



california  
health  
interview  
survey

## CHIS Working Paper Series

# **Can FedEx Mailings Improve Response from Black or African American Californians in an Address-Based Sample Survey? An Experiment in the California Health Interview Survey**

Jiangzhou Fu, UCLA Center for Health Policy Research

Xinyu Zhang, UCLA Center for Health Policy Research

Todd Hughes, UCLA Center for Health Policy Research

Royce Park, UCLA Center for Health Policy Research

November 2023

**UCLA**

**Center for Health  
Policy Research**

## **Summary**

The California Health Interview Survey (CHIS) invites sample cases to participate in a survey via several mail invitations. In 2018, CHIS conducted an experiment to evaluate the use of Certified mail in nonresponse follow-ups and found that the use of Certified mail significantly improved response rates. However, concerns raised by respondents due to the need to go to the post office to pick up the certified mailings led to CHIS abandoning this strategy in the nonresponse follow-ups in late 2019. Built upon the previous study, CHIS conducted an additional experiment in 2023 to explore using FedEx mailings in the high-density Black/African American areas to increase participation among Black/African American Californians.

We report results from the experiment to test the effects of using FedEx for nonresponse follow-up. The experiment was implemented in the high-density Black/African American areas in California with two experimental groups: 1) a reminder letter in a FedEx envelope; 2) a reminder letter in a regular First Class envelope. The results showed that FedEx mailings increased completion rates. As expected, the use of FedEx mailings was more expensive than the use of First Class mailings. On average, FedEx mailings were 70% more expensive than First Class mailings in terms of the cost per complete. More importantly, we found that FedEx mailings affected the composition of respondents with respect to race and ethnicity. While it increased participation from Black/African American respondents, it also did so for other racial and ethnic groups residing in the target areas making it less effective at specifically increasing the proportion of Black/African American respondents.

## **Introduction**

The California Health Interview Survey (CHIS) has been using a mixed-mode (web and telephone) survey since 2019. Due to declining response and coverage rates of random-digit-dialing (RDD) telephone surveys in the United States (U.S.), CHIS has shifted to addressed-based sampling (ABS). ABS emerges as a cost-effective sampling frame that provides a high level of coverage of the U.S. household. Wells et al. (2019) reported the use of a mixed-mode push-to-web design in CHIS increased the response rates and decreased the cost per complete.

In the current CHIS survey design, selected sample cases are invited to participate in a web survey via several mail invitations. The success of the survey relies on the design of mailings. In 2018, CHIS conducted an experiment to evaluate the use of Certified mail in nonresponse follow-ups in three California counties (Wells et al., 2019). They found that the use of Certified mail significantly improved response rates. However, concerns raised by respondents due to the need to go to the post office to pick up the undelivered certified mailings led to CHIS abandoning this strategy in the nonresponse follow-ups in late 2019.

CHIS purposefully oversamples Black/African American Californians, with the goal of maximizing the incidence rates of key subgroups while minimizing the impact on variance estimation. CHIS has already employed methods to oversample from census tracts that have a high proportion of Black/African American residents. For example, CHIS leveraged auxiliary data sources (such as

voter registration databases, consumer databases, and surname databases) to implement targeted strategies for reaching underrepresented demographic groups. However, CHIS is unable to predict with greater precision which specific addresses within those tracts include Black/African American residents.

In an effort to increase participation among Black/African American Californians, CHIS conducted an experiment in 2023 to explore enhancements to its existing mail methods in high density Black/African American census tracts. Focusing the use of FedEx mailings in these areas was seen as a way to direct the investment of additional costs in specific locations that would lead to a higher number of interview from Black/African American respondents, without increasing data collection costs in all areas. In the treatment arm, CHIS employed FedEx mailings in nonresponse follow-ups. Specifically, CHIS used the FedEx envelope (a more visible package with the air of increased importance) to send the final CHIS invitation letter to the nonrespondents to encourage them to respond by web/telephone. The experiment sent a FedEx envelope to a random sample of 5,100 households.

Our purpose in this study is to determine whether FedEx mail affects response rates, respondent representativeness, and survey costs. We report results from an experiment conducted in a statewide sample in CHIS 2023. The treatment arm changes the appearance of the mailing by using FedEx in the nonresponse follow-up mailing, while the control arm uses regular First Class mailings. We present the results of this experiment and discuss future directions for improving the format of mailings in web/mail data collections.

## **Background**

The use of an alternative mail delivery method in nonresponse follow-ups has been explored in the survey literature (e.g., Han et al., 2013; Messer and Dillman, 2011; Wagner et al., 2023; Zhang et al., 2023). The similar appearance of envelopes raises the concern that nonrespondents may not open them. The follow-up mailing with a noticeable change may be a useful approach. For example, a survey design with two mailings can use a plain paper envelope (e.g., First Class envelope) as the initial mailing, followed by a paperboard envelope (e.g., FedEx or First Priority envelope). The paperboard envelope serves as a visual stimulus and may catch the attention of nonrespondents who have not opened the previous mailings. Although the special packaging of the mailing is eye-catching, the decision to participate is also influenced by other factors that go beyond the display of a survey request (Groves et al., 2000). It is also worth noting that postage, materials, and assembly costs for a paperboard envelope are more expensive than a plain paper envelope.

Most existing studies focus on Priority Mail as a special mailing in nonresponse follow-ups, but their findings are relevant to the use of FedEx mailings. Messer and Dillman (2011) experimented with the use of Priority Mail as a nonresponse follow-up strategy in a statewide survey in Washington. Their experiment was implemented in the main stage of data collection.

They found that Priority Mail and First Class mail yielded similar response rates and recruited respondents with similar sociodemographic characteristics.

Zhang et al. (2023) report on an experiment in a national survey using a two-phase design. Their experiment for examining the main effect of Priority Mail was implemented in the screening phase. They found that Priority Mail as a useful strategy boosted the screening response rate by 2%; the screening response rate for the control group (First Class mail) was 4.7%. However, they did not find empirical evidence indicating that the use of Priority Mail would change the sociodemographic compositions of the respondents. It is worth noting that their comparisons have low statistical power due to the small number of respondents.

The use of Priority Mail in nonresponse follow-ups also has implications on data collection costs. Messer and Dillman (2011) reported an increase in the costs per respondent with Priority Mail, increasing from \$37.81 (First Class mail) to \$40.51. Zhang et al. (2023) found that the costs per respondent with Priority Mail were considerably higher, with a three-fold increase from \$30 (First Class mail) to \$123. Overall, these findings imply that the costs of a special mailing strategy (e.g., First Priority or FedEx) are higher than a standard mailing delivery method (e.g., First Class mail).

## **Methods**

### ***The CHIS design***

The CHIS sample is representative of California's non-institutionalized population living in households, a geographically stratified address-based probability sample of adults, children and adolescents. CHIS randomly selects one adult to interview in each sampled household throughout California. The adult sample size is approximately 20,000 completed interviews each year. Child interviews are also conducted from an adult parent/guardian who is sufficiently knowledgeable about the health of a child (aged 0 to 11). Interviews with adolescents (aged 12 to 17) are conducted directly following parental permission. In addition to English, CHIS is also conducted in Spanish, Chinese (Mandarin and Cantonese dialects), Korean, Vietnamese, and Tagalog.

### ***The FedEx Experiment Design***

The sequence of mailings in the 2023 CHIS data collection followed an existing data collection protocol. It began with an initial invitation letter with a visible \$2 pre-incentive, followed by a sealed postcard reminder, a second reminder letter, and finally a sealed postcard reminder. For households that were unresolved after the fourth mailing and for which a telephone number had been appended, non-response follow-up calls were made.

The FedEx experiment was introduced in the third mailing (the second reminder letter), as illustrated in Figure 1. In this experiment, a subset of the CHIS 2023 sample, residing in areas of the Black/African American population density of 13% or higher, was randomly assigned to two experimental groups: (1) receiving a reminder letter enclosed in a FedEx envelope, (2) receiving

a reminder letter in a First Class envelope. Each group had a sample size of about 5,100. The reminder letters in the experiment were distributed during six weekly waves, commencing on March 27, 2023, and ending on May 3, 2023.

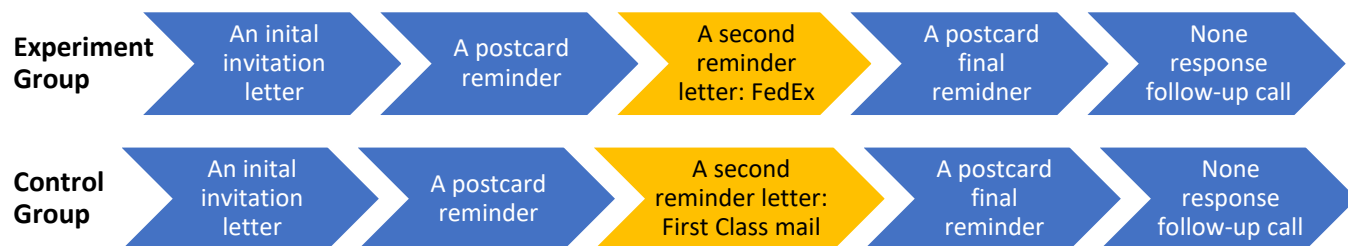


Figure 1. CHIS 2023 FedEx Experiment Flowchart.

The analysis utilized the following data sources: 1) main dataset including all eligible respondents for the FedEx experiment with Census block group (CBG) number; 2) CHIS 2023 monthly screener and adult file; 3) the Census 2020 and the American Community Survey 2021 5-Year dataset for demographics and socioeconomic characteristics at the CBG level.

The main dataset consisted of all eligible respondents and included CHIS base ID (BASEID), experimental group, and the Census block groups number. To gain insights into CHIS respondent characteristics and completion status in the experiment, CHIS 2023 monthly screener and adult files were matched to the main dataset by base ID. Additionally, we linked the main dataset to data from the Census and the American Community Survey.

The study primarily focuses on adult completes. We examined completion rates, the demographic characteristics of respondents, and the cost per interview (CPI).

## Results

Table 1 presents completion rates by experimental group, and within each one of the selected CBGs. The use of FedEx mailings significantly increased the overall completion rate. The overall completion rate was 5.7% for FedEx versus 3.3% for First Class. We found that FedEx significantly increased the completion rates among the most CBGs. Two exceptions are CBGs with Black/African American population density of 25% or higher, and CBGs with household size one with density 35% or higher, but the completion rates in the FedEx group were still higher than the completion rates in the First Class mail group. Please see the appendix for the completion rate breakdown by the interview completion status and the CBG.

Table 1. Completion rates by experimental group.

Census block group attributes	First Class		FedEx		Chi-square <i>p</i> -value
	n	Completion rate <sup>1</sup> (%)	n	Completion rate (%)	
Overall	5,098	3.3	5,125	5.7	<.001
AA <sup>2</sup> population density 15%+	2,811	2.9	2,829	5.0	<.001
AA population density 20%+	1,866	2.9	1,980	5.2	<.001
AA population density 25%+	1,206	3.2	1,310	4.4	.147
Poverty rate 15%+	2,330	3.0	2,440	4.6	.004
HH <sup>3</sup> size 1 density 35% +	743	4.7	714	7.1	.063
HH size 3 or + density 50% +	3,063	2.4	3,084	4.7	<.001
HH size 3 or + density 60% +	1,788	2.0	1,849	4.1	<.001
In Los Angeles County	2,217	3.6	2,195	5.1	.022
Outside Los Angeles County	2,881	3.1	2,930	6.1	<.001
Median age 38 or +	1,375	4.4	1,372	7.8	<.001
Median age 50 or +	309	2.9	253	7.9	.014
Urban	4,703	3.4	4,757	5.9	<.001

Note. <sup>1</sup>Both completed cases and sufficient partials are included. <sup>2</sup>AA denotes African American. <sup>3</sup>HH denotes household.

Table 2 shows the demographic characteristics of respondents by experimental group. Overall, there were no statistically significant differences between the FedEx and First Class groups among the most demographics. However, the experimental treatment was associated with significant change in race/ethnicity. Specifically, the percentage of Black/African American respondents was 5.9% lower for the FedEx group (13.8% versus 18.7%); FedEx recruited higher percentages of Asian respondents (14.6% versus 11.3%), other races (6.9% versus 2.0%) and White respondents (39.1% versus 32.0%). There were small differences in the distribution of age, education, and Federal Poverty Levels (FPLs) distributions, but no significant difference was observed.

Table 2. Demographic characteristics by experimental group.

CHIS demographics	First Class		FedEx		Chi-square p-value
	Respondents	%	Respondents	%	
Race/Ethnicity					.02
Asian, Non-Hispanic (NH)	17	11.3	38	14.6	
Black/African American, NH	28	18.7	36	13.8	
Hispanic	54	36.0	67	25.7	
Other race <sup>1</sup> , NH	3	2.0	18	6.9	
White, NH	48	32.0	102	39.1	
Age					.2
18-39	42	28.0	58	22.2	
40-64	65	43.3	105	40.2	
65+	43	28.7	98	37.5	
Education					.7
Less than high school	7	4.7	10	3.9	
High School	23	15.5	51	19.7	
Some college	46	31.1	89	34.4	
BA/BS degree	44	29.7	67	25.9	
Graduate degree	28	18.9	42	16.2	
Poverty level					.3
0-99% FPL	31	21.1	41	15.7	
100-199% FPL	33	22.4	48	18.4	
200-299% FPL	17	11.6	36	13.8	
300% FPL and above	66	44.9	136	52.1	

Note. <sup>1</sup>Other races included American Indian and Alaska Native (AIAN), Native Hawaiian and Pacific Islander (NHPI), and more than one race.

We also tested the distribution of gender identity by treatment group, but the result was not statistically significant. Due to data confidentiality requirements, we did not show the results.

Table 3 presents the CPI ratio between the FedEx group and the First Class mail group. The CPI takes into consideration the differential sample yield, mailing costs, and phone costs associated with a complete. The overall CPI ratio of 1.70 indicated that the CPI for the FedEx mailing was 70% more expensive than the First Class mailing. Within each one of the selected CBGs, the CPI for the FedEx mailing was consistently higher than the First Class mailing (CPI ratio ranged from 1.07 to 2.27). Specifically, the CPI ratios for Black/African American population density 15% or higher, 20% or higher, and 25% or higher were 1.69, 1.63, and 2.12, respectively. As expected, overall, the FedEx mailing was substantially more expensive than the First Class mailing.

Table 3. Cost per interview (CPI) ratio by CBG.

Census block group attributes	CPI ratio
Overall	1.70
AA population density 15%+	1.69
AA population density 20%+	1.63
AA population density 25%+	2.12
Poverty rate 15%+	1.88
HH size 1 density 35% +	1.92
HH size 3 or + density 50% +	1.48
HH size 3 or + density 60% +	1.42
In Los Angeles County <sup>1</sup>	2.27
Outside Los Angeles County	1.36
Median age 38 or +	1.65
Median age 50 or +	1.07
Urban	1.67

Note. The cost of a FedEx envelope was \$13.95 for all California areas other than Los Angeles and \$17.95 for Los Angeles in 2023.

## Discussion

We experimentally evaluated the effects of FedEx mailings as a nonresponse follow-up strategy in areas of Black/African American population density of 13% or above. We found that sending additional mailings using the FedEx envelope improved response rates. This suggests that the use of FedEx mailing could result in more sample cases to respond. However, FedEx mailings tended to be less cost-efficient. Compared with First Class mailings, sending FedEx mailings cost 70% more in terms of the CPI. These two findings are consistent with the existing literature.

Surprisingly, compared with the First Class mail, FedEx recruited a lower proportion of non-Hispanic Black/African American respondents; reasons for this finding are unclear. Given that the experiment was conducted in areas of Black/African American population density of 13% or above and more than a half of the sample was living in areas of Black/African American population density of 15% or above, achieving a sample composition of 13.8% of respondents identifying as non-Hispanic Black/African American was likely to under-represent the true population proportion. This finding also raises the concern that using FedEx mailings might introduce additional nonresponse bias, which was the opposite of our objectives in designing the experiment. This was inconsistent with the existing literature (Messer and Dillman, 2011; Zhang et al., 2023).

In summary, we found that the use of FedEx mailings improved response rates, but it was not cost-efficient and did not meet our objectives of increasing the proportion of responses coming from Black/African American Californians. Therefore, sending reminder letters by FedEx is less attractive in CHIS. Future studies might explore alternative low-cost mailings (e.g., First Class



service) that contain targeted messages that are more salient for Black/African American respondents.

## References

Han, D., Montaquila, J. M., and Brick, J. M. (2013), An Evaluation of Incentive Experiments in a Two-Phase Address-Based Sample Mail Survey. *Survey Research Methods*, 7, 207–218.

Groves, R. M., Singer, E., and Corning, A. (2000). Leverage-Saliency Theory of Survey Participation: Description and an Illustration. *The Public Opinion Quarterly*, 64(3), 299-308.

Messer, B. L., and Dillman, D. A. (2011). Surveying the General Public Over the Internet Using Address-Based Sampling and Mail Contact Procedures. *Public Opinion Quarterly*, 75(3), 429-457.

Wagner, J., West, B. T., Couper, M. P., Zhang, S., Gatward, R., Nishimura, R., and Saw, H. W. (2023). An Experimental Evaluation of Two Approaches for Improving Response to Household Screening Efforts in National Mail/Web Surveys. *Journal of Survey Statistics and Methodology*, 11(1), 124-140.

Wells, B. M., Hughes, T., Park, R., CHIS Redesign Working Group, and Ponce, N. (2019). *Evaluating the California Health Interview Survey of the Future: Results from a Statewide Pilot of an Address-Based Sampling Mail Push-to-Web Data Collection*. Los Angeles, CA: UCLA Center for Health Policy Research.

Zhang, S., West, B. T., Wagner, J., Couper, M. P., Gatward, R., and Axinn, W. G. (2023). Visible Cash, a Second Incentive, and Priority Mail? An Experimental Evaluation of Mailing Strategies for a Screening Questionnaire in a National Push-To-Web/Mail Survey. *Journal of Survey Statistics and Methodology*, 11(5), 1011-1031.

## Appendix

Table 1. All completion status by experimental group

	Completed	Insuff. partial <sup>1</sup>	Suff. <sup>2</sup> partial	Not completed	Other	Total	Completion rate <sup>3</sup>
FedEx	259	141	32	4,691	2	5,125	5.68%
First Class	150	104	19	4,825	0	5,098	3.32%

Note. <sup>1</sup>Insuff. denotes insufficient. <sup>2</sup>Suff. denotes sufficient. <sup>3</sup>Including both completed cases and sufficient partials. Insufficient partials are defined as interviews that break off prior to the end of Section K. Sufficient partials are defined as interviews that break off after the end of Section K, but before the end of the survey. Completed is defined as interviews that complete the entire survey (still considered as fully completes if respondents didn't finish follow-up survey permission sections).

Table 2. Completion status by experimental group: AA population density 15%+

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	125	78	17	2,608	1	2,829	5.02%
First Class	73	63	9	2,666	0	2,811	2.92%

Table 3. Completion status by experimental group: AA population density 20%+

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	89	61	13	1,816	1	1,980	5.15%
First Class	48	45	6	1,767	0	1,866	2.89%

Table 4. Completion status by experimental group: AA population density 25%+

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	50	32	8	1,219	1	1,310	4.43%
First Class	34	26	5	1,141	0	1,206	3.23%

Table 5. Completion status by experimental group: poverty rate 15%+

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	96	70	16	2,257	1	2,440	4.59%
First Class	61	47	8	2,214	0	2,330	2.96%

Table 6. Completion status by experimental group: median age 38+.

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	96	38	11	1,227	0	1,372	7.80%
First Class	41	70	20	1,293	0	1,375	4.44%

Table 7. Completion status by experimental group: median age 50+.

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	18	6	2	227	0	253	7.91%
First Class	9	7	0	293	0	309	2.91%

Table 8. Completion status by experimental group: HH size 1 density 35%+.

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	45	22	6	641	0	714	7.14%
First Class	31	21	4	687	0	743	4.71%

Table 9. Completion status by experimental group: HH size 3 or +, density 50%.

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	128	70	16	2,868	0	3,084	4.67%
First Class	65	57	8	2,933	0	3,063	2.38%

Table 10. Completion status by experimental group: HH size 3 or +, density 60%.

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	68	35	8	1,738	0	1,849	4.11%
First Class	31	32	5	1,720	0	1,788	2.01%

Table 11. Completion status by experimental group: in Los Angeles County

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	100	55	11	2,028	1	2,195	5.06%
First Class	71	43	9	2,094	0	2,217	3.61%

Table 12. Completion status by experimental group: outside Los Angeles County

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	159	86	21	2663	1	2,930	6.14%
First Class	79	61	10	2731	0	2,881	3.09%

Table 13. Completion status by experimental group: urban areas

	Completed	Insuff. partial	Suff. partial	Not completed	Other	Total	Completion rate
FedEx	250	128	30	4347	2	4,757	5.89%
First Class	142	98	17	4446	0	4,703	3.38%