Adding telephone follow-up can improve representativeness of surveys of seriously ill people

INTRODUCTION

A growing population of seriously ill people in the United States receives care from community-based serious illness programs. Surveys of patients’ experiences with these programs can help identify areas for improvement and compare care quality across programs. However, survey respondents may be systematically different from non-respondents in ways related to their experiences of care, which could bias the results by underrepresenting the views of underserved patient groups such as those with Medicaid coverage.

To test whether mixed mode survey administration could improve single-mode response rates and representativeness for seriously ill patients, we conducted an experiment in which sampled patients from home-based serious illness programs were randomized to mixed mode (mail with telephone follow-up) or mail-only survey administration.
**Table 1** Characteristics of patients sampled and responding to serious illness care survey

| Characteristic                  | Eligible sampled (N = 6210) (%) | Mail-only (N = 3102) RR in category (%) | Mixed (N = 3108) RR in category (%) | Adjusted OR of responding by mixed mode versus mail only (p-value)\(^a\) |
|--------------------------------|----------------------------------|----------------------------------------|------------------------------------|---------------------------------------------------------------------|
| Any                            | 100.0                            | 30.4                                   | 42.5                               | 1.74 (p < 0.01)                                                      |
| **Sex**                        |                                  |                                        |                                    |                                                                     |
| Female (reference)             | 59.7                             | 29.2                                   | 42.4                               | 1.90 (p < 0.01)                                                      |
| Male                           | 40.3                             | 32.1                                   | 42.8                               | 1.59 (p < 0.01)                                                      |
| **Age**                        |                                  |                                        |                                    |                                                                     |
| 18–54                          | 5.9                              | 16.9                                   | 35.9                               | 2.54 (p < 0.01)                                                      |
| 55–64                          | 10.3                             | 25.9                                   | 40.5                               | 1.84 (p < 0.01)                                                      |
| 65–69                          | 7.0                              | 30.0                                   | 43.3                               | 1.87 (p < 0.01)                                                      |
| 70–74                          | 10.9                             | 29.2                                   | 42.6                               | 1.89 (p < 0.01)                                                      |
| 75–79                          | 13.1                             | 29.7                                   | 39.4                               | 1.67 (p < 0.01)                                                      |
| 80–84                          | 16.3                             | 31.7                                   | 45.1                               | 1.90 (p < 0.01)                                                      |
| 85–89                          | 17.6                             | 36.1                                   | 45.2                               | 1.54 (p < 0.01)                                                      |
| 90 or older (reference)        | 19.0                             | 31.5                                   | 42.9                               | 1.63 (p < 0.01)                                                      |
| **Residential setting**        |                                  |                                        |                                    |                                                                     |
| Unknown                        | 23.3                             | 23.9                                   | 40.7                               | 2.22 (p = 0.13)                                                      |
| Facility                       | 8.1                              | 19.5                                   | 26.8                               | 1.76 (p = 0.04)                                                      |
| Home (reference)               | 68.6                             | 33.9                                   | 44.9                               | 1.64 (p < 0.01)                                                      |
| **Primary diagnosis**          |                                  |                                        |                                    |                                                                     |
| Cancer                         | 15.6                             | 25.4                                   | 37.9                               | 1.85 (p < 0.01)                                                      |
| Alzheimer’s or dementia        | 10.2                             | 27.2                                   | 40.2                               | 2.07 (p < 0.01)                                                      |
| Other (reference)              | 74.3                             | 31.9                                   | 43.7                               | 1.72 (p < 0.01)                                                      |
| **Number of in-person visits** |                                  |                                        |                                    |                                                                     |
| Unknown                        | 24.7                             | 23.9                                   | 40.3                               | 1.63 (p = 0.17)                                                      |
| 1–2 times                      | 15.4                             | 28.5                                   | 31.5                               | 1.36 (p = 0.09)                                                      |
| 3–4 times                      | 12.2                             | 27.2                                   | 41.4                               | 2.11 (p < 0.01)                                                      |
| 5–6 times                      | 9.8                              | 33.0                                   | 43.4                               | 1.98 (p < 0.01)                                                      |
| 7 or more times (reference)    | 37.9                             | 35.9                                   | 48.2                               | 1.91 (p < 0.01)                                                      |
| **Primary payer**              |                                  |                                        |                                    |                                                                     |
| Medicare (reference)           | 48.1                             | 32.1                                   | 40.6                               | 1.55 (p < 0.01)                                                      |
| Medicaid                       | 8.5                              | 17.9                                   | 43.8                               | 3.50 (p < 0.01)                                                      |
| Private                        | 18.9                             | 40.5                                   | 49.6                               | 1.57 (p = 0.01)                                                      |
| Other or unknown               | 24.5                             | 23.5                                   | 40.3                               | 2.00 (p = 0.10)                                                      |

Note: Percentages were calculated excluding missing values for all variables that had negligible missingness (<4%). For the three variables with non-negligible missingness (residential setting, number of in-person visits, and primary payer), we included missing/unknown as a separate category. p-values from joint significance tests for interactions with mode were 0.12 (sex), 0.81 (age), 0.87 (residential setting), 0.59 (primary diagnosis), 0.25 (number of in-person visits), and 0.01 (primary payer). We imputed missing patient-level characteristics with the program mean for that variable, except for the three variables with non-negligible missingness (residential setting, number of in-person visits, and primary payer), for which we included missing/unknown as a separate category. If the variable was missing for the entire program, it was imputed with the overall mean. To ensure results were not sensitive to treatment of missing values, we conducted a sensitivity analysis that removed the small number of programs (4 of 32) that had an entire variable missing, and a complete case analysis. Results from main effects models as well as models that added interaction terms were not sensitive to treatment of missing values.

Abbreviations: OR, odds ratio; RR, response rate.

\(^a\)OR represent odds of responding by mixed mode, relative to mail-only mode, for patients having the specified characteristic. p-values correspond to the p-value for the effect of mixed mode within the stratum, holding all other variables at their mean values. Results are from a logistic regression model for the probability of response, including all characteristics listed in the table, mode, and interaction terms between mode and all characteristics. The model includes program fixed effects.

\(^b\)OR represents odds of responding by mixed mode, relative to mail-only mode, from a logistic regression model for the probability of response including only main effects for the characteristics listed in the table and program fixed effects.
The survey instrument contained 56 items assessing communication, care coordination, help for symptoms, planning for care, and support for family and friends. Final, more concise versions of the survey are available online.

Program administrative data included the patient’s sex, age, residential setting (home vs. assisted living facility), primary payer for care, and primary diagnosis, and number of in-person visits.

We predicted survey response from patient characteristics and mode of administration using multivariate logistic regression models.

To determine whether mixed mode particularly benefits some patient groups in a way that affects survey representativeness, we added interactions between mode and all patient characteristics. We also conducted a stratified analysis, fitting the main effects regression model separately for sampled cases assigned to the mail-only and mixed modes.

**RESULTS**

There were 2263 eligible respondents (overall response rate 36.4%; 30.4% in mail-only mode, 42.5% in mixed mode).

Response rates increased with age. Those who lived in an assisted living facility had less than half the odds of responding as those in a private home. Patients with Medicaid as the primary payer for care were less likely to respond (odds ratio [OR]: 0.69) than those with Medicare as the primary payer. The odds of response were higher for those with more in-person visits.

Mode was one of the strongest predictors of response, with mixed mode yielding 74% greater odds of responding than mail-only (OR: 1.74; Table 1). Tests for heterogeneity of the mixed mode advantage by patient characteristics found significant differences only for the primary payer ($p = 0.01$). These results suggested that mixed mode may be most beneficial for patients with Medicaid as the primary payer (OR: 3.50 for mixed vs. mail mode), with response rates of 43.8% in mixed mode and 17.9% in mail-only mode. In stratified regression models within the mail-only and mixed mode strata, patients in the mail-only mode with Medicaid as their primary payer were substantially less likely to respond than patients with Medicare as the primary payer (OR: 0.43 for Medicaid relative to Medicare; $p < 0.01$ for payer). However, in the mixed mode stratum, odds of response did not differ significantly across primary payer types (OR: 0.89 for Medicaid relative to Medicare, $p = 0.85$ for payer). Figure 1 shows that mixed mode response rates are consistently higher than mail-only for all ages, response rates are higher for older age groups, and that mixed mode is especially beneficial in increasing response rates for those on Medicaid.

**DISCUSSION**

Seriously ill patients with low socioeconomic status are at greater risk of undertreatment and lower quality care; consequently, it is important to ensure that their experiences are included in assessments of care, and that Medicaid enrollees are adequately represented in patient survey responses used.
to measure care quality. Our results demonstrate the value of mixed mode survey administration in ensuring that the voices of these seriously ill individuals are heard.

Consistent with the findings for other patient experience surveys, we found that mixed mode of survey administration yielded a much higher response rate (42.5%) than mail only (30.4%), and that mixed mode was especially effective in increasing response rates among patients with Medicaid as the primary payer, more than doubling their response rates. This hard-to-reach group had lower response rates overall, and thus using a mixed mode of survey administration increases representativeness of survey respondents relative to the sample from which they are drawn.

Our results support the use of survey mixed mode administration to achieve broad representation of seriously ill people when evaluating quality of care.

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CONFLICT OF INTEREST
The authors have no conflicts of interest.

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