological importance, and it has long intrigued health researchers. Because these topics are not unique to diary studies, evidence on them is not reviewed here.

THE "HEALTH IN DETROIT" STUDY

In 1978, a health diary study was conducted in the Detroit metropolitan area. The main characteristics of the study are: (1) The diary is a principal data instrument; it is not used as a memory aid or for comparison with other instruments. (2) The study population is noninstitutionalized, civilian white adults (18+ years) residing in the metropolitan area. (3) The record-keeper is the sampled respondent, who answers for him/herself only. (4) A probability sample was designed to yield 600 completed cases. A completed case has two interviews and a 6-week health diary. One interview precedes the diary period; the other occurs at its end. (5) Respondents who complete the

study are compensated (\$10 and a special report of study findings). (6) The diary is in journal form with a standard set of questions for each day. Seven days are bound together into weekly booklets. A heavy folder holds the booklet, a mailing envelope, and several other forms to help respondents. (7) The diary asks ten main items for each day: rating of physical health, symptoms and underlying conditions, seriousness of condition, restricted activity, medical attention for symptoms, lay consultation for symptoms, medical visits for preventive reasons or nonsymptomatic conditions, pills/medications/treatments taken for any reason, rating of mood, and special or unusual events that day.

The theoretical purposes of the study are discussed in Verbrugge (1979). [In the full paper, detailed discussion of how the study is designed to exploit the advantages of health diaries and minimize their possible disadvantages follows. Three excerpts are included here.]

Data Collection Procedures. After an initial health interview, respondents were recruited to keep the Daily Health Records (DHR). Interviewers trained respondents by doing a practice day ("today"), and left a folder with the practice day, a pre-printed day with example responses, and two week-long booklets of DHRs. Two days later (Day 2), the interviewer called R to ask about any problems and to encourage continuation. On Day 8 and every week thereafter, an Ann Arbor interviewer telephone R to remind him/her to mail in a DHR booklet, to encourage participation, and to help with specific problems. Additional calls to R were made when booklets failed edit. DHR booklets for Weeks 3-6 were mailed to respondents. At the end of 6 weeks (Day 42), a termination interview was conducted by telephone.

Conditioning Effects. One purpose of the weekly telephone calls was to reduce respondent fatigue. Nevertheless, the study data probably contain conditioning effects. We devised two strategies to measure sensitization and fatigue. One is "direct": The termination interview contains explicit questions about the effects (e.g. Does R feel he/she changed health behaviors during the past 6 weeks? Did R tire of filling out the DHR and do it less thoroughly at some times?). The other strategy is "indirect": The termination interview repeats several questions from the initial interview. No change is expected for these over the diary period; if change appears, it is probably due to sensitization. Indirect measures of fatigue come from office editing records. All of these measures will serve as predictors of individual-level trends in reporting, or as control variables in analysis of covariance (e.g. symptom rates over time for fatigued vs. non-fatigued respondents).

Comments on the Study Population. The Detroit study is the first health diary study to have a general population sample (although it is restricted to whites). All prior studies using diaries as a main data instrument chose respondents from more limited populations or used a nonscientific sampling procedure. (See Smith and Mosley; Mechanic and Newton; Alpert et al.; Roghmann and Haggerty; Robinson.) Moreover, all prior health diary studies have accepted proxy responses (with the single exception of Laurent et al.). The Health In Detroit study is the first to require self-report data, and therefore the first to have

numerous male respondents.

SUMMARY

Between 1938 and 1978, fifteen studies have used health diaries. In 6, methodological purposes were foremost; in 4, the diaries served as memory aids; in 5, they were the main data source.

The principal advantages of health diaries are: They are better than other strategies for recording (a) health problems which are transient, of low-impact, or recently symptomatic, and (b) disability days. They are as good as retrospective interviews for counting chronic conditions and health services use. Diaries minimize recall error: telescoping is absent, and forgetting of health events is reduced. Diary data have greater validity than interview data. Diary reports have rich analysis potential for individual-level studies of health, for understanding the "iceberg" of health (as experienced by individuals rather than as viewed through clinic records), and for studying dynamics of health and health behavior.

Most claims about disadvantages of health diaries are not supported: Cooperation to keep diaries is high, and attrition during the diary period is low. Conditioning effects seem to occur but are modest in size. Data collection and processing are not intrinsically more complex than for other survey procedures. The quality of data produced by diary respondents appears closely related to the effort that staff devote to them. Missing data are infrequent if respondents stay strongly motivated and if they are recontacted for missing and unclear items. Survey costs are similar for studies with diaries and with multiple interviews. But if special quality-control procedures are used, diary studies do cost more.

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Table 3. Response Rates in Studies Using Health Diaries

| SOURCE | Muller et al. (1952) | Mooney (1962) San Jose | Rogghmann and Haggerty (1972a) | Wilcox (1963) | Laurent et al. (1972) | Sudman et al. (1974) Marshfield | Sudman et al. (1974) Chicago | Sudman and Lannom (1977) |
|------------------------------------|----------------------|------------------------|--------------------------------|---------------|-----------------------|---------------------------------|------------------------------|--------------------------|
| ELIGIBLE | 815 | 1632 | 628 | 50 | 121 | 321 | 337 | <1446 ^b |
| INTERVIEWED | 592 | 1474 | - | - | - | 288 | 251 | 873 |
| Survey Response Rate ^a | 73% | 90% | - | - | 89% | 90% | 74% | 81% |
| AGREED TO KEEP DIARY | 564 | 1430 | 543 | 48 | 108 | 282 | 240 | 785 |
| Diary Agreement Rate ^a | 95% | 97% | 86% | 96% | 92% | 98% | 96% | 88% |
| COMPLETED DIARY | 504 | 1400 | 512 | 48 | 101 | 267 | 211 | 576 |
| Diary Completion Rate ^a | 89% | 98% | 94% | 100% | 94% | 95% | 88% | 75% ^c |

- Not applicable

^a Survey Response Rate = No. interviewed/No. eligible for interview. Diary Agreement Rate = No. who agreed to keep diary/No. interviewed. Diary Completion Rate = No. who kept diary for duration of diary period/No. who agree to keep diary.

^b Of 1446 households sampled, it is not known how many were ineligible (missing addresses, moved, etc.).

^c For diaries returned by mail, the completion rate was 58%. For diaries picked up by interviewers, it was 94% (comparable to the other Diary Completion Rates in Table 3).