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Federal Policy and the Rise in Disability Enrollment: Evidence for the VA's Disability Compensation Program

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ABSTRACT

The U.S. Department of Veterans' Affairs (VA) currently provides disability benefits to 2.72 million veterans of U.S. military service through the Disability Compensation (DC) program. Until recently, the medical eligibility criteria for this program were the same across service eras, with the key condition being that the disability was caused or aggravated by military service. But in July of 2001, the VA relaxed the eligibility criteria for Vietnam veterans by including diabetes in the list of conditions covered by DC. This change was motivated by an Institute of Medicine report, which linked exposure to Agent Orange and other herbicides used by the U.S. military in Vietnam, to the onset of diabetes. In this paper, we investigate the impact of this policy change on DC enrollment, expenditures, and the sensitivity of the program to economic conditions. Our findings demonstrate that the Agent Orange decision increased DC enrollment by 7.6 percentage points among Vietnam veterans and that an additional 3.3 percent enjoyed an increase in their DC benefits. Our estimates further suggest that the policy change increased program expenditures by $2.69 billion during the 2006 fiscal year and by $45 billion in present value terms. After the policy took effect, we find that the sensitivity of the program to local economic conditions increased substantially. Taken together, our results suggest that even relatively narrow changes in the medical eligibility criteria for federal disability programs can have a powerful effect on program enrollment and expenditures.

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I. Introduction

In August of 2006, the U.S. Department of Veterans' Affairs (VA) provided cash benefits to more than 11 percent of the nation's 24 million military veterans through the Disability Compensation (DC) program. Total program enrollment in that month was 2.72 million and expenditures for the 2006 fiscal year were approximately $25 billion. To qualify for DC benefits, a veteran must have one or more disabilities that were caused or aggravated by his military service. The DC recipient then receives a monthly cash benefit along with essentially free medical care for the treatment of their disabilities through the Veterans Health Administration.

Until recently, the medical eligibility criteria for DC benefits have been essentially the same for veterans from all service eras. The key requirement was that a disability must have been caused or aggravated by military service. Thus individuals rarely qualified for DC because of conditions such as cancer and diabetes that first affected people long after their period of military service and for which service-connectedness would be difficult to prove. However in October of 2000 the National Institute of Medicine issued a report that linked exposure to Agent Orange, an herbicide used by the U.S. military in Vietnam, to the onset of diabetes. In July of 2001, the VA responded to this report by adding diabetes to the list of conditions for which a veteran who served in Vietnam during the war could qualify for DC benefits. There was no corresponding change for veterans from other eras.

In this paper we aim to estimate the impact of this policy change on DC enrollment, expenditures, and the sensitivity of the program to local economic conditions. Many previous authors have investigated these same types of issues for Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI), the federal government's two other major disability programs (Autor and Duggan, 2003; Black, Daniel, and Sanders, 2002). However, virtually no previous work has investigated the causes or consequences of DC enrollment.[1]

[1] In Bound and Burkhauser's 1999 *Handbook of Labor Economics* chapter on disability programs, 44 papers focus on SSDI, 17 consider SSI, and just 1 study examines DC. The one that considers DC is a descriptive paper that

As Figure 1 demonstrates, the 2001 policy change coincided with a sharp break in trend in DC enrollment. From 1996 to 2001, the number of DC beneficiaries grew by just 0.6 percent per year. But during the next five years, the annual growth rate was five times greater at 3.3 percent. Of course, other factors may have been at least partly responsible for this break in trend. We therefore use veterans from peacetime eras, almost all of whom served shortly before or after the Vietnam era, as our comparison group to estimate the effect of the policy. While this group of veterans is clearly not a perfect control group, they had mortality rates and trends in DC enrollment that were quite similar to those for Vietnam-era veterans prior to the policy change as shown in Figure 2.

Using aggregate data by service era in each year, our difference-in-differences estimates suggest that the expansion of the DC program's eligibility criteria increased the number of Vietnam veterans on the program in September of 2006 by 175,000 over what it would otherwise have been. This increase represents 2.3 percent of all Vietnam-era veterans and 7.6 percent of those who actually served in Vietnam during the conflict there, as the policy change applied only to this latter group.

An additional possible effect of the Agent Orange decision was that Vietnam veterans already on the program could increase their monthly benefits if they were found to have diabetes. The DC program pays benefits that are an increasing function of the recipient's combined disability rating (CDR). The CDR depends on the ratings for all of a recipient's rated disabilities, and thus a recipient who could obtain a rating for another condition would typically experience an increase in monthly benefits. Our results suggest that approximately 75,000 Vietnam veterans qualified for an increase in their benefits because of the 2001 policy change. Combined with the effect on enrollment, this suggests that 10.9 percent of the veterans who served in Vietnam and were still alive in 2006 experienced an increase in their DC benefits or became eligible for the program because of the less stringent medical eligibility criteria.

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compares the economic well-being of individuals who receive SSDI, SSI, DC, or Workers' Compensation benefits (Burkhauser and Daly, 1999) in the U.S. with those who receive disability benefits in Germany.

We next investigate the effect of the change in the DC program's medical eligibility criteria on short and long-term expenditures for the program. To do this we estimate the impact of the policy change on the number of Vietnam-era DC recipients with each of the eleven possible CDRs, and then multiply this by average monthly benefits within each CDR. This algorithm captures the effect due to the increase in the number of recipients as well as the increase in benefits for some existing DC recipients. Our estimates suggest that DC expenditures during the 2006 fiscal year were $2.69 billion higher than they would have been in the absence of the Agent Orange decision. Aggregating the effect across all years, our estimates suggest that the present value of Disability Compensation spending increased by more than $45 billion as a result of the policy change.

In our final empirical section, we explore whether the change in the DC program's medical eligibility criteria influenced the sensitivity of the program to local economic conditions. A large literature has explored this issue for other government programs, including AFDC/TANF (Hoynes, 2000; Blank, 2001), Medicaid (Cromwell et al, 1986), food stamps (Ziliak et al, 2003), SSDI (Autor-Duggan, 2003), and SSI (Black, Daniel, and Sanders, 2002; Rupp and Stapleton, 1998). The likelihood of such a link for the DC program is not as clear as for these other programs given that DC benefits are not means-tested and thus the number eligible for the program does not increase as economic conditions deteriorate. Despite this, it is still plausible given that the demand for new sources of income is likely to be greater among those who are out of work or have low earnings.

Our findings demonstrate that DC expenditures did increase much more rapidly in high unemployment areas following the policy change. We detect no corresponding relationship between DC expenditure growth and this measure of economic conditions just prior to the policy change. This result is robust to the inclusion of pre-existing trends in DC expenditures and is driven by spending on Vietnam-era veterans. It therefore appears that the liberalization of the program's medical eligibility criteria made spending for this one category of veterans more sensitive to local economic conditions but there is no corresponding change for their counterparts from other eras.

Taken together, our findings for the VA's Disability Compensation program suggest that changes in the medical eligibility criteria for disability programs can have a substantial impact on program enrollment and expenditures as well as on the responsiveness of the programs to economic conditions. These findings are consistent with the results from recent research on other federal disability programs such as SSDI (Autor and Duggan, 2003). But the main contribution of our study relative to work for other disability programs is that, because the change to DC applied only to Vietnam veterans, we can use other veterans as a comparison group to obtain a more reliable estimate of the policy impact. Changes to the SSDI and SSI programs have applied equally to essentially all potential applicants of those programs, and it has therefore been difficult to disentangle the effect of changes to these programs from the effect of other factors such as macroeconomic conditions.

II. The Department of Veterans Affairs and the Disability Compensation Program

The U.S. Department of Veterans Affairs (VA) provides benefits to veterans of military service and their families. At the end of the 2006 fiscal year, the VA estimated that there were 24 million veterans residing in the U.S. and that an additional 45 million were potentially eligible for VA benefits as family members or survivors of veterans. According to VA estimates, the number of living veterans fell by almost 10 percent from September of 2000 to September of 2006.[2]

As Table 1 demonstrates, this change in the veteran population has been associated with a substantial change in its composition, both because of mortality among veterans from earlier eras and because of entry by those serving during the Gulf War era. Most strikingly, the number of veterans from the World War II era declined by 44 percent (from 5.59 to 3.15 million) during this six-year period while the number of veterans from the Gulf War era increased by 51 percent (from 2.84 to 4.30 million). Veterans from the Vietnam era were the largest group in both years, with their ranks

[2] The data on dependents and population were obtained from the VA's website at http://www.va.gov/about_va/ and http://www.va.gov/vetdata/demographics/Vetpop2004/VP2004B.htm, respectively.

declining from 8.01 to 7.63 million but their share of all veterans increasing from 30 to 32 percent.[3]

It is worth noting that, while veterans are categorized based on their period of service, the number serving in specific conflicts tend to be much lower than the era-specific population data would suggest. For example, a recent estimate by the VA suggests that just 2.3 million of the 7.7 million Vietnam-era veterans alive in 2005 actually served in Vietnam.

A. VA Programs and Expenditures

Despite the significant decline in the veteran population since 2000, total VA expenditures have increased by an average of 6 percent per year during the same period. Table 2 lists total VA spending by category for the 1998 through 2005 fiscal years. As Table 2 shows, Compensation and Pension (CP) was the largest category of spending throughout this period, with the $32.1 billion in CP program benefits representing 46 percent of total spending by the VA during the 2005 fiscal year. The Veterans Health Administration (VHA) provided medical care to 4.96 million patients during this same year at a cost of $30.7 billion. The remaining $7.5 billion in VA spending was spread across several categories, including operating expenses, construction, insurance, housing assistance, vocational rehabilitation, training programs, and burial and memorial benefits.

CP benefits are paid through four main programs. The largest in terms of both enrollment and expenditures is the Disability Compensation program, which according to the data displayed in Tables 3A and 3B, accounted for 75 percent of CP enrollment and 74 percent of expenditures, respectively, during the 2005 fiscal year. The DC program pays benefits to disabled veterans of military service whose conditions were caused or aggravated by their military service. The program is not means-tested and an individual's DC benefits are not directly affected by his earnings. This is in contrast to the SSDI and SSI programs, which substantially reduce recipients' incentives to work.

[3] According to the VBA's 2004 *Annual Benefits Report*, the approximate service dates by era were: World War II (September 1940 – July 1947), Korea (June 1950 – January 1955), Vietnam (August 1964 – May 1975), and Gulf War (August 1990 – present). Peacetime includes veterans who served during all other periods. These population estimates assign veterans who served in two or more eras to their earliest era of service. However a veteran who served during a conflict and during peacetime would always be assigned to the conflict.

The Disability Pension (DP) program is targeted at low-income wartime veterans who either are age 65 or older or are permanently and totally disabled (regardless of service-connectedness). This program accounted for just 10 percent of CP enrollment and 9 percent of CP spending during the 2005 fiscal year. Beneficiaries of both the DC and DP programs are eligible for health care through the VHA and their expenditures accounted for much of the $30.7 billion in VHA spending during this same year.[4] The VA also paid $4.5 billion in cash benefits to the survivors of 0.54 million deceased veterans through the Death Compensation and Death Pension programs.

B. The Disability Compensation Program

To apply for Disability Compensation benefits, a veteran must submit an application at one of 63 regional offices of the Veterans Benefit Administration (VBA). At this stage, the 'authorization unit' collects necessary information regarding the claimant's application. These would include military service records and medical records from both VA medical facilities and private providers. The application is then forwarded to a Rating Board, which determines whether each disability for which an application is submitted is service connected and assigns an appropriate degree of disability according to the Schedule for Rating Disabilities. These ratings range from 0 to 100 percent (in 10 percent increments) depending on the type and severity of the disability, with more severe conditions receiving a higher rating.[5] The recipient's combined disability rating (CDR) is a function of the individual ratings. If the award is made for just one condition then the CDR is equal to the rating for that condition. If the award is made for multiple conditions then the CDR is generally greater than any of the individual ratings, though the CDR is not simply a sum of the remaining ratings.[6]

If a DC award is made, the CDR is used to determine the monthly cash benefit amount,

[4] The VHA provides care to other veterans as well, with 4.96 million served by the VHA during the 2004 fiscal year.
[5] The possible ratings depend on the disability. For example type II diabetes can have ratings of 10, 20, 40, 60, or 100 percent, whereas arthritis can only be assigned a rating of 10 or 20 percent. For a list of conditions and possible ratings see http://www.warms.vba.va.gov/bookc.html.
[6] If a claimant has multiple disabilities, only the claimant's residual ability is considered when determining the impact of the next disability considered. For example, if a veteran has two disabilities rated at 50%, then only 50% of his ability is considered when determining the impact of the second disability. Therefore, his CDR would be 80%; the sum of 50% for the first and 25% for the second (.5*(1-.5)) rounded to the nearest increment of 10%.

which is an increasing function of this rating.[7] The monthly benefit can increase beyond this base for DC recipients with a CDR of 30 percent or more and who have dependent spouses, children, or parents. The benefit can also increase for those with ratings of 60 percent or more and who are deemed unemployable. The second column of Table 4 lists the baseline monthly benefit amounts for the 2006 fiscal year by disability rating. As the table shows, benefit amounts increase with the CDR and the dollar increment from one category to the next also increases with the CDR. For example the monthly payment rates for ratings of 10, 40, 70, and 100 percent are $112, $485, $1099, and $2393, respectively. The next three columns in the table show the adjustments to these baseline amounts if the veteran has one or more dependents.

The first three columns of Table 5 list the total number of recipients, the total benefits paid, and the average monthly benefit in each CDR category in June of 2006 (the most recent month available). The average payment to the 2.70 million DC recipients in that month was $780 for a total of $2.11 billion in cash benefits. Those with ratings between 0 and 20 percent accounted for 45 percent of recipients but just 9 percent of dollars paid. The corresponding shares for those with ratings at or above 70 percent were 21 and 62 percent, respectively.[8]

As the next several columns of this table demonstrate, there was considerable variation across service eras in the distribution of the combined disability rating.[9] For example, among Vietnam era DC recipients, 32 percent had CDRs of 70 percent or more. The corresponding share for DC recipients who incurred their disabilities during the Gulf War era was just 13 percent. Because of this, average monthly benefits also varied widely by service era, from a low of $578 for Gulf War veterans to a high of $1029 for veterans serving in Vietnam.

[7] The VBA considers the average reduction in earnings capacity to determine the benefit amount associated with each value of the CDR.
[8] The average amounts for those rated 60 percent and higher are much greater than the baseline amounts because many of these recipients are eligible for the 100 percent payment amount because they are deemed unemployable.
[9] DC recipients are assigned to eras based on where their most significant disability occurred. This will introduce some measurement error in our estimates for era-specific DC enrollment rates because the population data are constructed differently, though the importance of this should not change significantly over short periods of time.

C. The DC Program's Medical Eligibility Criteria

In a typical year more than 70 percent of DC applicants apply for benefits for more than one condition. One of three outcomes is possible – outright rejection, an award for some but not all conditions, or an award for all conditions. During the 2000 fiscal year, 14 percent of applications considered were awarded for all conditions, 48 percent for some conditions, and 38 percent were outright rejected (VBA, 2001).[10] During the course of the year a total of 83,159 DC awards were made, with the average number of rated conditions among new recipients equal to 3.2.

Until July of 2001, the medical eligibility criteria for DC benefits were essentially the same across service eras. Any veteran who was honorably discharged and whose disability did not result from his willful misconduct could qualify for DC benefits if his disability "was a result of disease or injury incurred or aggravated during active military service." Many conditions would clearly have resulted from military service. For example if a soldier lost one or more limbs during a battle then there would be no uncertainty about whether the injury was service-connected. The same would also be true for scars, the most commonly compensated condition among DC recipients. The existence of such a causal link for the typical tinnitus (persistent ringing in the ears) or post-traumatic stress disorder application might be somewhat less clear cut, though still certainly plausible.[11]

Proving that such a link existed for a condition such as diabetes would undoubtedly be much more difficult. Indeed a 2000 report by the National Academy of Sciences argued that the most important determinants of diabetes were physical inactivity, family history, and obesity. The report further argued that any increased risk posed by wartime exposure to herbicides appeared to be small or nonexistent (NAS, 2000). Despite this, approximately 1.6 percent of DC recipients had diabetes

[10] These decisions are frequently appealed. Existing DC recipients can also apply for an increase in their benefit amount, either because of an increase in the severity of a rated condition or because a new health problem arises.

[11] A listing of the top twenty impairments at the end of each fiscal year can be found in the VBA's annual report. In September of 2000 more than 12 percent of DC recipients had "scars, other" as one of their qualifying conditions. Next most common were skeletal conditions (10.6 percent), knee impairment (9.8 percent), and arthritis due to trauma (8.0 percent). Tinnitus (6.2 percent) and PTSD (5.8 percent) were the 6th and 9th most common conditions.

as one of their covered conditions in September of 2000. While this share is not trivial, diabetes was not one of the twenty most common conditions among DC recipients at that time, nor was it one of the ten most common conditions for DC recipients from any of the five major service eras.

III. The Institute of Medicine Report on Agent Orange Exposure

While the DC program's medical eligibility criteria were essentially the same for all military veterans up until July of 2001, the types of disabilities incurred undoubtedly varied across service eras. For example, one might expect a significantly higher rate of service-connected post traumatic stress disorder (PTSD) among DC recipients who served in the Vietnam War than among their counterparts from other eras given the intensity of the conflict there. And this was indeed the case, with 13.3 percent of DC recipients from the Vietnam era receiving compensation for PTSD in September of 2000 versus just 2.2 percent of all other DC recipients (VBA, 2001).

Another reason that the disabilities incurred might vary across service areas is that different weapons and techniques were used by the U.S. military and their opponents over time. One notable example of this is the use of herbicides in the Vietnam War. Agent Orange was one of fifteen herbicides used by the U.S. military to defoliate trees that might otherwise provide cover to opposing forces. Although the use of Agent Orange did not begin until 1965, it represented more than 80 percent of the 19 million gallons of herbicides sprayed in Vietnam (VA, 2003).

Soon after the war ended, many Vietnam veterans voiced concerns about the possible long term effects of exposure to Agent Orange and other herbicides used in Vietnam. In response to these concerns, the VA established the Agent Orange Registry in 1978, which provided voluntary medical examinations to veterans who served in Vietnam between 1962 and 1975. Thirteen years later, the Agent Orange Act of 1991 was enacted, which charged the National Academy of Sciences' Institute of Medicine with conducting a review of the existing scientific literature regarding the possibility of a link between Agent Orange exposure and the prevalence of certain medical conditions.

In a series of five reports released between 1994 and 2003, the Institute of Medicine (IOM) grouped forty different medical conditions into one of four categories – (1) sufficient evidence of an association between Agent Orange and the condition (2) limited or suggestive evidence of an association (3) inadequate or insufficient evidence and (4) limited or suggestive evidence of no association. Interestingly, none of the four categories required causal evidence. In the first three reports, diabetes was placed in the third category, with the IOM concluding that there was insufficient evidence to establish an association between dioxin exposure and the onset of diabetes.

But soon after the third IOM report was released in 1999, two new studies were released that provided supporting evidence of an association between dioxin exposure and diabetes (Calvert et. al., 1999; AFHS, 2000). In October of 2000, the IOM evaluated the new studies in the context of previous research and concluded that there was suggestive evidence of an association between Agent Orange exposure and the onset of diabetes (IOM, 2000). This moved diabetes from category three to category two. In response to this report, the Secretary of the VA announced in November of 2000 that type II diabetes would be compensable under the DC program and, more importantly, that diabetes would be "presumptively" service-connected among those veterans who served in Vietnam.[12] Diabetes would not become compensable, however, until July of 2001.

Shortly after this policy change, the growth in total DC enrollment increased substantially, as shown in Figure 1. From September of 1996 to 2001, the number of DC recipients increased by just 0.6 percent per year. But during the next five years the annual growth rate was 3.3 percent, suggesting that the expansion in the eligibility criteria for Vietnam veterans was the main cause.

However this was not the only possible explanation for the increase in the rate of DC enrollment growth. For example, the Veterans Claim Assistance Act, which was enacted in 2000, required the VA to provide more assistance to DC applicants from all eras and to add more resources

[12] No such presumption was made for other Vietnam-era veterans, with the exception of those who served in Korea in either 1968 or 1969 because the U.S. military used herbicides there during this period as well (VA, 2005).

to the processing of DC applications (GAO, 2002). Similarly the economic downturn and the corresponding increase in the unemployment rate may have caused some veterans to seek out alternative sources of income. And finally, the wars in Afghanistan and Iraq may have led to a significant increase in the prevalence of disabilities among veterans serving in these conflicts. In the next two sections we estimate the impact of the policy change on DC enrollment and expenditures while attempting to control for the effects of these and other potentially confounding factors.

IV. The Effect of the Agent Orange Decision on Enrollment in the DC Program

Theoretically, one would expect the Agent Orange decision to have increased the propensity of veterans who served in Vietnam to apply for DC benefits. As Parsons (1980), Bound (1989), and others have noted, a key determinant of an individual's decision to apply for disability benefits is the probability that an award is made. It seems likely that this award probability increased following the July 2001 policy change, especially for Vietnam veterans who knew they had diabetes. But it may also have increased the incentive for other Vietnam veterans. For example, a veteran who thought there was some chance that he had diabetes might go for a medical checkup.[13] This medical checkup could identify other health problems, and thus he could subsequently qualify for the DC program even if he did not have diabetes.

The policy change would also have increased the incentive for existing DC recipients who served in Vietnam to apply for an increase in their monthly benefit. As described above, a veteran's DC benefit is a function of the combined disability rating (CDR), which generally increases when an additional condition is rated at 10 percent or more. Thus the Agent Orange decision could have increased both DC enrollment and the amount of benefits paid to existing DC recipients.

A. Difference-in-Differences Estimates of the Impact on DC Enrollment

[13] According to a CDC report (2003), approximately one third of diabetics in US are undiagnosed. See Singleton (2006) for an analysis of self-reported rates of diagnosed diabetes among veterans and non-veterans in response to the Agent Orange decision.

In its publication titled *Annual Benefits Report*, the Veterans Benefit Administration provides detailed information each year on the characteristics of individuals receiving DC benefits at the end of the previous fiscal year. This information includes the number of DC recipients with certain diagnoses, the number with each of the eleven possible combined disability ratings (0 to 100 percent), the average monthly benefit received, and many other variables of interest. This data is further broken down by service era, which can be used to estimate the impact of the policy change described above on enrollment in the DC program.

Because the Agent Orange decision differentially affected veterans who served in the Vietnam War, one can essentially use veterans from other eras to control for other changes occurring at the same time that might also have affected DC enrollment. For example, the Veterans Claim Assistance Act that was passed in the year 2000 influenced the DC application and award process for veterans from all eras (GAO, 2002). To the extent that this policy, the economic downturn, and other factors did not have a different effect on Vietnam veterans than on veterans from other eras, their effects could be captured by the time effects Θ_t in the following difference-in-differences model:

$$(1) \quad DC_{jt} = \beta_0 + \beta_1 * X_{jt} + \beta_2 * Vietnam_j + \beta_3 * Vietnam_j * POST_t + \sum_{t=\tau_1}^{\tau_2} \theta_t + \varepsilon_{jt}$$

In this model, the outcome variable DC_{jt}, is equal to one if individual j received DC benefits in year t and zero otherwise. The variable $Vietnam_j$ is equal to one if individual j is a Vietnam era veteran and zero otherwise. $POST_t$ is set equal to one after the policy takes effect, though to the extent that the impact is not immediate it may be more appropriate to allow the policy's impact to vary over time.[14] The parameter of particular interest in this model is β_3, which is the coefficient on the interaction between the $Vietnam_j$ and $POST_t$ variables and represents the impact of the policy change on the probability of DC enrollment among Vietnam era veterans. The key assumption for reliable

[14] Note that the inclusion of year indicators in this model makes it unnecessary to add a POST variable separately, as this would then be a linear function of certain year indicators.

estimation of β_3 is that there are not unobserved factors that influence DC enrollment differentially for Vietnam era veterans following the policy change.

Ideally when estimating a difference-in-differences model such as this one, the treatment and comparison groups would be identical on background characteristics such as age, education, and other possible determinants of DC enrollment. Of course, veterans who served in Vietnam will differ from other veterans in many respects. For example, they are older on average than Gulf War veterans and younger than veterans who served in Korea. But to the extent that the enrollment effect of these differences does not change at the time of the policy change, it should be captured by era-specific fixed effects and era-specific time trends.

B. Choosing the Comparison Group

The data summarized in Table 6 lists the number of veterans receiving DC benefits by service era in September of each year from 1998 to 2006. This table also lists the percentage change in this number from the previous year, the number of veterans in each service era, and the fraction of veterans receiving DC benefits. Before considering the effect of the 2001 policy change, three points are worth noting from this table. First, the number of DC recipients who served in World War II is declining steadily throughout this time period because of the high mortality rate among this group. Second, the number of DC recipients who served in the Gulf War era increased rapidly throughout this period. While this has largely been driven by an increase in the number of Gulf War era veterans (those serving since August 1990), the increase in the fraction receiving benefits from 9.6 to 16.2 percent has been nearly as important. And finally, the trends from 1997 to 2000 in DC enrollment are fairly similar for the other three service eras. During this period, DC enrollment increased by an average of 0.8 and 1.7 percent per year, respectively, among Vietnam and peacetime era veterans, while declining by an average of 2.2 percent per year among those serving in the Korea conflict.

Given these trends, it seems clear that veterans from either the World War II or Gulf War

eras would not be an appropriate comparison group for estimating the effect of the 2001 policy change on DC enrollment. Which of the other two eras is more appropriate is not as obvious. On the one hand, just prior to the Agent Orange decision, peacetime and Vietnam era veterans had similar rates of DC enrollment at 8.6 and 9.3 percent, respectively. The corresponding rate among Korean War era veterans was much lower at 4.9 percent. And in terms of average age, those classified as peacetime were much more similar to Vietnam era veterans because most served either shortly before or after the Vietnam War.[15] But on the other hand, many veterans from the Korean and Vietnam War eras incurred their disabilities in a military conflict and thus their service-connected disabilities may be more similar. But this seems unlikely to be as important as the age and DC enrollment similarities, and we therefore use individuals who served in peacetime as our comparison group.

C. The Impact of the Agent Orange Decision on DC Enrollment Rates

Figure 2 displays the fraction of Vietnam and peacetime era veterans receiving DC benefits in September of each year from 1998 through 2006.[16] As is clear from the figure, the trends for the two groups were fairly similar from 1998 to 2001, with the rate of enrollment increasing from 9.0 to 9.4 percent among Vietnam veterans and from 8.1 to 8.7 percent among peacetime veterans.[17] The trend for the peacetime group was quite similar during the next five years, with 9.7 percent of peacetime veterans receiving DC benefits by the end of the 2006 fiscal year. But the 3.0 percentage point increase in DC enrollment among Vietnam era veterans was exactly three times as large during this same five-year period, with their enrollment rising from 9.4 to 12.4 percent. Our difference-in-

[15] According to data from the VA, the average ages of Korea War, Vietnam War, and peacetime era veterans in September of 2002 were 72, 57, and 53, respectively. Table 1 demonstrates that veterans who served between the Korean and Vietnam War eras accounted for 53 percent of the peacetime era veteran population in September of 2000, with those serving after Vietnam but before the Gulf War era accounting for an additional 44 percent.

[16] As described above, the assignment of DC recipients to eras (the numerator) differs somewhat from the assignment of veterans to eras for population estimates (the denominator). For example, to be counted as peacetime in the population data a veteran must have served only in peacetime. To be assigned to peacetime as a DC recipient the veteran must have incurred his most severe disability during peacetime. This will introduce measurement error in our estimated enrollment rates. But as long as the impact of this has a smooth trend over time, it should not bias this comparison or the results that follow.

[17] The trends are similar through 2001 as well, though as our diagnosis data below demonstrates, the policy change had already started to have an effect by the end of 2001 and thus we consider it as post policy here.

differences estimate of the effect of the Agent Orange decision on the change in DC enrollment from September of 2001 to September of 2006 is therefore 2.0 percent.[18]

Our baseline estimate of 2.0 percentage points does not account for the fact that the pre-existing trends in DC enrollment were slightly different for veterans from the Vietnam and peacetime eras. We next account for this by assuming that the average annual increase for each group from 1998 to 2001 continued for the next five years. Given this assumption, the predicted rates of DC enrollment in September of 2006 for peacetime and Vietnam era veterans were 9.6 and 10.1 percent, respectively. The actual rate of 9.7 percent for our control group was almost identical to their predicted rate. But the same was not true for veterans from the Vietnam era, whose actual DC enrollment of 12.4 percent was 2.3 percentage points higher in 2006 than predicted.

Given that there were approximately 7.6 million Vietnam-era veterans alive in September of 2006, this latter estimate suggests that the Agent Orange decision increased DC enrollment by 175,000 above what it otherwise would have been by September of 2006. But this decision applied only to the 2.3 million veterans who served in Vietnam. Thus the expanded eligibility criteria induced a 7.6 percentage point increase in DC enrollment among those veterans who actually served in Vietnam. Furthermore, this increase can explain more than 53 percent of the acceleration in overall Disability Compensation enrollment since September of 2001 that is apparent in Figure 1.[19]

V. The Effect on Existing DC Recipients and on Program Expenditures

The results in the previous section estimated the effect of the Agent Orange decision on the

[18] This estimate and the one in the next paragraph would be almost identical if we instead used 2000 as the baseline. One possible source of bias in this estimate is that DC recipients who served both in peacetime and in Vietnam could, after qualifying from diabetes, switch from being classified as peacetime era to being classified as Vietnam era. While there is no way to rule out this possibility, the fact that the trend in DC enrollment for peacetime era veterans did not change significantly after 2001 suggests that it is not an important source of bias.

[19] The number of DC recipients increased at a 0.64 percent annual rate from 1998 to 2001. Had this growth continued during the next five years, the number of DC recipients would have been 329,044 lower in September of 2006. Thus the induced increase of 175,000 accounts for more than 53 percent of this. Essentially all of the remaining acceleration is attributable to the growing importance of entry by Gulf War veterans and the declining importance of exits by World War II DC recipients.

number of veterans receiving DC benefits but this did not include any resulting increase in benefits for existing DC recipients. In this section, we estimate this latter effect by using aggregate data from the VBA's *Annual Benefits Report* on the diagnoses of new and existing DC recipients in each year. We then investigate the effect of the policy change on total DC expenditures, which incorporates both the benefits paid to new recipients and the increase in benefits for existing recipients.

A. The Number of Vietnam Veterans Experiencing an Increase in DC Benefits

The top two rows of Table 7 list the number and percentage, respectively, of DC recipients receiving compensation for diabetes in each year. At the end of the 2000 fiscal year, just 1.6 percent of DC recipients were paid for this condition, with this fraction unchanged from the previous year. But in the years following the 2001 policy change, this percentage increased consistently, reaching a peak of 7.5 percent by the end of 2004 (the most recent year of this VBA data). This increase was driven almost entirely by Vietnam era DC recipients, with 18.5 percent of them receiving compensation for diabetes in September of 2004 versus just 1.7 percent of all other DC recipients.[20] Just three years after the policy change, diabetes had become the most frequently compensated condition among Vietnam era DC recipients after not being in the top ten in September of 2001.

The number of Vietnam-era DC recipients compensated for diabetes increased from 18,993 in September of 2000 to 163,485 by September of 2004. This increase reflects the coverage of diabetes among both new and existing DC recipients, though the VBA does not report how many of the new diabetes cases were already receiving DC at the time of the policy change. To estimate this, we first calculate how many new DC recipients would have been covered for diabetes by September of 2004 if the number of new diabetes awards in each year had remained at its 2000 level.[21] Using

[20] Values in this table with an asterisk were imputed. See the notes to Appendix Tables 1 and 2 for a description of our imputation procedure. 2004 is unfortunately our most recent year of diagnosis data.

[21] There were 101,732 new diabetes awards from 2001 to 2004 versus the 2,368 (= 592 * 4) that we estimate would otherwise have been made. This is lower than the increase in the number of Vietnam-era DC recipients by September of 2004, perhaps because many of the applications had diabetes rejected but other conditions accepted. The most common outcome of a DC application is to have one or more conditions accepted and others rejected.

the data listed in Appendix Table 2, we estimate that the total number of new awards for diabetes after the Agent Orange decision would have been lower by 99,364 during this period. If one makes the conservative assumption that none of these awardees would have exited the program by the end of 2004, then an additional 45,128 individuals who were receiving DC benefits at the time of the 2001 Agent Orange decision enjoyed an increase in their benefits by September of 2004 because their diabetes was covered.[22] However, this estimate excludes the number enjoying an increase in benefits during the 2005 and 2006 fiscal years, and we therefore inflate this estimate by two-thirds to arrive at our estimate of 75,213 for the number of existing DC recipients who enjoyed an increase in their monthly benefits because of the Agent Orange decision.[23]

When combined with the results from the previous section, our estimates suggest that approximately 250,000 Vietnam veterans enrolled in DC or enjoyed an increase in their DC benefits by September of 2006 as a result of the Agent Orange decision. This represents approximately 10.9 percent of the 2.3 million veterans who served in Vietnam and were still living at that time.

B. The Impact on Short and Long-Term Disability Compensation Expenditures

The effect of the Agent Orange decision on Disability Compensation expenditures depends on the characteristics of both those newly awarded DC benefits and of their counterparts already on the program who enjoyed an increase in their DC benefits. The main determinants of the short-term increase in spending are the CDR of new recipients and the increase in the CDR for existing recipients. If the 175,000 Vietnam veterans awarded benefits all had a CDR of just 10 percent, for example, then the effect on spending would be relatively modest. The same would be true if the 75,000 enjoying an increase in their benefits rose from a CDR of 10 to just 20 percent.

To estimate the effect of the Agent Orange decision on benefits paid, one would ideally use

[22] To calculate this, we subtract the increase in the number of Vietnam era veterans with diabetes from 2000 to 2004 (144,492) from the increase in the number of new DC recipients with diabetes as a covered condition (99,364).
[23] Some of those applying for an increase in benefits may have applied for multiple conditions or for an increase in ratings for existing conditions. Even if their diabetes applications were turned down, some recipients may have enjoyed an increase in benefits because of the application. This is one reason that our estimate may be too low.

individual-level longitudinal data on DC enrollment and benefit amounts for all veterans. This would allow us to estimate which new recipients enrolled in the program because of the policy change and which existing recipients enjoyed an increase in their benefits. Aggregating up the monthly benefits for these individuals, we could then calculate the effect on DC spending. Unfortunately we do not have this type of data. An (admittedly imperfect) alternative is to utilize aggregate data on the distribution of CDRs by service era in the years leading up to and following the policy change. As in the previous section, here we control for pre-existing trends in DC spending among Vietnam-era veterans to estimate the change that would have occurred in the absence of the Agent Orange decision if the pre-2000 trends had continued through June of 2006 (the most recent month available). Specifically we estimate the annual change from 1998 to 2000 in the number of Vietnam era veterans with each CDR and use this to predict the number with this CDR in 2006 as follows:[24]

$$(2) \quad \hat{V}_{DC,j,06} = V_{DC,j,00} + \left[5.75 * \left(\frac{V_{DC,j,00} - V_{DC,j,98}}{2} \right) \right]$$

with $V_{DC,j,t}$ equal to the number of Vietnam era DC recipients in CDR j in year t. We attribute any difference between the actual and predicted number of recipients within each CDR to the Agent Orange decision. To estimate the effect on spending we simply multiply these CDR-specific effects by the average monthly benefit amount for that CDR. If our assumptions are accurate, this estimate captures the spending effect that is attributable both to new recipients and to existing recipients.

Of course, the trend in the number of Vietnam era DC recipients for each CDR may have changed after 2000 even in the absence of the change in the program's medical eligibility criteria. For example, the Veterans Claim Assistance Act, the economic downturn, and related factors could have induced a break in trend. We therefore follow our approach from above and use veterans from the peacetime era as a control group. If our algorithm does a reasonable job of predicting the actual change in the number in each CDR bin for this group, it suggests that our estimates for the effect of

[24] We multiply by 5.75 because we are considering the change from September of 2000 to June of 2006.

the Agent Orange decision are not biased significantly by potentially confounding factors.

The results from this analysis are summarized in Table 8. The first and second panels include data for Vietnam and peacetime era veterans, respectively. The first three columns of the top panel list the number of Vietnam era veterans on the DC program with each of the eleven possible CDRs in 1998, 2000, and 2006, respectively. An examination of this data suggests that, despite the fact that the number of DC recipients was not changing much from 1998 to 2000, the distribution of the CDRs was. For example the number of DC recipients with ratings between 10 and 40 percent ratings declined by 3 percent, while the corresponding number with ratings between 50 and 100 percent increased by 12 percent. A similar pattern existed for peacetime era DC recipients from 1998 to 2000, with an increase of just 1 percent for ratings between 10 and 40 percent versus an increase of 13 percent for ratings between 50 and 100 percent. These pre-existing trends suggest that, even in the absence of the policy change, the distribution of CDRs among Vietnam and peacetime era DC recipients would have changed after the Agent Orange decision.

The fourth column lists the change in the number with each CDR that would have occurred from September of 2000 to June of 2006 if these pre-existing trends had continued. To calculate these predicted changes, we use equation (2) above. According to our estimates, the number of Vietnam era veterans with a rating of 10 percent would have fallen from 227,800 to 201,658 while the number with a rating of 100 percent would have increased from 85,994 to 109,172 during this five year period. The first of these two estimates is relatively accurate, as the number with a ten percent rating in June of 2006 was 206,429. But the latter estimate is much too low, with the actual number rated at 100 percent standing at 137,020 at the end of our period.

The discrepancy between our estimates and the actual change for all eleven possible CDRs is listed in column six. In every case our estimates are too low, which is not so surprising given the substantial increase in DC enrollment among Vietnam era veterans from 2000 to 2006. But in general the discrepancies are greatest for the highest CDRs. For example, we predicted an increase

of 38,752 in the number with ratings of 80 percent or more, but the actual increase was substantially higher at 100,937.[25] Multiplying these CDR-specific discrepancies by the average monthly benefit in June of 2006 for each CDR, we estimate that DC expenditures were $2.69 billion higher during the 2006 fiscal year than they would have been if the pre-2000 trend had continued. This represents more than 23 percent of benefits paid for Vietnam-era DC recipients in the 2006 fiscal year.

The bottom panel repeats this exercise for veterans from the peacetime era. In this case the discrepancies between our predictions and the actual number in each CDR are much smaller. As was true for Vietnam era veterans, we tend to underestimate more for the higher CDRs, though the total estimated dollar value of our discrepancies is just $0.02 billion for the 2006 fiscal year, which is 99.4 percent lower than the corresponding estimate of $2.69 billion for Vietnam era DC spending. Additionally, this represents just 0.4 percent of DC spending on peacetime era DC recipients. The similarity between actual and predicted DC expenditures for peacetime era veterans suggests that our estimate for the effect of the Agent Orange decision on Vietnam era DC spending is not driven by other factors such as macroeconomic conditions or the Veterans Claims Assistance Act.

Of course, the Agent Orange decision did not only affect expenditures during the 2006 fiscal year, but in several previous years and in many future years as well. To estimate the impact of the Agent Orange decision on the present value of DC spending, we take the following simple approach. First, for the 2002 to 2005 fiscal years, we simply linearly interpolate the 2006 estimate. This would, for example, assume that 40 percent of the $2.69 billion expenditure effect had occurred by 2003. For future years, we deflate the 2006 estimate by the VA's estimated decline in the Vietnam era veteran population. For example, the VA estimates that their ranks will decline by 16.2 percent from 2006 to 2016, and we therefore assume an expenditure effect of $2.26 billion in that latter year.[26]

[25] This would be surprising if DC recipients with diabetes had low benefits on average. But in December of 2004 the average benefit was 19 percent greater among Vietnam-era DC recipients with diabetes than among their counterparts without diabetes. This is because recipients with diabetes tend to also be covered for other conditions.
[26] The VA indexes DC benefits to the Consumer Price Index and thus we do not scale for the effect of inflation.

Using this algorithm along with an annual real discount rate of 3 percent, we estimate that the present value of DC spending increased by $45 billion dollars (in 2006 dollars) as a result of the policy change. For two reasons, this estimate is likely to understate the actual effect on the present value of VA spending. First, it assumes that there is no effect beyond the 2006 fiscal year on the number of DC recipients or on the benefits paid for existing DC recipients.[27] Second, it does not incorporate the effect on health care spending for DC recipients through the Veterans Health Administration, which we cannot reliably estimate with the available data. On the other hand, the estimate may be biased upward given that mortality rates of Vietnam-era DC recipients affected by the Agent Orange decision are likely to be higher than for the average Vietnam era veteran. But even when we adjust our present value calculations to account for the higher baseline mortality rates of Vietnam era DC recipients,[28] our estimated effect falls by just 19 percent to $37 billion.

VI. The Sensitivity of DC Expenditures to Local Economic Conditions

In contrast to the SSDI and SSI programs, an individual can receive DC benefits even if he has substantial labor market earnings. Thus whereas previous work has found that local economic conditions influence SSI and DI enrollment and expenditures (Black, Daniel, and Sanders, 2002; Autor and Duggan, 2003), it is not obvious that such a link would exist for the DC program. But this previous research has also shown that, when the medical eligibility criteria for the SSDI program were liberalized, the sensitivity of the program to economic conditions increased. Thus while one might expect a smaller impact of economic conditions on DC expenditures than on spending for other disability programs, this effect may have increased following the 2001 policy change.

There are a number of possible channels through which economic conditions might influence DC expenditures. Perhaps the most obvious one is that veterans without a job or with a job that has

[27] It also neglects any effect beyond 2033, as the VA does not make population projections beyond that year.
[28] The mortality rate in 2000 of Vietnam era DC recipients was 1.55% versus 0.71% for all Vietnam era veterans. We therefore scale the estimated mortality rates for all Vietnam veterans by 2.18 when calculating the present value.

low wages are likely to have a greater demand for alternative sources of income than their observably similar counterparts with higher earnings. Additionally it seems plausible that a veteran would need to invest a considerable amount of time and effort to learn about and apply for the program. Because the opportunity cost of time will be lower for those who are out of work or have low paying jobs, this time cost may be less likely to dissuade them. Similarly, advocacy groups and other institutions may have responded to the change in the DC program by launching outreach efforts in those parts of the country where Vietnam veterans were known to have relatively few labor market opportunities.

To investigate whether the relationship between the DC program and labor market conditions changed after the Agent Orange decision, we utilize annual, county-level data on expenditures by the VA on the four Compensation and Pension programs described in Section 2.[29] The available data does not separate out DC spending from spending on the other three programs. But as Table 3B demonstrates, almost 75 percent of Compensation and Pension spending is for the DC program. Additionally changes in Compensation and Pension spending after 2001 were primarily driven by the DC program, with total expenditures for the other three programs growing by an average of less than one percent per year from 2001 to 2004 versus a seven percent annual rate for the DC program.

We merge this Compensation and Pension (CP) expenditure data with annual, county-level unemployment rate data.[30] If local economic conditions had an important impact on the response of veterans to the change in economic conditions, one would expect to find a larger increase in CP expenditures in places with high rates of unemployment at the time of the policy change. To investigate this issue, we estimate models of the following type:

$$(3)\quad \Delta Log(CPSpending_{jt}) = \alpha + \beta_1 UnempRate_{j,t-1} + \beta_2 \Delta Log(CPSpending_{j,t-1}) + \beta_3 \Delta Log(Pop_{j,t}) + \varepsilon_{jt}$$

[29] Data on enrollment in these programs at the county level are not available. One advantage of considering expenditures rather than enrollment is that expenditures would capture the increase in benefits for existing recipients whereas enrollment would not. Virtually every county in the U.S. has nonzero CP spending in each year considered.
[30] We obtained these data from the U.S. Department of Labor's Bureau of Labor Statistics. This data is available online at http://www.bls.gov/lau/.

in which we use the log change in CP spending as our dependent variable. In all specifications we include the estimated change in the number of veterans living in the county.[31] In some specifications, we also control for the pre-existing trend in CP expenditures, as places with worse economic conditions may have been experiencing different changes in CP spending at the time of the policy change. The parameter of interest in this equation is β_1, which represents the relationship between the county unemployment rate and the change in CP expenditures. We consider two time periods, the three years prior to (1998-2001) and the three years following (2001-2004) the policy change. If the Agent Orange decision increased the sensitivity of the program to economic conditions, one would expect β_1 to increase from the pre-policy to the post-policy period.

Our estimates for these models are summarized in Table 9. The first two columns present the results from specifications for the 1998 to 2001 period, with the second one controlling for the pre-existing trend in CP spending. The statistically insignificant estimate for β_1 in both specifications suggests that areas with high rates of unemployment in 1998 did not experience larger increases in CP spending during the next three years. But the next two columns reveal that such a relationship did exist for the 2001 to 2004 period. The point estimate of 0.883 in the fourth specification implies that an increase of one-percentage point in the county's 2001 unemployment rate was associated with a 0.9 percent greater increase in CP spending from 2001 to 2004.[32]

In the next four columns we present the results from specifications in which we pool data from these two periods. Here we interact the unemployment rate measure with a POST indicator, which allows us to determine if the change in β_1 from the pre-policy to the post-policy period is statistically significant. We find that it is, and this significance remains when we introduce state fixed effects in the next two specifications. We do this to account for the possibility that state VBA

[31] To estimate this we obtained the total number of veterans by county in 1990 and 2000 from the decennial census. We then calculated the growth rate and used this to impute the population estimate in 1998, 2001, and 2004.
[32] Our results were qualitatively similar when we used the change in the level (rather than the log) of CP spending per veteran. For example, the analogous estimate for the specification summarized in column 2 was an insignificant -133 whereas the estimate from specification 4 was significant at the 1 percent level and equal to 2471.

offices differ in their outreach efforts or in their probability of making a DC award.

In the last two specifications we present the results from models in which the explanatory variable is the change in the unemployment rate rather than its level. The coefficient estimates of interest from these models, while not statistically significant, are qualitatively similar to the ones from the previous columns, suggesting that CP expenditures became more sensitive to local economic conditions after the policy change.

While the timing of the change in the relationship between economic conditions and CP expenditures is consistent with the hypothesis that the Agent Orange decision increased the sensitivity of the program to economic conditions, we probe further on this issue by investigating whether the increase in DC expenditures is significantly positively related with the fraction of DC benefits paid to Vietnam veterans diagnosed with diabetes. To do this we use aggregate, county-level DC spending in December of 2004 and differentiate between spending on Vietnam era veterans with diabetes and all other DC spending.[33] The results of our analysis are summarized in Table 10.

The first two columns of this table explore whether the log change in CP spending from 2001 to 2004 was significantly higher in counties where Vietnam veterans accounted for a relatively large share of spending. The significantly positive estimates of .171 (without pre-existing trends) and .198 (with trends) on the fraction of DC spending to Vietnam era veterans suggests that this was indeed the case. This is in contrast to the 1998 to 2001 period, when there was no evidence of a significantly positive relationship, as is shown in the last two columns of the table.

The two explanatory variables included in specifications 3 and 4 differentiate between DC spending for Vietnam veterans with diabetes and all other DC spending for Vietnam veterans. As the coefficient estimates show, there is a significantly positive relationship between the change in CP spending and the fraction of DC spending paid to Vietnam veterans with diabetes. No corresponding relationship exists for DC spending on other Vietnam veterans. This strongly suggests that the

[33] December of 2004 is the only month in which we have diagnosis-specific DC expenditures at the county level.

coverage of diabetes for Vietnam veterans is responsible for the changing relationship between spending by the VA on Compensation and Pension programs and economic conditions.

It is worth noting that while the results presented here suggest that the sensitivity of the DC program to economic conditions increased as a result of the Agent Orange decision, other factors may be at least partly responsible for our findings. For example, it could be the case that the prevalence of diabetes among Vietnam veterans is greater in counties with high unemployment rates. But our finding is consistent with the results of Autor and Duggan (2003) for the SSDI program, which found that the sensitivity of that program to economic conditions increased following the liberalization of the program's medical eligibility criteria in the mid-1980s. Such a connection for the DC program seems plausible given that the demand for alternative sources of income is likely to be greater among veterans affected by the policy who have low earnings or are out of work.

VII. Discussion

The findings in this paper suggest that a change in the medical eligibility criteria for the VA's Disability Compensation program that applied only to Vietnam veterans induced a 7.6 percentage point increase in disability enrollment among this group and increased the monthly benefit amount for an additional 3.3 percent. The effects of this change on VA expenditures were substantial, with our estimates suggesting that DC spending during the 2006 fiscal year was $2.69 billion higher than it otherwise would have been and that the present value increase in VA expenditures was approximately $45 billion. These estimates for enrollment and expenditures are likely to be conservative, as we have not considered any effect on veterans not already affected by June of 2006 nor have we incorporated the resulting increase in health care spending through the Veterans Health Administration. Our results further demonstrate that the 2001 policy change has coincided with a change in the responsiveness of the DC program to local economic conditions.

What do these findings imply for other disability programs such as SSDI and SSI? Because

only the 2.3 million veterans who served in Vietnam were directly affected by this policy change, it is clear that one cannot assume that a similar change for those programs would have the same response. Additionally, because the DC program is quite different from SSDI and SSI, which pay benefits on an all-or-nothing basis and do not allow recipients to have significant labor market earnings, the effect of such a change for these other programs might be quite different. However the findings do demonstrate that a relatively narrow change in the medical eligibility criteria for the DC program led to an increase in disability benefits for 10.9 percent of the individuals potentially affected by the policy. This makes it more plausible that the 1984 reforms to SSDI and SSI, which expanded the medical eligibility criteria for these programs, could have been largely responsible for the significant increase in enrollment for these two programs during the past two decades.

A potentially important direction for future research would be to estimate the effect of the induced increase in DC enrollment on the health, labor supply, and material well-being of veterans who served in Vietnam.[34] As a result of this policy change, more Vietnam veterans received essentially free health care through the Veterans Health Administration. This, along with the increase in benefits, could plausibly have improved the health of Vietnam veterans. Similarly while the DC program does not introduce a high marginal tax rate on earnings, it is plausible that a DC award or an increase in DC benefits could reduce labor supply through an income effect.

More generally, the VA's Disability Compensation program is a large and rapidly growing program that has essentially been ignored in prior economic research. At present there are 2.72 million veterans receiving DC benefits with $25 billion paid in benefits during the 2006 fiscal year. More work on this program, which is an increasingly important source of income and insurance for the nation's 24 million veterans and 45 million of their family members, seems warranted.

[34] Gruber (2000) uses a similar strategy to the one employed in this paper to estimate the effect of a change in Canada's disability program on labor supply. He exploits the fact that Quebec operated a separate program and uses individuals from that province as his control group.

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Figure 1: # of Disability Compensation Recipients: 1976-2006

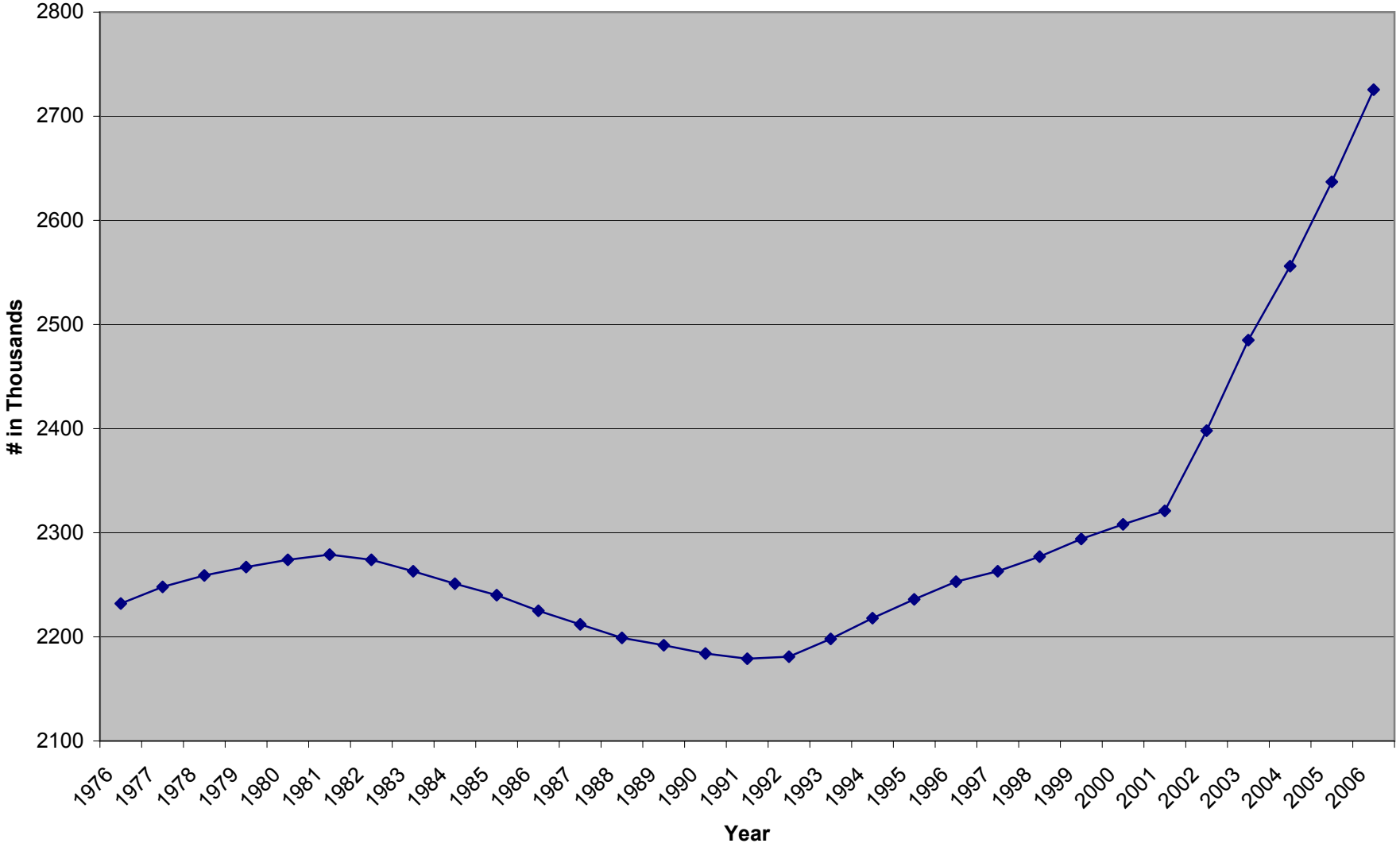

Figure 2: DC Enrollment for Vietnam and Peacetime Era Veterans: 1998-2006

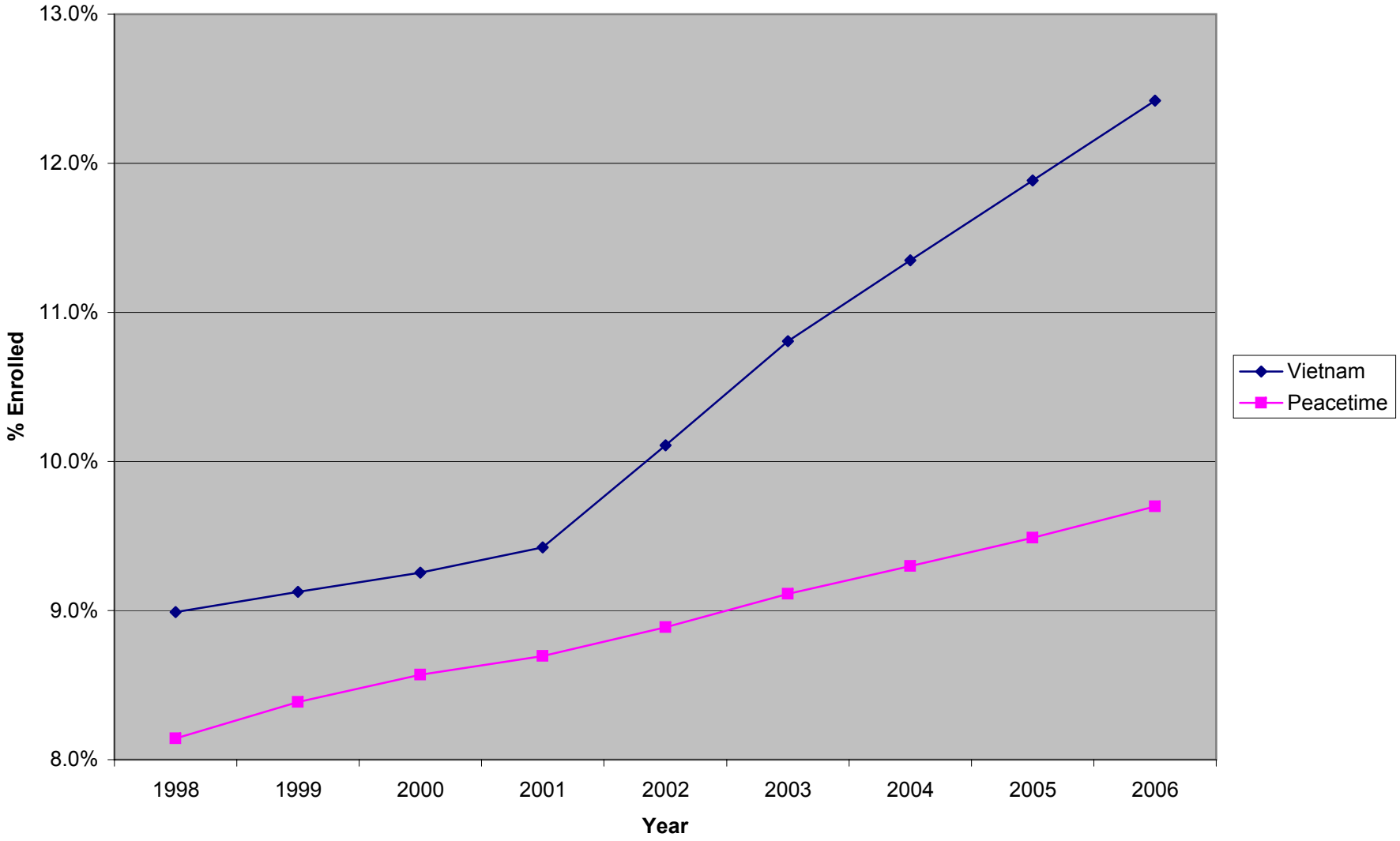

Table 1: Veteran Population Estimates by Era of Service in September of 2000 and 2006

	Number in Millions			Share	
	2000	2006	% Change	2000	2006
World War II Era	5.59	3.15	-43.6%	21.1%	13.1%
Between WWII and Korea	0.24	0.16	-33.3%	0.9%	0.7%
Korean War Era	3.50	2.76	-21.1%	13.2%	11.5%
Between Korea and Vietnam	2.88	2.54	-11.8%	10.8%	10.6%
Vietnam War Era	8.01	7.63	-4.7%	30.2%	31.8%
Between Vietnam and Gulf War	3.49	3.45	-1.1%	13.1%	14.4%
Gulf War Era	2.84	4.30	51.4%	10.7%	17.9%
Total # of Veterans	26.55	23.98	-9.7%	100.0%	100.0%

Data includes the number of veterans alive in September of 2000 and September of 2006 from each of seven different service eras. Individuals who served during a conflict and during peacetime are assigned to the conflict. Individuals serving during two or more of the four conflicts are assigned to the earliest conflict. Data were obtained from the VA's VP04 Ver 1.0 population estimates, which are available online at http://www.va.gov/vetdata/demographics/ and represent the VA's most recent estimates as of September, 2006.

Table 2: U.S. Department of Veterans' Affairs Expenditures: 1998-2005

	1998	1999	2000	2001	2002	2003	2004	2005
Compensation and Pension	$23,532	$24,231	$24,138	$24,927	$27,479	$29,698	$30,807	$32,068
Medical Expenditures	$21,087	$20,786	$23,267	$23,600	$25,073	$27,014	$29,086	$30,675
Education & Voc Rehab	$1,716	$1,814	$1,848	$1,715	$2,153	$2,398	$3,081	$3,155
Insurance and Indemnities	$2,435	$2,307	$2,223	$2,148	$2,063	$1,995	$1,928	$1,809
Operating Expenses	$1,539	$1,517	$1,698	$1,722	$1,933	$1,999	$2,003	$2,238
Construction	$655	$552	$396	$444	$481	$445	$438	$303
Total Spending	$50,964	$51,206	$53,569	$54,556	$59,182	$63,549	$67,343	$70,248

Data represents VA expenditures by category (in millions of 2005 dollars). Data for the 1999-2004 fiscal years is available online at http://www.va.gov/vetdata/GeographicInformation/index.htm. Data for 1998 and 2005 were obtained from the Department of Veterans Affairs following an email request.

Table 3A: Compensation and Pension Recipients by Program: 1998-2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Disability Compensation	2,277,049	2,294,453	2,308,186	2,321,103	2,398,287	2,485,229	2,555,696	2,636,979	2,725,472
Disability Pension	390,978	378,712	364,220	348,052	346,579	346,555	342,903	335,787	329,492
Death Compensation	310,299	311,631	313,408	313,540	315,731	319,998	324,019	329,184	331,909
Death Pension	291,483	274,106	257,106	241,467	230,267	223,553	215,253	206,594	200,130
Total C&P Recipients	3,269,809	3,258,902	3,242,920	3,224,162	3,290,864	3,375,335	3,437,871	3,508,544	3,587,004

Data represents the number of recipients of each program in September of each year. Data for the 1999-2004 fiscal years is available onlin from the VBA's Annual Benefits Report publication at http://www.vba.va.gov/reports.htm. Data for the 1998, 2005, and 2006 fiscal years were obtained from the Department of Veterans Affairs following an email request

Table 3B: Compensation and Pension Expenditures by Program: 1999-2004

	1999	2000	2001	2002	2003	2004
Disability Compensation	$16,298	$16,755	$17,430	$19,095	$20,736	$21,290
Disability Pension	$2,520	$2,444	$2,396	$2,470	$2,530	$2,530
Death Compensation	$3,897	$3,892	$3,926	$3,873	$4,027	$4,011
Death Pension	$807	$750	$715	$705	$701	$692
Total Estimated	$23,520	$23,842	$24,467	$26,274	$27,993	$28,523

Data represents the total estimated expenditure by program in each fiscal year (in millions of 2005 dollars). Data for the 1999-2004 fiscal years is available online from the VBA's Annual Benefits Report publication at http://www.vba.va.gov/reports.htm. Totals differ slightly from those listed in Table 2 because this data is estimated while the data in Table 2 represents actual spending.

Table 4: Monthly Disability Compensation Benefit Amounts During the 2006 Fiscal Year

CDR	Baseline	1 child	1 spouse	1 child & 1 spouse	Each Add'l Child < 18	Each Add'l In School 18+
10%	$112	$112	$112	$112	$0	$0
20%	$218	$218	$218	$218	$0	$0
30%	$337	$364	$377	$406	$20	$64
40%	$485	$521	$539	$578	$27	$86
50%	$690	$735	$757	$806	$34	$107
60%	$873	$927	$954	$1,012	$40	$129
70%	$1,099	$1,162	$1,193	$1,262	$47	$150
80%	$1,277	$1,349	$1,385	$1,463	$54	$172
90%	$1,436	$1,517	$1,557	$1,645	$61	$193
100%	$2,393	$2,484	$2,528	$2,626	$68	$215

Data represents the monthly benefit amount by combined disability rating (CDR) and presence of dependents for Disability Compensation recipients during the 2006 fiscal year. This data and the corresponding data for earlier years can be obtained at http://www.vba.va.gov/bln/21/Rates/.

Table 5: # of DC Recipients and Average Monthly DC Benefits by CDR in June 2006

				Share with Each Rating				
CDR	Recipients	Dollars	Avg Benefit	Gulf	Vietnam	Korea	WW II	Peacetime
0%	14,394	$ 1,075	$75	0.1%	0.3%	2.5%	1.4%	0.4%
10%	774,887	$ 87,336	$113	27.6%	22.0%	30.6%	33.2%	37.4%
20%	415,510	$ 91,437	$220	17.9%	13.4%	13.0%	12.5%	17.8%
30%	332,768	$ 124,874	$375	15.3%	10.7%	12.5%	13.2%	11.0%
40%	256,487	$ 139,326	$543	12.5%	9.0%	8.2%	8.1%	8.0%
50%	159,003	$ 121,343	$763	7.1%	5.9%	5.4%	5.8%	4.6%
60%	181,254	$ 230,850	$1,274	6.9%	7.0%	7.6%	7.1%	5.6%
70%	162,202	$ 302,969	$1,868	4.7%	8.5%	5.5%	5.3%	4.1%
80%	110,699	$ 229,674	$2,075	3.3%	5.6%	4.1%	4.0%	2.7%
90%	58,865	$ 133,267	$2,264	1.6%	3.1%	2.2%	2.3%	1.4%
100%	235,971	$ 645,755	$2,737	3.0%	14.6%	8.5%	7.2%	6.9%
Total	2,702,040	$ 2,107,906	$780	100.0%	100.0%	100.0%	100.0%	100.0%
		Total Era-Specific Enrollment		674,021	939,200	160,007	334,222	594,590
		Total Era-Specific Expenditures		$389,318	$966,165	$126,226	$244,833	$381,364
		Average Era-Specific Benefit		$578	$1,029	$789	$733	$641

Data in the first three columns provides the number of DC recipients, the total amount paid (in thousands of dollars), and the average monthly DC benefit by combined disability rating (CDR) in June of 2006. Data in the last five columns provides the share of DC recipients from each service era with each value of the CDR. Data were obtained from the Department of Veterans Affairs following an email request.

Table 6: Veterans Receiving Disability Compensation Benefits by Service Era and Year: 1998-2006

Service Era		1998	1999	2000	2001	2002	2003	2004	2005	2006
WWI + WWII	# Receiving	578,459	541,312	505,133	470,217	440,477	413,702	385,504	356,194	327,570
	% Change	-6.1%	-6.4%	-6.7%	-6.9%	-6.3%	-6.1%	-6.8%	-7.6%	-8.0%
	# Vets / 1000	6,544	6,044	5,582	5,155	4,732	4,319	3,916	3,526	3,151
	% Receiving	8.8%	9.0%	9.0%	9.1%	9.3%	9.6%	9.8%	10.1%	10.4%
Korean War	# Receiving	178,682	174,807	170,616	166,362	164,728	164,482	163,635	161,512	159,749
	% Change	-2.1%	-2.2%	-2.4%	-2.5%	-1.0%	-0.1%	-0.5%	-1.3%	-1.1%
	# Vets / 1000	3,730	3,614	3,502	3,392	3,276	3,154	3,027	2,894	2,757
	% Receiving	4.8%	4.8%	4.9%	4.9%	5.0%	5.2%	5.4%	5.6%	5.8%
Vietnam War	# Receiving	729,402	735,627	740,976	749,554	798,549	848,156	883,092	916,220	947,601
	% Change	0.8%	0.9%	0.7%	1.2%	6.5%	6.2%	4.1%	3.8%	3.4%
	# Vets / 1000	8,113	8,060	8,007	7,955	7,901	7,848	7,781	7,709	7,629
	% Receiving	9.0%	9.1%	9.3%	9.4%	10.1%	10.8%	11.3%	11.9%	12.4%
Peacetime	# Receiving	549,862	560,567	566,833	569,190	575,413	582,863	587,331	591,324	595,634
	% Change	2.1%	1.9%	1.1%	0.4%	1.1%	1.3%	0.8%	0.7%	0.7%
	# Vets / 1000	6,753	6,683	6,614	6,546	6,473	6,397	6,316	6,231	6,142
	% Receiving	8.1%	8.4%	8.6%	8.7%	8.9%	9.1%	9.3%	9.5%	9.7%
Gulf War	# Receiving	240,644	282,140	324,628	365,780	419,120	476,026	536,134	611,729	694,918
	% Change	19.2%	17.2%	15.1%	12.7%	14.6%	13.6%	12.6%	14.1%	13.6%
	# Vets / 1000	2,510	2,669	2,838	3,017	3,199	3,474	3,753	4,027	4,297
	% Receiving	9.6%	10.6%	11.4%	12.1%	13.1%	13.7%	14.3%	15.2%	16.2%
Total	# Receiving	2,277,049	2,294,453	2,308,186	2,321,103	2,398,287	2,485,229	2,555,696	2,636,979	2,725,472
	% Change	0.6%	0.8%	0.6%	0.6%	3.3%	3.6%	2.8%	3.2%	3.4%
	# Vets / 1000	27,522	27,028	26,542	26,066	25,582	25,191	24,793	24,387	23,977
	% Receiving	8.3%	8.5%	8.7%	8.9%	9.4%	9.9%	10.3%	10.8%	11.4%

Entries in this table represent the number of DC recipients, the number of veterans, and the fraction of veterans on DC by service era and year. Population data were obtained from the VA's most r population estimates (summarized in Table 1) and DC enrollment data were obtained from the VBA's Annual Benefits Report publication, which is available online at http://www.vba.va.gov/reports.h the 1999-2004 fiscal years. Data for 2005 and 2006 were obtained from the Department of Veterans Affairs in response to an email request. September 2006 data were estimated by assuming that the average monthly increase from September of 2005 to August of 2006 continued in that final month of the fiscal year.

Table 7: The Fraction of DC Recipients and Awardees with Diabetes as a Covered Condition

	1999	2000	2001	2002	2003	2004
# with Diabetes	37808	37985	46395	111932	161551	191649
% with Diabetes	1.65%	1.65%	2.00%	4.67%	6.50%	7.50%
# Vietnam with Diabetes	18904*	18993*	27403*	88259	135011	163485
% Vietnam with Diabetes	2.57%	2.56%	3.03%	11.05%	15.92%	18.51%
# All Other with Diabetes	18904*	18992*	18992*	23673	26540	28164
% All Other with Diabetes	1.21%	1.21%	1.21%	1.48%	1.62%	1.68%

The first two rows summarize the number and percentage of DC recipients with diabetes at the end of each fiscal year. The next two rows provide this same information for Vietnam era veterans and the last two rows provide this data for veterans from all other eras. Entries with an asterisk are imputed. See Appendix Tables 1 and 2 for an explanation of the imputation procedure.

Table 8: Number of DC Recipients by Combined Disability Rating for Vietnam and Peacetime Era

Panel A: Vietnam Era DC Recipients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of Recipients			*Change 2000-2006*			Avg Monthly	Est. Impact
CDR	9/1998	9/2000	6/2006	Predicted	Actual	Difference	DC Benefit	on 2006 DC $
0%	1,413	1,644	2,567	664	923	259	$75	$232
10%	236,893	227,800	206,429	-26,142	-21,371	4,771	$113	$6,453
20%	106,162	102,836	125,994	-9,562	23,158	32,720	$220	$86,405
30%	103,715	100,946	100,286	-7,961	-660	7,301	$375	$32,877
40%	66,412	66,094	84,843	-914	18,749	19,663	$543	$128,175
50%	42,490	43,772	55,642	3,686	11,870	8,184	$763	$74,950
60%	39,097	41,805	65,423	7,786	23,618	15,833	$1,274	$241,977
70%	29,063	38,443	79,443	26,968	41,000	14,033	$1,868	$314,527
80%	17,712	21,450	52,705	10,747	31,255	20,508	$2,075	$510,596
90%	8,513	10,192	28,848	4,827	18,656	13,829	$2,264	$375,693
100%	77,932	85,994	137,020	23,178	51,026	27,848	$2,737	$914,494
Total	729,402	740,976	939,200	33,275	198,224	164,949	-	$2,686,380

Panel B: Peacetime Era DC Recipients

	Number of Recipients			*Change 2000-2006*			Avg Monthly	Est. Impact
CDR	9/1998	9/2000	6/2006	Predicted	Actual	Difference	DC Benefit	on 2006 DC $
0%	2,791	2,704	2,406	-250	-298	-48	$75	-$43
10%	242,816	239,621	222,500	-9,186	-17,121	-7,935	$113	-$10,733
20%	105,401	107,411	106,064	5,779	-1,347	-7,126	$220	-$18,817
30%	62,041	64,169	65,530	6,118	1,361	-4,757	$375	-$21,421
40%	38,409	41,738	47,361	9,571	5,623	-3,948	$543	-$25,734
50%	20,200	22,196	27,544	5,739	5,348	-391	$763	-$3,576
60%	22,104	25,477	33,496	9,697	8,019	-1,678	$1,274	-$25,652
70%	11,878	14,732	24,527	8,205	9,795	1,590	$1,868	$35,633
80%	7,230	9,048	15,864	5,227	6,816	1,589	$2,075	$39,568
90%	3,281	4,152	8,035	2,504	3,883	1,379	$2,264	$37,460
100%	33,711	35,585	41,263	5,388	5,678	290	$2,737	$9,532
Total	549,862	566,833	594,590	48,792	27,757	-21,035	-	$16,216

Data summarized in columns 1-3 represent the actual number of DC recipients by CDR in September of 1998 and 2000 and in June of 2006 for the Vietnam and peacetime service eras. The next column lists the predicted change from 2000 to 2006 if the 1998-2000 trend had continued through June of 2006. Columns 5 and 6 list the actual change and the discrepancy between the actual and predicted values. Column 7 lists the average monthly benefit by CDR in June of 2006 and the final column multiplies this amount by 12 (to annualize) and by the discrepancy listed in column 6.

Table 9: Determinants of County-Level Growth in DVA Compensation and Pension Expenditures: 1998-2004

	1998-2001		2001-2004		1998-2004					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemp Rate$_{t-1}$	0.059	-0.097	0.889***	0.883***	0.051	-0.122	-0.140	-0.188		
	(.181)	(.160)	(.258)	(.230)	(.182)	(.158)	(.129)	(.132)		
Post * Unemp Rate$_{t-1}$					0.848***	1.019***	0.582***	0.832***		
					(.230)	(.293)	(.178)	(.242)		
Δ Unemp Rate$_t$									-0.123	0.000
									(.176)	(.168)
Post * Δ Unemp Rate$_t$									0.614	0.325
									(.533)	(.476)
Δ Population$_t$	0.830***	0.506***	0.752***	0.342***	0.792***	0.426***	0.826***	0.517***	0.825***	0.517***
	(.131)	(.209)	(.159)	(.183)	(.138)	(.186)	(.110)	(.188)	(.106)	(.190)
Δ Log(Comp+Pen)$_{t-1}$		0.423***		0.498***		0.462***		0.378***		0.371***
		(.156)		(.122)		(.136)		(.163)		(.163)
Year = 2004					0.121***	0.102***	0.136***	0.114***	0.159***	0.151***
					(.013)	(.017)	(.010)	(.017)	(.010)	(.011)
Constant	0.063	0.042	0.183	0.137	0.063	0.040	0.072	0.048	0.066	0.040
	(.007)	(.013)	(.018)	(.022)	(.007)	(.012)	(.005)	(.012)	(.002)	(.011)
# Observations	3136	3136	3136	3136	6272	6272	6272	6272	6272	6272
R-squared	0.196	0.325	0.168	0.368	0.471	0.576	0.564	0.625	0.563	0.621
State Effects?	No	No	No	No	No	No	Yes	Yes	Yes	Yes

Dependent variable in each column is equal to the change in the log of DVA Compensation and Pension expenditures. This county level data was obtained at http://www.va.gov/vetdata/GeographicInformation/index.htm. Specifications (1) through (4) include one observation for each county (either the 1998-2001 or the 2001-2004 change) while specifications (5) through (10) include two observations per county. The variable Unemp Rate is equal to the unemployment rate at the beginning of the period (thus either 1998 for the 1998-2001 change or 2001 for the 2001-2004 change). The change in population variable is equal to the change in the log of the veteran population in the county. The change in the log of Comp and Pen spending controls for the pre-existing trend in spending. The variable Post is equal to one for the 2001-2004 change and zero otherwise. All standard errors are clustered by state and all specifications are weighted by the veteran population in the county.

Table 10: Determinants of Growth in Compensation and Pension Expenditures: 1998-2004

	2001-2004				1998-2001	
	(1)	(2)	(3)	(4)	(5)	(6)
Vietnam DC Fraction 12/04	.171**	.198***			-0.038	-.100***
	(.066)	(.044)			(.066)	(.045)
Vietnam Diabetes DC Fraction 12/04			.590***	.500***		
			(.150)	(.087)		
Vietnam Other DC Fraction 12/04			-.004	0.071		
			(.076)	(.045)		
Δ Log(Comp+Pen)$_{t-1}$		.578***		.566***		.551***
		(.082)		(.081)		(.089)
Constant	0.112	0.068	0.129	0.082	0.069	0.067
	(.032)	(.023)	(.030)	(.021)	(.031)	(.022)
# Observations	3126	3126	3126	3126	3126	3126
R-squared	0.014	0.346	0.047	0.363	0.001	0.268

The dependent variable in all specifications is equal to the log change in compensation and pension expenditures (from 2001-2004 in columns 1 through 4 and from 1998-2001 in columns 5 and 6). The first explanatory variable represents the fraction of DC spending in the county paid to Vietnam veterans in December of 2004. The next two variables equal the fraciton of DC spending paid to Vietnam veterans with diabetes and the fraction of DC spending paid to all other Vietnam veterans, respectively. All standard errors are clustered by state and all specifications are weighted by the veteran population in the county.

Appendix Table 1: Service-Connected Disabilities by Body System for DC Recipients at End of Fiscal Years

Body System	1998	1999	2000	2001	2002	2003	2004
Musculoskeletal System	2204797	2280843	2346864	2412412	2524243	2652380	2786986
Skin	697081	711700	722474	731378	750407	770083	778521
Impairment of Auditory Acuity	463306	483532	505298	530931	587524	665419	742211
Neurological Conditions	302864	313252	322904	331653	369377	422448	581442
Mental Disorders	395329	403175	409071	414679	433618	463223	488333
Digestive System	424188	429546	432920	434606	440931	448128	452307
Cardiovascular System	326947	339195	348645	357259	385924	419039	442640
Respiratory System	286199	293179	298789	303890	314021	325106	334866
Endocrine System	*56416*	*57576*	*58719*	*68040*	*134905*	*185908*	*217126*
Diabetes Only	*-*	*37808*	*37985*	*46395*	*111932*	*161551*	*191649*
Diabetes & Vietnam Only	*-*	*18904**	*18993**	*27403**	*88259*	*135011*	*163485*
Diabetes & All Other	*-*	*18904**	*18992**	*18992**	*23673*	*26540*	*28164*
Not Diabetes	*-*	*19768*	*20734*	*21645*	*22973*	*24357*	*25477*
Genitourindary System	132164	136852	141583	145938	161387	180785	196268
Eye	103007	103704	104050	104472	108407	113553	117256
Infectious Diseases	49754	49042	47980	46714	46586	46576	46045
Gynecological System	28939	32004	34547	36667	39325	41905	44156
Dental and Oral Conditions	24715	25798	26798	27572	28924	30171	31114
Hemic and Lymphatic System	20354	20792	21153	21471	22216	23122	24996
Total	5516060	5699958	5842529	5989327	6370768	6812203	7309744

Data were obtained from the 2000 and 2004 versions of the VBA's Annual Benefits Report. Entries with an asterisk were estimated because they were not publicly available. We assume that the number of Vietnam DC recipients with diabetes is equal to the corresponding number of non-Vietnam DC recipients with diabetes in 1999 and 2000. This is likely to be approximately correct given that 46 percent of DC recipients with diabetes in October of 1998 were from the Vietnam era. We further assume that the number of non-Vietnam veterans with diabetes in 2001 is unchanged from its 2000 level. The values for 2002, 2003, and 2004 are not imputed.

Appendix Table 2: Service-Connected Disabilities by Body System for New DC Recipients in Fiscal Year

Body System	1998	1999	2000	2001	2002	2003	2004
Musculoskeletal System	107400	119485	111663	110520	156339	164970	164297
Skin	32013	34236	30334	28047	41453	42766	36955
Impairment of Auditory Acuity	23370	27321	28654	31995	59241	75316	76836
Neurological Conditions	13124	13567	13261	12927	28794	33575	28922
Mental Disorders	17043	17680	16613	16065	25402	31022	23564
Digestive System	17873	18823	16807	15109	21501	22017	19078
Cardiovascular System	13638	15588	14594	14253	26643	28069	28315
Respiratory System	14855	15842	14423	14190	19304	20678	19239
Endocrine System	*2350*	*2501*	*2485*	*5918*	*39852*	*36897*	*26206*
Diabetes Only	*-*	*1217*	*1183*	*4741*	*38652**	*35697**	*25006**
Diabetes & Vietnam Only	*-*	*609***	*592***	*4150**	*38061**	*35106**	*24415**
Diabetes & All Other	*-*	*608**	*591**	*591**	*591**	*591**	*591**
Not Diabetes	*-*	*1284*	*1302*	*1177*	*1200**	*1200**	*1200**
Genitourindary System	6411	6716	6502	6270	13392	14993	12884
Eye	3129	3314	3043	2998	5320	5708	4774
Infectious Diseases	2486	2524	2280	2081	3300	3233	2702
Gynecological System	2958	3154	2678	2285	2795	2780	2487
Dental and Oral Conditions	1365	1533	1518	1310	2087	1915	1616
Hemic and Lymphatic System	985	1032	1025	923	1262	1484	1822
Total	259000	283316	265880	264891	446685	485423	449697

Data were obtained from the 2000 and 2004 versions of the VBA's Annual Benefits report. Entries with an asterisk were estimated because they were not publicly available. We assume that the number of diabetes awards to Vietnam veterans was the same as the number of diabetes awards to all other veterans in the 1999 and 2000 fiscal years. This is likely to be approximately correct given that 46 percent of DC recipients with a diabetes diagnosis in October of 1998 were from the Vietnam era. We further assume that the number of diabetes awards to non Vietnam era veterans does not change after the 2001 reform, which seems reasonable given the much larger increase in diabetes cases among Vietnam veterans. And finally, we assume that the number of endocrine system awards that are not diabetes remains unchanged following the 2001 reforms. This seems reasonable given that the number of diabetes cases increased by 159,000 from 2000 to 2004 whereas the corresponding increase for other endocrine conditions was approximately 5,000.