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Melissa Boyle
College of the Holy Cross, mboyle@holycross.edu

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Department of Economics
College of the Holy Cross
Box 45A
Worcester, Massachusetts 01610
(508) 793-3362 (phone)
(508) 793-3710 (fax)

http://www.holycross.edu/departments/economics/website

Health and Utilization Effects of Increased Access to Publicly Provided Health Care: Evidence from the U.S. Department of Veterans Affairs

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Abstract

During the mid-1990s, the U.S. Department of Veterans Affairs overhauled its health care system in an attempt to increase quality and efficiency. The restructuring involved the adoption of a capitated payment system and treatment methods based on the managed care model. This reorganization was accompanied by a major expansion in the population eligible to receive VA care. Using the National Health Interview Survey and VA medical claims data, this study analyzes both the efficiency of providing public health care in a managed care setting and the effectiveness of expanding coverage to healthier and wealthier populations. I estimate that between 35 and 70 percent of new take-up of VA care was the result of individuals dropping private health insurance. While utilization of services increased, estimates of the impact on aggregate veteran health imply that the policy change did not result in net health improvements. Regions providing more care to healthier, newly-eligible veterans had bigger reductions in hospital care and larger increases in outpatient services for previously-eligible veterans. This shift away from specialty care may help to explain the aggregate health declines.

JEL Classification Codes: I1, H51

Keywords: Medicare, elderly, veteran, VA healthcare

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[†]Department of Economics, Box 191A, College of the Holy Cross, Worcester, MA 01610-2395, 508-793-2334 (phone), 508-793-3710 (fax), mboyle@holycross.edu

I. Introduction

In recent years there has been much focus in the political arena on the need for an improved system of public health care in the United States. With 45 million Americans currently uninsured, politicians often insist that the U.S. government should provide the same type of universal coverage for health expenditures that exists in other industrialized nations. In spite of years of national debate, however, a consensus has yet to be formed on a public insurance model for the entire United States. Often overlooked in these discussions is the fact that the United States government already owns and operates one of the largest health care systems in the world – the Veterans Health Administration (VHA).

The VHA is the principal agency of the U.S. Department of Veterans Affairs and the largest integrated health care system in the United States, with a budget of $25 billion for 2003. Sweeping changes in VA health care over the past decade have resulted in a system designed in the spirit of the U.S. managed care model. These changes were meant to increase both the quality and availability of health care provided to United States veterans. VA's 1,300 care facilities include 163 hospitals, 850 ambulatory care and community-based outpatient clinics, 206 counseling centers, 137 nursing homes and 43 domiciliary facilities (VA Fact Sheet, 2002).[1]

Historically, the VA health care system was a network of hospitals, established over 70 years ago to provide specialty care to veterans with injuries or conditions directly resulting from their military service. Over time, the system expanded to include care for low-income veterans with non service-connected conditions. VA provided mainly

[1] These provide shelter, food and necessary medical care to veterans disabled by age or disease but not in need of skilled nursing care or hospitalization.

inpatient care, with outpatient services for non service-connected conditions available only as a follow-up to an inpatient stay.

In 1995 the VHA began restructuring, shifting from hospital-based specialty care to an emphasis on primary care and prevention. The total number of patients treated in VA hospitals dropped 44 percent between 1989 and 1999, while the total number of outpatient visits increased 66 percent (Klein & Stockford, 2001). In addition to this change, the VHA's resource allocation system was redesigned. Following the HMO model, VA began distributing dollars using a capitated, patient-based formula.[2]

As a result of these changes, VA anticipated that increased efficiency would lead to significant reductions in costs per patient and in necessary staff. With this in mind, VA also changed its rules on eligibility for care. Prior to the reform, VA guaranteed care only to veterans with service-connected conditions or low incomes; following the restructuring, all veterans became eligible for VA health care (GAO/T-HEHS-99-109).

The reorganization of the VHA has similarities to reforms in other parts of the U.S. health care sector. The literature evaluating these reforms does not provide a clear picture of the expected impact of such changes in the VHA. Within the private sector, managed care methods appear to have been successful at reducing costs per patient without negatively impacting health outcomes (e.g. Cutler and Sheiner 1997, Cutler, McClellan and Newhouse 2000). In public health care, however, it remains unclear whether managed care might achieve the same success. In a study of Medicaid HMOs, Duggan (2004) finds increases in spending and worsening health outcomes as a result of the switch to managed care.

[2] In a capitated payment system, the health care provider is reimbursed a flat dollar amount for each patient regardless of the services performed.

Studies of public insurance expansions focusing on the increases in Medicaid eligibility in the late 1980s and early 1990s (e.g. Cutler and Gruber 1996, Dubay and Kenney 1997) have estimated that between 10 percent and 50 percent of new program enrollees are individuals who drop private health insurance in order to take up the public program. The expansion in VA coverage provides another opportunity to study the impact of offering public health care to a larger number of individuals, when newly-eligibles are drawn from a less vulnerable population in terms of income and health.

This paper is the first comprehensive study of these issues within the VA health care system. Papers that have examined the shift from hospital-based to outpatient-based care within the VHA (Ashton et al. 2003 and Thibodeau 2003) look at simple time trends in various health outcomes and conclude that the reorganization did not lead to health declines and may have resulted in health improvements along some dimensions. These studies, however, fail to control for overall health trends in the United States (for example, declining mortality and morbidity rates) and look at extremely short post-reform periods which do not capture the expansion in coverage. Therefore, while these findings may be suggestive, they are not conclusive.

Anecdotal evidence suggests that increased eligibility has resulted in severe overcrowding, particularly in regions serving a higher than average proportion of newly-eligible veterans (*New York Times,* 9/4/02). Even with the potential increases in the quality of care delivered, it is uncertain what the health effects of the reforms have been for the veteran population as a whole. Various competing effects make it difficult to predict whether aggregate veteran health should improve or decline as a result of these changes. On the one hand, as a result of the eligibility expansion, a large group of

veterans has access to a previously unavailable form of health insurance. This, coupled with the fact that VA-users are now enrolled in a health care system that offers many more services than the old hospital-based care model, could lead to significant improvements in access to care and health outcomes. It is unclear however, whether newly-eligible veterans who may switch to VA care from another form of insurance are receiving superior care as a result. Additionally, if capacity has not expanded enough to compensate for the increase in demand for VA-provided care, veterans who were reliant on the VHA prior to the reforms may now be receiving less than adequate care because of overcrowding.

The goals of this paper are therefore twofold. I first evaluate the impact of the policy change on the health and health care utilization of the entire U.S. veteran population. I find increases in total health care utilization by veterans but evidence of net health declines. I therefore test whether the amount of care provided by the VHA to veterans in the previously-eligible categories is lower in regions which have proportionally more newly-eligible veterans in the patient load. This allows me to determine whether the declines in health may be the result of healthier, higher-income veterans crowding-out care to VA's more vulnerable veteran populations. I find no evidence of crowd-out in total services provided, but instead find that regions with more newly-eligibles are shifting more of their care provision from inpatient to outpatient settings. Taken together, these findings suggest that financial constraints may have led to excessive reliance on outpatient systems for some veterans, lowering their health.

II. VHA Reform Details

By the early 1990s, the structure of the VA health care system had come under scrutiny. Critics of government-run health care pointed out that the U.S. government was already managing a very large health care system with a reputation for outdated, sub-par methods of care provision. The U.S. government determined that an overhaul of the VHA was necessary in order to repair the reputation of the health care system and to keep up with progress in American health care in general.

One of the biggest steps in the reorganization of the VHA was the passage of the Veteran's Health Care Eligibility Reform Act of 1996. Passed in October, this legislation was designed to restructure VA health care for increased efficiency. It led to the creation of the Medical Benefits Package, a health benefits plan available to all enrolled veterans. The plan covers services such as primary health care, diagnosis and treatment, surgery, mental health and substance abuse treatment, home health care, respite and hospice care, urgent and limited emergency care, drugs and pharmaceuticals, and preventive services such as immunizations and screening tests (VA Fact Sheet, 2002).

The Act also created a priority-based enrollment system for veterans using VA health care. All veterans who wish to receive VA care must enroll in the system, with the exception of those with a service-connected disability rating of 50 percent disabled or higher, those seeking care only for a service-connected condition, and those discharged from active duty for a disability incurred within the prior 12 months who have not yet received a disability rating. Veterans who enroll are placed in one of seven priority groups; veterans assigned to group one are considered the highest priority for treatment while veterans in group seven are considered lowest priority. (Group one veterans are

those with service-connected conditions resulting in disability of 50 percent or higher; group seven veterans are those with incomes above VA determined means-test thresholds and no service-connected disabilities who agree to pay certain co-payments.) During the time period examined in this study, priority groups were used only for enrollment purposes. For all those enrolled, routine care was to be provided on a first-come first-served basis.

VA is required to enroll only those veterans for whom it has sufficient resources to provide timely health care, but for the years relevant to this study VA determined that its resources were adequate to enroll all priority groups.[3] According to the 1996 legislation, VA could not provide hospital care or medical services to unenrolled veterans after October 1, 1998. VA began accepting applications for enrollment in October 1997, and applications were automatically processed for any veteran who had received care since January 1996. By 2002, the total number of veterans enrolled in the system was 6.6 million. In that same year, VA treated 4.5 million veterans, up from 2.5 million in 1995. Prior to the legislation, VA was required to provide care only to veterans in priority groups 1-6, but could provide care to those in group 7 if resources allowed. The number of priority group 7 veterans treated by VA increased from 107,000 in FY1996 to 828,000 in FY2001 when they accounted for 22 percent of VA's workload (GAO-03-161).

In 1997, VA reformed its resource allocation method through the creation of the Veterans Equitable Resource Allocation (VERA) system. VERA was implemented to improve the distribution of resources among VA facilities. Most funds distributed through VERA are allocated based on expected patient load, and are adjusted according

[3] As of January 2003 VA began denying care to new enrollees in the lowest priority group. This is not a concern for this analysis, however, as the data only extend through 2002.

to case-mix. Funds are distributed to the administrations of each of the VHA's 21 regional networks. These Veterans Integrated Service Networks (VISNs) are then able to distribute their budgets across facilities as they see fit. VISNs receive a fixed dollar amount for each patient, so VERA provides incentives to increase the number of cases treated while minimizing the costs per case. [4] Most priority 7 veterans are excluded from the patient load calculation, however.[5] Thus, networks serving a higher than average proportion of priority group 7 veterans have fewer budgeted resources per patient than networks with a lower proportion (RAND report, 2001).

VA rationalized that excluding the healthier (less costly) group 7 individuals from the formula would eliminate the incentive to treat these veterans preferentially, to the detriment of veterans in the other priority groups. They also reasoned that co-payments by the priority 7 veterans would defray the costs of treating these individuals. However, networks with higher proportions of priority 7 enrollees consistently complain about resource shortages and serious appointment backlogs. The United States General Accounting Office (GAO) and VA's Office of Inspector General have both recommended that priority 7 veterans be included in the workload calculation (GAO-02-744T).

[4] Under the case-mix adjustment, expected patients are classified as being either "Basic Care" or "Complex Care." Vested Basic Care patients (those with routine health needs) were allotted $3,126 in 2001 while each Complex Care patient was allotted $42,765. Adjustments are also made for variations in labor costs across regions (RAND report, 2001).

[5] Only those in the complex care category are included – about 8 percent of priority 7 veterans were included in 2000.

III. Predicted Effects of VHA Reforms

The VHA reforms have potentially competing effects on health care utilization and health outcomes. Following the policy change, all U.S. veterans became eligible for VA care, and therefore had to choose between the VHA and other health care providers. Such a decision is based on the relative value of treatment in each system, determined by factors such as the cost of care, wait time for care, and time to recovery following treatment. For an individual choosing between VA and the private sector, these factors may vary substantially before and after the policy change.

Prior to restructuring, low-income and disabled veterans could receive VA care for free, but the services provided were limited by the hospital-based nature of the health care system. For some priority 1-6 veterans, the value of VA hospital care was lower than the cost of privately purchased comprehensive insurance. For others, the cost of private care was prohibitive and if their particular needs were not met by available VA services, these individuals went without any care.

Previously-eligible veterans had more incentive to take up VA care following the reorganization because of the benefits expansion. Services remained free for veterans in groups 1-6, and the scope of VA coverage widened substantially. For poor and disabled veterans, the expected impact of the increase in benefits is increased utilization and improved health outcomes.

At the same time, as a result of the expansion in eligibility, newly-eligible veterans began queuing for care with previously-eligibles. If capacity did not expand enough to meet the increased demand for services, wait times for care provided to

priority 1-6 veterans would have increased. As a result, these individuals may have received fewer services relative to the pre-period. In some cases, the cost imposed by increased wait times may have induced previously-eligibles to seek care elsewhere or not at all. The broader range of services may not have benefited these veterans if they had to wait longer for appointments. The eligibility expansion therefore would be expected to result in decreased utilization and potential health declines for the previously-eligible population. For veterans in priority groups 1-6, the expected advantages of the expansion in services combined with the disadvantages of longer wait times make it impossible to predict the net effect on utilization and health.

Veterans in priority group 7 were not eligible to receive VA care prior to the reforms. Unless they qualified for some other public insurance program, these individuals had to choose between purchasing private coverage and foregoing medical care. As a result of open enrollment, these veterans gained access to a form of comprehensive health insurance that was formerly unavailable.

For newly-eligible veterans who were otherwise uninsured or who had difficulty paying for care, the expected result would be an increase in health care utilization which could in turn have significant health benefits. Other veterans, however, may have dropped private insurance in order to take up VA care. For individuals shifting from private to public health care coverage, the impact on health and utilization would depend on the quantity and quality of care provided in the two systems. It is likely that the effects of merely switching from one form of coverage to another would be negligible.

The impact of the VA policy change on aggregate veteran health is determined by a complicated set of factors, many of which have opposing predicted effects on health

care utilization and health outcomes. The consequences of this reform for the previously- and newly-eligible subsets of the veteran population are uncertain, and it is therefore difficult to predict the implications for access to care and health outcomes of veterans overall.

IV. Aggregate Health and Utilization Effects

Because the implications of the VA reforms are unclear, I turn to empirical evidence to determine the effect on health care utilization and health outcomes for the veteran population. In assessing the impact of this policy change it is important to examine the effects on the aggregate veteran population rather than just VA-users. If care to previously-eligibles is crowded out by newly-eligibles, some individuals may receive no treatment and thus will not show up in the VA system. An analysis examining only users of the VHA would therefore miss the potential negative impact on these individuals.

A. Data and Empirical Model

I use data from the National Health Interview Survey (1992-2001) to examine the impact of the changes in the VA system on aggregate veteran health. This survey is a nationally representative sample of repeated cross-sections containing information on individuals' self-reported health and utilization of health services. The NHIS contains an indicator for whether the individual in question is a veteran as well as data on an individual's health insurance coverage, but no information about health care providers

(i.e. whether a particular veteran actually sought VA treatment).[6] I therefore utilize this survey to examine the effects of the policy change on the health of the entire veteran population.

I use a difference-in-differences estimation strategy to compare the health of veterans and non-veterans before and after the enactment of the 1996 legislation. Because of the small number of female veterans and very young veterans in the data, I restrict my sample to include all surveyed males age 25 and over. The treated population is therefore male veterans age 25 and older, and the control group is male non-veterans over the age of 25. Since changes in the VHA are implemented throughout 1996 and 1997, I define 1992-1995 as the pre-policy period and 1998-2001 as the post-policy period. I estimate the following equation:

$$(1) \qquad y_{it} = \beta_0 + \beta_1 veteran_i + \beta_2 post_t * veteran_i + \beta_3 \mathbf{X}_{it} + \delta_t + \mu_{it}$$

where:

y_{it} = measures of health outcomes and utilization

$veteran_i$ = 1 if individual has been honorably discharged from active military duty

$post_t$ = 1 in post-policy period

$\mathbf{X}_{it}$ = vector of individual characteristics: age group dummies, age group*veteran status, race, marital status, years of education, income group, employment status, region, and an urban-rural indicator

δ_t = year dummy variables

and,

μ_{it} = a random error term.

[6] For the years 1992-1995 I also make use of the NHIS Health Insurance Supplement. Health insurance information was incorporated into the main surveys in 1997.

Summary statistics are shown in Table 1. Comparing these statistics for the veteran and non-veteran populations reveals that the veteran population is older than the non-veteran population. For this reason, I include an age*veteran interaction term in my regressions, allowing age to enter differently for the two populations. The age difference likely accounts for at least some of the differences in average characteristics between the two groups. Veterans are less likely to be currently employed but have slightly higher average income and are more likely to be married. In addition, a smaller proportion of the veteran sample is Hispanic or black.

I employ a variety of health and health care utilization measures to assess the impact of the policy change on the veteran population. The utilization measures include hospital nights in the past year, hospital stays in the past year, an indicator for whether the individual has visited a doctor in the past year and a count of doctor visits in the past two weeks. It is unclear whether changes in utilization indicate a change in health status or a change in access to care, but examining the effect on these variables and the health measures simultaneously will provide evidence of the impact of the policy change on both overall health and care availability. In addition to examining the utilization of particular health care services, I test measures of health insurance coverage, to see whether veterans drop private health insurance as a result of the policy change.

Health outcome measures include a self-report of the individual's health status (poor, fair, good, very good or excellent) and three 0-1 indicators of physical limitation based on activities of daily living (ADL) measures. These variables indicate whether an individual is limited in the ability to work, needs help with personal care, or is limited in any way. While it is difficult to quantify health, ADLs have been shown to be excellent

predictors of morbidity and mortality.[7] Since the NHIS does not contain mortality information, the ADL measures are the best available means of assessing the health effects of the policy change. In general, the average non-veteran in the sample reports slightly better health and spends fewer days in bed than the average veteran. In addition, the average non-veteran is less likely to report physical limitations and uses fewer health care services (hospital and outpatient).

B. Crowd-Out of Private Insurance

I first examine the impact of the policy change on health insurance coverage for the average veteran. The cost effectiveness of any public health insurance expansion will depend in part on how much of the newly-covered population was previously uninsured. Such a policy is expected to have a smaller impact on public health if a large portion of new users drops other forms of health insurance in order to take up the new program. Table 2 presents the results of probit estimations of equation 1, where the dependent variables are various forms of health care coverage. The reported coefficients are probit marginal effects.

Veterans are less likely to hold private health insurance as a result of the VA expansion. Now that they have access to free (or very low cost in the case of those paying co-payments) and comprehensive health care services through the VHA, some veterans appear to no longer value coverage purchased through a private insurer. As shown in column 1, the average veteran's probability of being covered by private health insurance drops by 5 percent as a result of the policy change. In addition, column 2

[7] Wiener et al. (1990) provide a list of papers which give evidence of the predictive power of ADLs in determining health.

shows that veterans are about 1 percent more likely to have no health insurance coverage other than VA as a result of restructuring.[8]

In columns 3-5, I test whether veterans drop other public programs as a result of the VA expansion. I check for declines in Medicare Part B coverage (Part B is the buy-in portion of Medicare which covers outpatient services) and whether there is any effect on take-up of Medicaid or other public insurance programs. Nearly all Medicare-eligibles in the United States buy into Part B. I test the impact on take-up for this program because of the fact that the VA Medical Benefits Plan is more generous than Medicare Part B coverage along some dimensions (for example, VA covers prescription drugs and routine physicals). Although the coefficient of interest is negative in the Part B equation, it is not statistically significantly different from zero. In addition, there appears to be no impact of the policy change on Medicaid or other forms of public insurance.

Prior to the policy change, about 80 percent of the veteran population was privately insured. The 5 percent decline in the probability that the average veteran has private insurance is therefore about a 4 percentage point drop in the veteran insurance rate, implying that 1.4 million veterans drop their private coverage. At the same time, about 2 million veterans take up VA care as a result of the policy change. Based on these numbers, about 70 percent of new take-up is offset by individuals who drop their private coverage. This is significantly higher than even the largest estimates of private insurance crowd-out in the Medicaid literature. This estimate is an upper-bound, because some

[8] There is not perfect offset between the increase in no coverage and the drop in private coverage mainly because individuals dropping private coverage may be simultaneously covered by public programs other than VA. Tests on Medicare-eligibles in the sample show a significant drop in private insurance by veterans in this category. These individuals, who held private insurance in addition to their Medicare coverage, may have determined that Medicare combined with VA was sufficient, and that supplemental private insurance was no longer needed after the VA expansion.

veterans may drop their private coverage planning to use VA should the need arise, but then never actually take up the public program. Additionally, this case differs from the Medicaid expansions because it is likely that some of those dropping private insurance may not be individuals taking up the program for the first time. The switch to a much more comprehensive coverage of health care services may lead previous users who had private coverage to switch to relying only on VA care.

A lower-bound on the crowd-out estimate can be obtained by looking at the number of veterans who enrolled in the VHA following the policy change. By 2002, 6.6 million veterans had signed up to receive care. The patient load prior to restructuring was about 2.5 million, implying that after the reform about 4 million new veterans had indicated an interest in the VA program. During the same year, however, only about 2 million new veterans were treated. It is likely that some of the individuals dropping private insurance were among the 2 million veterans who enrolled but did not use VA care. Based on the fact that about half of the new enrollees actually take up, it is reasonable to assume that an equivalent proportion of those dropping their insurance coverage are actually using VA care. This implies a lower-bound crowd-out estimate of about 35 percent.

C. Effects on Health Care Utilization

I next turn to estimating the effect of the policy change on utilization of health care services. In light of the fact that a non-trivial proportion of VA users appears to be substituting away from private insurance, it is uncertain whether the reforms will have a

significant impact on utilization. For veterans dropping private insurance as a result of the policy change, the expected impact on total health care utilization is not large. For other groups of veterans, however, the effects could be substantial. Fully 18 percent of the veteran sample was without health insurance in the pre-period. These individuals now have access to a new form of health care, which could have a noticeable impact on average utilization. Additionally, previously-eligible veterans now have a different range of services at their disposal, but could also potentially be waiting in longer lines for care. The expected impact on their health care utilization is uncertain.

Table 3 reports the effect of the policy change on the utilization of health care inputs by veterans. The tested inputs in the equations reported in this table include number of hospital stays in the past 12 months, number of nights spent in the hospital in the past 12 months, an indicator for whether the individual had a doctor visit in the past year, an indicator for whether the individual had a doctor visit in the past two weeks, and the number of doctor visits in the past two weeks. Column 1 shows a negative and significant drop in the number of nights the average veteran spent in the hospital in the past year as a result of the policy change. The number of hospital nights for the average veteran falls by -.1, which is approximately a 9 percent decrease in length of hospital stays relative to the pre-period.

With the exception of the number of hospital nights, all coefficients are positive and highly significant, indicating an overall increase in health care utilization by veterans following the policy change. Although the coefficient on number of hospital stays is positive, it is also small, indicating very little change in the number of admissions. This is not surprising; anecdotal evidence indicates that veterans with conditions serious

enough to warrant hospitalization continued to receive timely care after the reforms (Twombly, 2003). This finding is also consistent with the estimated effects of managed care on the private sector. In general, managed care payment methods result in shorter hospital stays but no significant change in the total number of hospital admissions (Cutler & Sheiner 1997).

While the length of hospital stays declines, use of outpatient services increases substantially. As a result of the policy change, the average veteran is 3 percent more likely to have had a doctor visit in the past year and 1.4 percent more likely to have visited the doctor in the past two weeks. The average number of doctor visits in the past two weeks increases by .04, a 14 percent increase in two-week outpatient visits for veterans. In spite of substantial shifting from private insurance, it does appear that overall utilization of health services increased for the veteran population as a result of restructuring.

D. Effects on Health Outcomes

Results for the effect of the reforms on health outcomes are reported in Table 4. All coefficients indicate a decline in veteran health as a result of the policy change, although the coefficient of interest in column 1 (the indicator for needing help with personal care) is insignificant. The policy change has a small positive effect on the probability that a veteran is limited in the ability to work. In addition, there is a larger positive effect on the probability that a veteran reports being limited in any way, with the policy change increasing this probability by 2 percent. In column 4, I test whether

veterans' self-reported health is affected. I re-code the self-reported health measure as being equal to 1 if an individual reports excellent or very good health, and equal to zero if health is reported as being good, fair or poor. Following restructuring, the average veteran is 2 percent less likely to report either excellent or very good health.

It appears that while there are increases in health care utilization for the veteran population as a whole, the aggregate impact on veteran health is negative. In considering what may cause this result, it is important to observe that the change in VA benefits increased the covered population from roughly 40 percent of the veteran population to all veterans in the United States. Many veterans who were not receiving care previously may now have had access to care. The newly-covered individuals, however, tend to be relatively healthier, and their health improvements may be small when compared to the magnitude of the negative effects of crowd-out or longer wait times on the previously-eligible population. This possibility therefore invites a more detailed consideration of whether benefits to the newly-eligible population outweigh costs to previously-eligible VA-users.

E. Specification Checks

Before turning to an in-depth analysis of the impact of the policy change on various subsets of the veteran population, I perform a number of specification checks. In interpreting the coefficients in the above equations, I have assumed that the health and utilization effects are indeed a result of the changes in VA health care. The history behind the restructuring of the VHA and literature on similar changes in other health care systems supports this assumption. It is hypothetically possible, however, that the policy

change arose from some pre-existing trend in veteran health, and that the changes in the post-period do not reflect changes in care provision. For example, veteran and non-veteran health may be moving relative to one another as a result of unobservables that are unrelated to VA policy and are not captured by the controls included in the regressions.

In order to confirm that the changes in veteran health and utilization actually result from the changes in VA health care, I check for pre-existing trends by estimating the same diff-in-diff regressions on pre-policy data. I choose the years 1991-1994 because this is a period when no major changes took place in the VHA. I code the years 1991 and 1992 as the "pre" years, and 1993 and 1994 as "post" years. The results of these falsification tests are reported in Tables 5a and 5b. In general, coefficients are quite small and insignificant, implying no previously existing trends impacting veteran health.

Most striking are the health outcome results reported in Table 5b. These coefficients are consistently the opposite sign from those found in the main regressions, indicating that veteran health was slightly improving prior to the policy change, whereas it declines sharply thereafter. The only highly significant, same-signed coefficient in these falsification checks is that on the indicator for visiting the doctor in the last two weeks, and even this is quite small – about 2.5 times smaller than the coefficient in the main regressions. Evidence from these regressions therefore overwhelmingly suggests that the effects in the main specifications are in fact the result of the VA overhaul and not caused by pre-existing trends.

As a further test, I also predict self-reported health for a veteran and non-veteran with the same characteristics. I do this by running the following regression in each year of the sample separately for the veteran and non-veteran populations:

(2) $y_i = \beta_0 + \beta_1 \mathbf{X}_i + \mu_i,$

where y_i is the self-reported health measure (ranging from 0 to 4, where 0 is poor and 4 is excellent) and $\mathbf{X}_i$ contains the same controls as in equation 1.

I use these point estimates to predict veteran and non-veteran health in each year by calculating the fitted values of the dependent variable for a veteran and non-veteran, using the same characteristics for both predictions. The characteristics I choose are the average for the non-veteran population. I then difference predicted veteran and non-veteran health and calculate the standard error of the difference. Results are shown in Figure 1. As the figure demonstrates, there is a positive but insignificant difference between predicted veteran and non-veteran health (where a higher self-report indicates better health) in the pre-period. This difference becomes negative and significant in the post-period. This is further evidence that the veteran health declines are a result of the policy change and not some other unobservable trend.

F. Which Veterans Are Affected?

The coefficients reported in Tables 2-4 show the impact of the policy change on the aggregate veteran population. Although these results give evidence of the effects on veterans overall, it is unclear whether these effects are the result of take-up by the newly-insured or changes in care provision to the previously-eligible population. For this

reason, I split the sample into two groups: expected previously-eligibles and expected newly-eligibles.

I categorize a veteran as previously-eligible (i.e. priority 1-6) if the individual has an income below VA-established means-test cutoffs (adjusted for the number of dependents in the household) or the individual reports being limited in any way. Since there is no indicator for service-connected disability in the survey, I assume that any disabled veteran is service-connected disabled. I therefore overestimate the number of priority 1-6 veterans in the sample. I define a veteran as newly-eligible (i.e. priority 7) if the individual reports no activity limitation and has an income above the means-test cutoff. I then estimate the same equations as reported in Tables 2-4 for each subset of the veteran population, where my control group for previously-eligible veterans is low-income or disabled non-vets and the control for the newly-eligible veterans is higher-income and non-disabled non-vets.

Results are reported in Tables 6a and 6b. The last row of Table 6b indicates whether the coefficients for previously and newly eligibles are significantly different from one another. I do not report results from regressions for the two samples where the dependent variables are indicators of health insurance coverage, because the coefficients for the two groups are never significantly different. Among the reported regressions, the two veteran samples are impacted differentially in three out of the six cases. The decline in hospital nights in the main results turns out to fall entirely on the previously-eligible population. This is as expected, and is encouraging evidence that the methodology for splitting the sample results in good estimates of the two subsets of the veteran population. The previously-eligible population is subject to the change in the nature of VA care

provision from hospital-based to outpatient-based services. The newly-eligible population, on the other hand, was (for the most part) not in the VA system before the change and did not experience this shift. It is therefore not surprising that hospital nights fall for the previously-eligible population only. In all other cases, both groups are affected similarly by the policy change, although some effects are slightly larger for the previously-eligibles.

The results in Table 6 establish that both subsets of the veteran population are affected by the policy change. This demonstrates that the results in Tables 2 through 4 are, for the most part, picking up effects for both newly- and previously-eligible veterans. It does not allow for a determination of which group is impacted more, however. While the effects on doctor visits seem a bit larger for the previously-eligible population, this is likely in part because these veterans are receiving more outpatient services in exchange for fewer inpatient services under the new VA system. Additionally, in spite of the increase in services, veterans in both groups still report a decline in health.

V. Are More Vulnerable Veterans Crowded Out?

The NHIS results show that for the average veteran, health care utilization, particularly of outpatient services, increases as a result of the changes in the VHA. They also demonstrate that this increase is not coupled with health improvements, but rather appears to be associated with declines in various measures of self-reported health. The declines in health for the previously-eligible population are of a particular concern, because these are the most vulnerable veterans – those VA is most concerned with

serving. Anecdotal evidence on overcrowding (e.g. *The Boston Globe,* 1/1/03) suggests that the health declines for priority group 1-6 veterans may reflect crowd-out of services to these veterans by those in priority group 7. In spite of VA's expansion in services, if veterans in priority groups 1-6 are competing for care with those in group 7, these veterans may be treated less intensively than they were prior to the expansion. In order to check whether this can explain the demonstrated decline in health, I utilize data that will allow me to look specifically at the impact of the expansion on users of VA health care.

A. Data and Empirical Model

For this section of the paper, I turn to two additional data sources: the Current Population Survey Veterans Supplements (1993, 1997 and 1999) and VA Patient Treatment File (PTF) and Outpatient Care (OPC) claims records (1993-2002). The PTF and OPC claims records are large administrative files containing detailed information on every treatment episode in every VA facility. Because of the sheer size of these files, I aggregate to the VISN-year level. I use the PTF and OPC records to calculate treatment intensity for veterans in priority groups 1-6 and 7 in each VISN-year. I calculate the total number of hospital nights, hospital stays, surgeries, inpatient procedures, clinic visits, and total contacts[9] for group 1-6 and group 7 veterans in each VISN-year.

The CPS Veterans Supplements contain an indicator of service-connected disability status for the veteran sample, and are therefore used to provide population estimates of the number of veterans in priority groups 1-6 and 7 within each VISN. Because an individual must enroll in VA health care in order to be assigned to a priority

[9] Total contacts are defined as hospital stays plus clinic visits.

group, the actual number of these individuals in the population is not known and therefore must be estimated. I use geographic identifiers in the CPS to assign veterans to a VISN. I separate priority group 7 veterans from those in groups 1-6 based on income (where the means test threshold is adjusted for number of dependents) and service-connected disability status. I also use the CPS to calculate the proportion of veterans in a VISN falling into each of six age groups.

I again employ a difference-in-differences empirical strategy, this time comparing regions providing a high number of services (measured as total contacts) to priority 7 veterans to those regions providing a low number of services to veterans in group 7. If it is true that newly-eligible veterans crowd out services to previously-eligibles, regions that provide more services to veterans in group 7 should therefore provide fewer services to those in groups 1-6 relative to other regions after the policy change. This possibility is made especially likely by the nature of the resource allocation system. Since VERA does not reimburse VISNs for treating priority 7 veterans, a region treating more of these individuals relative to its 1-6 patient population will have fewer total resources per patient. Regions providing more services to group 7 veterans may, as a result, provide fewer services to everyone else in the patient load.

I define 1993-1996 as the pre-policy period and 1998-2002 as the post-policy period, since open enrollment was announced in 1997 but phased in beginning in 1998. The equation that I estimate is as follows:

(3) $\text{services1-6}_{vt}/\text{pop1-6}_v = \beta_0 + \beta_1(\text{contacts7/pop1-6})_v * \text{post}_t + \beta_2 \mathbf{X}_{vt} + \mu_{vt}$

where:

$\text{services1-6}_{vt}/\text{pop1-6}_v$ = Number of services to 1-6 veterans/Population 1-6 in a VISN-year, where population 1-6 is estimated from the 1999 CPS

$\text{post}_t = 1$ in post-policy period

$(\text{contacts7/pop1-6})_v$ = Average number of contacts to priority 7 veterans in a VISN in the post-period/Population 1-6 in a VISN, where population 1-6 is estimated from the 1999 CPS

$\mathbf{X}_{vt}$ = VISN and year fixed effects, and VISN-level age group controls

and,

μ_{vt} = a random error term.

Tables 7a and 7b provide summary statistics on the services variables from the VA claims data. Table 7a reports the average number of treatments in a region provided to priority 1-6 and priority 7 veterans in the pre- and post-periods. Table 7b reports the average number of treatments to each priority group divided by the number of priority group 1-6 veterans living in the region. Comparing the pre- and post-period means reveals the significant shift from inpatient to outpatient services, as well as the large increase in treatments provided to veterans in priority group 7.

B. Results

I first estimate equation 3 by OLS. Results are reported in Table 8. A clear pattern emerges in the coefficients of the OLS regressions. Regions providing a higher number of contacts to veterans in priority group 7 do not appear to provide fewer total contacts to those in priority groups 1-6 – in fact the exact opposite is true. At the same

time, these regions do provide fewer inpatient services to 1-6 veterans. It therefore appears that regions with greater influxes of new patients are shifting more of their care to outpatient provision than less crowded regions. In order to interpret these results, it is helpful to think about the difference in services provided to 1-6 veterans in the region providing the highest average number of contacts to priority 7 veterans versus the region providing the lowest number. The region providing the lowest average number of contacts to priority 7 veterans relative to the 1-6 population is VISN 10 (Ohio), while the region providing the highest number is VISN 23 (North and South Dakota, Iowa, Minnesota and Nebraska). The (contacts7/pop1-6) measure varies from .67 to 2.73, so the difference between the highest and lowest regions is around 2. Based on this, the OLS results imply that as a result of the policy change, the region providing the most contacts to priority 7 gives priority 1-6 veterans around 7.5 more clinic visits and total contacts per 1-6 population than the region providing the fewest contacts to group 7. A similar analysis for hospital nights indicates that the region with the highest concentration of group 7 veterans in its patient load provides group 1-6 veterans with .62 fewer hospital nights per population 1-6 than the region with the lowest concentration of priority 7 veterans.

A potential problem with equation (3) is the endogeneity of the (contacts7/pop1-6) term. Within a given region, the services provided to veterans in groups 1-6 and group 7 will be determined jointly. Thus, (contacts7/pop1-6)*post may be correlated with the error term, in which case OLS will result in a biased estimate of β_1. In order to solve this problem, I instrument for (contacts7/pop1-6)*post using two different measures. The first instrument that I use is the post term interacted with the population of priority group

7 veterans in a VISN divided by the population of group 1-6 veterans (pop7/pop1-6), as estimated in the CPS.[10] The location of veterans can be assumed exogenous (i.e., the population at large is not determined by VA health care within a VISN).[11] Therefore, regions with more priority 7 veterans relative to priority 1-6 veterans can reasonably be expected to have more priority 7 veterans seeking treatment.

An alternative instrument is the post term interacted with the number of priority 7 veterans who are Medicare-eligible (where any individual over age 65 is coded as Medicare-eligible) divided by the CPS measure of the total population of group 1-6 veterans (pop7+Mcare/pop1-6). The rationale behind this instrumental variable is the strong interest in take-up of VA health care by Medicare-eligible veterans following the policy change. As noted above, the VA Medical Benefits Package includes more generous coverage than traditional Medicare for particular services, especially pharmaceuticals. Consequently, Medicare-eligibles in group 7 have taken up VA care at very high and increasing rates. While about 30 percent of priority group 7 veterans in the overall veteran population are Medicare-eligible, 52 percent of treated priority 7 veterans were Medicare-eligible in 1999. By 2001, this proportion had increased to 65 percent (GAO-03-161).

While many Medicare-eligibles are interested in VA care primarily for the purpose of obtaining low-cost prescription drugs, VA pharmacies cannot fill prescriptions written by private physicians. These individuals must therefore receive care from a VA

[10] For this variable, population 7 is measured in the 1999 CPS, while population 1-6 is measured in the 1997 CPS. This denominator is estimated from a different sample in order to eliminate the division bias that could result from correlated measurement error in the denominators of the dependent and independent variables.

[11] This reasoning was supported by examining CPS estimates of the fraction of the total U.S. veteran population living in each VISN before and after the policy change. Veterans do not appear to relocate as a result of the health care reorganization.

primary care physician in order to take advantage of the drug benefit. Since Medicare users are a subset of the veteran population that is highly likely to take up VA care as a result of the policy change, I assume that regions with a higher than average number of Medicare-eligible 7s relative to the total population of 1-6s will have to treat proportionately more group 7 veterans.

Results from the first stage regressions are reported in Table 9. In both cases, the coefficient on the instrument is positive and significant, demonstrating the expected relationship between the population of priority 7 veterans in a region and the number of services provided to those veterans. Tables 10a and 10b contain the results from the second stage. As in the OLS results, the number of clinic visits and total contacts to priority group 1-6 veterans rise relatively more in regions providing more services to group 7 after the policy change. Most of the inpatient measures are small and positive and statistically insignificantly different from zero, although the coefficients on hospital nights remain negative and in one case, significant. In table 10a, instrumenting for (contacts7/pop1-6)*post with (pop7/pop1-6)*post, the coefficients imply that as a result of the policy change, the region providing the most contacts to group 7 veterans relative to priority 1-6 veterans will provide 1-6 veterans with 17 more clinic visits per total 1-6 population and .4 fewer hospital nights (although the hospital measure is insignificant) than the region providing the fewest contacts to group 7 veterans. In table 10b, using the (pop7+Mcare)/pop1-6 instrument, the results imply that the policy change leads to .6 fewer hospital nights and 8 more clinic visits per population of 1-6 veterans in the highest contact 7 region versus the lowest.

As with the OLS results, 2SLS estimation suggests that regions serving more priority 7 veterans provide more total contacts to veterans in groups 1-6. At the same time, although the second-stage results for many of the inpatient measures are insignificant, evidence remains that regions serving more priority 7 veterans shorten hospital stays more and provide more of their treatment on an outpatient basis than regions serving fewer 7s relative to 1-6s. While there is no crowd-out in total services to previously-eligible veterans by newly-eligibles, it appears that the presence of newly-eligible veterans results in more substitution toward outpatient-based care for the previously-eligible population. Therefore, one possible explanation for the declines in veteran health found in the NHIS results is that the substitution of outpatient for inpatient services negatively impacts veterans in the previously-eligible group.

VI. Conclusion

Analysis of the reforms in the Veterans Health Administration is important both for evaluating the VA program itself, and because the nature of these changes provide an excellent test case for studying government provision of health care in general. This policy change offers an opportunity to examine the efficiency of providing public health care in a managed care setting, as well as the impact of extending health care coverage to individuals higher up in the health and income distributions.

As has been the case with other public health insurance expansions, some of the new take-up in VA health care appears to come from individuals who drop their private coverage in favor of VA. Crowd-out of private insurance by the public program is

estimated to be between 35 and 70 percent. This is a larger effect than the 10 to 50 percent crowd-out measures found in the case of the expansions in Medicaid eligibility. The magnitude of the crowd-out of private insurance could stem from two factors. First, a large proportion of the total veteran population was insured prior to the policy change (about 80 percent), so much of the increased eligibility was for individuals with other forms of health insurance coverage. Second, both previously- and newly-eligible veterans have an incentive to drop private coverage in favor of VA after restructuring because of the major expansion in services that accompanied the eligibility expansion.

Although a potentially large proportion of new VA take-up is individuals who were previously privately insured, there are significant utilization and health effects for both the newly-eligible and previously-eligible populations. As in the case of private insurance, VA care provision under the managed care model results in shorter hospital stays, but more services provided in an outpatient setting. While in the private sector this type of shift does not generally result in significant health declines or in changes in actual services provided, this appears not to be the case within the VA. Although health care utilization increases, veteran health declines according to every tested measure. This is more in line with the findings for Medicaid HMOs than private health care, although the reasons for declining health in the VHA may be different since Medicaid coverage was contracted out to private HMOs whereas VA is entirely government operated.

Anecdotal evidence, as reported in the popular press and also by the Federal government (for example, see the Report on the Budget of the United States Government, 2003) indicates that the reforms have left veterans in priority groups 1-6 competing for care with veterans in group 7. Tests for crowding-out of services to previously-eligible

veterans by the newly-eligible population do not indicate that veterans in more crowded regions receive fewer total visits, but rather that these regions shorten hospital stays more and alternatively provide more outpatient services relative to less crowded regions. It is possible, therefore, that VA's attempt to serve a larger (and on average, healthier) population has had a detrimental impact on veterans with service-connected conditions. Whereas, under the specialty care-based system, VA focused particularly on the needs of the most vulnerable veterans, the primary care-based system may substitute away from this type of care to the point that particular veterans with serious conditions related to their military service are no longer being treated with the same intensity.

Further research is needed to determine whether declines in specialty care are the cause of the negative health effects. The VA claims data contain diagnosis and treatment codes which will enable me to follow individuals with particular conditions over time in order to assess the impact of the policy change on treatment of specific health problems. I will additionally be able to test whether there is a change in the health composition of the previously-eligible population. This could result if VA specifically attempts to select the healthiest (least expensive) veterans. Bias in managed care towards healthier patient populations has been well-documented in the case of Medicare HMOs.[12] Constructing measures of illness severity using the diagnosis codes in the PTF and OPC files will allow me to determine whether the policy change resulted in VA providing more care to healthier previously-eligibles, while sicker previously-eligibles wait longer for treatment.

In the case of the Department of Veterans Affairs, the coverage expansion and capitated payment system appear to negatively impact average health. Further evidence is needed, however, to determine what changes would be necessary to achieve health

[12] For an overview of this literature, see Hellinger and Wong, 2000.

improvements. It is possible that adjustments in the resource allocation system allowing VA to shift more of its resources back to specialty services, or the end of open enrollment in 2003 halting the influx of healthier patients will result in a system which balances preventive medicine and specialty care in a manner more beneficial to the entire veteran population.

References:

Ashton et. al., 2003. "Hospital Use and Survival Among Veterans Affairs Beneficiaries." *New England Journal of Medicine*. 349: 1637-1646, October.

"Audit of Veterans Health Administration (VHA) Pharmacy Co-Payment Levels and Restrictions on Filling Privately Written Prescriptions for Priority Group 7 Veterans." Office of Inspector General, Report No. 99-0057-4. Washington, DC, 20 December 2000.

Bauman. Robert E., 1994. "70 Years of Federal Government Health Care: A Timely Look at the U.S. Department of Veterans Affairs." *Policy Analysis*, 207, April 27.

Borowsky, Steven J. and Diane C. Cowper, 1999. "Dual Use of VA and non-VA Primary Care." *Journal of General Internal Medicine,* 14, 274-280.

Cowper, Diane C., Denise M. Hynes, Joseph D. Kubal and Patricia A. Murphy, 1999. "Using Administrative Databases for Outcomes Research: Select Examples from VA Health Services Research and Development." *Journal of Medical Systems,* 23(3), 249-259.

Cutler, David M. and Jonathan Gruber, 1996. "Does Public Insurance Crowd Out Private Insurance?" *Quarterly Journal of Economics*, 111(2), 391-430.

Cutler, David M., Mark McClellan and Joseph P. Newhouse, 2000. "How Does Managed Care Do It? *RAND Journal of Economics*, 31(3), 526-548.

Cutler, David M. and Louise Sheiner, 1997. "Managed Care and the Growth of Medical Expenditures." NBER Working Paper 6140.

Dembner, Alice. "Swamped VA Hurt By Its Own Successes." *The Boston Globe.* 1 January 2003: A1.

Department of Veterans Affairs, 2002. "Fact Sheet: VA Health Care and the Medical Benefits Package." Office of Public Affairs and Media Relations. Washington, DC. July.

Department of Veterans Affairs, 2002. "Delivering on the Promise: Self-Evaluation to Promote Community Living for People with Disabilities – Report to the President on Executive Order 13217." Veterans Health Administration. Washington, DC. April.

Dubay, Lisa, 1999. "Expansions in Public Health Insurance and Crowd-Out: What the Evidence Says." *Urban Institue mimeo*, October.

Dubay, Lisa and GM Kenney, 1997. "Did Medicaid Expansions for Pregnant Women Crowd-out Private Coverage?" *Health Affairs*, 16(1), 185.

Duggan, Mark, 2004. "Does Contracting Out Increase the Efficiency of Government Programs? Evidence From Medicaid HMOs." Journal of Public Economics, 8(12), 2549-72.

"Experiment Shows Veterans Can't Get Timely Care." *Biloxi Sun Herald.* 3 August 2002.

Eze, Pius and Barbara Wolfe, 1993. "Is Dumping Socially Inefficient? An Analysis of the Effect of Medicare's Prospective Payment System on the Utilization of Veterans Affairs Inpatient Services." *Journal of Public Economics*, 52, 329-344.

Freudenheim, Milt. "VA Health Care Strained By Big Wave of Enrollees." *New York Times.* 6 April 2002, late ed.: A1+.

Hellinger, Fred J. and Herbert S. Wong, 2000. "Selection Bias in HMOs: A Review of the Evidence." *Medicare Care and Research Review*, 57(4), 405-439.

Hisnanick, John J. and Gujral S. Surinder, 1996. "Veteran's Health Insurance Status and Their Use of VA Medical Facilities: A Joint-Choice Analysis." *Social Science Quarterly*, 77(2), 393-406.

Klein, Robert E. and Donald D. Stockford, 2001. "Data on the Socioeconomic Status of Veterans and on VA Program Usage." http://www.va.gov/vetdata/demographics/index.htm

Lahiri, Kajal and Guibo Xing, 2002. "An Empirical Analysis of Medicare-Eligible Veterans' Demand for Outpatient Health Care Services." SUNY Albany Dept. of Economics Discussion Papers, 02-01.

Murphy, et al, 2002. "Veterans Health Administration Inpatient and Outpatient Care Data: An Overview." *Effective Clinical Practice.* May/June. 5:E4.

Petersen, Laura A.. et al, 2000. "Outcome of Myocardial Infarction in Veterans Health Administration Patients as Compared With Medicare Patients." *New England Journal of Medicine,* 343(26), 1934-1941.

RAND, 2001. *An Analysis of the Veterans Equitable Resource Allocation (VERA) System* (Santa Monica, CA).

Rapoport, Frank M. and Samantha L. Southall, 1999. "The Federal Government and Health Care Contractors: Maximizing Your Results When Participating in the Federal Marketplace." *Healthcare Contracting News*, May.

Thibodeau, Nicole, 2003. "Improving the Organization Architecture of Public Enterprise: An Investigation of the Effects of the Federal Government's Latest Effort Through the Veterans Health Administration." Ph.D. Dissertation, University of Pittsburgh.

Twombly, Renee, 2003. "VA System a Model for Health Care, Experts Say." *Journal of the National Cancer Institute*. 95(21), 1570-1572.

U.S. Department of Commerce, Bureau of the Census. Current Population Survey, September 1999: Veterans Supplement. ICPSR version. Washington, DC.

U.S. Department of Commerce, Bureau of the Census. Current Population Survey, September 1997: Veterans Supplement. ICPSR version. Washington, DC.

U.S. Department of Commerce, Bureau of the Census. Current Population Survey, September 1993: Veterans Supplement. Unicon version. Washington, DC.

U.S. Department of Health and Human Services, National Center for Health Statistics. National Health Interview Survey, 1992-2001. ICPSR version. Hyattsville, MD.

U.S. Department of Health and Human Services, National Center for Health Statistics. National Health Interview Survey, 1992-1995: Health Insurance Supplements. ICPSR version. Hyattsville, MD.

U.S. General Accounting Office, 1994. *Veterans' Health Care: Most Care Provided Through Non-VA Programs*, GAO/HEHS-94-104BR, Washington, DC, April.

U.S. General Accounting Office, 1994. *Veterans' Health Care: Use of VA Services by Medicare-Eligible Veterans*, GAO/HEHS-95-13, Washington, DC, Oct.

U.S. General Accounting Office, 1996. *Statement – VA Health Care: Efforts to Improve Veterans' Access to Primary Care Services*, GAO/T-HEHS-96-134, Washington, DC.

U.S. General Accounting Office, 1998. *VA Health Care: More Veterans Are Being Served, But Better Oversight is Needed,* GAO/HEHS-98-226, Washington, DC, August.

U.S. General Accounting Office, 1999. *Veterans' Affairs: Progress and Challenges in Transforming Health Care,* GAO/T-HEHS-99-109, Washington, DC, April 15.

U.S. General Accounting Office, 1999. *VA Health Care: Progress and Challenges in Providing Care to Veterans*, GAO/T-HEHS-99-158, Washington, DC, July 15.

U.S. General Accounting Office, 2002. *VA Health Care: Allocation Changes Would Better Align Resources with Workload*, GAO-02-338, Washington, DC, Feb. 28.

U.S. General Accounting Office, 2002. *VA Health Care: Changes Needed to Improve Resource Allocation to Health Care Networks,* GAO-02-744T, Washington, DC, May. 14.

U.S. General Accounting Office, 2002. *VA Health Care: Expanded Eligibility Has Increased Outpatient Pharmacy Use and Expenditures,* GAO-03-161, Washington, DC, Nov. 8.

"VA Plans to Give Priority in Appointments to Disabled." *New York Times.* 4 September 2002, late ed.: A18.

VIReC Research User Guide: FY2002 VHA Medical SAS Inpatient Datasets. Veterans Affairs Information Resource Center. Edward J. Hines Jr. VA Hospital, Hines IL. January 2003.

VIReC Research User Guide: FY2002 VHA Medical SAS Outpatient Datasets. Veterans Affairs Information Resource Center. Edward J. Hines Jr. VA Hospital, Hines IL. January 2003.

VIReC Research User Guide: FY2000 VHA Medical SAS Inpatient Datasets. Veterans Affairs Information Resource Center. Edward J. Hines Jr. VA Hospital, Hines IL. September 2001.

VIReC Research User Guide: FY2000 VHA Medical SAS Outpatient Datasets. Veterans Affairs Information Resource Center. Edward J. Hines Jr. VA Hospital, Hines IL. September 2001.

VIReC Research User Guide: FY1999 VHA Medical SAS Inpatient Datasets. Veterans Affairs Information Resource Center. Edward J. Hines Jr. VA Hospital, Hines IL. May 2000.

VIReC Research User Guide: FY1999 VHA Medical SAS Outpatient Datasets. Veterans Affairs Information Resource Center. Edward J. Hines Jr. VA Hospital, Hines IL. May 2000.

Weiner, Joshua M. et al., 1990. "Measuring the Activities of Daily Living: Comparisons Across National Surveys." *Journal of Gerontology*. 45(6) S229-237.

Wright, Steven M., Jennifer Daly, Elliott S. Fisher and George E. Thibault, 1997. "Where Do Elderly Veterans Obtain Care for Acute Myocardial Infarction: Department of Veterans Affairs or Medicare?" *Health Services Research*, 31(6), 739-754.

TABLE 1. SUMMARY STATISTICS, NHIS 1992-2001
(Sample Restricted to Males age 25+)

	Veterans		Non-Veterans	
	Pre (N=43218)	**Post (N=28388)**	**Pre (N=89047)**	**Post (N=88329)**
Age	55.452 (14.049)	57.928 (14.692)	43.190 (14.5583)	44.010 (13.725)
Hispanic	.044	.065	.132	.221
Black	.102	.109	.117	.116
Married	.801	.738	.741	.690
Years Education	12.928 (2.783)	13.081 (2.601)	12.629 (3.538)	12.562 (3.485)
Employed	.611	.564	.787	.803
Midwest	.249	.235	.238	.214
South	.337	.369	.327	.350
West	.220	.218	.228	.252
Northeast	.193	.177	.206	.184
MSA	.762	.777	.790	.817
Income $0-$4999	.010	.012	.018	.016
Income $5000-$9999	.037	.023	.045	.029
Income $10000-$14999	.061	.038	.065	.039
Income $15000-$19999	.079	.043	.074	.041
Income $20000-$24999	.082	.055	.075	.049
Income $25000-$34999	.147	.104	.137	.090
Income $35000-$44999	.121	.091	.115	.081

TABLE 1. SUMMARY STATISTICS, NHIS Cont.

	Veterans		Non-Veterans	
	Pre (N=43218)	**Post (N=28388)**	**Pre (N=89047)**	**Post (N=88329)**
Income $45000+	.300	.367	.291	.363
Health (=0 if poor, 1 if fair, 2 if good, 3 if very good, 4 if excellent)	2.641 (1.164)	2.587 (1.119)	2.839 (1.117)	2.842 (1.061)
Hospital Nights Last Year	1.112 (6.636)	1.096 (6.590)	.552 (3.958)	.492 (4.292)
Hospital Stays Last Year	.156 (.540)	.187 (.892)	.088 (.410)	.090 (.480)
Doctor Visit Last Year?	.767	.844	.670	.718
#Doctor Visits Past 2 Weeks	.285 (.890)	.366 (1.240)	.190 (.750)	.201 (.941)
Limited in Ability To Work	.179	.168	.135	.095
Need Help With Personal Care	.047	.045	.039	.027
Limited in Any Way	.244	.219	.167	.120
Private Health Insurance	.799	.742	.733	.696
No Health Insurance	.175	.138	.262	.217
Medicare	.321	.359	.121	.104
Medicare Part B (Conditional on Medicare Eligibility)	.964	.939	.968	.937

Table 2. Effects of VA Coverage Expansion on Other Forms of Health Insurance (Probit)

	(1) Private Coverage	(2) No Outside Coverage	(3) Medicare Part B	(4) Medicaid	(5) Other Public
Post x veteran	**-0.04863****	**0.00697***	**-0.00189**	**0.00146**	**0.00071**
	(0.00336)	**(0.00307)**	**(0.00436)**	**(0.00191)**	**(0.00059)**
veteran	0.01321	0.00659	-0.00983	-0.00481**	-0.00062
	(0.01934)	(0.00673)	(0.00601)	(0.00161)	(0.00079)
years education	0.02509**	-0.01488**	-0.00020	-0.00206**	-0.00012**
	(0.00103)	(0.00111)	(0.00037)	(0.00008)	(0.00005)
Employed	0.23777**	-0.04332**	-0.02360**	-0.06690**	-0.00538**
	(0.01050)	(0.00555)	(0.00494)	(0.00233)	(0.00060)
Midwest	0.03252**	-0.01038+	0.01805**	-0.00488**	-0.00117*
	(0.00519)	(0.00582)	(0.00616)	(0.00071)	(0.00052)
South	-0.05047**	0.05741**	0.01954**	-0.00720**	-0.00090+
	(0.00797)	(0.00751)	(0.00387)	(0.00049)	(0.00047)
West	-0.06699**	0.04643**	0.01833**	0.00114	0.00055
	(0.00810)	(0.00612)	(0.00553)	(0.00093)	(0.00066)
Urban	0.00921*	-0.00161	-0.00685**	-0.00196**	-0.00055
	(0.00361)	(0.00261)	(0.00258)	(0.00059)	(0.00053)
hispanic	-0.13504**	0.11958**	-0.00908	0.00215**	-0.00110**
	(0.00773)	(0.00921)	(0.00671)	(0.00061)	(0.00033)
Black	-0.07772**	0.04614**	-0.01645*	0.00810**	0.00010
	(0.00312)	(0.00279)	(0.00676)	(0.00098)	(0.00051)
Married	0.12343**	-0.08929**	0.01256**	-0.00652**	-0.00057*
	(0.00397)	(0.00671)	(0.00409)	(0.00029)	(0.00027)
Observations	219014	227790	18208	219181	219078

Results from estimating equation (1) with Probit regressions.
Dependent variables are indicators for various sources of insurance coverage.
Coefficients are probit marginal effects.
Robust standard errors in parentheses are clustered on veteran and year.
Controls also include year, age and income group dummies, age group*veteran interaction terms and a constant

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 3. Effects of VA Reforms on Health Care Utilization

	(1) Hospital Nights (OLS)	(2) Hospital Stays (OLS)	(3) Dr. Visit in Past Yr. (Probit)	(4) Number Dr. Visits Last 2 Wks (OLS)	(5) Dr. Visit Last 2 Weeks (Probit)
Post x veteran	**-0.09921+**	**0.01191***	**0.03106****	**0.03966****	**0.01423****
	(0.04990)	**(0.00424)**	**(0.00644)**	**(0.00425)**	**(0.00224)**
veteran	0.12845*	-0.00129	0.04120**	0.00405	0.01726**
	(0.04395)	(0.00675)	(0.00740)	(0.01102)	(0.00567)
years education	-0.01770**	-0.00172**	0.01075**	0.00436**	0.00268**
	(0.00490)	(0.00037)	(0.00064)	(0.00078)	(0.00023)
Employed	-1.34508**	-0.15975**	-0.09372**	-0.22679**	-0.08269**
	(0.06329)	(0.00739)	(0.00366)	(0.01180)	(0.00328)
Midwest	-0.05659+	0.00562*	-0.02900**	-0.00898	-0.00537+
	(0.02972)	(0.00258)	(0.00435)	(0.00682)	(0.00281)
South	-0.02998	0.01296**	-0.03325**	-0.01126	-0.00725**
	(0.03368)	(0.00332)	(0.00403)	(0.00767)	(0.00278)
West	-0.19408**	-0.01449**	-0.03305**	-0.00494	-0.00310
	(0.03511)	(0.00300)	(0.00724)	(0.01030)	(0.00328)
Urban	0.01579	-0.01025**	0.01281**	0.02335**	0.00853**
	(0.02124)	(0.00268)	(0.00376)	(0.00592)	(0.00158)
Hispanic	-0.07849**	-0.01858**	-0.06397**	-0.03257**	-0.02625**
	(0.02190)	(0.00274)	(0.00421)	(0.00808)	(0.00252)
Black	0.15903**	0.00138	0.01148**	-0.00997	-0.00849**
	(0.03029)	(0.00307)	(0.00289)	(0.00633)	(0.00199)
Married	-0.13149**	-0.00456+	0.04741**	-0.01763*	-0.00321
	(0.03086)	(0.00243)	(0.00470)	(0.00630)	(0.00208)
Observations	241550	241615	176195	241648	241650

Results are from estimating Equation (1). OLS coefficients are reported in columns (1), (2) and (4).
Probit coefficients in columns (3) and (5) are marginal effects.
Dependent variables are measures of health care utilization.
Robust standard errors in parentheses are clustered on veteran and year.
Controls also include year, age and income group dummies, age group*veteran interaction terms and a constant

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 4. Effects of VA Reforms on Health Outcomes

	(1)	(2)	(3)	(4)
	Needs Help Personal Care (Probit)	Limited in Ability to Work (Probit)	Limited Any Way (Probit)	Health Excell./Very Good (Probit)
Post x veteran	**0.00081**	**0.00716****	**0.02092****	**-0.02212****
	(0.00072)	**(0.00161)**	**(0.00205)**	**(0.00199)**
veteran	-0.00654**	0.00275	0.00336	0.03717**
	(0.00179)	(0.00420)	(0.00492)	(0.00942)
years education	-0.00128**	-0.00611**	-0.00667**	0.02606**
	(0.00008)	(0.00019)	(0.00016)	(0.00054)
Employed	-0.08088**	-0.27913**	-0.27555**	0.21792**
	(0.00195)	(0.01554)	(0.01262)	(0.00549)
Midwest	0.00387**	0.01217**	0.01859**	-0.01301**
	(0.00073)	(0.00264)	(0.00355)	(0.00285)
South	0.00348**	0.01543**	0.01980**	-0.03151**
	(0.00069)	(0.00311)	(0.00424)	(0.00458)
West	0.00318**	0.01660**	0.02537**	-0.01704**
	(0.00082)	(0.00393)	(0.00466)	(0.00540)
Urban	0.00069*	-0.00920**	-0.01577**	0.02658**
	(0.00031)	(0.00301)	(0.00354)	(0.00405)
Hispanic	-0.00503**	-0.04517**	-0.05445**	-0.02361**
	(0.00050)	(0.00174)	(0.00286)	(0.00441)
Black	0.00045	-0.01463**	-0.01396**	-0.08142**
	(0.00066)	(0.00249)	(0.00246)	(0.00436)
Married	-0.00754**	-0.03608**	-0.04210**	0.03035**
	(0.00099)	(0.00270)	(0.00377)	(0.00418)
Observations	241650	214890	241650	241650

Results from estimating equation (1) with Probit regressions.
Coefficients are probit marginal effects
Robust standard errors in parentheses are clustered on veteran and year.
Controls also include year, age and income group dummies , age group*veteran interaction terms and a constant.

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 5a. Falsification Tests: Utilization ("pre"= '91-'92, "post"='93-'94)

	(1) Hospital Nights (OLS)	(2) Hospital Stays (OLS)	(3) Dr. Visit in Past Yr.? (Probit)	(4) # Dr. Visits Last 2 Wks (OLS)	(5) Dr. Visit Last 2 Weeks? (Probit)
"post" x veteran	-0.05991	-0.00315*	0.00841+	0.00774	0.00544**
	(0.05382)	(0.00103)	(0.00441)	(0.00709)	(0.00105)
Observations	135443	135443	133321	135443	135443

Results from estimating equation (1) on 1991-1994 sample with "post" redefined as 1993-1994 and "pre" redefined as 1991-1992.
OLS coefficients are reported in columns (1), (2) and (4).
Probit coefficients in columns (3) and (5) are marginal effects.
Robust standard errors in parentheses are clustered on veteran and year.
Controls also include year, age and income group dummies, an age group*veteran interaction terms and a constant.

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 5b. Falsification Tests: Health Outcomes ("pre"= '91-'92, "post"='93-'94)

	(1) Needs Help Personal Care (Probit)	(2) Limited in Ability to Work (Probit)	(3) Limited Any Way (Probit)	(4) Health Excell./Very Good (Probit)
"post" x veteran	-0.00206**	-0.00237	-0.00714**	0.01052+
	(0.00032)	(0.00199)	(0.00182)	(0.00552)
Observations	135443	120234	135443	135443

Results from estimating equation (1) on 1991-1994 sample with "post" redefined as 1993-1994 and "pre" redefined as 1991-1992.
OLS coefficients are reported in columns (1), (2) and (4).
Probit coefficients in columns (3) and (5) are marginal effects.
Robust standard errors in parentheses are clustered on veteran and year.
Controls also include year, age and income group dummies, an age group*veteran interaction terms and a constant.

+ significant at 10%; * significant at 5%; ** significant at 1%

Figure 1. Predicted Health Difference, Vet vs. Nonvet, Same Average Characteristics

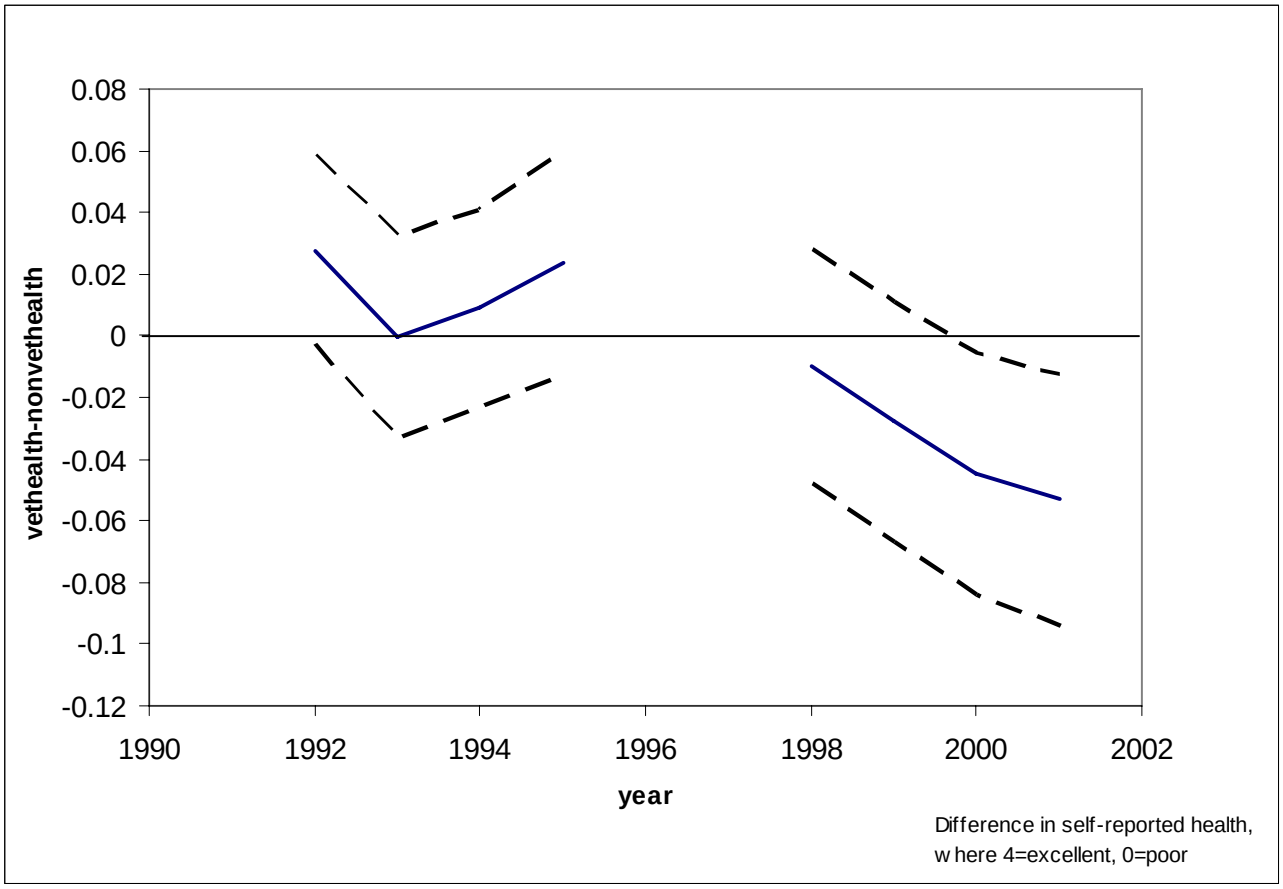

Table 6a. Effects on Expected Newly Eligibles

	(1)	(2)	(3)	(4)	(5)	(6)
	Hospital Nights (OLS)	Hospital Stays (OLS)	Dr. Visit in Past Yr.? (Probit)	# Dr. Visits Last 2 Wks (OLS)	Dr. Visit Last 2 Weeks? (Probit)	Health Excell./Very Good (Probit)
Post x veteran	0.00996	0.00952**	0.01970*	0.02679**	0.01082**	-0.01339**
	(0.01568)	(0.00284)	(0.00811)	(0.00360)	(0.00191)	(0.00344)
Observations	125840	125843	92539	125843	125843	125843

Results are from estimating Equation (1) for the non-poor, non-disabled portion of the sample.
OLS coefficients are reported in columns (1), (2) and (4).
Probit coefficients in columns (3) and (5) are marginal effects.
Dependent variables are measures of health care utilization.
Robust standard errors in parentheses are clustered on veteran and year.
Controls also include year, age and income group dummies, age group*veteran interaction terms and a constant

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 6b. Effects on Expected Previously Eligibles

	(1)	(2)	(3)	(4)	(5)	(6)
	Hospital Nights (OLS)	Hospital Stays (OLS)	Dr. Visit in Past Yr.? (Probit)	# Dr. Visits Last 2 Wks(OLS)	Dr. Visit Last 2 Weeks?(Probit)	Health Excell./Very Good,(Probit)
Post x veteran	-0.22490*	0.01173	0.04421**	0.05154**	0.01867**	-0.02786**
	(0.10264)	(0.00938)	(0.00837)	(0.00973)	(0.00445)	(0.00572)
Observations	115710	115772	83656	115805	115807	115807
Joint Sig?	Yes	No	Yes	Yes	No	No

Results are from estimating Equation (1) for the poor and/or disabled portion of the sample.
OLS coefficients are reported in columns (1), (2) and (4).
Probit coefficients in columns (3) and (5) are marginal effects.
Dependent variables are measures of health care utilization.
Robust standard errors in parentheses are clustered on veteran and year.
Controls also include year, age and income group dummies, age group*veteran interaction terms and a constant

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 7a. Mean Number of Treatments in a Region-Year

Pre-1997		Post-1997	
Hospital Nights 1-6	Hospital Nights 7	Hospital Nights 1-6	Hospital Nights 7
444,752	9,853	226,955	10,898
(232,164)	(6,899)	(85,964)	(4,223)
Surgeries 1-6	Surgeries 7	Surgeries 1-6	Surgeries 7
13,879	315	7,757	529
(7,127)	(203)	(2,659)	(230)
IP Procedures 1-6	IP Procedures 7	IP Procedures 1-6	IP Procedures 7
58,384	1,308	49,741	2,772
(40,294)	(1,040)	(18,020)	(1,133)
Discharges 1-6	Discharges 7	Discharges 1-6	Discharges 7
32,019	685	23,427	1,296
(16,932)	(445)	(7,407)	(518)
Clinic Visits 1-6	Clinic Visits 7	Clinic Visits 1-6	Clinic Visits 7
663,959	20,269	5,214,600	546,784
(514,274)	(21,056)	(2,100,890)	(273,391)
Contacts 1-6	Contacts 7	Contacts 1-6	Contacts 7
695,900	21,032	5,232,077	554,030
(524,492)	(21,439)	(2,105,674)	(276,005)

Table 7b. Mean Number of Treatments Per Pop. 1-6 In A Region-Year

Pre-1997		Post-1997	
Hospital Nights 1-6/Pop 1-6	Hospital Nights 7/Pop 1-6	Hospital Nights 1-6/Pop 1-6	Hospital Nights 7/Pop 1-6
0.9940	0.0246	0.5050	0.0266
(0.5001)	(0.0207)	(0.1665)	(0.0106)
Surgeries 1-6/Pop 1-6	Surgeries 7/Pop 1-6	Surgeries 1-6/Pop 1-6	Surgeries 7/Pop 1-6
0.0304	0.0007	0.0172	0.0013
(0.0126)	(0.0005)	(0.0048)	(0.0006)
IP Procs 1-6/ Pop 1-6	IP Procs 7/ Pop 1-6	IP Procs 1-6/ Pop 1-6	IP Procs 7/ Pop 1-6
0.1343	0.0033	0.1171	0.0071
(0.0975)	(0.0030)	(0.0565)	(0.0038)
Discharges 1-6/Pop 1-6	Discharges 7/Pop 1-6	Discharges 1-6/Pop 1-6	Discharges 7/Pop 1-6
0.0711	0.0016	0.0522	0.0031
(0.0345)	(0.0011)	(0.0127)	(0.0013)
Clinic Visits 1-6/Pop 1-6	Clinic Visits 7/Pop 1-6	Clinic Visits 1-6/Pop 1-6	Clinic Visits 7/Pop 1-6
1.4771	0.0490	11.5125	1.3161
(1.0255)	(0.0510)	(3.3497)	(0.6643)
Contacts 1-6/Pop 1-6	Contacts 7/Pop 1-6	Contacts 1-6/Pop 1-6	Contacts 7/Pop 1-6
1.5481	0.0509	11.5511	1.3341
(1.0441)	(0.0520)	(3.3560)	(0.6720)

Table 8. OLS: Dependent Variables = Services to Priorities 1-6/Pop1-6

	(1) Discharges	(2) Hospital Nights	(3) Inpatient Procedures	(4) Surgeries	(5) Clinic Visits	(6) Total Contacts
(Contacts7/ pop1-6)*post	-0.016** (0.001)	-0.321** (0.031)	-0.011 (0.007)	-0.007** (0.001)	3.766** (0.643)	3.741** (0.642)
Observations	189	189	189	189	189	189

Results from estimating equation (3) by OLS.
Dependent variables are VISN-level measures of the number of services provided to priority 1-6 veterans divided by the CPS estimate of the total population of 1-6 veterans in the VISN.
Robust standard errors in parentheses are clustered on VISN pre and post.
Regressions also include year and VISN fixed effects and age group controls and a constant.

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 9. First Stage

	(1) (Contacts7/pop1-6)*post	(2) (Contacts7/pop1-6)*post
(pop7/pop1-6)*post	0.428** (0.162)	
(pop7+Mcare/pop1-6)*post		1.757** (0.437)
Observations	189	189
R-squared	0.91	0.92

Dependent variables are VISN-level measures of the total number of contacts (office visits + hospital stays) provided to group 7 veterans relative to the group 1-6 population in the VISN, interacted with the post dummy.
Regressions also include year and VISN fixed effects and age group controls and a constant.

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 10. 2SLS: Dependent variables = Services to Priorities 1-6/Pop 1-6

10a. Instrument: (pop7/pop1-6)*post

	(1) Discharges	(2) Hospital Nights	(3) Inpatient Procedures	(4) Surgeries	(5) Clinic Visits	(6) Total Contacts
(Contacts7/ pop1-6)xpost	0.002	-0.194	0.065	0.012	8.724*	8.698*
	(0.012)	(0.170)	(0.074)	(0.013)	(3.783)	(3.780)
Observations	189	189	189	189	189	189

Results from estimating equation (3) by 2SLS.
Instrument is VISN ratio of total population of group 7 veterans to total population of group 1-6 veterans, interacted with the post dummy.
Dependent variables are VISN-level measures of the number of services provided to priority 1-6 veterans divided by the CPS estimate of the total population of 1-6 veterans in the VISN.
Robust standard errors in parentheses clustered on VISN pre and post
Regressions also include year and VISN fixed effects and age group controls and a constant

+ significant at 10%; * significant at 5%; ** significant at 1%

10b. Instrument: (pop7+Mcare/pop1-6)*post

	(1) Discharges	(2) Hospital Nights	(3) Inpatient Procedures	(4) Surgeries	(5) Clinic Visits	(6) Total Contacts
(Contacts7/ pop1-6)xpost	0.004	-0.290**	0.029	0.010	4.344*	4.329*
	(0.009)	(0.098)	(0.038)	(0.008)	(1.784)	(1.777)
Observations	189	189	189	189	189	189

Results from estimating equation (3) by 2SLS.
Instrument is VISN ratio of population of Medicare-eligible group 7 veterans to total population of group 1-6 veterans, interacted with the post dummy.
Dependent variables are VISN-level measures of the number of services provided to priority 1-6 veterans divided by the CPS estimate of the total population of 1-6 veterans in the VISN.
Robust standard errors in parentheses clustered on VISN pre and post
Regressions also include year and VISN fixed effects and age group controls and a constant

+ significant at 10%; * significant at 5%; ** significant at 1%