Supplementary Analysis and Technical Assistance for the 2007 Annual Survey of Veteran Enrollees Health and Reliance on VA

Final Report

Submitted to the Veterans Healthcare Administration
By Macro International Inc.

Date: Feb 14, 2008

In 2006, Macro International Inc. (Macro) reviewed the research design for the Veterans Healthcare Administration's (VHA) 2005 Survey of Enrollees. The review examined the survey process and potential biases resulting from missing or outdated contact information and survey non-response—including the inability to make contacts and respondent refusals. This resulting report, presented here and submitted to the Office of Management and Budget (OMB), made several actionable recommendations for improving the research design. During discussions about this report, VHA, Macro and OMB developed a design improvement plan that includes long and short-term goals.

This report summarizes many of the enhancements suggested for the 2007 Survey of Enrollees. First, we follow-up on and extend the original analysis. The format for this analysis is largely the same as it was for the 2005 Survey of Enrollees. We also evaluate potential biases caused by various steps in the survey process and make general summary observations based on the 2007 results. When relevant, we compare the 2007 results to our 2005 observations. The 2007 research includes two experiments to improve response rates—sending a pre-notification letter and increasing the number of call attempts. We describe these two experiments and examine their impact on response.

Finally, in 2006 Macro recommended that the survey weighting include a non-response adjustment for utilization of VHA services. We evaluate this new weighting adjustment and its success at mitigating the impact of non-response.

Discussion

The results from 2007 are largely consistent with the 2005 results—the sample of respondents produced biased estimates with respect to utilization as measured by VHA administrative data. Since one of the objectives of the Survey of Enrollees is to measure healthcare utilization (self-reported), it is very likely that the survey estimates are overestimating true utilization for the population of enrollees. There is no way to confirm which survey estimates are biased or whether other survey concepts (awareness, perceptions, etc.) are affected by a sample of respondents that is overrepresented by enrollees who tend to use VHA healthcare services.

The purpose of this report and its 2006 predecessor is to quantify the impact of each operational stage in the survey process. Breaking the process into stages and evaluating the probability that

an enrollee passes through each stage allows us to develop actionable strategies for mitigating the effects of bias at each stage. These strategies may involve operational changes to the survey to reduce the likelihood of biased estimates or post-survey adjustments to correct for observed biases.

The three stages are: frame eligibility, valid contact information, and survey non-response. In general, each stage in the process introduces bias.

Frame eligibility

Although frame eligibility, with about 75 percent of the population eligible for the frame, is the stage that contributes least to the bias, there are utilization differences between eligible and non-eligible enrollees. For each utilization statistic, the frame estimate is within 10 percent of the true population value. This is consistent with the 2005 survey.

Valid Contact Information

As with 2005, about one-third of the sampled enrollees in 2007 had invalid contact information. This stage seems to be a major contributor to the bias observed in the six health statistics. Enrollees with valid contact information differed significantly from enrollees with invalid contact information on all six health measures. Compounding the invalid contact information (frame error) is the 27 percent that are frame ineligible, leaving about 48 percent of the enrollee population for conducting the survey.

The percentage of enrollees without valid contact information who received inpatient treatment for substance abuse or mental health is twice as high as the percentage for the enrollees with valid contact information. Of the other statistics, the minimum percent difference between eligible and ineligible groups is six percent and the maximum is over 35 percent.

Survey Response

Response rates for the 2007 Enrollee Survey are lower than the 2005 response rates, yet the difference between the respondents and non-respondents is very similar to 2005. The only utilization statistic where the difference in the groups is much larger than in 2005 is for enrollees who received inpatient care for substance abuse or mental health, where 0.46 percent of respondents received care versus 0.67 percent for non-respondents.

2007 Design Enhancements

In the 2006 report, we recommended altering the survey weighting to include measures of healthcare utilization. Including these variables in the weighting will mitigate the potential for bias if the survey measures are correlated with response likelihood and healthcare utilization. We also concluded that frame accuracy ought to be the top priority for improving the survey operations. Much of the population is excluded from participation due to lack of, or inaccurate, contact information. Since accurate contact information seems to correlate with utilization, the frame (contactable enrollees) produces biased utilization estimates right from the outset. We offered a variety of suggestions, most leveraging the address information:

- The most radical use of addresses is moving from telephone survey mode to a mail survey. There are many considerations surrounding this shift in methodology—such as

survey administration (self-administered with pen and paper versus an interviewer-administered, computer-assisted instrument), field time, data entry, etc. However, if the address information is better than the telephone information, then the risk of coverage bias will be reduced.

- With addresses, we can send a pre-notification letter, stating the survey's purpose and importance, indicating the sponsor (VHA), and introducing the research company conducting the survey. The letter elicits participation by communicating that the survey is a critical tool for VHA to effectively administer benefits. Further, it legitimizes the survey and provides reassurance that the information provided will be kept completely confidential. In an era of information thievery, an official letter will most likely improve response among enrollees.
- One further possibility would be to use the address information to identify a telephone number by running the veteran's name and address against a reverse look-up database. Security restrictions may impede this matching considering that this service would be performed by an outside vendor.

Two operational changes stemming from the 2006 report are the sending of pre-notification letters and increasing the number of attempts. The analyses of these two experiments suggest that both methods increase response rates considerably. Macro recommends full adoption of these operational changes for the 2008 survey. The success of the additional attempts is conditional on the pre-notification letter. For sampled enrollees not receiving pre-notification, there was an insignificant increase in response rate for those receiving additional attempts. Yet, when a pre-notification letter is sent, the additional attempts have a positive impact on response rates.

Another improvement for the 2007 survey is the use of a more complex weighting scheme. Incorporating health measures into the non-response (and frame coverage) adjustment mitigates biases in the survey response data due to varying frequencies of use among VHA enrollees. This adjustment will improve estimates of utilization.

In summary, the 2007 results are very similar to the 2005 results. The experiments implemented for the 2007 survey are promising enhancements and should be applied to the entire sample. Future experiments should continue to focus on improving frame information with reverse phone look-ups or potentially a mail or internet survey for enrollees without a phone number.

2008 Recommendations:

1. *Send pre-notification letters to sampled enrollees and increase the number of call attempts from 6 to 10.*
2. *Experiment with reverse phone look-ups based on address information.*
3. *Experiment with alternative response options for enrollees with no telephone.*
4. *Continue using the propensity score weighting.*

Background

VHA serves American veterans by providing primary and specialized care as well as related medical and social support services. It administers the country's largest, most comprehensive,

integrated healthcare system. In 2007, VHA served over seven million veteran enrollees. The number of veterans turning to VHA for healthcare increases every year, and their need is expected to grow. More and more veterans are turning to VHA as a result of changes in our nation's economy, the demographics of the veteran population, and as benefits available to them under Medicare diminish. In addition, rising healthcare costs and a financial burden that is more often being placed on the consumer will also contribute to more veterans relying on VHA for assistance.

While demand for healthcare services grows, VHA's ability to meet this demand is circumscribed by the Veteran's Healthcare Eligibility Reform Act of 1996 (Public Law 104-262). This law instituted a priority-based enrollment system designed to balance the needs of those veterans most in need of services, with the necessity to control healthcare costs and demands on the system. Under this law, the number of priority levels to which VHA can deliver care is a function of annual funding levels and utilization of healthcare services by enrollees.

The 1996 law also requires VHA to fully understand the reliance of enrolled veterans on VHA healthcare services and programs compared to their use of non-VHA services and programs (also known as "VA reliance"). This understanding comes from data gathered through a survey of veteran enrollees (the VHA Survey of Enrollees). The VHA Survey of Enrollees was developed with core and supplemental sections to gather a variety of information that determines the relationship among demographic, socioeconomic, and morbidity characteristics of veteran enrollees, as well as enrollees' choice of healthcare providers and their healthcare utilization.

VHA has conducted six cycles of this survey of veteran enrollees (1999, 2000, 2002, 2003, 2005, and 2007). The data gathered by the VHA Survey of Enrollees also establishes the number of priority levels that VHA can support. It is used to develop healthcare budgets and to assist the Department for Veterans Affairs with its annual enrollment decisions. This data is also used as inputs into the VHA Healthcare Enrollment Projection Model. Forecasts developed from this model are used for a number of purposes, such as the Capital Asset Realignment for Enhanced Services (CARES), Millennium Bill Projects, budgeting, and scenario-based policy and planning analyses.

Any collection of information conducted or sponsored by a Federal agency requires OMB clearance. As part of the FY07 OMB clearance package, VHA was tasked with conducting a non-response bias assessment of the VHA Survey of Enrollees, as well as with examining the quality of the information in the sampling frame. The 2006 analysis satisfied this task. VHA and Macro met with OMB to discuss the 2006 analysis and agreed to develop methods to improve the survey program. OMB granted clearance to VHA with the condition that VHA take steps to improve the design, starting with the 2007 survey. Since the 2007 survey was already under development, OMB and VHA agreed to experiment with design enhancements that could be seamlessly integrated into the 2007 survey. Two experiments were added for 2007—sending a pre-notification letter and increasing the number of call attempts.

This report details Macro's findings of the non-response bias assessment for the 2007 Survey of Enrollee results and an assessment of the sampling frame and design. This report is organized as follows:

- Results of the survey experiments—pre-notification and additional attempts;
- A summary of the sample design for the Survey of Enrollees;
- The sample design and its relation to interview outcomes;
- Findings for the sample bias analysis (frame eligibility);
- Results of the non-response bias analysis;
- Survey weighting; and
- Weighting adjustments.

2007 Experiments

One of the 2006 findings was that the VHA enrollee database had an address listed for nearly all of the enrollees, whereas it only listed a valid phone number for about three-quarters of enrollees. One way to take advantage of address listings is to send a pre-notification letter. Survey pre-notification letters generally increase response rates by informing respondents about the survey—explaining the survey's purpose, describing the information that will be collected, and indicating when the survey call should be expected. To evaluate the impact of sending pre-notification letters, in 2007 VHA mailed these letters to a subsample of the sampled enrollees; the subsample was comprised of 42,000 randomly selected enrollees with a valid address. For operational feasibility, the pre-notification letter experimental group was the first group of replicates released for data collection. This may have had a minor impact on the evaluation since the sample of enrollees selected for the pre-notification letter experiment were in the field longer, which tends to increase response rates slightly. However, we believe that any impact on the experiment due to the unequal time in the field is minimal.

A second experiment added to the 2007 survey evaluated the impact of an increased number of attempts. Ten percent of the enrollee sample received a 10-attempt protocol rather than the six-attempt protocol used in past survey cycles. More attempts tend to increase response, but each additional attempt provides diminishing returns. Most completed interviews occur within the first few calls, but the most difficult respondents to reach usually need more attempts.

As enrollees were assigned to each experiment independently, the design has four conditions:

1. Sent pre-notification and receiving additional attempts;
2. Sent pre-notification and not receiving additional attempts;
3. Not sent pre-notification and receiving additional attempts; and
4. Not sent pre-notification and not receiving additional attempts.

The response rates for each of the conditions are presented in Table 1. As expected, the highest response is in the group that received the pre-notification letter and received a 10-attempt protocol—43.3 percent. This is twice as high as the group that did not receive either experimental condition—21.4 percent. Sending a pre-notification letter clearly improves response to the survey. The response rate for enrollees who received the letter is 38.9 percent, much higher than those who did not receive the letter.

About 7.3 percent of the letters mailed out were returned as undeliverable. Of these, about 45 percent of the letters were returned because of undeliverable addresses and another 33 percent

due to an unknown addressee. Nearly all enrollees have address information, and 92.6 percent of the addresses for frame-eligible enrollees (valid phone number and stratification variables) are deliverable. The response for undeliverable mail is 12.1 percent, while the delivered mail response rate is 39.7 percent. The cost to print and mail pre-notification letters to 42,000 enrollees is $26,551.20, or $0.63 per letter. The 42,000 sampled enrollees yielded 10,502 interviews, so the cost per completed interview is $2.53. At $2.53 per completed interview and an annual target of 42,000 completed interviews, sending letters to the entire sample will cost about $106,185. Sending the letters increases response rate—and therefore, also the interviewing productivity. However, another factor to consider is survey length. The survey averaged 17.5 minutes for interviews conducted with enrollees assigned to the letter group while the average length for the non-letter group averaged 16.8 minutes – the difference of only a minute on the telephone may or may not be attributable to the letter The total time per completed interview, which includes time spent on incomplete interviews as well as non-talk time (between calls and after call work) is 30.8 for the letter group and 32.6 for the non-letter group. This translates into a reduction of about 1,800 hours over the course of the full project. However, this savings, about $42,000, does not completely offset the mailing costs.

Overall, the 10-attempt protocol seems to have had a slight impact on response rates relative to the six-attempt, 25.3 percent versus 24.0 percent. The effect is exaggerated when paired with the letter, suggesting that using the letter in conjunction with extra attempts may yield the best results. Among those who were sent the letter, the 10-attempt protocol groups have a response rate that exceeds the six-attempt group by five points, 43.3 percent to 38.4 percent. This effect is not evident among those enrollees who were not sent letters, 22.1 percent and 21.4 percent. Although this increase is significant, it is small in comparison to the difference in response rates for those who were sent letters.

Table 1. Response Rates for the Experimental Conditions

	Sampled Enrollees	Response Rate	Complete interview	Partial	Refused interview	Other non-interview	Un-known status
Total	264,199	24.1%	42,588	513	18,944	29,406	85,090
Letter	42,000	38.9%	10,502	103	2,831	4,365	9,232
Delivered	38,931	39.7%	10,396	102	2,751	4,217	8,696
Returned	3,064	12.1%	106	1	80	148	540
No letter	222,199	21.5%	32,086	410	16,113	25,041	75,858
10-attempt	26,413	25.3%	4,441	51	1,971	2,804	8,281
6-attempt	237,786	24.0%	38,147	462	16,973	26,602	76,809
Letter and 10-atts	4,200	43.3%	1,149	10	308	348	841
Letter and 6-atts	37,800	38.4%	9,353	93	2,523	4,017	8,391
No letter and 10-atts	22,213	22.1%	3,292	41	1,663	2,456	7,440
No letter and 6-atts	199,986	21.4%	28,794	369	14,450	22,585	68,418

The response rates were calculated with American Association of Public Opinion Research (AAPOR) Response Rate 1 (RR1), which is a strict definition that assumes all unresolved records are eligible respondents. This response rate is described in a later section of this report.

To further examine the impact of a more rigorous call attempt protocol and sending the letters, we compare the survey responses for the respondents in each group:

- Respondents assigned to the 10-attempt protocol versus those assigned to the 6-attempt protocol, and
- Respondents who were sent a pre-notification letter versus those who were not sent a letter.

Further, for respondents who were assigned to the 10-attempt protocol, we examine the respondents who were reached after six attempts (late responders, those who would not have been interviewed under the existing protocol) versus those who were reached during the first six attempts (early responders). We look at four questions about health insurance coverage:

> PREA. Are you enrolled in VA healthcare?
> A1. Are you covered by Medicare?
> A7. Are you currently covered by Medicaid for any of your healthcare?
> A9. Are you currently covered by any other individual or group health plan that either you, or an employer, or someone else, such as a family member obtains for you?

We see significant differences in three out of four estimates when comparing the responses for enrollees sent letters versus those who were not. The percentage of enrollees who reported that they didn't remember enrolling or don't know if they are enrolled is slightly higher in the group that was sent letters, 3.4 percent to 2.7 percent (p-value = 0.0289), but this difference seems to have very little practical significance. The percentage of enrollees covered by Medicare is nearly 3 percentage points higher in the letter group than the non letter group (71.1% to 68.4%, p-value = 0.0002), as is the percentage of enrollees covered by another group health plan (28.6% to 26.0%, p-value = 0.0002). There is no difference in the percentage enrolled in Medicaid.

When comparing results for enrollees assigned to the six-attempt versus those assigned to the 10-attempt protocol, there are no significant differences among the four questions we compared. However, the results of the comparison between the enrollees who were reached within six attempts and those reached after six attempts do suggest that the enrollees interviewed later differ from those interviewed early. The percentage of late responders who do not remember enrolling or do not know if they are enrolled with VHA is considerably higher than the early responders, 7.9 percent versus 2.7 percent (p-value = 0.0021.) Likewise, the percentage of late responders covered by Medicare is much lower than early respondents (54.7 percent to 68.7 percent, p-value = 0.0005) while the percentage covered by other insurance is much higher (35.5 percent to 26.1 percent, p-value = 0.0102). There is no difference in the percentage enrolled in Medicaid.

Table 2a. Comparison of Survey Responses for Attempts and Letter Experiments

		Letter sent	No letter sent	6-attempt	10-attempt		
					Total	Early	Late
Total responding enrollees		10,502	32,086	38,146	4,441	4,159	282
PREA. Are you enrolled in VA health care?	Yes	85.5%	85.3%	85.5%	84.6%	84.6%	84.2%
	No	11.2%	11.9%	11.6%	12.4%	12.6%	7.9%
	DR/DK*	3.4%	2.7%	2.9%	3.0%	2.7%	7.9%
		p-value = 0.0289		p-value = 0.6008		p-value = 0.0021	
A1. Are you covered by Medicare?	Yes	71.1%	68.4%	69.3%	67.9%	68.7%	54.7%
	No	28.9%	31.6%	30.7%	32.1%	31.3%	45.3%
		p-value = 0.0002		p-value = 0.2038		p-value = 0.0005	
A7. Are you currently covered by Medicaid for any of your health care?	Yes	9.6%	9.4%	9.5%	9.3%	9.3%	9.1%
	No	90.4%	90.6%	90.5%	90.7%	90.7%	90.9%
		p-value = 0.7036		p-value = 0.8548		p-value = 0.9395	
A9. Are you currently covered by any other individual or group health plan that either you, or an employer, or someone else, such as a family member obtains for you?	Yes	28.6%	26.0%	26.7%	26.6%	26.1%	35.5%
	No	71.4%	74.0%	73.3%	73.4%	73.9%	64.5%
		p-value = 0.0002		p-value = 0.9243		p-value = 0.0102	

*DR/DK = I don't remember enrolling or Don't know

During the survey, enrollees are also asked about whether they received any services from VHA, "In **2006**, did you use **any** VA healthcare services, or did you have **any** of your health care paid for by VA?" If the answer was yes, respondents were asked about these services including:

A13. Do you currently have prescription drug coverage from VA?

B15. In 2006, did you stay overnight at any VA Medical Hospital or a VA Mental Health Facility, or have any stays at Non-VA facilities that were paid for by VA?

<u>If yes</u>,

B16. In 2006, how many total overnight stays, if any, did you have at a VA Medical Hospital, or a medical hospital paid for by VA? Please do not count stays for mental health and substance abuse treatment?

B19. In 2006, how many overnight stays, if any, did you have for mental health or substance abuse treatment at a VA Facility or at a facility paid for by VA?

B22. In 2006, how many outpatient visits for medical care did you make that were paid for by VA? That would include the number of times you went to a VA doctor, hospital or clinic for medical care or received medical care somewhere else that was paid for by VA. Do not count dental or mental health visits or trips to a pharmacy.

B23. In 2006, how many home health care visits, if any, were made to you by VA providers or non-VA providers paid for by VA?

B24. In 2006, how many outpatient visits for mental health or substance abuse treatment, if any, did you make to VA or visits elsewhere that were paid for by VA?

From these questions we calculate six variables indicating whether the enrollee utilized VHA services or not:

1. Received home health benefits
2. Inpatient treatment
    a. Mental health or substance abuse
    b. Non-mental health and non-substance abuse
3. Outpatient treatment

a. Mental health or substance abuse
b. Non-mental health and non-substance abuse

4. VHA pharmacy benefits

These utilization statistics are self-reported. Later in the report, we use administratively measured utilization statistics to analyze frame coverage and non-response bias in the survey.

Table 2b. Comparison of Self-reported VHA Utilization for Attempts and Letter Experiments

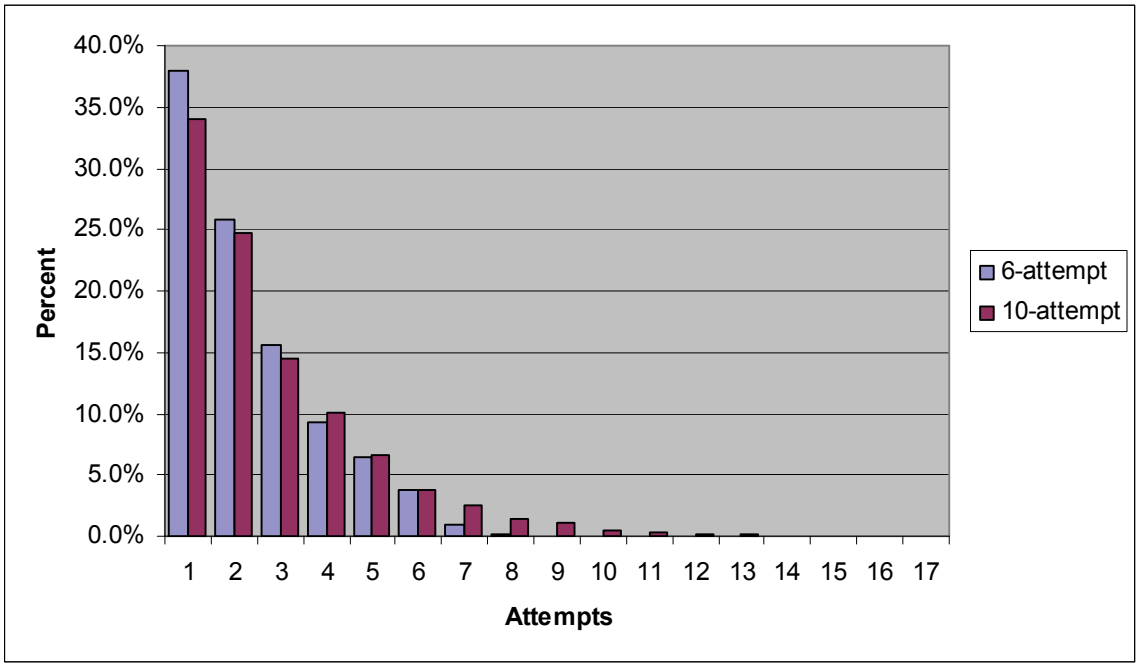
		Letter sent	No letter sent	6-attempt	10-attempt		
					Total	Early	Late
Total responding enrollees		10,502	32,086	38,146	4,441	4,159	282
1. Received home health benefits	Yes	97.3%	97.0%	2.9%	2.9%	2.9%	2.2%
	No	2.7%	3.0%	97.1%	97.1%	97.1%	97.8%
		p-value = 0.3891		p-value = 0.9291		p-value = 0.6662	
2a. Inpatient treatment for mental health or substance abuse	Yes	0.8%	0.7%	0.7%	0.5%	0.4%	1.9%
	No	99.2%	99.3%	99.3%	99.5%	99.6%	98.1%
		p-value = 0.4397		p-value = 0. 3367		p-value = 0.0465	
2b. Inpatient treatment for non-mental health and non-substance abuse	Yes	5.8%	5.9%	5.9%	5.9%	5.8%	8.0%
	No	94.2%	94.1%	94.1%	94.1%	94.2%	92%
		p-value = 0.7084		p-value = 0.9909		p-value = 0.2987	
3a. Outpatient treatment for mental health or substance abuse	Yes	8.2%	8.2%	8.2%	9.1%	9.0%	9.4%
	No	91.8%	91.8%	91.8%	90.9%	91.0%	90.6%
		p-value = 0.9900		p-value = 0.1634		p-value = 0.8856	
3b. Outpatient treatment for non-mental health and non-substance abuse	Yes	57.6%	60.0%	58.5%	59.3%	59.6%	53.6%
	No	42.4%	40.0%	41.5%	40.7%	40.4%	46.4%
		p-value = 0.0999		p-value = 0.4863		p-value = 0.1487	
4. VHA pharmacy benefits	Yes	25.7%	24.8%	74.9%	75.2%	73.4%	73.1%
	No	74.3%	75.2%	25.1%	24.8%	26.6%	26.9%
		p-value = 0.1647		p-value = 0.7371		p-value = 0.4859	

When comparing the enrollees who were sent a letter to those who were not, we see no significant differences in utilization statistics. The largest difference comes in measuring outpatient treatment unrelated to substance abuse or mental health, 57.6 percent for those sent a letter versus 60.0 percent for those who didn't (p-value = 0.0999).

We see no statistically significant differences in the service utilization statistics when comparing the sample that was administered a 6-attempt protocol to the sample that was administered the 10-attempt protocol. When comparing the late responders to the early responders, only one difference is significant, the percentage of enrollees receiving inpatient treatment for mental health or substance abuse, 0.4 percent for early responders and 1.9 percent for late responders (p-value = 0.0465).

Overall, only six percent of respondents completed the interview after six attempts so the overall results aren't significantly impacted, but the late respondents differ considerably from early respondents with respect to health coverage. The distribution of completed interviews over the call attempts is presented in Figure 1.

Figure 1. Percentage of Interviews Completed on Each Attempt



Sample Design

VHA provides Macro with a sample of records from its database of enrollees. We understand that the sample for the Survey of Enrollees is selected in the following manner:

- VHA considers the entire universe of enrollees who are listed as of a certain date—this list includes both institutionalized and non-institutionalized veterans.
- VHA eliminates all records that lack a telephone number.
- VHA then eliminates all records where the telephone number is incomplete or lacks a valid exchange-area code combination.
- VHA eliminates all records where at least one of the sample stratification variables is absent; namely VISN, pre/post enrollee status, or priority group status.
- The file of enrollees is then stratified by pre/post enrollee status, priority group, and VISN, and independent random samples are drawn for each stratum.

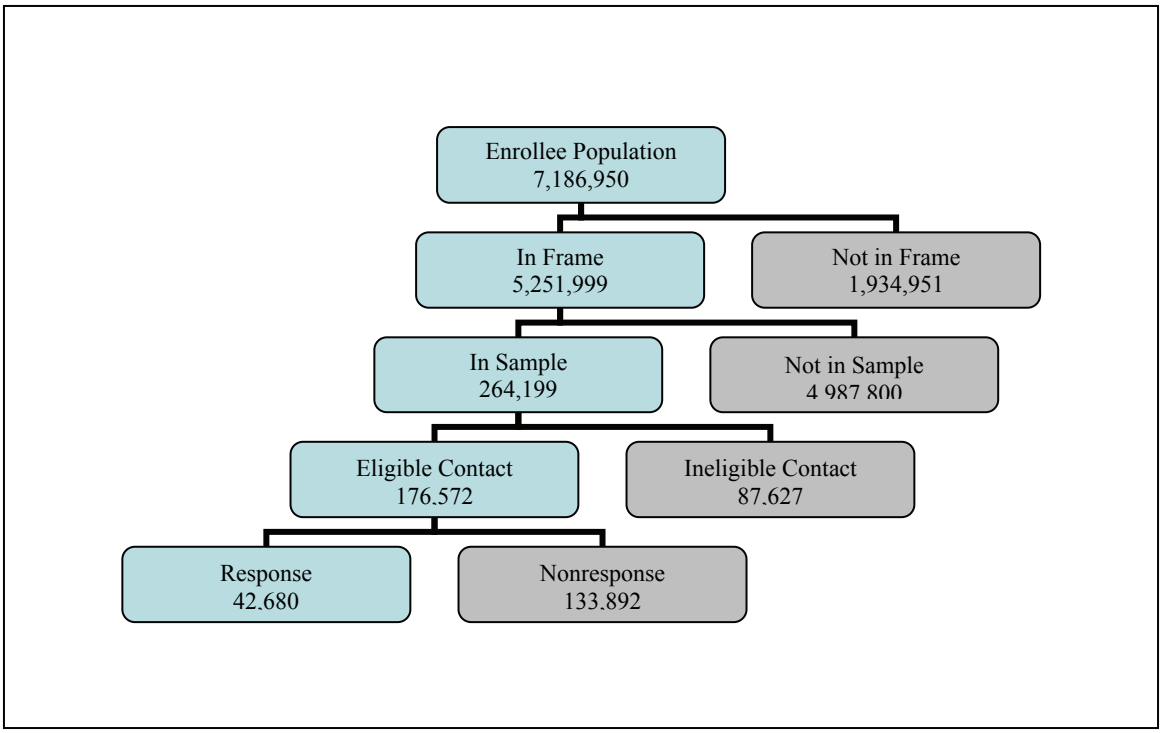
Sampling Design and Interview Outcomes

The final sample of enrollees responding to the Survey of Enrollees must pass through many stages:

- First, to be in the final sample of respondents, an enrollee must be in the sampling frame—meaning that contact information and all stratification variables are available;
- Then, the enrollee must be sampled via the stratified random selection process;
- Next, the enrollee's contact information must be valid and lead to the correct enrollee; and
- Finally, the enrollee must elect to respond to the survey.

The only stage that is a controlled random process, and therefore not subject to potential bias, is the random sample selection. All other stages have the potential to introduce non-random systematic bias into enrollee estimates. Figure 2 presents enrollee totals at each of the sample stages for the 2007 survey. Table 3 presents the enrollee frequencies for each of the major stratum levels: VISN, enrollee type, and priority group.

Figure 2. Stages and Enrollee Totals for the 2007 Survey of Enrollees



Note: The number of respondents displayed in this chart includes 93 enrollees who responded to the survey, but did complete the full interview.

Table 3. Stages and Enrollee Totals for the 2007 Survey of Enrollees

		Enrollee Population	Frame Eligible	Enrollees Selected	Correct Contact	Survey Responses
Total		**7,186,950**	**5,251,999**	**264,199**	**176,572**	**42,680**
VISN	1	316,460	265,114	12,397	9,046	2,029
	2	197,528	152,182	10,869	7,810	2,019
	3	317,488	249,704	15,499	10,612	2,016
	4	418,972	356,307	11,637	8,511	2,063
	5	175,200	141,136	17,230	11,303	2,035
	6	381,461	295,734	12,540	8,537	2,039
	7	431,230	260,026	17,384	10,643	1,983
	8	603,388	402,563	13,854	9,220	2,024
	9	327,825	247,681	11,329	7,787	2,041
	10	262,048	197,651	12,430	8,416	2,031
	11	311,908	235,417	10,902	7,399	2,042
	12	307,158	227,133	12,979	8,798	2,042
	15	291,310	233,703	10,098	6,913	2,034
	16	584,123	427,965	11,237	7,376	2,029
	17	325,362	244,036	14,576	9,079	2,017
	18	300,407	177,022	12,382	7,921	2,040
	19	209,591	154,322	11,189	7,375	2,038
	20	313,982	224,221	10,276	6,469	2,031
	21	298,688	225,832	11,998	8,072	2,051
	22	384,319	244,508	14,698	9,194	2,044
	23	354,576	289,742	8,695	6,091	2,032
Priority Group	1	870,018	618,474	21,724	15,580	4,269
	2	496,102	351,280	24,528	16,211	4,256
	3	939,191	666,581	27,624	17,661	4,279
	4	196,791	140,324	25,549	15,891	4,284
	5	2,252,477	1,585,318	25,386	16,043	4,252
	6	253,289	173,923	33,162	20,326	4,243
	7/8	2,179,059	1,716,099	106,226	74,860	17,097
Enrollee type	POST	4,796,634	3,557,789	122,530	84,041	21,378
	PRE	2,390,316	1,694,210	141,669	92,531	21,302

Frame Eligibility

About 27 percent of the enrollee population was ineligible to be in the sampling frame due to incomplete telephone information or incomplete stratification information—slightly higher than

the 25.6 percent in 2005. A telephone number may be missing from the sample completely, be missing digits, or not have a valid exchange-area code combination. Less than one percent of the frame exclusions have a valid telephone but are missing stratification variables, so the overwhelming majority of exclusions are due to invalid telephone numbers. The implication is that there is significant coverage error within the current sample design.

Currently, the presence or absence of an address for an enrollee is not considered when determining frame eligibility. An address represents an alternative piece of information that could be used to locate a veteran either via mail or to identify a telephone number by reverse look-up procedures. The promise of accurate address information is realized in the pre-notification experiment, which nearly doubled the response rate.

Looking at the frame exclusions with valid stratification information and invalid telephone number, 98.7 percent had a valid address. Overall, 99.4 percent of the enrollees have valid address information. Both of these statistics are similar to the 2005 frame analysis. A record with a valid address has data in all relevant mailing address fields. This does not mean that the ZIP code, city, or other mailing address fields have *accurate* data—it only means that there *is* data in each field. Table 4 presents the distribution of enrollees based on telephone and address validity. Table 13 in the Appendix provides the percentages by VISN, priority group, and enrollee type.

Table 4. Frequency and Percent of Enrollees with Valid Addresses and Telephone Numbers

Valid Phone	Valid Address	Total	Percentage
No	No	24,154	0.3%
	Yes	1,852,714	25.8%
	Total	1,876,868	26.1%
Yes	No	17,353	0.2%
	Yes	5,292,729	73.6%
	Total	5,310,082	73.9%
Total	No	41,507	0.6%
	Yes	7,145,443	99.4%
	Total	7,186,950	100.0%

For enrollees who have received services (home healthcare, inpatient or outpatient care) in the past 12 months, the frame eligible percentage is slightly higher than for those who have not received services, 74 to 72 percent. Similarly, the frame eligibility percentage is slightly higher for enrollees receiving the prescription drug benefit, 74 to 72 percent.

Sample Selection

A total of 264,199 enrollees were sampled from the frame in order to meet the sample size requirements for each stratum; this was 72,551 more than last year's sample. The sample was stratified, with 294 strata defined by 21 VISNs (1-12, 15-23), two enrollee groups (pre and post), and seven priority groups (one through six and, seven and eight). The target number of completed interviews per stratum was 200 in priority groups one through six and 400 in priority group seven and eight—totaling 42,000 overall. Within each stratum, a random sample of enrollees was selected from the frame.

The equal allocation of sample to strata results in a disproportionate sample with smaller strata receiving higher shares of sample than the larger strata. For analysis at the sampling stage, we use design weights equal to the ratio of the frame total to the sample total in each stratum.

Survey Eligibility

All of the enrollees sampled for the survey were called at least once in order to initiate an interview. During data collection, many telephone numbers were classified as ineligible including: non-working numbers, wrong numbers where selected enrollee is not known, out of service numbers, fax or modem telephone numbers, and business numbers where the enrollee is not known. Although these were ineligible for the survey since they did not lead to the selected enrollee, this loss of sample may impose bias on the survey estimates since these enrollees were part of the population, yet cannot be reached for interview. There were no protocols for identifying an alternative telephone number other than the ability to contact an alternative number if provided. The dialing of telephone numbers during data collection was a second form of frame validation since, albeit the enrollee was included in the frame, the frame information did not lead to the selected enrollee. The percentage of sampled enrollees with invalid contact information was 33 percent. Adding this sample estimate to the 27 percent of enrollees excluded from the frame suggests that 51 percent of the frame may not be reachable by telephone using the current data collection protocols and sample design.

For enrollees who had received services (home healthcare, inpatient, or outpatient care) in the previous 12 months, the survey eligibility rate was much higher than for those who had not received services, 74 to 59 percent. Similarly, the survey eligibility rate was much higher for enrollees receiving the prescription drug benefit, 74 to 60 percent. Enrollees who received services had more incentive to keep their contact information current and accurate. Further, an enrollee receiving services presents an opportunity for VHA to confirm and update current contact information.

The design weights described in *Sample Selection* above were used in the analysis of the enrollees with correct and incorrect contact information.

Non-response

After determining that the telephone contact information was accurate, the final stage of the process became either a complete interview with the enrollee (response) or unsuccessful interview attempts. We classify non-response into two forms: enrollee refusal and enrollee non-contact. Enrollee refusals result when an enrollee (or an enrollee agent) is contacted, the sponsor (VHA) and purpose of the survey are communicated, and the enrollee elects not to participate by verbal refusal, hang-up, or other form of termination. A non-contact means that the enrollee (or an enrollee agent) is never reached directly; this includes answering machines and other technological barriers, language barriers, hang-ups and refusals *before or during* the survey introduction (where an enrollee's presence in not yet confirmed), busy phone numbers, etc.

In general, non-response is evaluated by examining a survey's response rate (i.e. the proportion of completed interviews relative to the selected sample, minus the identified ineligible sample elements); response rates of less than 70-80 percent are frequently considered to imply that there

is the potential for significant non-response bias to be present in the results. For the FY07 Survey of Enrollees, the final response rate using AAPOR RR1 calculations was 24 percent for the overall sample.[1] Therefore, the potential for non-response bias is considerable.

$$\textbf{\textit{Response Rate}} = \frac{\mathbf{i}}{(\mathbf{i}+\mathbf{p})+(\mathbf{r}+\mathbf{nc}+\mathbf{o})+(\mathbf{uo})+(\mathbf{uh})}$$

Where:

i is a completed interview

p is a partial interview

r is a refusal

nc represents non-contacts (i.e. answering machines, fax machines, callbacks, etc.)

o represents "other" (i.e. language barrier, no eligible proxy, etc.)

uo represents unknown others (i.e. no answer/ no previous contact, busy/no pervious contact, hang-ups, etc)

uh represents working telephone number but unknown if veteran located there (i.e. no opportunity to screen for eligibility)

The design weights described in *Sample Selection* were used in the analysis of the enrollees with correct and incorrect contact information.

Bias Analysis

With the exception of the controlled random sampling process, all stages described in the previous section have the potential to introduce bias into the survey estimates. The impact of coverage (or frame) bias and non-response bias are difficult to assess since data are not available for those who do not participate in the survey. Therefore, there is no way to compare the groups and draw inferences about the survey data. In lieu of survey responses for individuals who do not participate in the survey, we rely on secondary information available for both survey respondents and non-respondents. This information generally comes from the sampling frame and/or the population. In most cases, this information is limited, but in the case of VHA, there is considerable administrative data available about the population of enrollees. This information allows us to review the frame coverage and non-response biases for the survey with respect to enrollees' use of various VHA services.

For the purpose of conducting this bias analysis, VHA provided Macro with a file based on administrative records that indicated if an enrollee had utilized any of the following services in the past year (the file did not indicate the frequency or amount for any of these benefits):

1. Received home health benefits
2. Inpatient treatment
    a. Mental health or substance abuse
    b. Non-mental health and non-substance abuse
3. Outpatient treatment

[1] Response rates reported for the VHA Reliance Survey prior to 2005 reported the equivalent of AAPOR cooperation rates.

   a. Mental health or substance abuse
   b. Non-mental health and non-substance abuse
4. VHA pharmacy benefits

The following sections detail the bias analysis using this information.

1. Receiving Home Health Benefits

Only a fraction of enrollees receive home health benefits, 0.11 percent overall. This percentage increases slightly to 0.12 percent for frame eligible enrollees, compared to 0.09 percent for frame ineligible enrollees. The percentage of enrollees receiving home health benefits with valid contact information is 0.11 percent compared to 0.08 percent for enrollees with invalid contact information (p-value=0.0722). There is insufficient information to detect a difference between the responding enrollees and non-responding enrollees (0.14 vs. 0.10 percent, p-value=0.1158). This pattern of differences among groups is similar to the pattern found last year.

In Priority Group 4, the percentage receiving home healthcare is much higher than the rest of the strata, 1.25 percent. Over the course of each stage of the process, this percentage increases to 1.30 percent in the frame, 1.48 percent with eligible contact information to 1.55 percent for responding enrollees. Reviewing the remaining strata, the stage that seems to introduce bias appears to be invalid contact information. There are several strata where the enrollees with invalid contact information are significantly different than those with valid contact information. For all significant stratum differences ($p < 0.1$; five VISNs, three priority groups, and pre-enrollee type), the percentages for enrollees without contact information are lower than those with valid contact information. This seems intuitive in that contact information for enrollees receiving home healthcare is bound to be updated more frequently and completely. Like last year, there are fewer statistical differences between respondents and non-respondents. Four VISNs (5, 16, 18, 21—none of the same groups as last year) and Priority Group 1 differed between respondents and non-respondents, although not in a consistent direction.

Figure 3. Percentage of Enrollees Receiving Home Healthcare

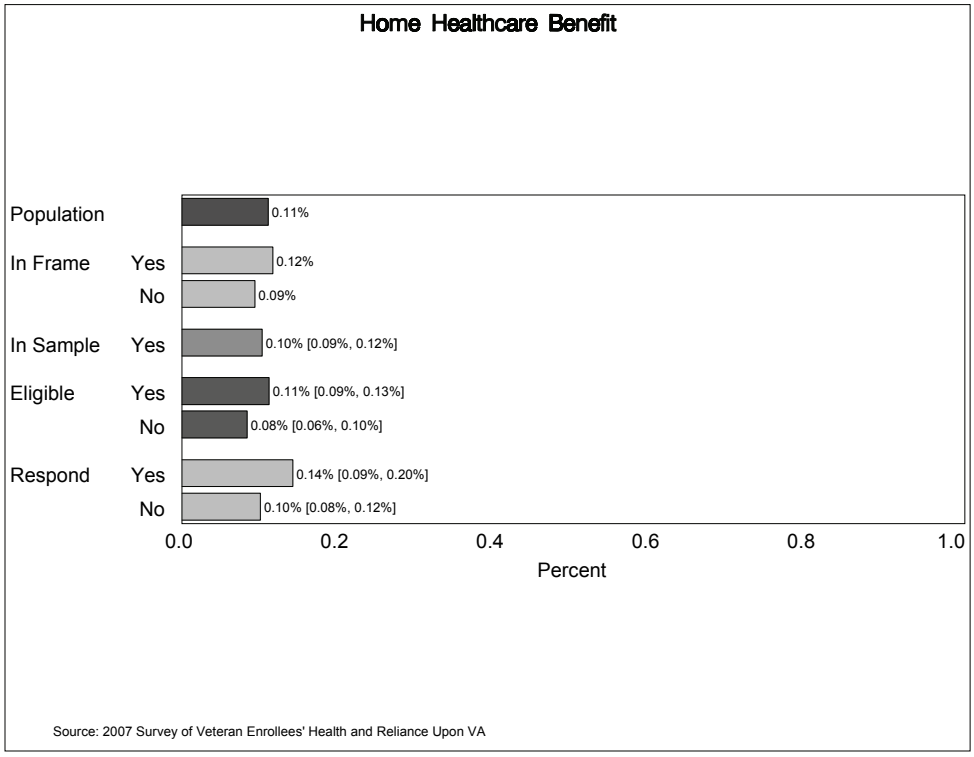


Table 5. Percentage of Enrollees Receiving Home Healthcare

			In Frame		Sampled	Eligible			Respond		
		Population	Yes	No	Yes	Yes	No	P-value	Yes	No	P-value
Total		0.11	0.12	0.09	0.10	0.11	0.08	0.0722	0.14	0.10	0.1158
VISN	1	0.13	0.14	0.08	0.15	0.18	0.05	0.0532	0.08	0.22	0.1406
	2	0.32	0.35	0.23	0.32	0.31	0.34	0.8209	0.25	0.33	0.6711
	3	0.10	0.12	0.04	0.09	0.11	0.04	0.0254	0.20	0.09	0.2005
	4	0.09	0.10	0.05	0.08	0.09	0.04	0.1834	0.05	0.11	0.3589
	5	0.10	0.11	0.06	0.13	0.12	0.16	0.6189	0.02	0.14	0.0025
	6	0.06	0.06	0.04	0.04	0.04	0.03	0.5166	0.04	0.04	0.9746
	7	0.11	0.10	0.12	0.08	0.06	0.10	0.4900	0.10	0.06	0.3515
	8	0.10	0.09	0.10	0.09	0.10	0.05	0.0941	0.12	0.10	0.7650
	9	0.05	0.06	0.03	0.07	0.06	0.09	0.6467	0.04	0.07	0.6061
	10	0.28	0.30	0.23	0.16	0.19	0.11	0.1701	0.17	0.19	0.8221
	11	0.14	0.14	0.11	0.15	0.17	0.11	0.4627	0.22	0.14	0.5200
	12	0.11	0.11	0.12	0.11	0.13	0.08	0.3747	0.19	0.11	0.5486
	15	0.07	0.08	0.04	0.06	0.06	0.04	0.5702	0.06	0.06	0.9888
	16	0.09	0.09	0.07	0.13	0.13	0.15	0.8217	0.36	0.03	<.0001
	17	0.09	0.10	0.06	0.05	0.04	0.08	0.1761	0.05	0.03	0.5628
	18	0.08	0.09	0.07	0.07	0.10	0.02	0.0022	0.02	0.14	0.0031
	19	0.10	0.11	0.07	0.10	0.12	0.06	0.2553	0.20	0.09	0.2478
	20	0.06	0.07	0.03	0.06	0.08	0.03	0.3728	0.06	0.10	0.6534
	21	0.19	0.20	0.15	0.16	0.17	0.14	0.7605	0.40	0.08	0.0022
	22	0.12	0.11	0.15	0.10	0.12	0.08	0.5225	0.19	0.09	0.3441
	23	0.09	0.10	0.06	0.07	0.07	0.07	0.9682	0.10	0.06	0.6312
Priority	1	0.19	0.21	0.14	0.18	0.18	0.17	0.8636	0.30	0.14	0.0661
	2	0.08	0.08	0.06	0.07	0.04	0.12	0.0259	0.04	0.05	0.8539
	3	0.08	0.08	0.05	0.08	0.09	0.07	0.7132	0.13	0.07	0.2757
	4	1.25	1.30	1.10	1.32	1.48	1.06	0.0081	1.55	1.45	0.6628
	5	0.09	0.10	0.07	0.08	0.10	0.03	0.0225	0.12	0.09	0.6915
	6	0.01	0.01	0.01	0.02	0.02	0.02	0.7296	0.03	0.02	0.4309
	7/8	0.03	0.03	0.03	0.02	0.03	0.01	0.0405	0.03	0.03	0.7260
Enrollee Type	POST	0.07	0.07	0.06	0.06	0.07	0.05	0.2598	0.09	0.06	0.3118
	PRE	0.20	0.22	0.15	0.19	0.21	0.15	0.0807	0.26	0.19	0.1978

Notes: 1. Statistical tests for independence are based on the Rao-Scott Chi Square statistic.
2. N/A indicates no observed cases.

2. Inpatient Treatment

Very few enrollees have been admitted to a hospital or medical facility for mental health or substance abuse reasons—just less than one percent (0.85 percent). This percentage drops slightly to 0.77 percent for those who have sufficient information to be frame eligible, versus 1.06 percent for those who are frame ineligible. There is a considerable difference between enrollees with valid contact information and enrollees without valid contact information, 0.61 to 1.22 percent (p-value<0.0001). Overall, non-respondents were somewhat more likely to have received inpatient treatment (0.67 percent versus 0.46 percent, p-value = 0.0003)—a difference that was not as significant in last year's data.

Across VISNs, the percentage ranges from 0.62 to 1.19 percent, with five VISNs exceeding one percent. The VISN percentages based on the responding enrollees suggests that the percentage has an average of 0.46 percent with a range of 0.11 to 1.04 percent. In Priority Groups 1 and 4 (the two groups with the highest population percentage of enrollees admitted to a hospital or medical facility for mental health or substance abuse reasons), the percentages, as measured from the responding enrollees, 1.24 and 3.60 percent, underestimate the population percentages of 2.17 and 6.40 percent. This was due both to differences in enrollees with valid versus invalid contact information and differences between those who responded to the survey or did not.

For all of the significant differences in eligibility (19 of the 21 VISNs, six of the seven priority groups, and both pre- and post-enrollee status), the percentage for enrollees with eligible contact information is less than those without. This pattern holds when evaluating the percentage between responding and non-responding enrollees (seven of the 21 VISNs, two of the seven priority groups, and both pre- and post-enrollee status).

Turning to enrollees admitted to a hospital or medical facility for reasons unrelated to mental health or substance abuse, we see a different pattern. In the case of home health and mental health or substance abuse inpatient visits, there were some noticeable differences at the frame and response stages, but the stage that seemingly impacts the final results most is the enrollee contact stage. Those with contact information are frequently different from those without valid information. In the case of inpatient treatment unrelated to mental health or substance abuse, there are fewer significant differences with respect to eligibility (only four of 21 VISNs, two of seven priority groups; and both enrollee types). However, there are more differences between responding and non-responding enrollees (nine of the 21 VISNs, all seven priority groups, and both enrollee types). Furthermore, where there are significant differences with respect to response, estimates based on respondents generally overestimate population percentages.

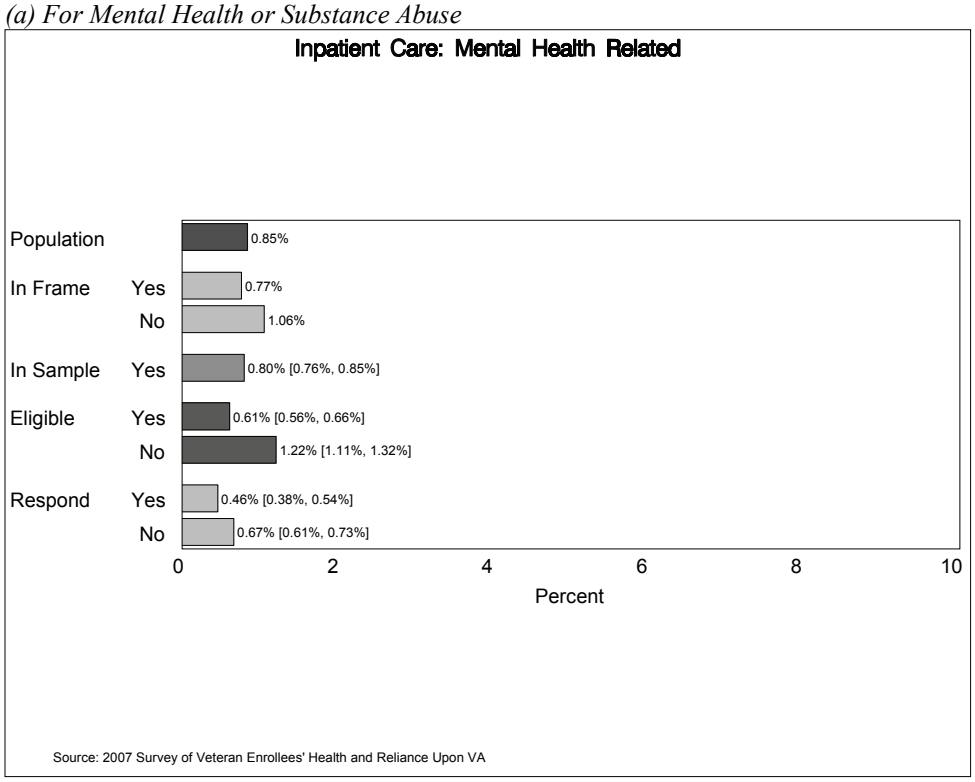
Overall, the population percentage of 4.42 is overestimated by the responding enrollees, 4.98 percent. The non-responding enrollees have a much lower percentage of 3.84 (p-value<0.0001). Since 4.15 percent of the enrollees with valid contact information have been admitted for reasons unrelated to mental health or substance abuse, the overestimation is a result of non-response bias.

The opposite pattern exists when evaluating inpatient treatment unrelated to mental health or substance abuse. The percentage of enrollees without valid contact information is systematically lower than those with valid contact information. As with the home healthcare, this seems like a

logical result since inpatient treatment offers the opportunity to update contact information. Curiously, this theory does not hold when evaluating inpatient treatment related to mental health or substance abuse.

Figure 4. Percentage of Enrollees Receiving Inpatient Treatment

(a) For Mental Health or Substance Abuse



(b) Not for Mental Health nor Substance Abuse

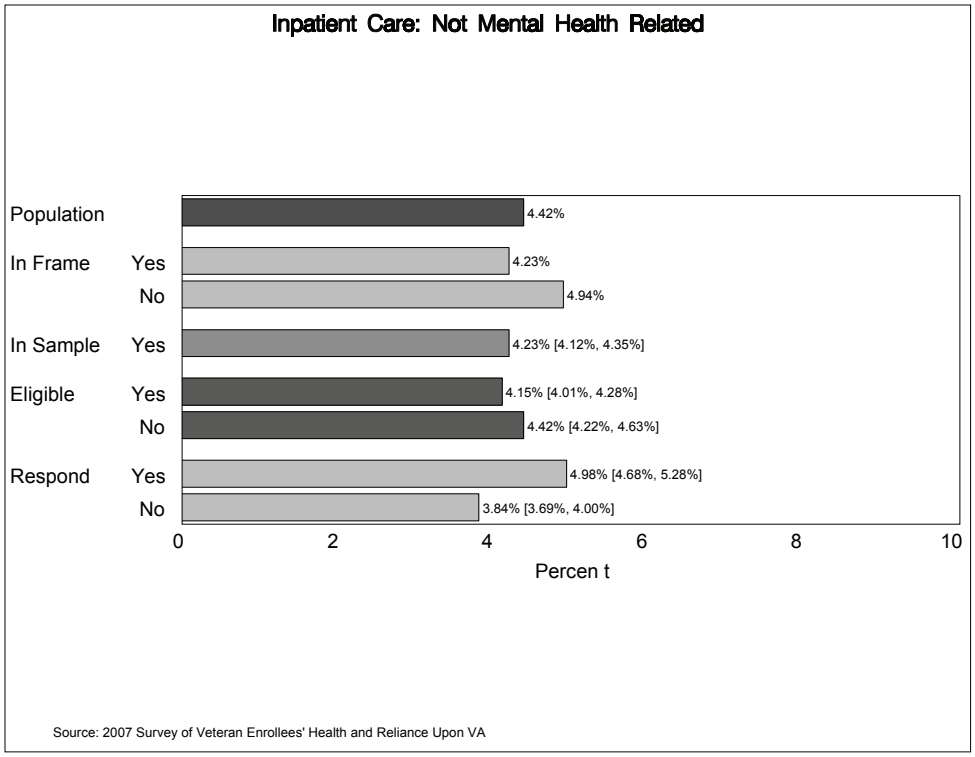

Inpatient Care: Not Mental Health Related
Population
In Frame
Yes
No
In Sample
Yes
Eligible
Yes
No
Respond
Yes
No
4.42%
4.23%
4.94%
4.23% [4.12%, 4.35%]
4.15% [4.01%, 4.28%]
4.42% [4.22%, 4.63%]
4.98% [4.68%, 5.28%]
3.84% [3.69%, 4.00%]
0
2
4
6
8
10
Percen t
Source: 2007 Survey of Veteran Enrollees' Health and Reliance Upon VA

Table 6. Percentage of Enrollees Receiving Inpatient Treatment

(a) For Mental Health or Substance Abuse

			In Frame		Samp-led	Eligible			Respond		
		Popul-ation	Yes	No	Yes	Yes	No	P-value	Yes	No	P-value
Total		0.85	0.77	1.06	0.80	0.61	1.22	<.0001	0.46	0.67	0.0003
VISN	1	1.08	0.97	1.63	1.07	0.85	1.71	0.0016	0.63	0.92	0.2664
	2	0.77	0.71	0.97	0.70	0.54	1.15	0.0040	0.48	0.55	0.7402
	3	0.64	0.62	0.70	0.70	0.51	1.12	0.0004	0.29	0.57	0.1313
	4	0.89	0.81	1.37	0.90	0.69	1.54	0.0026	0.68	0.69	0.9927
	5	1.19	1.10	1.56	1.12	0.90	1.53	0.0072	0.46	1.01	0.0540
	6	1.04	0.98	1.26	0.95	0.80	1.28	0.0936	0.57	0.89	0.2725
	7	0.81	0.73	0.95	0.78	0.62	1.03	0.0187	0.59	0.62	0.9030
	8	0.67	0.56	0.88	0.50	0.41	0.70	0.0440	0.37	0.42	0.8103
	9	1.01	0.93	1.23	0.98	0.85	1.27	0.1154	1.04	0.78	0.4178
	10	1.10	0.92	1.66	0.82	0.62	1.25	0.0140	0.35	0.73	0.0750
	11	0.88	0.80	1.12	0.75	0.53	1.23	0.0003	0.42	0.58	0.3851
	12	0.93	0.76	1.43	0.93	0.74	1.36	0.0093	0.99	0.66	0.2581
	15	0.93	0.85	1.27	0.76	0.43	1.51	<.0001	0.37	0.46	0.5863
	16	0.80	0.73	0.97	0.96	0.76	1.37	0.0194	0.41	0.90	0.0641
	17	0.95	0.86	1.22	0.90	0.68	1.28	0.0252	0.43	0.77	0.2154
	18	0.75	0.68	0.86	0.65	0.50	0.93	0.0415	0.19	0.62	0.0138
	19	0.86	0.76	1.13	0.68	0.48	1.10	0.0016	0.11	0.62	<.0001
	20	0.94	0.86	1.13	0.95	0.76	1.30	0.0415	0.23	1.02	<.0001
	21	0.72	0.60	1.06	0.65	0.35	1.31	<.0001	0.23	0.39	0.2871
	22	0.62	0.61	0.64	0.53	0.45	0.67	0.1295	0.19	0.53	0.0573
	23	0.63	0.54	1.02	0.64	0.40	1.29	0.0002	0.41	0.40	0.9603
Priority	1	2.17	2.01	2.57	2.10	1.82	2.80	<.0001	1.24	2.06	0.0022
	2	0.69	0.63	0.83	0.66	0.54	0.89	0.0025	0.52	0.55	0.8312
	3	0.54	0.50	0.65	0.56	0.49	0.69	0.0333	0.37	0.53	0.1941
	4	6.40	6.11	7.13	6.20	5.01	8.16	<.0001	3.60	5.56	<.0001
	5	0.78	0.73	0.90	0.76	0.50	1.24	<.0001	0.36	0.55	0.1794
	6	0.28	0.27	0.32	0.24	0.21	0.30	0.2063	0.27	0.19	0.3853
	7/8	0.12	0.10	0.19	0.12	0.08	0.23	<.0001	0.03	0.09	0.1168
Enrollee Type	POST	0.53	0.46	0.73	0.50	0.38	0.78	<.0001	0.29	0.41	0.0375
	PRE	1.48	1.41	1.65	1.44	1.13	2.05	<.0001	0.84	1.24	0.0030

Note: Statistical tests for independence are based on the Rao-Scott Chi Square statistic.

Table 7. Percentage of Enrollees Receiving Inpatient Treatment

(b) Not for Mental Health or Substance Abuse

			In Frame		Samp-led	Eligible			Respond		
		Popul-ation	Yes	No	Yes	Yes	No	P-value	Yes	No	P-value
Total		4.42	4.23	4.94	4.23	4.15	4.42	0.0320	4.98	3.84	<.0001
VISN	1	3.74	3.68	4.05	3.69	3.62	3.90	0.5950	4.16	3.44	0.2403
	2	3.79	3.84	3.61	3.58	3.44	3.94	0.3473	3.56	3.40	0.7885
	3	3.54	3.61	3.31	4.01	3.70	4.68	0.0310	4.78	3.45	0.0280
	4	3.48	3.23	4.92	3.35	3.18	3.87	0.2179	3.86	2.95	0.1496
	5	4.79	4.77	4.85	4.87	4.88	4.86	0.9744	5.99	4.61	0.0685
	6	4.29	4.35	4.06	4.15	4.21	4.01	0.7207	4.47	4.12	0.6219
	7	3.91	3.35	4.75	3.31	2.92	3.93	0.0077	3.70	2.73	0.0640
	8	4.62	4.23	5.38	4.17	3.92	4.72	0.1228	4.97	3.61	0.0313
	9	5.77	5.73	5.89	5.98	5.88	6.23	0.6314	7.64	5.21	0.0095
	10	4.38	3.94	5.71	3.72	3.47	4.24	0.2042	2.90	3.70	0.2168
	11	4.00	3.95	4.16	3.80	3.55	4.36	0.1579	3.59	3.53	0.9230
	12	4.76	4.19	6.38	4.37	4.29	4.55	0.6107	4.78	4.13	0.3307
	15	4.97	4.88	5.30	4.84	4.95	4.60	0.5941	6.31	4.31	0.0191
	16	4.81	4.67	5.20	4.89	5.23	4.21	0.1201	6.98	4.49	0.0053
	17	4.76	4.58	5.31	4.60	4.66	4.49	0.7594	5.53	4.37	0.1354
	18	4.93	4.56	5.46	4.43	4.50	4.28	0.6996	4.75	4.41	0.6557
	19	4.64	4.42	5.26	4.55	4.81	4.03	0.1547	6.60	4.10	0.0003
	20	4.53	4.46	4.70	4.11	3.69	4.86	0.0373	4.13	3.46	0.3029
	21	4.22	4.10	4.59	4.12	4.19	3.98	0.7180	4.96	3.89	0.1433
	22	4.41	4.31	4.60	4.35	4.60	3.93	0.1538	5.85	4.21	0.0248
	23	4.65	4.40	5.74	4.15	3.75	5.25	0.0135	4.29	3.48	0.1860
Priority	1	8.87	8.79	9.07	8.93	8.51	9.98	0.0038	9.23	8.21	0.0873
	2	3.58	3.50	3.79	3.51	3.80	2.93	0.0013	4.56	3.51	0.0037
	3	3.00	2.96	3.11	2.93	3.04	2.72	0.1340	3.74	2.81	0.0023
	4	16.50	16.22	17.20	16.33	16.13	16.64	0.3387	17.16	15.73	0.0517
	5	5.58	5.48	5.83	5.44	5.54	5.26	0.3964	6.62	5.12	0.0008
	6	1.38	1.37	1.41	1.20	1.15	1.28	0.4201	1.74	0.98	0.0007
	7/8	1.51	1.40	1.95	1.40	1.37	1.48	0.3273	1.65	1.28	0.0035
Enrollee Type	POST	2.94	2.71	3.59	2.60	2.46	2.91	0.0020	3.05	2.25	<.0001
	PRE	7.40	7.43	7.33	7.66	7.85	7.29	0.0299	9.24	7.34	<.0001

Note: Statistical tests for independence are based on the Rao-Scott Chi Square statistic.

3. Outpatient Treatment

For outpatient treatment unrelated to mental health or substance abuse, there is extreme systematic bias evident. Overall, the population percentage is 58.85 percent and is slightly higher for frame eligible enrollees, 59.86 percent. A one-to-two percentage point increase is fairly consistent across the strata. The percentage then climbs to 65.02 percent for enrollees with valid contact information. This is significantly different (p-value<0.0001) from the 48.22 percent for enrollees without valid contact information. The percentage climbs nearly 12 points to 76.72 percent when measured for the responding enrollees. Overall, 4.06 percent of enrollees receive treatment, but this percentage drops slightly to 3.81 percent for enrollees who are frame eligible, and further to 3.71 percent for enrollees who have valid contact information. The enrollees without valid contact information are statistically different (p-value=0.0017) from those with information, 4.08 to 3.71 percent. Enrollees not eligible for the frame also show a higher percentage, 4.74 percent. There is no significant difference between respondents and non-respondents (p-value=0.81).

As with the inpatient mental health and substance abuse treatment, when a significant difference exists (four VISNs, two priority groups, and post-enrollee type), the percentage of enrollees with invalid contact information is systematically higher than those with valid information.

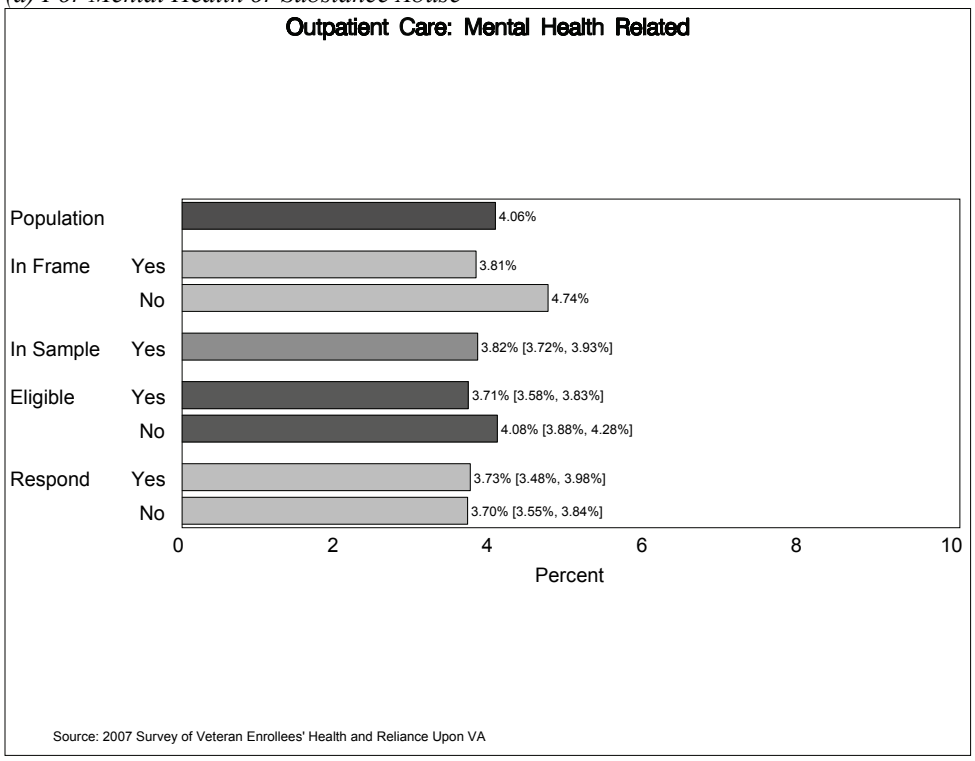
This pattern, where the frame contact information causes overestimation of utilization, is consistent for outpatient and inpatient care not related to health or substance abuse and across years.

For Priority Groups 1 and 4, the strata with the highest percentages (11.52 and 9.83 percent), we see two different patterns. In Priority Group 1, the percentage drops slightly at each stage with the largest drop coming at the response stage—11.25 percent for frame eligible, 11.06 percent for valid contact information, and 10.32 percent for responding enrollees. The same pattern holds for Priority Group 4, but the drop at the response stage is much more exaggerated—9.63 percent for frame eligible, further to 9.33 percent for valid contacts, and still further to 7.36 for responding enrollees, which is significantly different from the 60.76 percent for non-respondents (p-value<0.0001).

This pattern is similar for all strata. Percentages for enrollees with valid contact information are significantly larger than those without valid contact information and percentages for responding enrollees are significantly larger than non-responding enrollees. For all but one grouping, more bias was introduced at the response stage than the eligibility stage.

Figure 5. Percentage of Enrollees Receiving Outpatient Treatment

(a) For Mental Health or Substance Abuse



(b) Not for Mental Health nor Substance Abuse

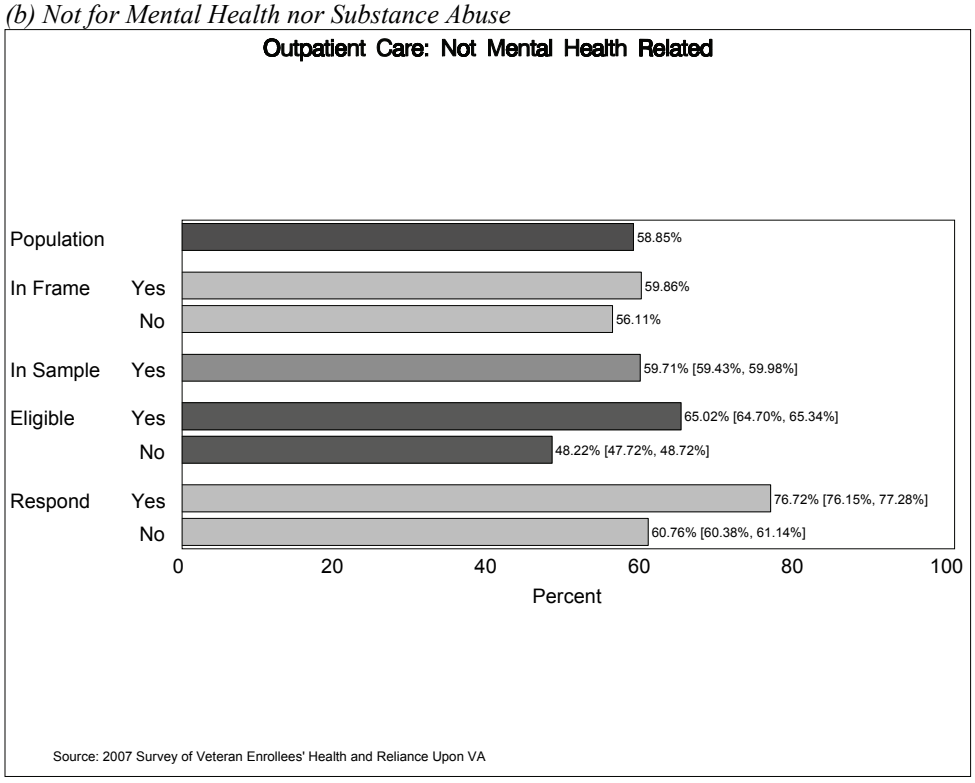


Table 8. Percentage of Enrollees Receiving Outpatient Treatment

(a) For Mental Health or Substance Abuse

			In Frame		Samp-led	Eligible			Respond		
		Popul-ation	Yes	No	Yes	Yes	No	P-value	Yes	No	P-value
Total		4.06	3.81	4.74	3.82	3.71	4.08	0.0017	3.73	3.70	0.8057
VISN	1	4.95	4.66	6.45	4.49	4.16	5.46	0.0160	4.27	4.12	0.8121
	2	3.26	3.16	3.60	3.22	2.79	4.35	0.0014	2.60	2.85	0.6099
	3	3.91	3.88	4.01	3.69	3.74	3.58	0.6819	3.74	3.75	0.9876
	4	3.58	3.37	4.75	3.64	3.24	4.85	0.0031	3.06	3.30	0.6562
	5	3.46	3.29	4.18	3.49	3.50	3.46	0.9295	2.97	3.63	0.2987
	6	4.25	4.12	4.70	3.89	3.86	3.95	0.8724	3.58	3.96	0.5546
	7	4.32	3.91	4.95	3.61	3.53	3.72	0.6124	3.75	3.48	0.6462
	8	3.28	2.96	3.91	2.81	2.90	2.63	0.5195	3.25	2.79	0.4314
	9	4.28	4.17	4.64	4.71	4.41	5.39	0.1068	3.56	4.73	0.0940
	10	5.18	4.71	6.64	4.79	4.77	4.83	0.9231	4.09	5.04	0.2364
	11	4.15	3.92	4.85	4.02	3.62	4.93	0.0372	4.60	3.16	0.0288
	12	3.96	3.43	5.44	3.47	3.47	3.47	0.9822	3.24	3.55	0.5907
	15	4.22	3.96	5.30	3.96	3.91	4.07	0.8020	3.90	3.92	0.9858
	16	4.29	4.07	4.89	4.30	4.41	4.07	0.5633	4.33	4.45	0.8856
	17	4.22	3.91	5.14	4.00	3.89	4.19	0.5746	4.54	3.66	0.2341
	18	3.45	3.26	3.72	3.25	3.08	3.54	0.3370	3.95	2.74	0.0532
	19	4.29	3.90	5.39	3.82	3.96	3.55	0.4187	3.58	4.11	0.4065
	20	4.45	4.22	5.03	4.48	4.30	4.80	0.4143	3.79	4.55	0.3089
	21	4.37	4.02	5.47	4.12	3.97	4.44	0.4248	4.11	3.91	0.7736
	22	4.04	3.83	4.42	3.48	3.34	3.73	0.3656	3.99	3.14	0.1675
	23	3.63	3.28	5.21	3.23	3.10	3.60	0.3513	3.04	3.13	0.8752
Priority	1	11.52	11.25	12.16	11.05	11.06	11.04	0.9812	10.32	11.36	0.1078
	2	5.16	4.92	5.75	5.06	5.09	5.00	0.7979	4.88	5.17	0.4830
	3	3.00	2.82	3.45	2.66	2.63	2.72	0.6564	3.25	2.42	0.0053
	4	9.83	9.63	10.32	9.80	9.33	10.56	0.0040	7.36	10.10	<.0001
	5	3.57	3.38	4.01	3.48	3.23	3.95	0.0082	3.02	3.30	0.4306
	6	3.89	3.67	4.36	3.69	3.75	3.58	0.5869	3.95	3.69	0.5462
	7/8	1.28	1.20	1.58	1.26	1.25	1.29	0.6705	1.35	1.21	0.2861
Enrollee Type	POST	3.20	2.90	4.06	2.96	2.80	3.33	0.0002	2.86	2.78	0.6350
	PRE	5.77	5.71	5.94	5.63	5.70	5.51	0.4058	5.65	5.71	0.8546

Note: Statistical tests for independence are based on the Rao-Scott Chi Square statistic.

Table 9. Percentage of Enrollees Receiving Outpatient Treatment

(b) Not for Mental Health or Substance Abuse

			In Frame		Samp-led	Eligible			Respond		
		Popul-ation	Yes	No	Yes	Yes	No	P-value	Yes	No	P-value
Total		58.85	59.86	56.11	59.71	65.02	48.22	<.0001	76.72	60.76	<.0001
VISN	1	60.75	62.49	51.78	61.85	67.43	45.45	<.0001	78.66	63.74	<.0001
	2	53.69	56.27	45.02	56.21	60.90	43.79	<.0001	74.36	56.25	<.0001
	3	44.88	47.25	36.17	48.20	53.10	37.27	<.0001	69.20	49.40	<.0001
	4	60.34	61.36	54.57	59.90	64.23	46.56	<.0001	76.30	60.05	<.0001
	5	52.33	53.50	47.47	51.98	57.42	41.92	<.0001	72.74	53.65	<.0001
	6	58.99	61.07	51.81	61.31	66.39	50.07	<.0001	78.20	62.09	<.0001
	7	56.18	50.76	64.43	51.55	55.28	45.65	<.0001	68.31	52.18	<.0001
	8	66.85	67.96	64.64	67.20	72.29	55.99	<.0001	85.40	68.40	<.0001
	9	62.98	64.93	56.96	64.10	68.33	54.46	<.0001	79.59	64.05	<.0001
	10	56.92	55.63	60.89	55.51	61.92	42.31	<.0001	75.78	56.43	<.0001
	11	60.31	63.00	52.00	63.46	69.76	49.19	<.0001	79.29	65.34	<.0001
	12	60.70	59.79	63.30	59.14	64.57	46.75	<.0001	75.84	60.92	<.0001
	15	64.39	66.23	56.90	65.80	71.47	52.66	<.0001	81.73	66.62	<.0001
	16	62.01	63.29	58.50	62.83	68.29	51.86	<.0001	76.45	64.79	<.0001
	17	59.03	59.49	57.64	60.22	65.22	51.59	<.0001	74.43	62.06	<.0001
	18	60.71	61.01	60.27	61.91	67.49	51.88	<.0001	76.69	63.88	<.0001
	19	57.76	58.29	56.30	58.21	64.36	45.88	<.0001	76.32	59.60	<.0001
	20	55.00	55.80	53.01	55.79	61.85	45.15	<.0001	72.61	56.45	<.0001
	21	54.74	55.47	52.47	56.06	60.84	45.86	<.0001	73.62	55.82	<.0001
	22	51.82	51.77	51.92	51.43	56.96	42.00	<.0001	69.84	52.93	<.0001
	23	65.38	66.91	58.55	67.19	71.88	54.26	<.0001	79.35	68.08	<.0001
Priority	1	72.58	73.14	71.22	73.37	75.49	68.05	<.0001	79.25	73.92	<.0001
	2	60.02	60.82	58.07	60.90	65.58	51.74	<.0001	73.85	62.44	<.0001
	3	53.75	55.55	49.34	55.78	62.05	44.56	<.0001	72.20	58.63	<.0001
	4	67.59	68.61	65.05	68.49	73.89	59.59	<.0001	82.18	70.65	<.0001
	5	60.19	61.11	57.98	60.67	67.75	47.81	<.0001	80.78	62.74	<.0001
	6	46.36	47.16	44.63	47.20	52.07	38.71	<.0001	62.20	49.15	<.0001
	7/8	54.59	55.98	49.45	55.73	60.58	41.96	<.0001	74.90	55.68	<.0001
Enrollee Type	POST	56.60	57.51	54.00	57.29	62.36	45.76	<.0001	74.86	57.81	<.0001
	PRE	63.38	64.82	59.87	64.79	70.88	52.88	<.0001	80.80	67.26	<.0001

Note: Statistical tests for independence are based on the Rao-Scott Chi Square statistic.

4. VHA Pharmacy Benefits

The percentage of enrollees receiving VHA pharmacy benefit follows very closely to the observed patterns for outpatient treatment unrelated to mental health or substance abuse. The percentage of enrollees receiving the benefit is 57.18 percent and increases to 58.04 percent for frame eligible enrollees. There is a five point increase to 63.01 percent when limited to sampled enrollees with valid contact information and another increase to 74.92 percent when measured for responding enrollees. This pattern is consistent across all strata—a slight increase in the percentage from population to frame eligible and significant increases in the percentage for enrollees with valid contact information and responding enrollees. All comparisons between enrollees with valid information to those without are significant. Further, all comparisons of responding to non-responding enrollees are significant.

Figure 6. Percentage of Enrollees Receiving Prescription Drug Benefits

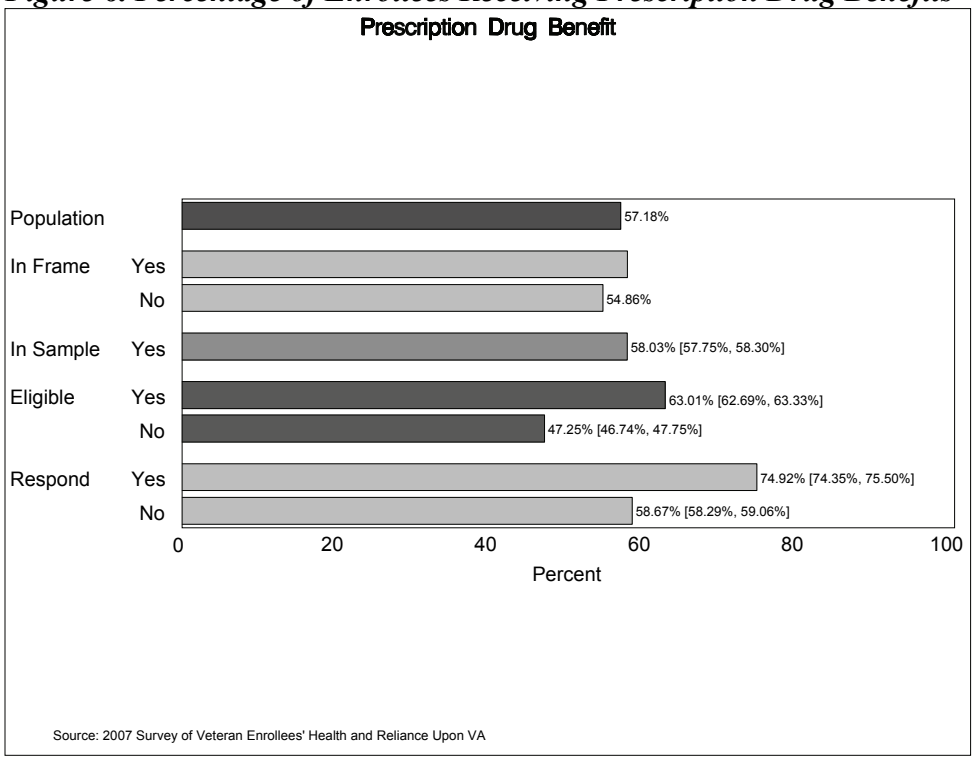


Table 10. Percentage of Enrollees Receiving Prescription Drug Benefits

			In Frame		Samp-led	Eligible			Respond		
		Popul-ation	Yes	No	Yes	Yes	No	P-value	Yes	No	P-value
Total		57.18	58.04	54.86	58.03	63.01	47.25	<.0001	74.92	58.67	<.0001
VISN	1	59.42	61.01	51.21	60.45	65.66	45.13	<.0001	76.91	61.96	<.0001
	2	51.43	53.88	43.23	53.70	57.69	43.15	<.0001	71.90	52.77	<.0001
	3	43.26	45.71	34.21	46.06	50.85	35.36	<.0001	67.05	47.12	<.0001
	4	57.84	58.71	52.86	57.22	61.27	44.76	<.0001	73.74	56.95	<.0001
	5	48.37	49.68	42.96	48.72	53.69	39.50	<.0001	67.92	50.20	<.0001
	6	58.36	60.38	51.39	60.57	65.40	49.88	<.0001	77.61	60.96	<.0001
	7	55.64	49.64	64.77	50.31	53.52	45.20	<.0001	65.86	50.58	<.0001
	8	64.17	64.92	62.67	64.31	69.09	53.80	<.0001	81.34	65.45	<.0001
	9	62.08	63.93	56.38	64.09	67.83	55.55	<.0001	78.12	63.92	<.0001
	10	57.21	55.43	62.67	55.05	60.95	42.89	<.0001	73.88	55.82	<.0001
	11	59.56	62.09	51.76	62.87	68.51	50.11	<.0001	79.54	63.40	<.0001
	12	59.23	58.03	62.64	57.77	63.13	45.54	<.0001	75.08	59.25	<.0001
	15	63.74	65.43	56.88	65.93	71.32	53.48	<.0001	81.80	66.36	<.0001
	16	61.84	63.00	58.68	63.24	68.49	52.69	<.0001	76.80	64.93	<.0001
	17	57.64	57.99	56.58	58.60	63.27	50.56	<.0001	73.59	59.74	<.0001
	18	57.90	58.43	57.13	58.85	64.13	49.35	<.0001	74.52	60.05	<.0001
	19	56.13	56.51	55.09	55.87	61.96	43.67	<.0001	74.53	56.96	<.0001
	20	52.97	53.67	51.24	53.90	59.15	44.69	<.0001	68.59	54.41	<.0001
	21	51.96	52.41	50.57	53.50	57.81	44.32	<.0001	71.05	52.61	<.0001
	22	48.32	48.22	48.49	47.65	52.67	39.10	<.0001	65.41	48.69	<.0001
	23	62.48	63.82	56.46	64.19	69.24	50.27	<.0001	77.63	64.98	<.0001
Priority	1	78.16	78.27	77.91	78.34	80.31	73.38	<.0001	83.90	78.81	<.0001
	2	55.64	56.03	54.69	56.14	60.24	48.14	<.0001	67.20	57.59	<.0001
	3	47.69	49.10	44.23	49.33	54.77	39.61	<.0001	64.82	51.38	<.0001
	4	74.73	75.24	73.45	75.22	80.63	66.29	<.0001	88.09	77.72	<.0001
	5	59.62	60.61	57.25	60.39	67.03	48.35	<.0001	80.49	61.84	<.0001
	6	37.66	38.47	35.88	38.29	42.36	31.22	<.0001	52.91	39.31	<.0001
	7/8	51.42	52.83	46.18	52.88	57.62	39.43	<.0001	72.00	52.69	<.0001
Enrollee Type	POST	53.26	54.07	50.95	54.06	58.77	43.35	<.0001	71.33	54.20	<.0001
	PRE	65.05	66.38	61.82	66.36	72.35	54.65	<.0001	82.85	68.53	<.0001

Note: Statistical tests for independence are based on the Rao-Scott Chi Square statistic.

Survey Weighting

The weighting methodology for the 2007 Survey of Enrollees includes a base weight as the inverse of the probability of selection in each stratum (enrollee type, VISN, and priority group) with a non-response adjustment by age group (under 45, 45-64, and 65+). This non-response adjustment was semi-successful in reducing bias:

- Overall, the non-response weighting tends to reduce bias in measuring the health estimates—four of six estimates are closer to the population.
- The percentage of enrollees receiving outpatient care unrelated to mental health or substance abuse and the percentage receiving pharmacy benefits still overestimate the population by about 12 points, though this is better than the base-weighted estimate.
- For the percentage of enrollees receiving home healthcare—most likely correlated to age—the age-based non-response adjustment essentially removes the bias completely.
- The bias is considerably reduced for the percentage of enrollees receiving inpatient treatment related to mental health and substance abuse.
- The bias increased for the percentage of enrollees receiving inpatient treatment unrelated to mental health or substance abuse and the percentage of enrollees receiving outpatient treatment related to mental health or substance abuse.

A recommendation stemming from the 2006 analysis was to add utilization statistics to the non-response adjustment. The details of the non-response modeling and weighing adjustment are forthcoming in a later section. The preceding bias analysis is based on weighted data that accounts for the differential sampling probabilities for each stratum and does not adjust for non-response. We ran the bias analysis using the weights used for the Survey of Enrollees to analyze if the non-response adjustment reduces the biases observed for the health estimates.

Table 11. Survey Estimates and Bias for Weighted and Weighted and Adjusted Data

		Base weight only				Base weight and nonresponse adjustment			
	Popul-ation	**Est**	**Bias**	**L95**	**U95**	**Est**	**Bias**	**L95**	**U95**
1. Home Healthcare	0.11	0.14	0.03	-0.02	0.09	0.11	0.00	-0.04	0.03
2. Inpatient treatment									
(a) Related to MH/SA	0.85	0.46	-0.39	-0.47	-0.30	0.89	0.04	-0.12	0.21
(b) Unrelated to MH/ SA	4.42	4.98	0.56	0.25	0.86	4.51	0.09	-0.21	0.38
3. Outpatient treatment									
(a) Related to MH/SA	4.06	3.73	-0.32	-0.57	-0.07	4.07	0.01	-0.29	0.32
(b) Unrelated to MH/ SA	58.85	76.72	17.86	17.30	18.43	58.85	0.00	-0.86	0.86
4. VHA Pharmacy benefit	57.18	74.92	17.74	17.17	18.31	57.30	0.11	-0.73	0.96

The new weighting procedure has eliminated the bias for each of the six health measures. This is expected since these health measures contribute to the propensity score estimates that are used to make the adjustment. The weighting adjustment will succeed in reducing bias when survey

responses are correlated with the probability to respond and with one of the six health measures in the model.

Weighting Adjustments

In 2006, Macro recommended a weighting adjustment that corrects for the differential non-response by health utilization and demographic information. After adjusting for stratum level disproportionate sampling with base weights (or design weights) we recommended a propensity score weighting adjustment, in which individual propensities to respond are measured with a probability model. The estimated probabilities are then used to group the enrollees in to classes with similar probabilities. Typically five classes (or quintiles) are formed. Within each class, the respondents are weighted up to account for the non-respondents. These weighting adjustments reduce potential bias to the extent that the non-respondents and respondents with similar response probabilities are also similar with respect to the survey statistics of interest.

For the 2007 Survey of Enrollees, Macro used this weighting methodology with two adjustments, one for survey non-response and the second for frame coverage.

The first adjustment is for survey non-response (including ineligible contact information). We classify each sampled respondent into a non-response category (y) based on whether the interview was a complete or an incomplete interview:

$$y = \begin{cases} 0 & \text{if interview is an incomplete interview} \\ 1 & \text{if interview is a complete interview} \end{cases}$$

Using logistic regression, we estimate the probability that an enrollee completes the interview given their characteristics, $\Pr(y = 1 \mid x) = \frac{e^{x'\boldsymbol{\beta}}}{1 + e^{x'\boldsymbol{\beta}}}$, where x is a matrix of sampled enrollees each enrollee has a set of p covariates, $\mathbf{x}_i' = (1, x_{1i}, ...x_{pi})$ for enrollee i, used as explanatory (or predictor) variables, and $\boldsymbol{\beta} = (\beta_0, \beta_1, ..., \beta_p)$ is a set of regression coefficients, or parameters. The predictor variables include the sample design variables, the six administrative health measures, and demographic variables. For this modeling, we use design weights equal to the ratio of the frame total to the sample total in each stratum. The model results are presented in Table 14 of the appendix.

After estimating each sampled enrollees probability of being a completed interview based on the predictor variables, we group the respondents and non-respondents into quintiles based on their propensity score. Within each quintile, the respondents are ratio adjusted to account for the non-respondents.

	Response	Non-response	Non-response Adjustment
0-20th percentile	59251	991065	17.73
20-40th percentile	124621	925821	8.43
40-60th percentile	182024	868391	5.77
60-80th percentile	265225	785013	3.96
80-100th percentile	326065	724524	3.22

Each respondent's design weight is multiplied by the adjustment factor from the quartile where they fall to calculate the non-response adjusted weights.

The second adjustment accounted for frame ineligibility due to missing phone numbers. For this adjustment, each enrollee in the universe is categorized based on whether they were eligible for the frame or not (z):

$$z = \begin{cases} 0 & \text{if the enrollee is not eligible for the frame} \\ 1 & \text{if the enrollee is eligible for the frame} \end{cases}$$

Similarly, we use a logistic regression model to estimate the probability that an enrollee completes the interview given their characteristics. The model results are presented in Table 14 of the appendix.

After estimating an enrollee's probability of being eligible for the frame based on the predictor variables, we group the respondents and non-respondents into quintiles based on their propensity score. Within each quintile, the respondents are ratio adjusted to account for the non-respondents.

	Eligible	Not eligible	Frame Adjustment
0-20th percentile	794812	627779	1.79
20-40th percentile	936100	486517	1.52
40-60th percentile	1046483	375725	1.36
60-80th percentile	1168110	254698	1.22
80-100th percentile	1306494	116306	1.09

Each respondent's non-response adjusted weight is multiplied by the adjustment factor from the quartile where they fall to calculate the frame adjusted weights.

Finally, to account for the enrollees who are not included in the modeling due to missing stratification variables, a final adjustment calibrates the weighted respondents to the total number of enrollees, 7,186,950.

Bias reduction for Self Reported Utilization

As illustrated in the previous section, the non-response and coverage adjustments correct for the biases observed for the six health measures, but this is expected since this information was used

to make the adjustments. These adjustments will also mitigate bias when the survey data is correlated with the probability of response. To evaluate this, we've calculated VA reliance estimates based on the survey responses with the base weight (adjusted only for disproportionate sampling) and the non-response adjusted weight. Note, that survey response data may the survey estimates. Note that survey responses about healthcare are subject to other forms of bias including recall and response bias. Differences between the self-reported reliance and administratively measured reliance should not be attributed only to non-response.

The percentage of enrollees who received outpatient care unrelated to substance abuse or mental health and the percentage who receive VHA pharmacy benefits both decrease about 10 percentage points with the non-response adjustment. This is consistent with large drops in the administratively measured estimates. The percentage of enrollees with inpatient visits–both related to substance abuse or mental health and unrelated follow the same pattern as the corrections in the administratively measured estimates. The percentage of enrollees who received outpatient care unrelated to substance abuse or mental health is roughly the same before and after the non-response adjustments—consistent with very little change in the administrative data. Finally, the self-reported estimate for the percentage of enrollees who receive home health care seems to be inflicted by extreme recall bias or response bias. The self-reported estimate is roughly 2.5 percent, whereas the administratively measured estimate is only 0.1 percent.

Table 12. Self-reported Utilization with and without Non-response Adjustments

	Base weight only			**Base weight and non-response adjustment**		
	Est	**L95**	**U95**	**Est**	**L95**	**U95**
1. Home Health Care	2.91	2.67	3.15	2.48	2.25	2.71
2. Inpatient treatment						
(a) Related to MH/SA	0.46	0.46	0.46	0.82	0.68	0.96
(b) Unrelated to MH/ SA	5.66	5.33	5.99	5.18	4.85	5.50
3. Outpatient treatment						
(a) Related to MH/SA	8.20	7.83	8.57	8.14	7.72	8.55
(b) Unrelated to MH/ SA	57.14	56.44	57.84	47.01	46.18	47.83
4. VHA Pharmacy benefit	78.54	77.99	79.10	67.72	66.89	68.55

Table 13. Frequency and Percent of Enrollees with Valid Addresses and Telephone Numbers

			Phone			Address		
		Total	**Full**	**Partial**	**None**	**Full**	**Partial**	**None**
VISN	1	316,460	84.18	12.63	3.19	99.84	0.16	0.00
	2	197,528	77.39	19.30	3.32	99.91	0.09	0.00
	3	317,488	79.33	17.40	3.26	99.85	0.15	0.00
	4	418,972	85.43	12.15	2.43	99.58	0.42	0.00
	5	175,200	81.12	14.19	4.68	98.93	1.07	0.00
	6	381,461	77.87	18.87	3.26	99.89	0.11	0.00
	7	431,230	60.68	36.12	3.20	99.93	0.07	0.00
	8	603,388	67.07	30.65	2.29	99.75	0.25	0.00
	9	327,825	75.90	20.70	3.39	99.78	0.22	0.00
	10	262,048	75.85	20.10	4.04	99.93	0.07	0.00
	11	311,908	75.82	21.14	3.04	99.82	0.18	0.00
	12	307,158	74.44	22.63	2.93	99.50	0.50	0.00
	15	291,310	80.56	15.99	3.45	99.92	0.08	0.00
	16	584,123	73.70	23.15	3.15	99.81	0.19	0.00
	17	325,362	75.45	21.45	3.10	99.94	0.06	0.00
	18	300,407	59.18	37.73	3.09	99.91	0.09	0.00
	19	209,591	73.88	22.59	3.53	99.51	0.49	0.00
	20	313,982	71.68	23.85	4.47	99.19	0.81	0.00
	21	298,688	76.05	20.69	3.27	99.49	0.51	0.00
	22	384,319	64.05	31.98	3.97	99.41	0.59	0.00
	23	354,576	81.95	14.96	3.09	99.88	0.12	0.00
Priority Group	1	870,018	71.65	24.75	3.60	99.31	0.66	0.03
	2	496,102	71.38	24.51	4.12	99.30	0.65	0.06
	3	939,191	71.64	23.59	4.78	99.26	0.64	0.10
	4	196,791	72.80	23.44	3.76	99.55	0.41	0.04
	5	2,252,477	71.39	24.87	3.74	99.51	0.42	0.07
	6	253,289	69.19	28.32	2.49	99.29	0.62	0.09
	7/8	2,179,059	79.54	18.16	2.30	99.48	0.43	0.09
Enrollee Type	POST	4,796,634	74.91	22.41	2.67	99.36	0.53	0.11
	PRE	2,390,316	71.82	23.31	4.86	99.55	0.45	0.01

Table 14. Model Results for Non-response and Frame Coverage Adjustments

	Non-response adjustment				Frame Coverage Adjustment			
Parameter	**Est**	**Std. Error**	**Wald chi-square**	**P-value**	**Est**	**Std. Error**	**Wald chi-square**	**P-value**
Intercept	-3.41	0.01	131092.72	<.0001	-0.16	0.01	560.13	<.0001
priostrat1	0.18	0.00	1958.03	<.0001	0.03	0.00	71.47	<.0001
priostrat2	0.18	0.01	1259.68	<.0001	0.03	0.00	51.35	<.0001
priostrat3	0.04	0.00	93.38	<.0001	-0.01	0.00	17.03	<.0001
priostrat4	-0.13	0.01	288.48	<.0001	-0.28	0.01	2317.73	<.0001
priostrat5	0.00	0.00	0.98	0.3211	-0.29	0.00	14164.14	<.0001
priostrat6	0.11	0.01	199.54	<.0001	-0.08	0.00	277.57	<.0001
visn_r1	-0.35	0.01	2639.10	<.0001	0.11	0.01	296.45	<.0001
visn_r2	-0.23	0.01	797.06	<.0001	-0.33	0.01	2120.28	<.0001
visn_r3	-0.67	0.01	7938.74	<.0001	-0.27	0.01	1791.74	<.0001
visn_r4	-0.26	0.01	1753.34	<.0001	0.20	0.01	1010.62	<.0001
visn_r5	-0.59	0.01	4040.95	<.0001	-0.08	0.01	116.68	<.0001
visn_r6	-0.23	0.01	1229.62	<.0001	-0.23	0.01	1492.99	<.0001
visn_r7	-0.61	0.01	6267.25	<.0001	-1.07	0.01	37958.58	<.0001
visn_r8	-0.60	0.01	9068.04	<.0001	-0.90	0.01	28967.39	<.0001
visn_r9	-0.22	0.01	997.85	<.0001	-0.32	0.01	2701.58	<.0001
visn_r10	-0.17	0.01	529.52	<.0001	-0.38	0.01	3527.37	<.0001
visn_r11	-0.09	0.01	158.86	<.0001	-0.37	0.01	3629.45	<.0001
visn_r12	-0.40	0.01	3013.26	<.0001	-0.46	0.01	5735.48	<.0001
visn_r15	-0.08	0.01	153.34	<.0001	-0.14	0.01	453.51	<.0001
visn_r16	-0.17	0.01	783.66	<.0001	-0.46	0.01	7320.54	<.0001
visn_r17	-0.39	0.01	2926.35	<.0001	-0.39	0.01	4093.36	<.0001
visn_r18	-0.29	0.01	1348.91	<.0001	-1.14	0.01	37743.90	<.0001
visn_r19	-0.20	0.01	593.20	<.0001	-0.43	0.01	4114.95	<.0001
visn_r20	0.01	0.01	0.53	0.4684	-0.53	0.01	7653.25	<.0001
visn_r21	-0.18	0.01	668.56	<.0001	-0.37	0.01	3411.77	<.0001
visn_r22	-0.39	0.01	2855.74	<.0001	-0.90	0.01	25249.28	<.0001
enroll_pr	-0.15	0.00	3105.93	<.0001	-0.20	0.00	10614.69	<.0001
gender_m	-0.05	0.01	68.34	<.0001	0.08	0.00	358.93	<.0001
age	0.03	0.00	76720.01	<.0001	0.03	0.00	171011.18	<.0001
dupflag_y	-0.65	0.01	14905.55	<.0001	15.69	5.54	8.03	0.0046
hhuse_y	0.57	0.03	309.31	<.0001	0.15	0.03	26.77	<.0001
ip_mhsause_y	-0.51	0.02	992.23	<.0001	-0.02	0.01	5.31	0.0212
ip_nonmhsause_y	-0.04	0.01	64.82	<.0001	-0.17	0.00	1582.58	<.0001
op_mhsause_y	0.61	0.01	6215.22	<.0001	-0.04	0.01	56.43	<.0001
op_nonmhsause_y	0.68	0.00	19883.86	<.0001	0.07	0.00	375.65	<.0001
rxuse_y	0.28	0.00	3757.01	<.0001	0.00	0.00	0.47	0.4948