# USING ALTERNATE ADDRESS INFORMATION TO INCREASE RESPONSE AMONG ACTIVE DUTY PERSONNEL

Nancy A. Clusen, Esther M. Friedman, Mathematica Policy Research
Michael Hartzell, Department of Defense
Nancy A. Clusen, 600 Maryland Ave., SW, Suite 550, Washington, DC 20024, nclusen@mathematica-mpr.com

**KEY WORDS:** Nonresponse, Health Care Survey of Department of Defense Beneficiaries (HCSDB)

## INTRODUCTION

The Health Care Survey of Department of Defense (DoD) Beneficiaries (HCSDB) is an important tool used by DoD to monitor satisfaction with, access to, and use of care in the military health system. Currently questionnaires are mailed to active-duty beneficiaries at their residential address. However, previous nonresponse studies indicate that one-quarter of beneficiaries have an incorrect address on the sample frame. For active-duty beneficiaries, the residential address may not be updated as promptly as the military unit address. However, due to the nature of active-duty service, beneficiaries may or may not receive mail more easily at their military unit address. It is therefore difficult to know which mailing address is more appropriate for this population. This phenomenon is hardly unique to the military, and may be observed among other populations, including college students. Students often use their parents' address as a permanent residential address, but also have a student address for more timely correspondence. When multiple addresses are present, it is not always clear to the survey researcher which address is more appropriate.

To improve our understanding of and ability to improve response rates of active duty personnel, we designed an experiment in which we randomly assigned a subsample of active-duty beneficiaries to receive their questionnaires at their military unit address instead of their residential address. The results of this experiment provide some limited insight into nonresponse among active-duty beneficiaries. We evaluated the results of the experiment by looking at the overall response rates by treatment and control, as well as by a number of subgroups known to have an effect on response. This study concludes with a discussion of the implications of the findings on survey operations and statistical procedures.

## METHODS

The HCSDB is a quarterly mail survey of a sample of 45,000 Military Health System (MHS) beneficiaries. The target population is all adults eligible for military health care benefits including active duty personnel and their family members, and retired personnel and their family members. The HCSDB mailing process is designed so each beneficiary with a useable address receives up to four mailings: a notification letter, a questionnaire, a reminder or thank you postcard, and a second questionnaire. The current standard procedure includes mailing the questionnaire to one of the three addresses: residential address, beneficiary's sponsor's address, and military unit address. When possible, the residential address is given preference over the beneficiary's sponsor address. Likewise, the beneficiary's sponsor address is given preference over the military unit address. However, a previous study showed that an estimated one-quarter of beneficiaries had an incorrect address on the sample frame (Clusen, et al 2002).

We hypothesized that for active-duty beneficiaries the residential address may not be updated as frequently as the military unit address. We imbedded an experiment into

the first Quarter 2003 HCSDB to measure the impact on response of mailing to the military unit address. Within military hospital service areas we randomly assigned ten percent of the active-duty sample to the treatment group. A total of 2,227 active-duty beneficiaries were assigned to the treatment group. For the treatment group, the questionnaire was mailed using the following algorithm: the military unit address is given preference over the residential address, and the residential address is given preference over the beneficiary's sponsor address. For the control group, the questionnaire was mailed using the standard procedure.

National Research Corporation fielded the survey. The field period for this survey was January 2 through February 28, 2003. Mathematica Policy Research conducted the sample design, weighting, data analysis, and reporting.

**RESULTS**

We evaluated the results of the experiment by looking at the overall response rates by treatment and control, as well as by a number of subgroups known to have an effect on response: rank, age, branch of service, and Continental U.S. and outside Continental U.S. Below is a table of unweighted response rates for each subgroup by treatment group (Table 1).

Because the dependent variable of interest is dichotomous (response or nonresponse), we tested whether the mailing to the unit address significantly increased or decreased response by using a logistic regression model. First, we modeled just the effect of the treatment group on response, where response was defined as a sufficiently completed and returned questionnaire. The odds ratios for this model are in the first column of Table 2. We found that the treatment group is not a significant predictor

of response. The first column of Table 2 shows this model in which the t-test failed to reject that $\beta = 0$ (p = 0.330). In other words, the odds of responding to the survey do not change as you move from control group to treatment group.

**Table 1: Unweighted response rates for various groups by treatment group**

|  | Control | Treatment |
|---|---|---|
| Overall | 18.2 | 17.3 |
| CONUS |  |  |
|     Outside Cont. U.S. | 12.2 | 11.4 |
|     Continental U.S. | 20.0 | 19.2 |
| Rank |  |  |
|     Enlisted | 15.3 | 14.5 |
|     Warrant Officer | 31.1 | 31.7 |
|     Officer | 37.6 | 37.5 |
| Age |  |  |
|     18-22 | 8.0 | 6.6 |
|     23-27 | 11.8 | 9.9 |
|     28-36 | 20.6 | 20.2 |
|     37+ | 34.3 | 34.8 |
| Service |  |  |
|     Army | 17.2 | 15.6 |
|     Navy | 16.9 | 14.4 |
|     Marine Corp | 10.8 | 13.7 |
|     Air Force | 21.2 | 21.0 |
|     Coast Guard | 21.1 | 15.4 |

Next we tested whether the effect of the treatment might be different for subgroups of active-duty beneficiaries. We know that response varies by geography, rank, age, and service (see Table 1). Therefore, these four independent variables were included in models along with a variable indicating treatment group and the interaction of the independent variable and treatment group. The interaction is equal to one when a beneficiary is a member of both the treatment group and a particular subgroup of active duty beneficiaries and zero otherwise. If the interaction variables were significant in the model, then we would conclude that there is an effect of the treatment that interacts with the independent variable.

**Table 2: Odd ratios for logistic regression (and *p*-values) predicting response overall, by CONUS, rank, age, and service, and the interaction of CONUS, rank, age, and service with unit address**

| Predictor | Overall | CONUS | Rank | Age | Service |
|---|---|---|---|---|---|
| | | | Model | | |
| Intercept | 0.22 | 0.14 | 0.46 | 0.52 | 0.27 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Unit address group | 0.94 | 0.92 | 1.03 | 1.03 | 0.99 |
| | (0.330) | (0.595) | (0.816) | (0.800) | (0.896) |
| CONUS | | | | | |
|   Continental U.S. | | 1.80*** | | | |
| | | (0.000) | | | |
|   Outside Continental U.S. | | — | | | |
|   Treatment by Continental U.S. | | 1.03 | | | |
| | | (0.867) | | | |
|   Treatment by Outside Continental U.S. | | — | | | |
| Rank | | | | | |
|   Enlisted Personnel | | | 0.39*** | | |
| | | | (0.000) | | |
|   Warrant Officer or Officer | | | — | | |
|   Treatment by Enlisted Personnel | | | 0.91 | | |
| | | | (0.490) | | |
|   Treatment by Warrant Officer or Officer | | | — | | |
| Age | | | | | |
|   18-22 | | | | 0.17*** | |
| | | | | (0.000) | |
|   23-27 | | | | 0.26*** | |
| | | | | (0.000) | |
|   28-36 | | | | 0.50*** | |
| | | | | (0.000) | |
|   37+ | | | | — | |
|   Treatment by 18-22 | | | | 0.79 | |
| | | | | (0.233) | |
|   Treatment by 23-27 | | | | 0.80 | |
| | | | | (0.235) | |
|   Treatment by 28-36 | | | | 0.95 | |
| | | | | (0.731) | |
|   Treatment by 37+ | | | | — | |
| Service | | | | | |
|   Army | | | | | 0.77*** |
| | | | | | (0.000) |
|   Coast Guard | | | | | 1.00 |
| | | | | | (0.974) |
|   Marines | | | | | 0.45*** |
| | | | | | (0.000) |
|   Navy | | | | | 0.76*** |
| | | | | | (0.000) |
|   Air Force | | | | | — |
|   Treatment by Army | | | | | 0.90 |
| | | | | | (0.437) |
|   Treatment by Coast Guard | | | | | 0.69 |
| | | | | | (0.423) |
|   Treatment by Marines | | | | | 1.33 |
| | | | | | (0.240) |
|   Treatment by Navy | | | | | 0.84 |
| | | | | | (0.294) |
|   Treatment by Air Force | | | | | — |

*Notes*: Dependent variable coded 1 = response, 0 = nonresponse.
***$p < 0.001$.

The odds ratios after adjusting for other variables included in the model are shown in columns two through five in Table 2. Odds ratios greater than one indicate that members of the group defined by the independent variable are more likely than others to respond, while an odds ratio less than one indicates they are less likely to respond. None of the odds ratios for any of the interaction terms is significantly different from one. Therefore, we conclude that the effect of the treatment is not different for any of these subgroups. The odds ratios for the models excluding the interaction terms are shown in Table 3.

## DISCUSSION

The results of this study indicate that mailing to the military unit address does not increase response among active-duty beneficiaries. There are several possible reasons for this non-effect. First, the hypotheses that unit addresses are more likely to be correct or that active duty are more likely to respond to materials received at their unit address may be incorrect. Second, questionnaires mailed to unit addresses may take longer to arrive than those mailed to residential addresses. The field period for this mail survey is eight weeks, which may not be enough time in the field for effective use of the military mail system. Overseas letters "are given airlift service on a *space available basis* [emphasis added] between overseas military post offices outside the 48 contiguous states, and between those military post offices and the point of embarkation or debarkation of this mail within the 50 states" (US Postal Service 2003). Domestic mail may also be delayed given that there is an extra step in the delivery of military mail, as described in *Handbook PO-630 - Post Offices Serving DOD Installations,* "The local post office on the installation accumulates mail for the military installation and distributes it in bulk to the Department of Defense mail center, which then distributes and delivers it" (US Postal Service). If mailings were delayed,

active duty may be more likely to respond to questionnaires delivered to their unit addresses, but less likely to respond during the eight-week fielding period, resulting in no effect overall.

Third, delays in delivery to unit addresses may have been increased by the build-up of forces in the Persian Gulf. The field period for this survey was January 2 through February 28, 2003, which immediately preceded Operation Iraqi Freedom. Delays could have been greater for mail addressed to military unit addresses because of the intervention of the military mail system. If delivery to unit addresses was delayed for either of the above reasons, we would expect to observe higher response rates for the treatment group among late-arriving responses.

Fortunately, questionnaires returned after the end of the field period are processed in anticipation of incorporating the responses into a dataset composed of four quarterly surveys (Friedman, et al. 2003). We followed-up on our results by incorporating these late-arriving responses in our analysis. We hypothesized that adding late arriving responses would lead to an effect of the treatment. The results of these analyses are in Table 4.

The follow-up analyses draw the same conclusion. That is mailing to the military unit address does not increase response among active-duty beneficiaries. However, there does seem to be some effect among officers, but the effect is not statistically significant. Before incorporating late responses, the response rates for officers were essentially equal for treatment and control, 31.7 percent and 31.1 percent, respectively. However, after incorporating late responses, 36.7 percent of officers in the treatment group responded, as compared to 33.1 percent for the control. Thus, if given more time, officers may be motivated to respond when they receive the

**Table 3: Odds ratios for logistic regression (and *p*-values) predicting response by CONUS, rank, age, and service**

| Predictor | Model | | | |
| --- | --- | --- | --- | --- |
| | CONUS | Rank | Age | Service |
| Intercept | 0.14 | 0.46 | 0.53 | 0.27 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Unit address group | 0.94 | 0.96 | 0.94 | 0.94 |
| | (0.337) | (0.467) | (0.333) | (0.277) |
| CONUS | | | | |
|   Continental U.S. | 1.80*** | | | |
| | (0.000) | | | |
|   Outside Continental U.S. | — | | | |
| Rank | | | | |
|   Enlisted Personnel | | 0.39*** | | |
| | | (0.000) | | |
|   Warrant Officer or Officer | | — | | |
| Age | | | | |
|   18-22 | | | 0.16*** | |
| | | | (0.000) | |
|   23-27 | | | 0.25*** | |
| | | | (0.000) | |
|   28-36 | | | 0.50*** | |
| | | | (0.000) | |
|   37+ | | | — | |
| Service | | | | |
|   Army | | | | 0.77*** |
| | | | | (0.000) |
|   Coast Guard | | | | 0.97 |
| | | | | (0.780) |
|   Marines | | | | 0.46*** |
| | | | | (0.000) |
|   Navy | | | | 0.75*** |
| | | | | (0.000) |
|   Air Force | | | | — |

*Notes*: Dependent variable coded 1 = response, 0 = nonresponse.
***$p < 0.001$.

questionnaire at their unit address. Further research in this area could lead to more definitive conclusions as to the effects on officers of mailing to their unit addresses.

## CONCLUSION

Increasing response among active duty beneficiaries is not as simple as changing the mailing address. However, the conclusions for this study are confounded by the unknown effect of Persian Gulf build-up. Perhaps the experiment could be repeated during peacetime and normal levels of deployment. Furthermore, we intend to continue to experiment with other data collection methods, such as web data collection, express mailings, or telephone follow-up, to increase response among this important population.

**Table 4: Odd ratios for logistic regression (and p-values) predicting response, incorporating late-arriving responses**

| Predictor | Model | | | | |
|---|---|---|---|---|---|
| | *Overall* | *CONUS* | *Rank* | *Age* | *Service* |
| Intercept | 0.24 | 0.17 | 0.50 | 0.57 | 0.29 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Unit address group | 0.98 | 1.04 | 1.163 | 1.05 | 1.03 |
| | 0.742) | (0.768) | (0.207) | (0.616) | (0.729) |
| CONUS | | | | | |
|    Continental U.S. | | 1.60*** | | | |
| | | (0.000) | | | |
|    Outside Continental U.S. | | | | | |
|    Treatment by Continental U.S. | | 0.93 | | | |
| | | (0.640) | | | |
|    Treatment by Outside Continental U.S. | | — | | | |
| Rank | | | | | |
|    Enlisted Personnel | | | 0.40*** | | |
| | | | (0.000) | | |
|    Warrant Officer or Officer | | | — | | |
|    Treatment by Enlisted Personnel | | | 0.82 | | |
| | | | (0.137) | | |
|    Treatment by Warrant Officer or Officer | | | — | | |
| Age | | | | | |
|    18-22 | | | | 0.17*** | |
| | | | | (0.000) | |
|    23-27 | | | | 0.26*** | |
| | | | | (0.000) | |
|    28-36 | | | | 0.50*** | |
| | | | | (0.000) | |
|    37+ | | | | — | |
|    Treatment by 18-22 | | | | 0.82 | |
| | | | | (0.278) | |
|    Treatment by 23-27 | | | | 0.85 | |
| | | | | (0.358) | |
|    Treatment by 28-36 | | | | 0.97 | |
| | | | | (0.832) | |
|    Treatment by 37+ | | | | — | |
| Service | | | | | |
|    Army | | | | | 0.78*** |
| | | | | | (0.000) |
|    Coast Guard | | | | | 0.94 |
| | | | | | (0.631) |
|    Marines | | | | | 0.48*** |
| | | | | | (0.000) |
|    Navy | | | | | 0.78*** |
| | | | | | (0.000) |
|    Air Force | | | | | — |
|    Treatment by Army | | | | | 0.88 |
| | | | | | (0.355) |
|    Treatment by Coast Guard | | | | | 0.64 |
| | | | | | (0.342) |
|    Treatment by Marines | | | | | 1.26 |
| | | | | | (0.316) |
|    Treatment by Navy | | | | | 0.87 |
| | | | | | (0.340) |
|    Treatment by Air Force | | | | | — |

*Notes*: Dependent variable coded 1 = response, 0 = nonresponse.
***$p < 0.001$.

## REFERENCES

Clusen, N.A., Schone, E., Kasprzyk, D., and Williams, T.V. (2002). "Nonsampling Error in a Survey of Department of Defense Health Care Beneficiaries." *2002 Proceedings of the American Statistical Association, Survey Research Methods Section* [CD-ROM]. Alexandria, VA: American Statistical Association.

Friedman, E.M., Clusen, N.A., and Hartzell, M. (2003). "Better Late? Characteristics of Late Respondents to a Health Care Survey." *2003 Proceedings of the American Statistical Association, Survey Research Methods Section* [CD-ROM]. Alexandria, VA: American Statistical Association.

United States Postal Service. *Domestic Mail Manual*. Available at http://pe.usps.gov/text/dmm/DMMTC.htm. October 30, 2003.

United States Postal Service. (2000). *Post Offices Serving DOD Installations*. Handbook PO-630, April 2000.