

The Effects of Web and Mail Mixed-Mode Approaches on Response Rates in a Survey of Physicians

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Abstract

This paper evaluates the effects of two mixed-mode (mail and web) survey designs versus a single mode (mail) design on response rates for a survey of physicians. In comparisons of single-mode physician surveys, mail surveys typically outperform web surveys (Van Geest, 2007). However, very little research with physicians has compared whether a mail and web mixed-mode approach can improve response rates compared to mail-only surveys. A mixed-mode approach may increase response rates by offering flexibility and allowing physicians to choose their preferred mode for responding.

In a national survey of board-certified physicians, two different mixed-mode approaches were used to evaluate the impact on response rates. In the first approach, physicians were sent a mail survey with the option to respond by either mailing back the enclosed survey or completing the survey on the web. All follow-up mailings used the same approach. In the second mixed-mode approach, physicians received a mail survey with a mail-only response option for the first mailing. On all follow-up mailings, however, physicians received a mail survey with the option to respond by mail or web. This alternative approach was chosen because the Total Design Method (Dillman, 2000) suggests that follow-up attempts should use a different technique than the original attempt to improve their effectiveness.

The effect of the two different mixed-mode approaches on response rates will be compared to the single-mode control group (mail-only survey and response option on all mailings). The implications of the findings will be discussed in terms of future designs of surveys and survey research with elite populations.

Introduction

Response rates for mail surveys of physicians are, on average, about 10 percentage points lower than response rates for surveys of the general population (Cummings, Savitz, and Konrad 2001). To increase response rates in general population surveys, researchers often implement mixed-mode designs; the additional options for response may increase the likelihood of response for some people. However, adopting the same strategies for physician surveys is not as clear cut.

Supplementing mail surveys with telephone call-backs can improve response rates compared to mail only follow-ups (Kalsbeek, Dever, Sanders, and Bennett, 1992; Olson, Srinath, Burich, and Klabunde, 1999; Gupta, Ward, and D'Este, 1998; Asch, Jedrziwski, and Christakis, 1997; Parsons, Johnson and Warnecke, 1993; Thran, Olson and Strouse, 1987). However, telephone call-backs with physicians are particularly time consuming and expensive. Physicians typically have a number of “gatekeepers,” such as receptionists, administrative staff, or nurses who work to protect the physician from unwanted intrusions on their time. Therefore telephone contacts with physicians are often considerably more expensive than with the general population, which makes them an unsuitable option for many studies with physicians.

While web surveys are generally less expensive than data collection by telephone, they have not been shown to be successful at achieving adequate response rates with physicians to date. In comparisons of single-mode physician surveys, web surveys typically have lower response rates than other modes (Van Geest, 2007; Akl et al. 2005; Leece et al. 2004; Losh, Thompson and Lutz 2004; McMahon et al. 2003; Raziano et al. 2001; Kim et al. 2001). The research above focuses on single-mode approaches; very little research with physicians has evaluated whether a mail and web mixed-mode approach, where both options are offered together, can improve response rates compared to mail-only surveys. A mixed-mode approach may increase response rates by offering flexibility and allowing physicians to choose their preferred mode for responding, while not increasing costs.

This paper evaluates the effectiveness of two approaches for introducing a web response option on a national survey of board-certified physicians. The effect on response rates of the two different approaches for introducing a web response option will be compared to a control group in which physicians can respond by mail or fax only. In the first approach, physicians were sent a mail survey with the option to respond by either mailing back the enclosed survey, faxing back the survey, or completing the survey on the web. All follow-up mailings used the same approach. In the second mixed-mode approach, physicians received a mail survey with a mail and fax response option only for the first mailing. On all follow-up mailings, however, physicians also received the option to respond by web. The web response option was introduced on the follow-up mailings only because the Total Design Method (Dillman, 2000) suggests that follow-up attempts should use a different technique than the original attempt to improve their effectiveness in obtaining maximum response. In this paper we test whether implementing a tailored design methodology affects physicians' likelihood to complete the survey.

Methods

Since 1990, *U.S. News & World Report* has assessed the quality of hospitals in the United States annually in the form of lists collectively titled "America's Best Hospitals." Each year, the magazine identifies hospitals of exceptional quality from over 5,000 hospitals in the United States across a variety of medical specialties. Hospitals are assigned a composite score and ranked based on data from multiple sources. One of the primary sources of data is a brief, one-page, survey sent to board-certified physicians asking them to nominate the "best hospitals" in their medical specialty.

2009 Physician Survey Methods

The sample for the 2009 physician survey consisted of 4,700 board-certified physicians. Stratifying by census region (Midwest, Northeast, South, West) and medical specialty, we selected a stratified random probability sample of 200 physicians (50 from each region) for each of 16 adult specialties, and 150 physicians from each of 10 pediatric specialties. The 17 adult medical specialties represented in the sample included the

following: Cancer; Digestive Disorders; Ear, Nose, and Throat; Geriatrics; Gynecology; Heart and Heart Surgery; Hormonal Disorders; Kidney Disease; Neurology and Neurosurgery; Ophthalmology; Orthopedics; Psychiatry; Rehabilitation; Respiratory Disorders; Rheumatology; and Urology. The 10 pediatric specialties represented in the sample included the following: Cancer, Gastrointestinal Disorders, Diabetes/Endocrine Disorders, Nephrology; Neurology and Neurosurgery; Orthopedics; Respiratory Disorders; and Urology.

The 2009 physician survey mailings were sent in stages over several weeks. The initial mailing was sent via United States Postal Service (USPS) first-class metered mail. The package included a cover-letter, survey, stamped return envelope and a \$2 bill as an incentive for response. Two weeks after the initial survey mailing, a thank-you/reminder letter was sent to the sampled physicians with another copy of survey for those who had not yet responded and a business reply envelope. Two weeks after the thank-you/reminder letter, another copy of the survey was sent by USPS Priority mail to nonresponders. A fourth and final copy of the survey was sent to nonresponders two weeks after the third mailing. This mailing was sent by USPS Priority or FedEx depending on random assignment for a separate experiment.

Experimental Conditions

In past years of data collection, all survey mailings instructed physicians to return the survey using the enclosed postage-paid return envelope or by fax at the provided toll-free number. In the 2007 and 2008 surveys, physicians were also given the option to complete the survey online. In their mailing packets, physicians received a login and password along with instructions for logging on to a site where they could submit their responses via a web survey. The percent of responders who completed the survey online compared to mail or fax was relatively low. Only about 10% of the responders completed the survey online, which is consistent with other studies that show that web response options are not as high with physician populations compared to mail and fax (Van Geest, 2007). However, it was unclear whether providing the web response option helped increase response rates slightly, had no effect on response rates, or was actually having a negative effect on response rates. The last scenario may seem counterintuitive since the purpose of offering multiple response modes is to increase options, and thereby propensity, for response. However, the provision of the web option could also serve as a way for respondents to delay responding, thinking “I’ll save the web instructions and come back to it later,” only to never return to the task. Also, the inclusion of another set of instructions could complicate the task or message being relayed as compared to a simple request to mail or fax back the completed survey.

In order to investigate the impact of a web response option on participation in the physician survey, we randomly divided the sample into three groups. The first group (*web-always*) received the web response option in all survey mailings. The second group (*mail-only*) did not receive a web response option for any of the mailings. The third group (*mail/web*) did not receive a web response option in the first mailing, but did receive it in any subsequent mailings. The alternative design for the third group was chosen because the Total Design Method (Dillman, 2000) suggests that follow-up attempts should use a

different technique than the original attempt to improve their effectiveness. It was hypothesized that offering a change in the way that physicians could respond might increase their likelihood of responding. See **Table 1** for approximate sample distributions for the experimental conditions in each mailing. Chi-square tests were used to analyze the impact of these methods on response rates.

Table 1. Experimental Conditions

<i>Experimental Group</i>	<i>Approximate Distribution</i>	<i>Mailing 1 Options for responding</i>	<i>Mailings 2-4 Options for responding</i>
Web-always	33%	Mail, fax, or web	Mail, fax, or web
Mail-only	33%	Mail or fax	Mail or fax
Mail/Web	33%	Mail or fax	Mail, fax, or web

RESULTS

The physician survey was conducted from January to March, 2009. The survey achieved an overall response rate of 51.1%. All response rates reported were calculated using AAPOR standard response rate formula 6^2 , which excludes undeliverables and ineligible. After removing ineligible and undeliverables, the effective sample size was 4,518. The results of the mixed-mode experiments are reported below.

First, we examined the results of the study after the first mailing only. Physicians who completed the survey within 3 weeks of the first mailing were considered completes. The *mail-only* and the *mail/web* group were combined for this analysis since neither group received the web option in the first mailing. **Table 2** shows the response rates for the *web-always* and combined mail groups after the first mailing. While the *mail-only* and *mail/web* group attained a response rate of about 2 percentage points higher than the *web-always* group, A chi-square test did not reveal a significant effect of treatment group on response rate for the first mailing. The results indicate that providing a web response option did not have an effect on response rates to the first mailing in this survey.

Table 2. Treatment Effects for Mailing 1

	<i>Web-always</i>	<i>Mail-only & Mail/web</i>
Mailing 1 (n=4,518) Response Rate	23.8%	25.6%
	<i>p</i> =.1886	

² www.aapor.org/uploads/Standard_Definitions_04_08_Final.pdf

Next, we examined the response rate for all three experimental groups after each mailing. For mailing 1, differences between the *mail-only* group and the *mail-web* group are due to random variation as neither group received a web response option. For all follow-up mailings, however, the *mail-web* group receive the web response option, while the *mail-only* group continued to receive only the mail and fax response options. **Table 3** shows the response rates for three experimental groups by mailing. A chi-square test did not reveal a significant effect of treatment group on response rate for any mailing. While not statistically significant, the response rate for the *mail-only* group was highest, particularly after the second mailing when the tailored design approach was implemented. The results indicate that providing a web response option either in the first mailing or on follow up mailings did not have an effect on response rates in this survey.

Table 3. Treatment Effects for Mailings 1-4

Data Collection Phase	Experimental Condition		
	Web-always	Mail-only	Mail/Web
Mailing 1 (n=4518)			
Response Rate	23.8%	25.3%	25.9%
		<i>p</i> =.3997	
Mailings 1 & 2 (n=4518)			
Cumulative RR	32.4%	37.9%	33.7%
		<i>p</i> =.1802	
Mailings 1 - 3 (n=4518)			
Cumulative RR	43.0%	44.9%	44.4%
		<i>p</i> =.5676	
Mailings 1 - 4 (n=4518)			
Cumulative RR	50.2%	51.8%	50.9%
		<i>p</i> =.6726	

Physicians who responded to the first mailing were excluded from the next set of analyses in order to more closely examine the effects of the tailored design approach on the follow-up mailings. **Table 4** shows the response rates for the *web-always*, *mail-always*, and *mail/web* groups after each follow-up mailing. Although the response rate was higher for the *mail-only* group, Chi-square analyses did not reveal a significant effect of treatment group on response rate for any of the mailings. The results indicate that providing a web response option did not have an effect on response rates in this survey.

Table 4. Treatment Effects for Mailings 2-4

Data Collection Phase	<i>Experimental Condition</i>		
	<i>Web-always</i>	<i>Mail-only</i>	<i>Mail/Web</i>
Mailing 2 (n=3388)			
Response Rate	14.3%	16.8% <i>p</i> =.1889	14.6%
Mailings 2 & 3 (n=3388)			
Cumulative RR	25.3%	26.3% <i>p</i> =.7858	25.0%
Mailings 2,3, & 4 (n=3388)			
Cumulative RR	34.6%	35.4% <i>p</i> =.7173	33.8%

The final response rates for the adult specialties averaged to 48.0% compared to an average of 58.0% for the pediatric specialties. Therefore we are particularly interested in methods to boost the response rates for the adult specialties. We limited the analyses to physicians in the adult specialties and found a marginally significant effect for treatment group on response rates after the second mailing, $\chi^2(2, N = 2,374) = 2.47, p < .10$, but not for any of the other mailings. Physicians who received the web response option either in both the first and second mailing or just the second mailing had lower response rates compared to the physicians who never received a web response option. **Table 5** shows the results of limiting the analyses to the adult only specialties for the second mailing.

Table 5. Treatment Effects for Adult Specialties Only on Mailing 2

Data Collection Phase	<i>Experimental Condition</i>		
	<i>Web-always</i>	<i>Mail-only</i>	<i>Mail/Web</i>
Mailing 2 (n=2374)			
Response Rate	13.2%	16.1% <i>p</i> =.0846	12.5%

SUMMARY AND DISCUSSION

The results of this study showed providing physicians with the option of completing a survey online is not likely to improve response rates to a mailed survey. In fact, while not statistically significant, the results suggest any effect on response rates may be negative. We conducted an experiment that evaluated two methods for introducing a web response option on a national mail survey of board-certified physicians.

The findings from the experiment showed that neither approach for providing a web response option to a mail survey of physicians had a significant effect on survey response rates. While not statistically significant, the group that never received the web response option had higher response rates than the two groups that did receive web response options. In particular, the greatest differences in response rates between groups were observed after the second mailing when the tailored design approach was first implemented.

When we limited the analyses to physicians in the adult specialties only, the effects became more pronounced. After the second mailing, there was a marginally significant effect for treatment group for physicians in the adult specialties. Physicians who did not receive the web response option on any mailing had the highest response rates. We do not currently have a hypothesis for why this may be, but it is important to note since adult specialists generally have lower response rates than their pediatric counterparts.

Previous research on single-mode surveys showed that surveys conducted via the web only did not elicit as high of response rates as surveys conducted by mail only. The results of this study are consistent with the previous literature in that offering a web response option on a mail survey of physicians does not improve response rates and in turn may have a negative impact on response rates. In addition to hurting response rates, offering additional modes for survey response may introduce error due to mode effects if physicians who responded online answered differently than physicians who responded by mail or fax.

It is unclear why providing a web response option would negatively impact response rates with physicians. One factor that may have affected the results is that the survey used for this study is only one page. When faced with a longer survey, the web response might be more appealing to physicians. It is also possible that physicians who otherwise would have completed and mailed back the survey immediately decided to complete the form online, but then failed to do so, ultimately becoming nonresponders.

One limitation of this study is that we did not have sufficient information on our sample frame to determine if certain factors such as age, sex, or years of experience were related to mode of response. It may be that providing a web response option is effective for certain subpopulations of physicians, but not physicians overall. Another limitation of this study is that we did not compare survey responses by mode to determine whether any mode effects exist. Finally, we believe that it is very important to examine not only response rates, but indicators of nonresponse bias when comparing methods. Response rates alone do not provide an overall measure of quality or evidence of the absence of nonresponse bias. We plan to conduct additional research to examine the impact of these methods on nonresponse bias in addition to response rates for surveys of physicians.

REFERENCES

- Akl, E., Maroun, N., Klocke, R., Montori, V., Schünemann, H. (2005). Electronic Mail was Not Better than Postal Mail for Surveying Residents and Faculty. *Journal of Clinical Epidemiology*, 58(4): 425-429.
- Asch, DA, Jedrzejewski, MK, and Christakis, NA. (1997). Response Rates to Mail Surveys Published in Medical Journals. *Journal of Clinical Epidemiology*. 50(10). 1129-1136.
- Cummings SM, Savitz, LA, and Konrad, TR. (2001). Reported Response Rates to Mailed Physician Questionnaires. *Health Service Research*, 35(6), 1347-55.
- Dillman, D. A. (2000). Mail and Internet surveys: The tailored design method. 2nd ed. New York, NY: John Wiley & Sons.
- Gupta, L, Ward J, and D'Este, C. (1998). Differential Effectiveness of Telephone Prompts by Medical and Non-medical Staff in increasing Survey Response Rates: A Randomized Trial 1998. *Australian and New Zealand Journal of Public Health* 56:442-453.
- Kalsbeek, WD, Dever, JA, Sanders, LL, and Bennett, EM (1992). An Assessment of Alternative Designs for Conducting Physician Surveillance Surveys. *ASA 1992 Section on Survey Research Methods*, Boston, MA pp. 256-261
- Kim, H.L., Gerber, G.S., Patel, R.V., Hollowell, C.M., Bales, G.T. (2001). Practice Patterns in the Treatment of Urinary Incontinence: A Postal and Internet Survey. *Urology* 57(1): 45-48.
- Leece, P, Bhandari M, Sprague S, Swiontkowski MF, Schemitsch EH, Tornetta P, Devereaux PJ, and Guyatt GH. (2004) Internet versus mailed questionnaires: a randomized comparison. *Journal of Medical Internet Research*. Sep 24;6(3):e30.
- Losh, M. E., Thompson, N., Lutz, G. (2004). The Effect of Mode on Response Rates and Data Quality in a Survey of Physicians. The American Association for Public Opinion Research (AAPOR) 59th Annual Conference. McMahon SR, Iwamoto M, Massoudi MS, Yusuf HR, Stevenson JM, David F, Chu SY, Pickering LK. (2003). Comparison of e-mail, fax, and postal surveys of pediatricians. *Pediatrics*. Apr;111(4 Pt 1):e299-303.
- Olson, L, Srinath, KP, Burich, MC, Klabunde, C (1999). Use of a Website Questionnaire as One Method of Participation in a Physician Survey. American Association of Public Opinion Research.
- Parsons, JA, Johnson, TP and Warnecke, RB (1993). The Effect of Interview Characteristics on Gatekeeper Resistance in Surveys of Elite Populations. *Evaluation Review*, 17(2), 131-143.
- Raziano, DB, Ravishankar, J, Valenzula, D, Weiner, M, and Lavizzo-Mourey, M (2001). E-mail Versus Conventional Postal Mail Survey of Geriatric Chiefs. *The Gerontologist*. 41(6), 799-803.

Thran, SL, Olson, L, and Strouse, R (1987). The Effectiveness and Costs of Special Data Collection Efforts in a Telephone Survey of Physicians. ASA Section on Survey Research Methods.761-766.

VanGeest, JB, Wynia, Johnson, TP and Welch, VL. (2007). Methodologies for Improving Response Rates in Surveys of Physicians: A systematic Review. Evaluation of Health Professionals. Vol 30(4): 303-321.
