# A comparison of mail and face-to-face responses in a dual-mode survey of physicians

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**Abstract**

The National Ambulatory Medical Care Survey (NAMCS) is an annual survey of office-based physicians and visits to their practices. Since its inception, the survey has been conducted face-to-face, but in order to provide better estimates of physician adoption and use of electronic medical records (EMR), the original sample was augmented with a supplemental sample of physicians who reported EMR-based content from NAMCS through a mail questionnaire. Mail and face-to-face survey data from 2008 were combined for the first time to produce dual-mode estimates. This paper compares responses and item non-response by mode according to physician and practice characteristics. Although mail survey respondents were less likely to provide certain write-in numeric responses than face-to-face respondents, most results were comparable across modes.

**Key Words:** Physician survey, dual mode survey, item response

## 1. Introduction

The National Ambulatory Medical Care Survey (NAMCS) is a nationally representative survey of visits to office-based physicians. NAMCS has been monitoring physician use of electronic medical record (EMR) systems since 2001. NAMCS physician estimates of EMR use have been used by the Office of the National Coordinator (ONC) for Health Information Technology to monitor progress toward the 2004 Health Information Technology Initiative's goal of universal adoption of electronic health record (EHR) systems by most health care providers by 2014 (1). Information on the extent to which physicians have adopted EMRs/EHRs could also provide new opportunities for the conduct of the survey. The main difference between EHR and EMR systems is the ability of EHR systems to exchange information between health care providers. ONC's charge to promulgate and monitor adoption of EHR systems became more prominent with passage of the 2009 American Recovery and Reinvestment Act (ARRA) since ARRA includes $19 billion in Medicare or Medicaid incentive payments to encourage adoption and use of EHRs (2). Starting in 2008, the NAMCS physician sample size was increased by conducting the physician survey as a dual-mode survey. The larger sample is needed for a more detailed analysis of physician EMR/EHR system adoption patterns. To evaluate comparability of data included in dual-mode-estimates, this paper compares responses and item non-response rates for selected physician and practice characteristics by mode.

## 2. Methods

### 2.1 Dual-mode NAMCS sample design

NAMCS is an annual nationally representative survey of visits to non-federal office-based physicians in the United States; excluding radiologists, anaesthesiologists, and pathologists. Each year, a sample of office-based physicians who report they provide direct patient care is taken from the master files of the American Medical Association (AMA) and the American Osteopathic Association (AOA). The multi-stage NAMCS sample design includes a sample of 112 geographic primary sampling units (PSUs) and then a sample of physicians within PSUs. Physicians are first stratified by their specialty within PSUs before sampling. Although NAMCS has included an extra stratum of community health centers and their providers since 2006 (3), the dual-mode file analyzed included only physicians selected from the AMA/AOA master files.

The NAMCS physician interview is used to determine eligibility for the survey, as well as to collect physician and practice characteristics. Since 2005, NAMCS has successively collected more detailed information about EMR systems. The following information is currently collected in personal interviews: the functionalities of electronic record systems adopted by physicians, plans to install new EHRs or replace current systems, date of installation/upgrade of current system, and certification status of EHR systems (4-6). The content of the 2008 mail questionnaire was comparable to questions asked in the personal interview with the exception of the items on plans to install new EHRs or replace current systems, date of installation/upgrade of current system, and certification status of EHR. Funding for the increased sample size was provided by ONC for Health Information Technology.

The 2008 NAMCS sample of physicians was randomly assigned to mode of survey; 3,200 were assigned to personal interview, the usual mode for the NAMCS, and 2,000 were assigned to mail. The usual NAMCS procedure involves personal interviews with physicians prior to the selection of an average sample of 30 visits during a random week of the year. The survey period for face-to-face interviews was January through December 2008, with close-out extended to April 2009. The mail survey was conducted April through August 2008. The U.S Census Bureau field representatives conducted the usual NAMCS and SRA International, Inc. conducted the mail survey.

At the end of data collection for the mail survey, a follow-up study involving three samples was conducted. From the refusals, NCHS staff conducted telephone follow-up for a random sample of 200 refusals with no eligibility information. From the non-locatable group, two simple random samples of 100 each were selected. The Census Bureau conducted follow-up for 100 non-locatable cases by personal interview, while NCHS staff conducted intensive telephone follow-up and web searches for the other sample of 100 non-locatable cases (7). All follow-up information was used to adjust the final response rate and final estimation procedures for the mail survey.

## 2.2 Data analysis

This study used the combined file that included 1,390 personal interview responses and 843 mail survey responses. Based on Office of Management and Budget standards for calculating response rates (8), the final weighted response rate for the mail survey (62%) was similar to that for personal interviews (64%). For this study, eligible physicians were

considered responding if they answered the question on use of electronic medical records, as well as two of four practice characteristics (practice size (number of physicians), number of non-physician clinicians, owner/employee status, and who owns the practice).

Responses and item non-response rates (failure to obtain and record all items of information collected) were examined by mode of survey for physician and practice characteristics. Variables examined included: EMR use, practice size, physician ownership/employee status, whether practice was a multi-specialty practice, number of non-physician clinicians, percent of revenue by selected payment sources, percent of managed care revenue, and number of selected types of medical encounters during a typical week. During data processing, blank responses to payment source items were edited to zero when the sum of payment source responses summed to 100 percent.

All analyses were performed using the statistical packages SAS version 9.2 (SAS Institute, Cary, N.C.) and SUDAAN version 9.0 (Research Triangle Institute, Research Triangle Park, N.C.) which takes into account the complex survey design. Differences in item non-response indicators by mode were examined using *t*-tests for selected physician and practice characteristics. *Chi-square* and *t*-tests were used to examine differences in response patterns by mode (unknowns were excluded). All tests were evaluated at $p \leq .05$ level.

### 3. Results

Two response patterns were observed between the survey modes. First, missing data for categorical variables varied. There were no differences in non-response rates between mail and personal interview responses for physician owner/employee status, and multi-specialty practice (Table 1). However, missing information on EMR use was more likely in personal interview than in mail survey responses. Second, personal interviews usually had lower levels of missing data than mail survey responses for questions requesting write-in numeric responses, e.g., number of non-physician clinicians, percent of revenue from selected payment sources, and number of encounters during a typical week of practice. Exceptions to this pattern were: practice size, percent of managed care revenue, and percent of revenue from private insurance.

It might be expected that variables with similar rates of missing data by mode (practice size, owner/employee status, whether multi-specialty practice and percent of managed care revenue) would also have similar response patterns by mode. This in fact was the case; there were no significant differences in response categories for owner/employee status, and whether multi-specialty practice by mode. There were also no differences in average practice size or average percent of managed care revenue by mode (Table 2). For the remaining variables with significantly different rates of item non-response by mode, most had similar response distributions or average response by mode. There were no significant differences in responses on EMR use by mode (Table 2). Among write-in numeric questions, mean responses did not differ significantly by mode for number of non-physician clinicians, percent of revenue from private insurance, percent of revenue from Medicaid, percent of revenue from patients, and the average number of the following medical encounters during a typical week: hospital visits, home visits, nursing home visits, telephone calls, and e-mail contacts. It should be noted that, although not significant, the mode difference in average number of weekly hospital visits (10.1 versus

23.8) was larger than found among the other types of medical encounters. A larger sample is needed to investigate this difference in more detail.

There were a few exceptions. The percent of revenue from Medicare varied by mode; at least part of this difference, however, may be due to over-reporting of revenue sources in the mail survey. Table 2 shows the sum of mean revenue percentages by payment source from personal interviews was 98 percent, while the comparable sum for mail survey responses was 107 percent. The higher sum of mail survey revenue source items reflects the maximum (110 percent) allowed during editing. It should be noted, however, that no case exceeded this maximum. Table 1 reveals that item non-response rates for the percent of revenue variables are significantly different across modes, with the highest difference occurring among "Other sources" of revenue. This is a fairly complex item that asks respondents to allocate sources of revenue across a total of 100%. The relatively high rate of item non-response for "Other sources" in the mail survey is probably attributable to the fact that an interviewer was not present to resolve ambiguities (e.g., when there were one or more blank responses but the total did not add to 100%). Although the difference in mean responses for other sources of revenue by mode was statistically significant, the difference was small - less than 2 percentage points (Table 2).

## 4. Conclusions

Our study found that although there was less missing data for mail survey than face-to-face interviews for the question on use of EMR systems, there were no differences among responses on EMR use. Although we found mail respondents were more likely to have missing data than respondents to personal interviews for write-in numeric fields, such as number of non-physician clinicians, percent of revenue from selected sources, and number of weekly contacts outside of office visits, there were no differences in mean responses by mode of survey for most of these data items. Thus, we can reasonably combine these data to produce dual-mode estimates (9).

Although we found more missing data in the mail survey compared to personal interviews, and the mail survey required a follow-up survey to accurately reflect eligibility of non-locatable cases and refusals, conducting the mail survey enhanced the analytic capabilities of NAMCS. We were able to release mail survey results on physician adoption of EHR systems four months after data collection. Data collection for the face-to-face NAMCS ended several months after the mail survey estimates were released (10). This paper describes the continuing efforts of NAMCS survey designers to produce policy-relevant statistics that measure the diffusion of new technologies and changes in care provided by our health care delivery system.

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**Table 1:** Item non-response rates (percent) for selected physician and practice characteristics by survey mode.

| Characteristic | Personal interview | Mail | T-test p-value |
|---|---|---|---|
| Uses electronic medical records | 2.5 | 0.2 | <.01 |
| Practice size | 0.2 | 1.9 | .47 |
| Owner/employee status | 0.6 | 2.3 | .54 |
| Multi-specialty practice | 24.4 | 24.9 | .59 |
| Employs non-physician clinicians | 1.1 | 3.1 | .01 |
| Percent of revenue by source: | | | |
|   Managed care | 22.4 | 19.8 | .40 |
|   Private insurance | 8.6 | 9.7 | .82 |
|   Medicare | 8.0 | 11.6 | .03 |
|   Medicaid | 8.3 | 14.8 | <.01 |
|   Patient payment | 8.6 | 24.1 | <.01 |
|   Other sources | 8.7 | 40.4 | <.01 |
| Number of encounters during typical week of practice | | | |
|   Hospital visits | 6.2 | 10.7 | .03 |
|   Home visits | 3.1 | 16.3 | <.01 |
|   Nursing home visits | 3.1 | 14.4 | <.01 |
|   Telephone calls | 6.4 | 17.9 | <.01 |
|   Email contacts | 5.4 | 17.7 | <.01 |

**Table 2:** Mean response for selected physician and practice characteristics by survey mode.

| Characteristic | Personal interview | Mail | Chi-square or t-test p-value |
|---|---|---|---|
| Uses electronic medical records | | | |
| Yes | 43.7% | 38.4% | .16 |
| No | 53.8 | 61.4 | |
| | | | |
| Average practice size (number of physicians) at location where most patients were seen | 4.9 | 5.2 | .44 |
| Owner/employee status | | | |
| Owner | 67.5% | 68.2% | .80 |
| Employee | 29.0 | 26.4 | |
| Contractor | 2.9 | 3.1 | |
| | | | |
| Multi-specialty practice | | | |
| Multi-specialty | 20.5% | 17.6% | . 34 |
| Single specialty | 55.1 | 57.5 | |
| | | | |
| Average number of non-physician clinicians at location where most patients were seen | 2.8 | 3.2 | .37 |
| Average percent of managed care revenue | 50.2 | 49.5 | .86 |
| Average percent of revenue by source: | | | |
| Private insurance | 45.0 | 42.1 | .26 |
| Medicare | 27.7 | 33.4 | .04 |
| Medicaid | 12.7 | 13.0 | .86 |
| Patient payment | 10.1 | 13.6 | .23 |
| Other sources | 3.0 | 4.7 | .02 |
| Average number of encounters during typical week of practice | | | |
| Hospital visits | 10.1 | 23.8 | .11 |
| Home visits | 0.1 | 0.4 | .23 |
| Nursing home visits | 0.9 | 2.0 | .21 |
| Telephone calls | 9.6 | 11.8 | .15 |
| Email contacts | 0.6 | 2.0 | .21 |

NOTE: Edits of percent of revenue by payment sources allowed the sum payment source percentages to exceed 100 percent by 10 percent.