Seil, Kacie, Shengchao Yu, Robert Brackbill, and Lennon Turner. 2021. "Web and Paper Survey Mode Patterns and Preferences, Health & Employment Survey, World Trade Center Health Registry." *Survey Practice*, June. https://doi.org/10.29115/SP-2021-0006.

ARTICLES

Web and paper survey mode patterns and preferences, Health & Employment Survey, World Trade Center Health Registry

Kacie Seil, MPH[1], Shengchao Yu, PhD, MA[1], Robert Brackbill, PhD, MPH[1], Lennon Turner, MPH[1]

[1] World Trade Center Health Registry, New York City Department of Health & Mental Hygiene

Keywords: survey mode, mixed-mode, cohort study, response rate

https://doi.org/10.29115/SP-2021-0006

Survey Practice

This study described patterns of response versus nonresponse, earlier versus later response, and paper versus web response to the 2017–2018 Health & Employment Survey (HES). We predicted odds of responding to the survey based on demographic factors and examined impact of multiple email reminders on response volume. The overall completion rate was 65%. The likelihood of responding to HES was more than doubled when the web survey was an option. Most web surveys were received during the first two months of data collection compared with less than one-third of paper surveys. Multiple email reminders resulted in increased responses. To offer mode options to all, more efforts should be made on collecting valid email addresses.

Introduction

The World Trade Center Health Registry (WTCHR) was established in 2002, forming a longitudinal cohort of survivors of the 9/11/2001 terrorist attacks in New York City. More than 71,000 enrollees have been surveyed about their 9/11-related short- and long-term health effects in four major surveys (i.e., waves 1 – 4) as well as in smaller, focused in-depth surveys. From September 2017 until March 2018, a subset of enrollees was invited to participate in the Health & Employment Survey (HES). Using data and metadata from the HES, we sought to understand survey mode preferences (i.e., paper vs. web) and patterns of response among enrollees. This information may be utilized in future surveys to boost completion rates, optimize sampling strategies, and use resources most effectively.

Web surveys have become more acceptable to participants in recent years (Beebe et al. 2018). Researchers often prefer to use web surveys for data collection because they offer numerous benefits: faster response times (Hardigan, Popovici, and Carvajal 2016; Kwak and Radler 2002; Burgess, Nicholas, and Gulliford 2012), better data completeness and higher data quality (Jiang et al. 2017; Kwak and Radler 2002; Manfreda et al. 2008), no printing (Ardalan et al. 2007) or mailing expenses (Kaplowitz, Hadlock, and Levine 2004; Saleh and Bista 2017), allowance for self-pacing (Jiang et al. 2017), and perceived privacy while answering sensitive questions (Jiang et al. 2017). Web survey drawbacks include consistent findings that response rates are typically the lowest for web surveys compared with other modes (Van Mol 2017; Funkhouser et al. 2014; Kwak and Radler 2002; Manfreda et al. 2008; Sax, Gilmartin, and Bryant 2003; Sinclair et al. 2012). This is not the case for all

survey populations, however (Jiang et al. 2017). Also, lower response rates for web surveys may be more likely among one-time survey respondents compared with panel respondents (Manfreda et al. 2008).

Paper surveys have strengths and limitations as well. Results from some studies have shown that older populations, including clinicians, tend to be more responsive to paper surveys (Hardigan, Popovici, and Carvajal 2016; Ernst et al. 2018). A key strength is that response rates for paper-only surveys are nearly always higher than those for web-only surveys (Sinclair et al. 2012; Fan and Yan 2010). Limitations to paper surveys are reflected in the benefits of web surveys discussed previously.

When different modes have similar response rates or similar volumes of response, mixed-mode methodology becomes a good option (Hagan, Belcher, and Donovan 2017; Funkhouser et al. 2014; Jiang et al. 2017; Dykema et al. 2013). A study by Hagan, Belcher, and Donovan (2017) found that among their sample population of cancer patients, more vulnerable patients tended to prefer paper surveys over web surveys. The researchers concluded that it was important to offer the paper survey as an option, particularly for the more vulnerable (e.g., older, non-White, less educated, and less wealthy) population (Hagan, Belcher, and Donovan 2017). Mixed-mode surveys also tend to have higher response rates than single-mode surveys (Beebe et al. 2018; Millar and Dillman 2011; Rubsamen et al. 2017).

Web surveys that use email invitations as their method of deployment also enable the researchers to send email reminders throughout the data collection period. Reminders for paper surveys can increase labor and costs for the research team, while email reminders tend to be easy to send and cost-effective. Reminders also increase the likelihood of web survey response (Cernat and Lynn 2018; Van Mol 2017; Goritz and Crutzen 2012). According to results by Svensson et al. (2012), those who received 7-to-9 email reminders had the highest response rate compared with individuals who received fewer or more reminders. They also noted that they received little negative feedback about the recurrent reminders (Svensson et al. 2012). Most researchers suggest using a limited number of reminders (Saleh and Bista 2017; Van Mol 2017; Sanchez-Fernandez, Munoz-Leiva, and Montoro-Rios 2012), as sending too many may overwhelm or bother the survey respondents (Goritz and Crutzen 2012).

There were multiple aims of this study. (1) We were interested in whether survey mode was related to survey completion, predicting that odds of completion would be greatest for enrollees offered both modes. (2) We examined demographic differences in the HES for paper respondents compared with web respondents and earlier respondents versus later respondents. Our expectation was that web respondents and earlier respondents were more likely to be young, white non-Hispanic, with greater educational attainment and household income versus paper respondents and later respondents. (3) We sought to determine whether web survey respondents

were responsive to up to twelve email reminders. We hypothesized that there would be no noticeable increases in survey response after six-to-eight email reminders.

Methods

Data Source & Sampling

The HES was an in-depth survey conducted during September 2017 – March 2018 on a sample of enrollees from the WTCHR. A total of 71,426 individuals are enrolled in the WTCHR, and all have been invited to participate in the major wave surveys: wave 1 (2003–2004), wave 2 (2006–2007), wave 3 (2011–2012), and wave 4 (2015–2016). The sampling strategy for the HES reflected the survey's focus on retirement patterns and related health conditions; those who reported being retired or unemployed for health reasons at any point during the waves 2–4 surveys were invited to participate as well as a sample of age-matched controls (Yu, Seil, and Maqsood 2019). The sample pool included those who were under the age of 75 years, English-speaking, and had completed both wave 1 and wave 2 surveys. A total of 22,795 enrollees were invited to participate in the HES, and 14,887 enrollees completed the survey (completion rate = 65%). This study sample total differs from a previously published number because our sample was limited to enrollees who had a valid mailing address or email address on file (Yu, Seil, and Maqsood 2019).

Survey Deployment & Communication

The HES was offered in two modes: paper and web. Enrollees with email addresses in our system were invited to participate via web; others were invited to participate via paper survey sent through the mail. After the first invitations were sent, those invited to complete the web survey received a number of email reminders to fill out the survey if they had not yet done so. About ten weeks after the initial paper and web invitations, a second batch of paper surveys was mailed to enrollees who had not completed the survey, regardless of initial mode invitation. Therefore, some enrollees were able to participate via either mode. Email reminders continued to be sent about every one-to-three weeks to enrollees invited to participate in the web survey, and a third batch of paper surveys was mailed to nonresponders about 11 weeks after the second batch was sent. The final mailing of paper surveys and the final two email reminders introduced a monetary incentive (i.e., a $10 gift card) upon survey completion.

Statistical Analyses

We used logistic regression modeling to determine the likelihood of responding to the HES based on mode of invitation and demographic factors: gender; race/ethnicity; age group (based on age on 9/11/2017); household income; marital status; educational attainment; and enrollee eligibility group (i.e., rescue/recovery worker, resident, area worker, passer-by, or student/school staff).

We were also interested in potential demographic differences between earlier versus later respondents and paper versus web respondents. Earlier respondents were those whose surveys were received during September 2017 – November 2017; later respondents' surveys were received during December 2017 – March 2018. We calculated descriptive statistics and conducted chi-square testing to assess any differences between these groups.

To illustrate the data collection volume by survey mode, we calculated response proportions for both paper and web surveys by month. We calculated completion rates following each of the 12 email reminders sent to enrollees invited to respond via web survey to understand whether numerous email reminders would result in continued survey response gains. The web completion rate was calculated by taking the number of web surveys received following an email reminder and prior to the subsequent email reminder, divided by the number of enrollees who received the reminder.

Results

Using logistic regression modeling to predict the likelihood of responding to the HES, we confirmed that survey invitation mode was an important predictor of survey response. Compared with those invited to participate with paper only, those invited to participate via web only were 7.0 times as likely (95% confidence interval [CI]: 6.01, 8.07) to respond to the survey (see Table 1); this is mainly due to the survey deployment, wherein nonresponders to the web invitations were later given the opportunity to respond via paper survey, leading to them being categorized with an invitation mode of both paper and web. Those invited to both modes were 2.3 times as likely (95% CI: 2.13, 2.43) to respond to the survey compared with the paper only group.

Other demographic factors were predictive of survey response as well. Black non-Hispanic (odds ratio [OR] = 0.74, 95% CI: 0.67, 0.82) or Asian enrollees (OR = 0.84, 95% CI: 0.71, 1.00) were less likely to respond to the survey than White non-Hispanic enrollees. Enrollees in older age groups were significantly more likely to participate in the survey than those in the 28–49 years age group (50–59 years: OR = 1.43, 95% CI: 1.27, 1.60; 60–64 years: OR = 1.82, 95% CI: 1.63, 2.04; 65+ years: OR = 1.91, 95% CI: 1.72, 2.13). Compared with the highest household income group, the lowest income group was less likely to participate in the survey (OR = 0.79, 95% CI: 0.68, 0.93). In contrast, the second highest income group was more likely to participate (OR = 1.14, 95% CI: 1.03, 1.26) compared with the highest income group. Compared with rescue/recovery workers, residents were much less likely to respond (OR = 0.67, 95% CI: 0.60, 0.74). We also found an interaction between race/ethnicity and income that suggested that Black non-Hispanic enrollees in the lowest two income groups were more likely to respond to HES than White non-Hispanic enrollees in the highest income group (not presented in Table 1).

Table 1: Likelihood of responding to Health & Employment Survey based on invitation mode and demographic factors, N = 22,795

	Odds Ratio	95% Confidence Interval	*p-value*
Invitation mode			
Paper only	Ref	--	--
Web only[1]	6.96	6.01, 8.07	*<0.0001*
Both paper and web[2]	2.27	2.13, 2.43	*<0.0001*
Gender			
Male	1.09	1.02, 1.17	*0.013*
Female	Ref	--	--
Race/ethnicity			
White non-Hispanic	Ref	--	--
Black non-Hispanic	0.74	0.67, 0.82	*<0.0001*
Hispanic	0.91	0.82, 1.01	*0.076*
Asian	0.84	0.71, 1.00	*0.048*
Multiple races	1.02	0.81, 1.27	*0.884*
Other	0.80	0.59, 1.10	*0.165*
Age group			
28–49 years	Ref	--	--
50–59 years	1.43	1.27, 1.60	*<0.0001*
60–64 years	1.82	1.63, 2.04	*<0.0001*
65+ years	1.91	1.72, 2.13	*<0.0001*
Household income			
Less than $25,000	0.79	0.68, 0.93	*0.004*
$25,000 – < $50,000	0.94	0.83, 1.06	*0.319*
$50,000– <$75,000	1.01	0.90, 1.13	*0.844*
$75,000 – <$150,000	1.14	1.03, 1.26	*0.011*
$150,000 or more	Ref	--	--
Marital status			
Married or living with partner	Ref	--	--
Divorced or separated	0.97	0.88, 1.06	*0.466*
Widowed	0.97	0.79, 1.18	*0.758*
Never married	0.98	0.89, 1.07	*0.605*
Educational attainment			
High school or less	0.96	0.87, 1.06	*0.384*
Some college	0.92	0.84, 1.01	*0.079*
Bachelor's degree	1.00	0.91, 1.09	*0.915*
Postgraduate degree	Ref	--	--
Eligibility group			
Rescue/recovery worker	Ref	--	--
Resident	0.67	0.60, 0.74	*<0.0001*
Area worker, student/school staff	1.02	0.95, 1.10	*0.534*
Passer-by	0.88	0.76, 1.03	*0.101*

[1] The majority of the web only group consists of those who completed a web survey prior to the second paper mailing.

[2] More than 99% of those invited to participate via both survey modes were those first invited to complete the web survey but had not responded before the second paper mailing.

We also made demographic comparisons between paper (N = 7,481) versus web (N = 7,406) and earlier (N = 10,715) versus later (N = 4,172) respondents. There were nearly equal numbers of paper and web responses to the HES

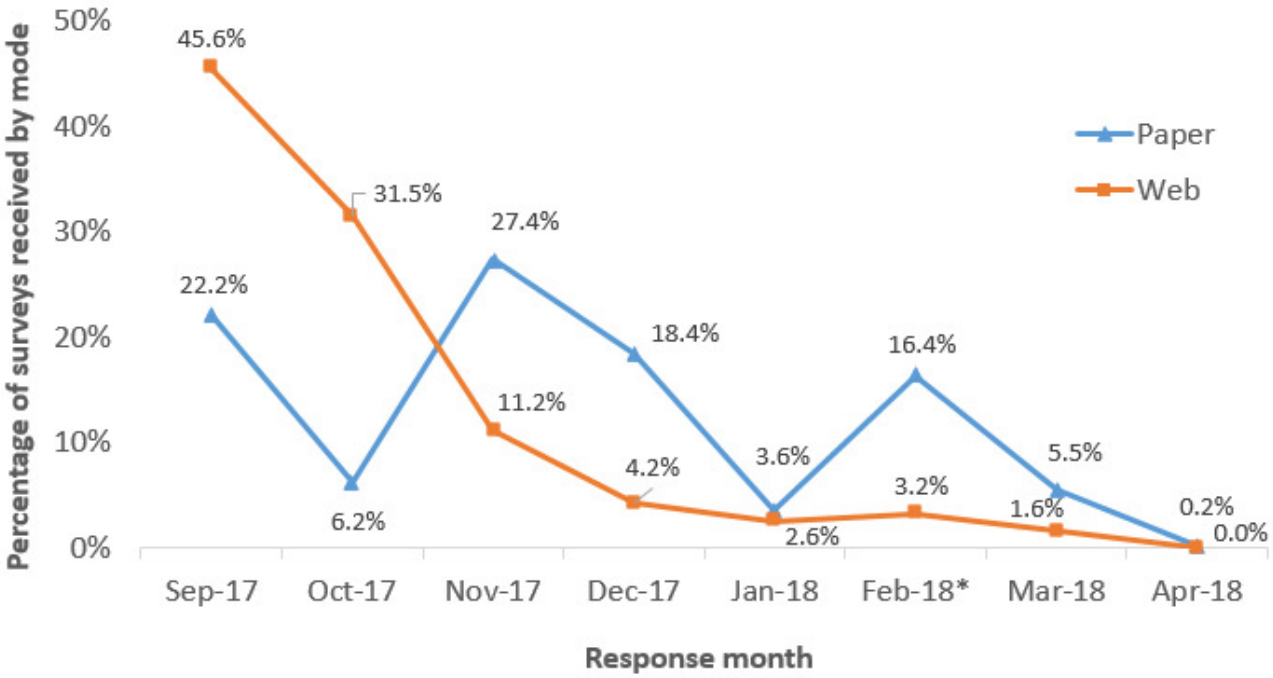

Figure 1: Percentage of Health & Employment Survey response by mode and month, N = 14,887.[1]

*Monetary incentive introduced.

[1] Paper survey mailing dates: 9/12/17, 11/22/17, 2/8/18.

(see Table 2). Paper respondents had lower household incomes than web respondents, with 22.3% having an annual household income under $50,000 compared with 15.0% of web respondents (*p<0.0001*). Web respondents were more likely to have a bachelor's degree or higher than paper respondents (58.5% vs. 46.5%, respectively; *p<0.0001*). Among those who responded to the survey during the first three months of data collection, 65.7% were males; among those who responded to the survey later, 60.5% were males.

There was not a linear pattern to the volume of surveys received during the data collection period (see Figure 1). Paper surveys demonstrated volume increases following each of the three mailings. The majority of web surveys (77.1%) were received within the first two months of data collection. Both web and paper surveys showed an increase in surveys received during February 2018, when the monetary incentive was introduced to those who had not yet completed the survey.

Table 2: Demographic comparison of paper versus web and earlier versus later Health & Employment Survey respondents, N = 14,887

	Paper (N=7,481)		Web (N=7,406)		*p*-value	Earlier (N=10,715)		Later (N=4,172)		*p*-value
	N	%	N	%		N	%	N	%	
Gender										
Male	4,767	63.7%	4,799	64.8%	*0.170*	7,042	65.7%	2,524	60.5%	*<.0001*
Female	2,714	36.3%	2,607	35.2%		3,673	34.3%	1,648	39.5%	
Race/ethnicity										
White non-Hispanic	5,283	70.6%	5,860	79.1%	*<.0001*	8,219	76.7%	2,924	70.1%	*<.0001*
Black non-Hispanic	944	12.6%	505	6.8%		965	9.0%	484	11.6%	
Hispanic	777	10.4%	586	7.9%		897	8.4%	466	11.2%	
Asian	225	3.0%	231	3.1%		302	2.8%	154	3.7%	
Multiple races	148	2.0%	126	1.7%		184	1.7%	90	2.2%	
Other	104	1.4%	98	1.3%		148	1.4%	54	1.3%	
Age group										
28–49 years	512	6.8%	604	8.2%	*<.0001*	719	6.7%	397	9.5%	*<.0001*
50–59 years	1,442	19.3%	1,547	20.9%		2,127	19.9%	862	20.7%	
60–64 years	1,892	25.3%	2,041	27.6%		2,857	26.7%	1,076	25.8%	
65+ years	3,635	48.6%	3,214	43.4%		5,012	46.8%	1,837	44.0%	
Household income										
Less than $25,000	399	5.3%	254	3.4%	*<.0001*	429	4.0%	224	5.4%	*<.0001*
$25,000 – < $50,000	1,270	17.0%	858	11.6%		1,462	13.6%	666	16.0%	
$50,000 – <$75,000	1,581	21.1%	1,430	19.3%		2,128	19.9%	883	21.2%	
$75,000 – <$150,000	2,759	36.9%	3,118	42.1%		4,329	40.4%	1,548	37.1%	
$150,000 or more	773	10.3%	1,077	14.5%		1,390	13.0%	460	11.0%	
Missing	699	9.3%	669	9.0%		977	9.1%	391	9.4%	
Educational attainment										
High school or less	1,947	26.0%	1,251	16.9%	*<.0001*	2,297	21.4%	901	21.6%	*0.216*
Some college	2,010	26.9%	1,793	24.2%		2,691	25.1%	1,112	26.7%	
Bachelor's degree	2,030	27.1%	2,447	33.0%		3,232	30.2%	1,245	29.8%	
Postgraduate degree	1,445	19.3%	1,888	25.5%		2,437	22.7%	896	21.5%	
Missing	49	0.7%	27	0.4%		58	0.5%	18	0.4%	

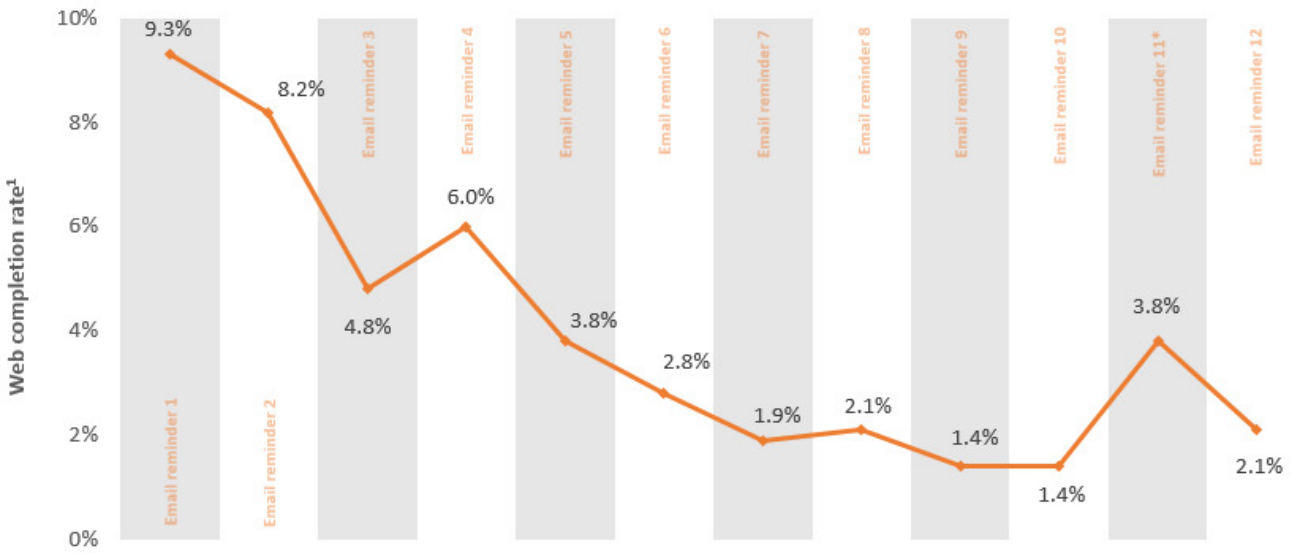

Figure 2: Web Health & Employment Survey response following each email reminder.

*Monetary incentive introduced.

[1] Web completion rate: number of web surveys received following an email reminder and prior to the subsequent email reminder, divided by number of enrollees who received reminder.

Our data demonstrated that even after 12 email reminders, there were increases in web survey completions (see Figure 2). Completion rates ranged from 9.3% after the first reminder to 1.4% after the ninth and tenth reminders. Web survey completion rates more than doubled after the monetary incentive was introduced (3.8%) and remained elevated even after the final email reminder (2.1%).

Discussion

In this study, we were interested in learning more about differences in survey mode preferences and patterns, specific to the WTCHR enrollee population. There were equal numbers of paper and web responses to the HES. Nearly half of the total web surveys were received in the first month of data collection; over three-quarters were received during the first two months. Only 22% of paper surveys were received in the first month of data collection by comparison. Not only did web survey data come in faster than paper survey data, but statistical modeling showed that the likelihood of responding to the HES was more than doubled when the web survey was an option (compared with those only offered the paper mode). Enrollees who were male, older, and had higher household income were also more likely to respond. Compared with rescue/recovery workers, lower Manhattan residents were significantly less likely to participate in the HES.

We also wanted to consider the level of impact that up to 12 email reminders would have on survey response. The literature is mixed on how many email reminders survey participants should receive, though the guidance tends to be that fewer is better. In our study, there was a noticeable increase in returned

surveys following each reminder. If we had offered the monetary incentive in an earlier email reminder, we may have gotten even more responses, but offering it earlier may have been prohibitively expensive, as the volume of both web and paper surveys received would have likely increased.

To understand the impact of survey mode patterns and preferences, we examined differences in demographic factors between paper versus web and earlier versus later respondents. Our data showed that web respondents had greater household incomes and level of educational attainment compared with paper respondents. Earlier responders to the HES were more likely to be male and have greater income levels compared with later responders. Because survey volume was evenly split by mode, we conclude that it is important to use mixed-mode methodology among our cohort.

As the enrollees are part of an ongoing, closed cohort, it is important to keep them engaged in the research process. Survey planning must balance the needs of the research team as well as the participants, with the ultimate goal of having high completion rates for WTCHR surveys, keeping in mind both time and resource considerations. The cohort's unique composition could limit the generalizability of these results to other survey populations, but they would likely be of use to other long-running cohorts aiming to minimize loss to follow-up. The results may also be relevant to survey populations where the individuals have a shared experience in common (e.g., a natural disaster or pandemic).

Conclusions

Over 16 years following 9/11/2001, the WTCHR continues to maintain an active and responsive cohort of survivors. With consistent communication from the staff at WTCHR (e.g., annual reports, holiday cards, and website updates); assistance with finding survivor resources; and proven utility of survey data via scientific outputs, the WTCHR enrollees have continued their participation in the research at high levels. The use of a mixed-mode survey methodology was necessary in achieving a strong completion rate, demonstrated by the fact that half of the respondents chose to respond via paper, and half chose to respond via web. Because respondent demographics differed based on the mode of survey, offering both helps minimize response bias. That said, the cost differential by mode is significant; we estimated that each paper survey response cost about 16 times more than each web survey response. The cost, response time, and data quality benefits of web surveys (as well as the ability to send numerous email reminders), lead us to conclude that efforts must be made to collect email addresses for all WTCHR enrollees, as well as correct the numerous invalid email addresses in the system.

Funding

This publication was supported by Cooperative Agreement Numbers 2U50/OH009739 and 5U50/OH009739 from the National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention (CDC); U50/ATU272750 from the Agency for Toxic Substances and Disease Registry, with support from the National Center for Environmental Health (CDC); and by the New York City Department of Health and Mental Hygiene (NYC DOHMH). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIOSH, CDC, or the Department of Health and Human Services.

Corresponding author information

Kacie Seil, MPH

30-30 47th Ave., Suite 414

Long Island City, NY 11101

kseil@health.nyc.gov

718-786-4478

Submitted: February 23, 2021 EDT, Accepted: April 27, 2021 EDT

REFERENCES

Ardalan, A., R. Ardalan, S. Coppage, and W. Crouch. 2007. "A Comparison of Student Feedback Obtained through Paper-Based and Web-Based Surveys of Faculty Teaching." *British Journal of Educational Technology* 38 (6): 1085–1101. https://doi.org/10.1111/j.1467-8535.2007.00694.x.

Beebe, T. J., R. M. Jacobson, S. M. Jenkins, K. A. Lackore, and L. J. F. Rutten. 2018. "Testing the Impact of Mixed-Mode Designs (Mail and Web) and Multiple Contact Attempts within Mode (Mail or Web) on Clinician Survey Response." *Health Services Research* 53 Suppl 1: 3070–83. https://doi.org/10.1111/1475-6773.12827.

Burgess, C., J. Nicholas, and M. Gulliford. 2012. "Impact of an Electronic, Computer-Delivered Questionnaire, with or without Postal Reminders, on Survey Response Rate in Primary Care." *Journal of Epidemiology and Community Health* 66 (7): 663–64. https://doi.org/10.1136/jech-2011-200884.

Cernat, A., and P. Lynn. 2018. "The Role of E-Mail Communications in Determining Response Rates and Mode of Participation in a Mixed-Mode Design." *Field Methods* 30 (1): 70–87.

Dykema, J., J. Stevenson, L. Klein, Y. Kim, and B. Day. 2013. "Effects of E-Mailed versus Mailed Invitations and Incentives on Response Rates, Data Quality, and Costs in a Web Survey of University Faculty." *Social Science Computer Review* 31 (3): 359–70. https://doi.org/10.1177/0894439312465254.

Ernst, S. A., T. Brand, S. K. Lhachimi, and H. Zeeb. 2018. "Combining Internet-Based and Postal Survey Methods in a Survey among Gynecologists: Results of a Randomized Trial." *Health Services Research* 53 (2): 879–95. https://doi.org/10.1111/1475-6773.12664.

Fan, W., and Z. Yan. 2010. "Factors Affecting Response Rates of the Web Survey: A Systematic Review." *Computers in Human Behavior* 26: 132–39.

Funkhouser, E., J. L. Fellows, V. V. Gordan, D. B. Rindal, P. J. Foy, and G. H. Gilbert. 2014. "Supplementing Online Surveys with a Mailed Option to Reduce Bias and Improve Response Rate: The National Dental Practice-Based Research Network." *Journal of Public Health Dentistry* 74 (4): 276–82. https://doi.org/10.1111/jphd.12054.

Goritz, A. S., and R. Crutzen. 2012. "Reminders in Web-Based Data Collection: Increasing Response at the Price of Retention?" *American Journal of Evaluation* 33 (2): 240–50. https://doi.org/10.1177/1098214011421956.

Hagan, T. L., S. M. Belcher, and H. S. Donovan. 2017. "Mind the Mode: Differences in Paper vs. Web-Based Survey Modes Among Women With Cancer." *Journal of Pain and Symptom Management* 54 (3): 368–75. https://doi.org/10.1016/j.jpainsymman.2017.07.005.

Hardigan, P. C., I. Popovici, and M. J. Carvajal. 2016. "Response Rate, Response Time, and Economic Costs of Survey Research: A Randomized Trial of Practicing Pharmacists." *Research in Social and Administrative Pharmacy* 12 (1): 141–48. https://doi.org/10.1016/j.sapharm.2015.07.003.

Jiang, W., L. Ha, M. Abuljadail, and S. A. Alsulaiman. 2017. "Item Non-Response of Different Question Types and Formats in Mixed-Mode Surveys: A Case Study of a Public Broadcasting TV Station's Members." *Journal of Communication and Media Research* 9 (1): 173–84.

Kaplowitz, M. D., T. D. Hadlock, and R. Levine. 2004. "A Comparison of Web and Mail Survey Response Rates." *Public Opinion Quarterly* 68 (1): 94–101.

Kwak, N., and B. Radler. 2002. "A Comparison between Mail and Web Surveys: Response Pattern, Respondent Profile, and Data Quality." *Journal of Official Statistics* 18 (2): 257–73.

Manfreda, K. L., M. Bosnjak, J. Berzelak, I. Haas, and V. Vehovar. 2008. "Web Surveys versus Other Survey Modes: A Meta-Analysis Comparing Response Rates." *International Journal of Market Research* 50 (1): 79–104.

Millar, M. M., and D. A. Dillman. 2011. "Improving Response to Web and Mixed-Mode Surveys." *Public Opinion Quarterly* 75 (2): 249–69.

Rubsamen, N., M. K. Akmatov, S. Castell, A. Karch, and R. T. Mikolajczyk. 2017. "Comparison of Response Patterns in Different Survey Designs: A Longitudinal Panel with Mixed-Mode and Online-Only Design." *Emerging Themes in Epidemiology* 14: 4. https://doi.org/10.1186/s12982-017-0058-2.

Saleh, A., and K. Bista. 2017. "Examining Factors Impacting Online Survey Response Rates in Educational Research: Perceptions of Graduate Students." *Journal of MultiDisciplinary Evaluation* 13 (29): 63–74.

Sanchez-Fernandez, J., F. Munoz-Leiva, and F. J. Montoro-Rios. 2012. "Improving Retention Rate and Response Quality in Web-Based Surveys." *Computers in Human Behavior* 28 (2): 507–14. https://doi.org/10.1016/j.chb.2011.10.023.

Sax, L. J., S. K. Gilmartin, and A. N. Bryant. 2003. "Assessing Response Rates and Nonresponse Bias in Web and Paper Surveys." *Research in Higher Education* 44 (4): 409–32.

Sinclair, M., J. O'Toole, M. Malawaraarachchi, and K. Leder. 2012. "Comparison of Response Rates and Cost-Effectiveness for a Community-Based Survey: Postal, Internet and Telephone Modes with Generic or Personalised Recruitment Approaches." *BMC Medical Research Methodology* 12: 132. https://doi.org/10.1186/1471-2288-12-132.

Svensson, M., T. Svensson, A. W. Hansen, and Y. Trolle Lagerros. 2012. "The Effect of Reminders in a Web-Based Intervention Study." *European Journal of Epidemiology* 27 (5): 333–40. https://doi.org/10.1007/s10654-012-9687-5.

Van Mol, C. 2017. "Improving Web Survey Efficiency: The Impact of an Extra Reminder and Reminder Content on Web Survey Response." *International Journal of Social Research Methodology* 20 (4): 317–27. https://doi.org/10.1080/13645579.2016.1185255.

Yu, S., K. Seil, and J. Maqsood. 2019. "Impact of Health on Early Retirement and Post-Retirement Income Loss among Survivors of the 11 September 2001 World Trade Center Disaster." *International Journal of Environmental Research and Public Health* 16 (1177): 1–12. https://doi.org/10.3390/ijerph16071177.