How does Medicare Eligibility affect Choice and Utilization?: Evidence from Veterans

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Abstract

We study the effects of aging into Medicare eligibility with pre-existing health insurance coverage by study veterans who are simultaneously enrolled in the Veterans Health Administration (VHA). We exploit the changes in insurance network coverage induced by Medicare eligibility at age 65 to examine changes in their inpatient health care behaviors. Using Regression Discontinuity methods, we find that inpatient hospitalizations increase slightly, by approximately 3 percent at 65. However, there are large reallocations across which insurer pays for health care. Individuals increasingly use Medicare for hospitalizations once it becomes available (a 70 percent increase relative to the pre-65 share) while VHA and commercial insurers are used increasingly less, with an approximately 7 and 51 percent decline, compared to the pre-65 share, respectively. We also find larger reallocations toward Medicare usage for certain groups, particularly among individuals who live relatively closer to a Medicare hospital and further from VHA hospitals, and among those who visit the hospital for more postponeable medical procedures. However, we do not find evidence that the average "quality" of the hospital selected at 65 changes; rather, individuals are choosing hospitals that are relatively closer. Moreover, our results suggest that Medicare may compete with other federal programs to provide health care to veterans.

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1 Introduction

Medicare is one of the largest US public programs, comprising nearly 3.6 percent of GDP (CMS (2022)). Given its size and continued growth, many studies have examined different dimensions of this public program, often focusing on the financial protections and health benefits that it provides (e.g., Card et al. (2009) and Finkelstein and McKnight (2008)). However, less understood is how Medicare eligibility changes the insurance network faced by individuals and the subsequent implications for individuals' health care utilization and choice.

For example, Medicare eligibility may provide health insurance to those without prior health insurance coverage or result in network changes for individuals who switch to Medicare and exclusively rely on it as their insurer. Alternatively, Medicare eligibility may *alter or expand* the insurance network and insurance generosity of individuals who maintain their pre-65 insurance coverage after becoming Medicare eligible.[1] For example, estimates from the 2008 – 2022 American Community Survey (ACS) indicate that among Medicare recipients, ages 65 to 70 years, approximately 35 percent also have an employer-sponsored health insurance plan and more than half report at least two forms of insurance coverage. Moreover, with the Affordable Care Act's (ACA) expansion of Medicaid, more adults may not only become dually enrolled in both Medicare and Medicaid, but may also age into Medicare-Medicaid dual eligibility at age 65 (McInerney et al., 2021). In both cases, the onset of Medicare eligibility may result in i) additional insurance generosity as Medicare now takes on the role of either the primary or second payer of health care claims and ii) an expanded insurance network if Medicare is more widely accepted by providers than the pre-65 insurance option.[2]

In this paper, we examine how changes to insurance coverage, stemming from the onset of Medicare eligibility, affect health care utilization among those who maintain their prior insurance coverage. In particular, we investigate whether there is increased

[1]The former would occur if Medicare is accepted by more providers than a previous insurance plan while the latter may occur since there are now at least two payers jointly covering the costs of health care.

[2]Among Medicare recipients, Medicare may either act as the first payer (e.g., for Medicaid recipients), paying what is owed to a health care provider first, while in other cases, Medicare is the second payer. For further details, see for Medicare and Services (2021).

health care consumption and/or a *reallocation* of where health care is received, and which agency pays for it.

Specifically, we examine the network effects of Medicare by examining the health care decisions of US veterans who become Medicare eligible upon turning age 65. Important to our setting, most individuals experience a strictly expanded choice set, such that the number of hospitals where they can receive insured health care, within a given geography, increases. This is because: i) health care through the Veterans Administration (VA) is provided through an integrated health care system with limited geographic density; thus Medicare eligibility expands the number of physical locations that eligible veterans can visit for health care (i.e., hospitals that accept Medicare as payment) and ii) health care coverage through the VA is a benefit independent of age.[3] Thus, health care through the VA remains available even as veterans age into Medicare at 65.

To examine these questions, we make use of rich data that consists of detailed veteran electronic medical record data linked to state-level inpatient hospitalization claims across six states. The linked data allows us to observe the entirety of inpatient health care utilized by the veterans in our sample as well as observe the agency paying for the hospitalization.[4] We employ a a Regression Discontinuity Design (RDD) to exploit the change in veterans' Medicare eligibility at age 65 in order to examine how much inpatient health care is consumed and if there are shifts in which agency pays for/finances the health care used once individuals become Medicare eligible.

We find that overall hospital utilization rates change relatively little at age 65. Specifically, we find a three percent increase in the overall inpatient hospital utilization rate at 65. However, we find that there is a *reallocation* in which agency pays for health care. Focusing on the three most common payer types for pre-65 hospitalizations, we find that the share of hospitalizations paid for by the VA decrease by 7 percent, the share of hospitalizations paid for by Medicare increases by 70 percent while the share of hospitalizations paid for by commercial insurance declines by 51 percent. We also find across-group heterogeneity in our results. For groups with a lower pre-65 reliance on the

[3]We describe the circumstances under which a Veteran is eligible to receive health care benefits through the Veterans Health Administration in Section 2.

[4]Agencies paying for health care include Medicare, the VA, Commercial Insurers, Medicaid, and other Federal programs.

VA (e.g., those with the highest, relative cost-sharing), we find larger relative reallocations between commercial insurance and Medicare, while for groups with a higher pre-65 reliance on the VA (e.g., Black veterans), we find smaller reallocations between the VA and Medicare and between commercial insurance and Medicare. Our results suggest that the onset of Medicare eligibility does not result in increases in health care consumption as captured by inpatient hospitalizations, but, instead results in *reallocations* of which agency pays for health care. Specifically, we find that Medicare competes with other federal programs to finance health care for veterans.

We also find evidence that geographic proximity to hospitals may affect the observed reallocation. For example, we find that individuals who live closest to a CMS hospital (0 – 5 miles) have larger increases in Medicare utilization at 65 than those living further away. Similarly, individuals who live furthest from a Veterans Health Administration/VHA (25 – 50 miles) also appear to experience a larger increase in Medicare utilization share at 65 than those who are closer to a VHA.

There is also evidence of strategic postponement of medical procedures. Specifically, we find that for more postponeable procedures (i.e., hip and knee replacements), there are larger increases in overall hospitalization rates and sharper reallocations to Medicare as the payer, compared to non-postponeable procedures (i.e., acute myocardial infarction (AMI) and stroke) where there are smaller changes in the overall hospitalization rates and smaller, albeit positive, shifts to Medicare. This is consistent with the findings of Card et al. (2008) who find increases in overall hospitalization rates for hip and knee procedures at age 65, particularly among individuals who are most likely to have insurance before becoming Medicare eligible. Moreover, this result indicates that price is not the only factor affecting decisions, since VA health care is heavily subsidized and near free for the majority of Veterans in our sample; rather, individuals may be postponing health care utilization to periods of post-Medicare eligibility when access to CMS hospitals greatly expands.

Our work contributes to several strands of literature. The first is the literature on health insurance expansions, specifically studies that examine the impacts of increased health care access via expanded insurance networks on health care utilization and out-

comes. These studies have typically focused on populations that were previously uninsured and gained insurance either through expansion in means-tested programs, such as Medicaid (Finkelstein et al. (2012), Miller and Wherry (2017)) and Kolstad and Kowalski (2012)), or through large legislative changes, such as the adoption of the Affordable Care Act (ACA) (Sommers et al. (2015) and Frean et al. (2017)). These studies find that health insurance expansions generally result in improved outcomes, including increases in health care access, improved health outcomes, as well as reductions in financial strain.

In contrast, we study the impacts of insurance network expansions on those who are already insured, particularly those who already have generous health care benefits through the VA. As such, our findings help inform how expanding insurance networks affects individuals' health care behaviors, including if the presence of new options results in demand shifts (Duggan et al. (2022)) and the reasons for those demand shifts (e.g., perceived quality of a hospital). We also contribute to the literature examining trends in Medicare and VHA use among Medicare-VA dual eligible individuals (e.g., Hynes et al. (2007) and Liu et al. (2018)) but move away from associative analyses. Instead, we estimate the *causal* effect of Medicare eligibility on changes in health care choices by tracking how the *onset* of new health care options, via Medicare, change health care decisions and also examine the mechanisms that result in these changes.

Understanding the factors affecting consumer demand shifts is important for insurers when deciding which providers to include in their networks, particularly if there is a large variance in provider pricing (Shepard (2022)). Moreover, given the observed VA advantage in mortality outcomes, relative to non-VA hospitals (Chan Jr et al. (2022)), understanding why veterans decide to receive health care outside of the VA health system is important, particularly if it could result in worsened health outcomes.

We also contribute to the extensive literature discussing the impacts of Medicare on a variety of outcomes. This literature includes examinations of the impact of Medicare on general health insurance access (Card et al., 2008), mortality (Finkelstein and McKnight (2008) and Card et al. (2009)) as well as the impacts on individuals' financial well-being (Barcellos and Jacobson (2015) and Chatterji et al. (2022)). By focusing on the VA setting where we observe a relatively stable prior choice set around 65, we can

arguably better identify the effects of Medicare eligibility on health care behaviors. This is because complete changes in the health care choice set, which could, in and of itself, change utilization, should be minimized. This is an important consideration given that: i) changes to an insurance network, e.g., through provider exits, have been shown to affect health care consumption ((Zhang, 2022) and Fadlon and Van Parys (2020)).

Lastly, we contribute to the discussion of "crowd-out" across insurance programs. Our focus is on crowd-out in health care utilization across *public* insurance programs, rather than program take-up, since veterans are eligible for both Medicare and VA benefits.[5]. This stands in contrast to most discussions of crowd-out, which focus on insurance take-up across public versus private insurance options (e.g., Cutler and Gruber (1996a) and Cutler and Gruber (1996b)) and often find that public insurance crowd-out of private insurance take-up is significant.[6]

Thus, our paper is the first study, known to the authors, to examine the potential for crowd-out across public insurance programs. This issue is important from a public finance perspective as the VA congressional funding formula accounts for VHA utilization in its disbursement of funds. Moreover, the budget for the VA is sizeable. For example, in 2022, the VA budget was nearly $269 billion with approximately $98 billion allocated to the VHA (Panangala and Sussman (2022)). Thus, understanding how many veterans are truly reliant on the VA is important for the correct forecasting of VA budgets, especially as the size of veteran cohorts change.

The rest of our paper will proceed as follows: Section 2 discusses the institutional background of the VHA, while Section 3 describes our data. Section 4 discusses our methods and we present our results and discussion in Sections 6. We conclude in Section 7.

[5]McInerney et al. (2017) and Carey et al. (2020) study crowd-out, with regard to capacity constraint spillovers, by focusing on how Medicare beneficiaries receipt of health care services is affected by new health care demand among those made newly eligible for Medicaid through program expansions.

[6]For example, Gruber and Simon (2008) estimate a crowd-out of approximately of around 60 percent.

2 VA Institutional Background

The Veterans Health Administration (VHA) is the branch within the US Department of Veterans Affairs (VA) that is charged with providing health care to eligible veterans. Each year, approximately 9 million veterans are enrolled and 7 million receive VA medical services. Of note, approximately 6 percent of the US adult population is classified as a veteran where a veteran is defined as, "a person who served in the active military, naval, or air service, and who was discharged or released under conditions other than dishonorable" (U.S. Department of Veterans Affairs (2019) and Schaeffer, Katherine (2023)).

The VHA is the largest integrated health care system in the USA, operating a network of 171 medical centers and 1298 outpatient facilities across the United States and US territories, and hiring physicians and hospital personnel directly. Figure 1 provides a map of the location of the VA medical centers across the continental USA. The VHA provides extensive services that include primary care, mental health care, specialty care and long-term rehabilitation. Additionally, VA medical care provided through the VHA is classified as a benefit, rather than health insurance coverage. As such, veterans can be enrolled in VHA benefits and simultaneously enrolled in another insurance plan (e.g., Medicare, Medicaid, commercial insurance).

The VHA also purchases care for veterans (i.e., VHA-purchased care) when medically necessary and efficient, or if the veteran needs care that the VHA does not provide (e.g., organ transplants). For example, in 2014, Congress passed the Choice Act, followed by the MISSION Act in 2018, both of which expanded the criteria by which veterans were eligible for VHA-purchased care. The Choice Act established specific criteria based on the distance between the veteran's home and the closest VHA medical center, under the assumption that Veterans living far away had limited access. The MISSION Act changed the eligibility criteria from distance to drive time, and the current criteria make veterans eligible if they live farther than 30 minutes for primary care and mental health care, and 60 minutes for specialty care.[7].

VHA cost-sharing is small compared to typical health insurance plans in the US.

[7]See U.S. Department of Veterans Affairs Fact Sheet (2019) for more details about veteran community care eligibility

For example, approximately two-thirds of the veterans who receive VHA care each year are exempt from any co-payments or co-insurance due to a service-connected disability or an income means test. For those veterans who face a co-pay, the VHA has established a uniform set of co-payments.[8].

3 Data Description

To perform our analysis, we combine administrative electronic health records data from the VHA with state inpatient claims databases for veterans over the age of 18. Our data consists of veterans who ever resided in Florida, Missouri, New York, Oregon, Pennsylvania, or South Carolina between the years 2010 and 2019.[9] For these veterans, we observe their VHA hospitalizations and inpatient hospitalizations occurring outside the VHA, within the above mentioned states.

This merged dataset captures patient demographic characteristics, including age, sex, race, priority group (reflecting VA disability rating and subsequent VHA copays) as well as the zip code of residence. Also captured are clinical information, including the CPT codes and ICD-9 codes associated with an inpatient encounter, as well as encounter dates and location of *all* inpatient hospitalizations for veterans in our sample at VA hospitals as well as hospitals outside the VHA (e.g., private hospitals). The dataset also captures the agency (i.e., payer) who pays for the inpatient hospitalization. In our setting, if a hospitalization occurs within the VHA at a VA hospital, the payer is, by definition, the VA. This is because the VA is a vertically integrated system where only veterans with VHA benefits can access the sytem.[10] For hospitalizations occurring outside of a VA hospital, we observe the agency paying for the hospitalization, which include Medicare (Medicare fee-for-service and Medicare Advantage), Medicaid, commercial health insurers such as Blue Cross, Anthem, and Kaiser, as well as other federal programs (e.g., Tricare or the Indian Health Service). We also observe health care that is paid for/purchased by the

[8]See U.S. Department of Veterans Affairs (2024) for more information on VA copay rates

[9]We focus on these states as these states were willing to merge their data with VHA records. We also focus on inpatient hospitalizations as this was the state data available.

[10]There are a limited number of instances where non-veterans may use VA health care (e.g., at joint DOD/VA facilities).

VA, but provided at non-VA hospitals.[11] We refer to this health care as VA Community Care per its designation by the VA.

Additionally, we use data from the Veteran Survey of Enrollees (SoE) for veterans ages 60 to 70 between the years 2010 to 2021. The SoE is a cross-sectional, annual survey that is administered nationally to veterans who are enrolled in the VHA. It captures a number of veteran outcomes related to health care utilization including all sources of health insurance coverage (i.e., the VA and other sources). As such, this survey allows us to examine and understand patterns of health insurance coverage for the general veteran population, before and after age 65, including estimates of the share who hold more than one form of health insurance coverage prior to and after age 65.

3.1 Outcomes

We examine two primary outcomes of interest. The first are utilization rates, which represent the number of distinct inpatient hospitalizations occurring for a given age group divided by age-group specific denominators. Age-group specific denominators provide a count of the number of VHA-enrolled population within each age group of veterans ever residing in the six states of interest observed between 2010 and 2019, for the relevant group of interest.[12] The second outcome of interest is payer shares. This outcome represents the share of hospitalizations attributable to a given payer source (e.g., Medicare, Medicaid, commercial insurance, and the VA).

3.2 Summary Statistics

Table 1 presents the summary of our data above and below age 65. The majority of the sample consists of men who are white, consistent with veteran demographics. Additionally, the majority of our sample lives in urban areas (approximately 70 percent) and nearly 84 percent qualify for free inpatient health care. The latter implies that financial costs (i.e., patient cost-sharing) should not be a barrier to health care access prior to 65

[11] The VA pays for health care provided outside of VA hospitals in either emergency situations or if the veteran experiences the select circumstances discussed in Section 2.

[12] For example, when examining outcomes by race, the age-group specific denominators are constructed separately for each race.

for the majority of our sample.

Additionally, we present estimates of the change in the share of individuals with these demographic characteristics in the *Change at 65* column. Across the groups examined, we do not find evidence of statistically significant changes in characteristics at 65. This is consistent with the "as-good-as-random" assignment of individuals across the age 65 threshold.

4 Empirical Strategy

For our examination of outcomes, we estimate the following equations:

$$Y_a = \beta_0 + \beta_1 D_a + \beta_2 \tilde{x}_a + \beta_3 \tilde{x}_a^2 + \beta_4 \tilde{x} \times D_a + \beta_5 \tilde{x}_a^2 \times D_a + \epsilon_a \tag{1}$$

$$Y_i = \beta_0 + \beta_1 D_i + \beta_2 \tilde{x}_i + \beta_3 \tilde{x}_i^2 + \beta_4 \tilde{x} \times D_i + \beta_5 \tilde{x}_i^2 \times D_i + \epsilon_i \tag{2}$$

In Equation 1, we collapse VHA encounter records over a ten year period spanning 2010 – 2019 at the month-age level, a. Here, Y_a represents the outcome of interest at the month-age level, a. D is a binary variable such that $\mathbb{1}\big(a \geq 65\big)$; that is, if the observed month-age level observed is greater than or equal to 65 years, D_a takes the value of one, and is zero otherwise. We also collapse utilization counts at the monthly age-cell level, centered at 65 years, which are represented by $\tilde{x}_a$ in Equation 1. Thus, $\tilde{x}_a$ represents the number of months until/since age 65 (e.g., 64 years and 1 month will appear as -11 months and 65 years and 8 months will appear as 8 months). We drop observations at 65 years and 0 months.

Equation 2 is used to estimate the share of hospitalization, i attributable to a given payer source. The observed payer sources include Medicare, the VA, Medicaid, commercial insurance (i.e., private health insurance), other federal insurance (e.g., Tricare), as well as an other category, which captures sources not included in the former groupings.[13]

[13]Tricare is a health care program provided through the Department of Defense for which some military retirees may be eligible.

5 Results

5.1 Change in Insurance Coverage at Age 65

Figure 2a details the changes in insurance coverage at 65 among veterans enrolled in the VHA between 2010 and 2021. We find changes in insurance coverage at 65 across several insurance types. For example, the share with Medicaid increases by 27 percent (1.84 p.p) while there are declines in the share with private health insurance 21 percent (-6.9 p.p). We interpret these changes as likely reflecting changes in Medicaid eligibility as individuals exit the labor force or increased salience of Medicaid program eligibility as individuals age into the Medicare program.

As expected, VA coverage remains steady, at approximately 93 percent, across the 65 threshold. Additionally, we find a more than doubling of the share with Medicare, specifically an approximately 56 percentage point (p.p.) increase. Consistent with this finding, Figure 2b shows that the share of veterans with health insurance outside the VA jumps from approximately 63 percent to 85 percent at age 65. Our results indicate that while VA coverage remains stable, Medicare coverage dramatically increases for the majority of the veteran population at age 65.

5.2 Health Care Utilization

Our main estimates are presented in Tables 3 and 5. Estimates are of β_1 from Equations 1 and 2 and indicate changes inpatient hospitalization rates and payer shares, respectively. We further estimate changes in the utilization rate and shares by insurance payer type.

We find that total inpatient utilization increases slightly by 3.2 percent at age 65. Our effect is notably smaller in comparison to estimates of Card et al. (2008) who find an approximate increase of 7.6 percent in hospital admissions for individuals turning 65. This contrast is consistent with the fact that there should be less pent-up health care demand in our setting since health care coverage and access exists prior to age 65.

While overall utilization remains relatively steady at 65, our results indicate that there is a *reallocation* in which agency pays for health care (see Table 5). In particular, we find that the share of hospitalizations which are paid for by Medicare increases by 70

percent (17.7 p.p) relative to the pre-65 mean share; the share paid for by VA decreases by 7 percent (-3.1 p.p); the share paid for by commercial insurance decreases by 51 percent (-6.4 p.p); the share paid for by the VA community program decreases by 29 percent (-2 p.p); the share paid for by other federal programs, such as TRICARE, decreases by 48 percent (-2.8 p.p); and the share paid for by Medicare decreases by 81 percent (-1.6 p.p), all relative to the pre-65 mean share.

5.2.1 Payer Shifting

In order to understand how the increases in Medicare utilization are "financed" by reductions in the use of other insurers/payers, we can characterize the increases in the Medicare share (i.e., the share of hospitalizations paid for by Medicare) by how much other payer shares are reduced. Specifically, we use Equation 3, below, to characterize the change in payer share attributable to other payers as a fraction of the change in the payer share attributable to Medicare. In doing so, we create a proxy estimate for the "crowd-out" in insurance programs that occurs when veterans become Medicare eligible. We interpret our result as a crowd-out estimate for overall inpatient utilization because there is little change in the overall health care utilization rate. Thus, shifts in payer shares represent re-allocations across payers, holding the overall health care utilization roughly fixed.

$$\Delta\text{Medicare} + \Delta\text{VA} + \Delta\text{Commercial} + \Delta\text{VA-Community} + \Delta\text{Other Fed} + \Delta\text{Medicaid} = 0 \tag{3}$$

Δ represents the change share of utilization (i.e., counts) attributable to a given insurer at 65. We can rearrange Equation 3 to show the following:

$$1 = -\frac{\Delta\text{VA}}{\Delta\text{Medicare}} - \frac{\Delta\text{Commercial}}{\Delta\text{Medicare}} - \frac{\Delta\text{VA-Community}}{\Delta\text{Medicare}} - \frac{\Delta\text{Other Fed}}{\Delta\text{Medicare}} - \frac{\Delta\text{Medicaid}}{\Delta\text{Medicare}}$$

We present these results in Figure 6, which depicts the change in payer shares as a fraction of the increase in Medicare's share of total inpatient utilization. It is evident that the largest shifts in insurer share contributing to the increase in Medicare's payer share,

come from reductions in commercial insurance and the VA. Specifically, 36 percent of the increase in Medicare's payer share comes from declines in the commercial insurance share and 18 percent of Medicare's payer share increase comes from declines in the VA payer share. While commercial insurance was a smaller payer than the VA before veterans turned 65, this payer experiences the biggest relative share decline compared to the increase in Medicare. This may be a function of labor market transitions that move individuals away from employer sponsored health insurance.

Interestingly, we also find a sizeable decline in the payer share attributable to other government programs. Specifically, approximately 54 percent of the change in the Medicare utilization share comes from decreases in VA, VA-Community, other federal insurance and Medicaid payer shares. The reallocation in government spending for health care across federal agencies suggests that Medicare may crowd out other government health care programs.

6 Mechanisms

To better understand the factors influencing the reallocation of payers at age 65, we focus on several mechanisms, discussed below.

6.1 Procedure Heterogeneity and Strategic Behavior

We first focus is on the importance of strategic behavior in explaining the sharp increase in Medicare utilization. To do this, we examine whether veterans are forward-looking in their demand for health care. To address this question, we create two measures of procedure deferrability under the hypothesis that deferrable procedures can accommodate forward-looking behavior – by way of deferred consumption/demand – while non-deferrable procedures cannot. As such, if there are larger shifts in the Medicare utilization share for deferrable procedures (vs. non-deferrable), this suggests that veterans strategically wait and postpone deferrable procedures until they become Medicare eligible at 65.

We create two measures of deferrability and separately estimate Equations 1 and

2 for these two groups. For our first measure, we define emergency procedures as non-deferrable and non-emergency procedures as deferrable.[14] For our second measure of deferrability, we consider hospitalizations for three groups of Diagnosis-Related Groups (DRGs): mental health and substance abuse, acute myocardial infarction/AMI (i.e., heart attack) and strokes, and hip and knee procedures.[15] The former are considered non-deferrable because of their likely as-good-as-random onset (e.g., see Fadlon and Nielsen (2019)), while the latter is considered deferrable (e.g., see Card et al. (2008)).

Our results are presented in Table 3 for emergency and non-emergency admissions and in Table 4 for the three DRGs examined. We find that hospitalization rates for non-emergency admissions increase little (0.68 percent), but this increase is not statistically different from zero. However, we find an approximately 8 percent increase in non-emergency admissions at 65. We see similar patterns across the three DRGs examined. Mental health and substance abuse admissions do not experience a statistically significant increase and AMI/stroke admissions increase moderately at 10 percent. In contrast, we find a much larger and statistically significant 33 percent increase in the utilization rate of hip and knee procedures at 65. Taken together, our results suggest that veterans may strategically postpone deferrable procedures until they become Medicare eligible.

6.2 Distance

We examine the importance of distance for veterans' shift to Medicare at 65. To motivate our analysis, we present Figures 7 and 8. Figure 8 shows the geographic location of VA hospitals and CMS hospitals across the continental US. It is evident that there is geographic dispersion in VA hospitals and that CMS hospitals are much more geographically dense in concentration by comparison. Figure 7 depicts the distribution of the nearest VHA and CMS hospitals within 100 miles of veterans. More than **50** percent of the

[14] In our sample, emergency admissions are hospitalizations for which the admission source for the hospitalization is an emergency room or admissions for which there is an emergency department claim on the day of or the day prior to an inpatient admission. Approximately 64 percent of hospitalizations in our sample are classified as emergency admissions by this definition.

[15] The DRG codes for mental health and substance abuse include codes 876, 880 – 887, 894 – 897. The DRG codes for AMI and stroke include codes 280 – 285 and 061 – 066. The DRG codes for hip and knee replacement include codes 469 and 470.

veterans in our sample live within 5 miles of a CMS hospital, while fewer than 25 percent live within 5 miles of a VA hospital, indicating that veterans tend to live relatively closer to CMS hospitals.

To understand the importance of hospital distance in the Medicare utilization increase, we perform two tests. We first test if the actual distance traveled to a hospital decreases at 65 under the assumption that if hospital distance is important in the decision to move to Medicare, distance traveled should decrease. This is motivated, in part, by the documented positive correlation between hospital proximity and hospital demand (Gowrisankaran et al. (2015)). To perform this test, we estimate the actual distance traveled for hospital visits in Florida, New York, and Pennsylvania as these are the states for which we observe hospital names and geo-coordinates. We then estimate Equation 2 where the outcome is now distance to the hospital selected.

We also test the importance of distance by examining how relative distance affects shifts in payer shares. Specifically, we test the hypothesis that if distance matters for veterans' move to Medicare at 65, the increase in Medicare's share as a payer source will be larger for individuals who live *relatively* closer to CMS hospitals versus VA hospitals, all else equal. To perform this test, we determine how the payer share varies for individuals who live within a fixed distance to a CMS hospital, while varying the distance to the nearest VA hospital. We focus on the group of veterans who live 0 – 5 mile from a CMS hospital as this is the majority of veterans in our sample, representing more than 50 percent of veterans.

The results for our first test are presented in Figure 9. We find that distance traveled decreases slightly by approximately 0.7 miles, translating to a travel reduction of approximately 3.4 percent from the pre-65 mean. This result appears to be driven by emergency admissions, where we find a reduction in miles traveled of approximately 1.3 miles (-8.3 percent), with no sizeable no statistically significant effects for non-emergent admissions.

We also find evidence that relative distance matters, as shown in Figure 10. For example, the change in the share of hospitalizations paid for by Medicare nearly triples for individuals who live within 25 – 50 miles from a VHA versus 0 – 5 miles from a VHA;

respectively the coefficient estimates for β_1 are 0.21 and 0.08. These increases seem to come from declines in the use of both commercial insurers and the VA Community program, as evidenced from the 0.02 decline in the commercial share for those 0 – 5 miles from a VHA versus a 0.06 decline for those 25 – 50 miles from a VHA and the lack of an effect on the VA community share for those 0 – 5 miles from a VHA versus 0.03 decline for those 25 – 50 miles from a VHA. The latter result is particularly interesting given that VA community care is received outside of the VA, but is paid for by the VA. This suggests that people may prefer to use Medicare over the VA for health care received outside of the VA.

6.3 Quality Ratings

We examine the importance of quality, as measured by hospital ratings, in veterans' decisions to increasingly use Medicare once eligible to do so. The hypothesis underlying this analysis is that if hospital quality is important, we expect veterans to choose higher rated hospitals once they become Medicare eligible.

To test our hypothesis, we collect hospital ratings from two sources for hospitalizations occurring in Florida, New York, and Pennsylvania as these are the states in which we can observe the name of the hospital visited. VA hospital ratings data is available for each hospital for the years 2016 – 2019 and is provided by the VA's Strategic Analytics for Improvement and Learning Value Model (SAIL), while CMS hospital ratings are obtained from CMS Care Compare for the same years.[16] Of note, both systems assign hospitals a 1 – 5 rating, but during this time period, the VA used its own internal rating methodology, which was different from CMS. However, we believe the rating comparison across CMS and VA hospitals is still meaningful as both rating systems use the same numeric scale (1 – 5).

We next assign the average hospital rating, averaged over the period 2016 – 2019, to the VA/CMS hospital visited by a veteran and re-estimate Equation 2 and present our results in Figure 11. We do not find a change in the average rating of the hospital selected at age 65. This result is not sensitive to distinctions between emergent and non-emergent

[16]More information on the CMS hospital rating methodology can be found at Centers for Medicare and Medicaid Services (2024).

hospital admissions, as shown in Figure 12, where we also do not find a change in the average rating of the hospital selected. This is likely a function of the largely overlapping distribution of rating for hospitals within a near vicinity of veterans, defined as hospitals within a 25 mile radius of a veteran. Figure 13 shows this, demonstrating that the rating distribution of VA versus CMS hospitals is largely overlapping within this 25 mile radius.

6.4 Procedure Price Variation

We investigate the importance of procedure pricing for veterans' shifts to Medicare at 65. To do this, we focus on services not covered by traditional Medicare, but may be covered by the VHA – audio/hearing exams and dental exams, and re-estimate Equation 1. We are not able to observe use of these services outside of the VA since these are outpatient procedures. As a result, we examine if these services have steady utilization within the VHA, under the hypothesis that lack of disruptions in the utilization of these services within the VA implies steady use of the VA for these services. If this is the case, this suggests that veterans continue to use the VA when it is cheaper to do so.

Our results are presented in Figure 14. We do not find statistically significant changes in the utilization rates for these two procedures. This case setting suggests that the veterans in our sample are aware, to some degree, of procedure pricing and also choose to continue using the VA when it is cheaper to do so.

7 Conclusion

This study examines the effect of aging into Medicare eligibility with pre-existing health insurance coverage and its effects on health care consumption. We focus on the population of veterans enrolled in the Veterans Health Administration (VHA), a relatively generous health benefit provided independent of age and employment, and analyze how the onset of Medicare eligibility at age 65 affects health care behaviors for this group. Specifically, we employ Regression Discontinuity methods and use detailed veteran electronic medical record data linked to six state inpatient claims databases to examine how inpatient health care utilization is affected at age 65.

We find that overall inpatient utilization increases slightly, by approximately 3 percent. However, we find large re-allocations across payers. Specifically, among the top three payers, we find that the share of hospitalizations paid for by Medicare increases by 70 percent relative to the pre-65 mean, while the share of hospitalizations paid for by the VHA and commercial insurers declines by 7 and 51 percent relative to the pre-65 mean, respectively.

The increased use of Medicare appears to be driven mainly by distance, as we find that the average distance traveled to a hospital falls by approximately 0.7 miles (3.4 percent) with no observed change in the average quality rating of the selected hospital. However, other factors contributing to the increased use of Medicare include the deferrability of procedures, as seen with the increase in hip and knee procedures at 65, as well as price, as observed with the stable utilization of services typically not covered by traditional Medicare (i.e., audio and dental exams) within the VA around age 65.

Taken together, our results demonstrate that Medicare appears to be valued beyond the basic provision of health insurance, as our veteran sample ages into Medicare eligibility with relatively generous health care coverage through the VA. Moreover, the sharp reallocation toward Medicare as the payer for hospitalizations at 65 suggests that Medicare may compete with other federal programs to finance health care for veterans.

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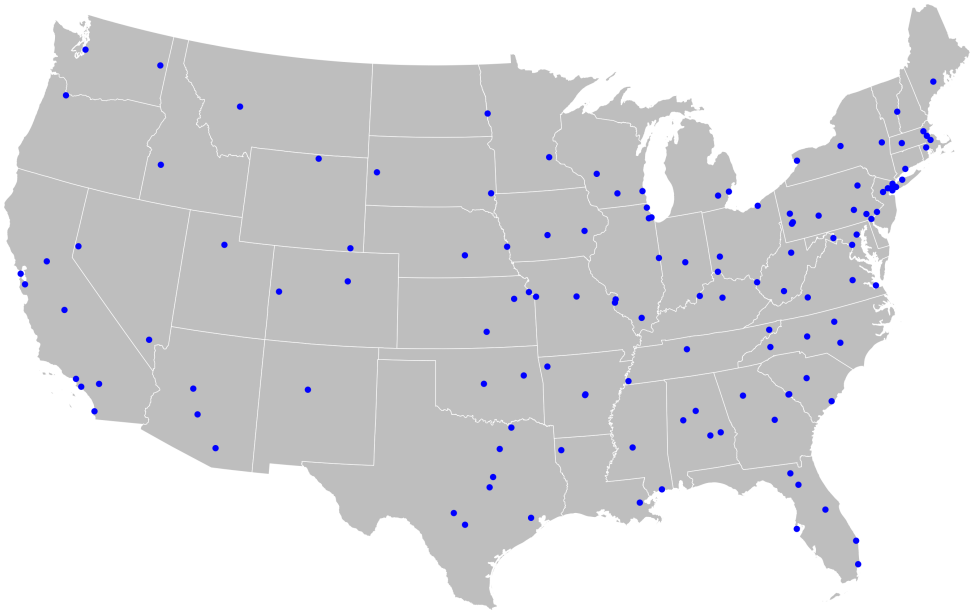
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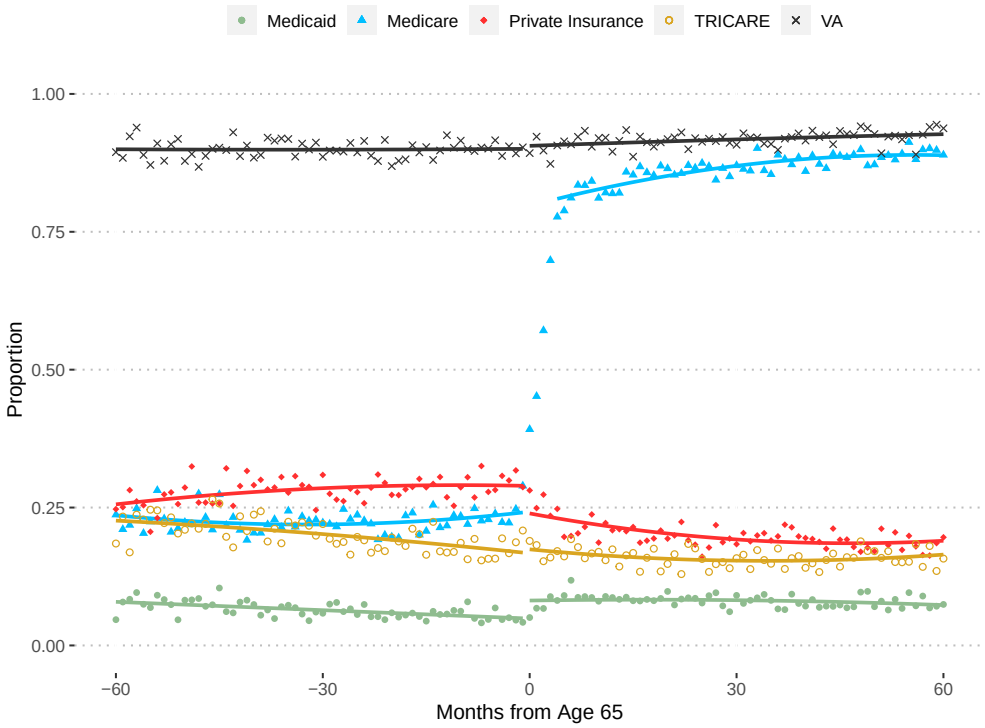
Figure 1: Geography of VA Medical Centers



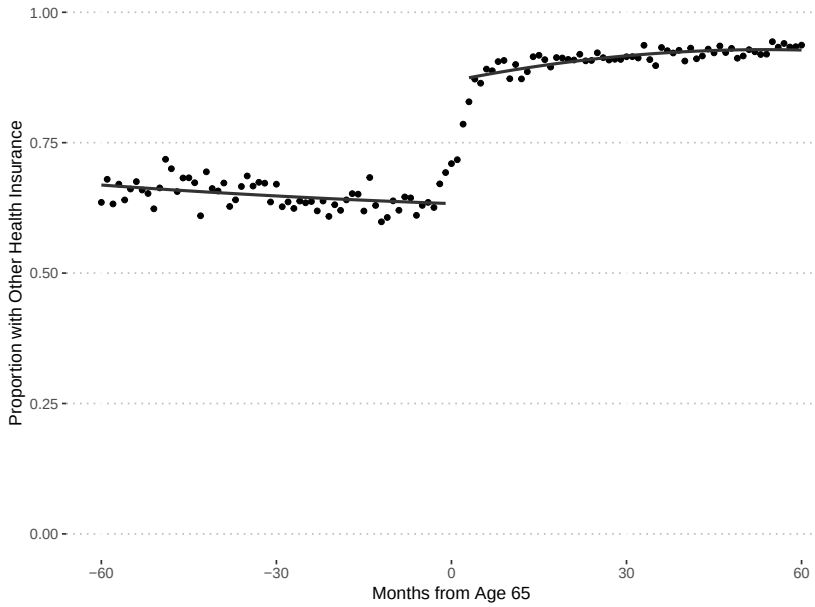
This figures presents the geographic location of VA medical centers across the continental United States.

Figure 2: Age Profile of Health Insurance

(a) All Sources



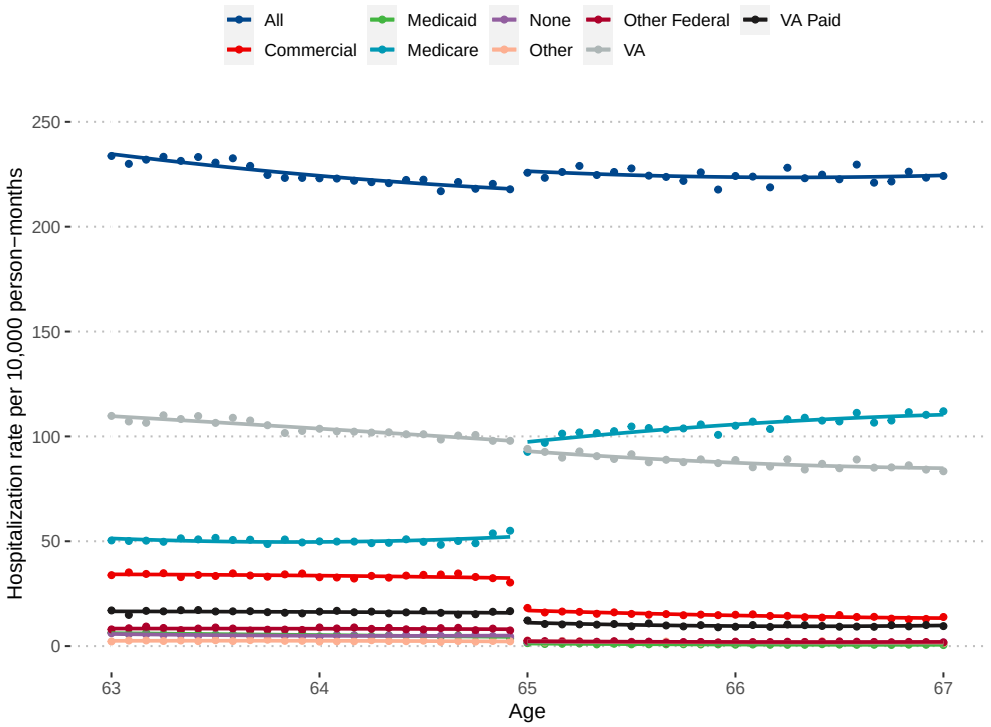
(b) Any Health Insurance Aside from VA



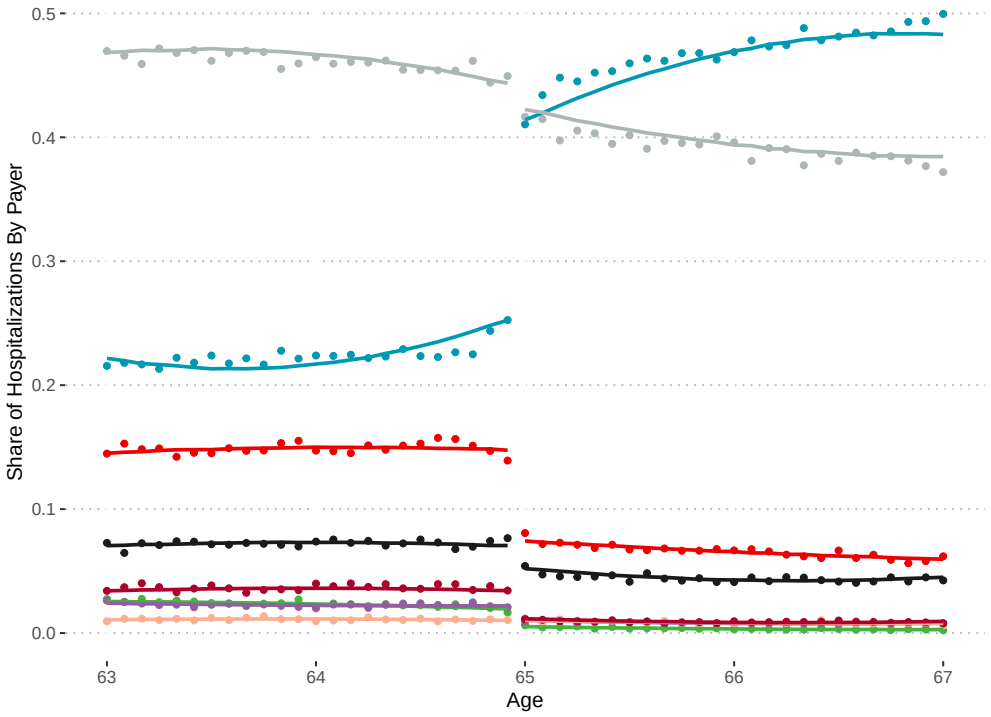
Notes: Age profile of different insurance sources from the VA survey of enrollees 2010 – 2021. Categories are not mutually exclusive. *Medicare* refers to either traditional Medicare or Medicare Advantage, and *TRICARE* includes any TRICARE plan. Fitted lines do not include the four month period immediately after age 65 due to missing information on exact survey completion date. See Table XXX for regression estimates.

Figure 3: Age Profile of Hospitalization Rate and Payer Share

(a) Hospitalization Rate



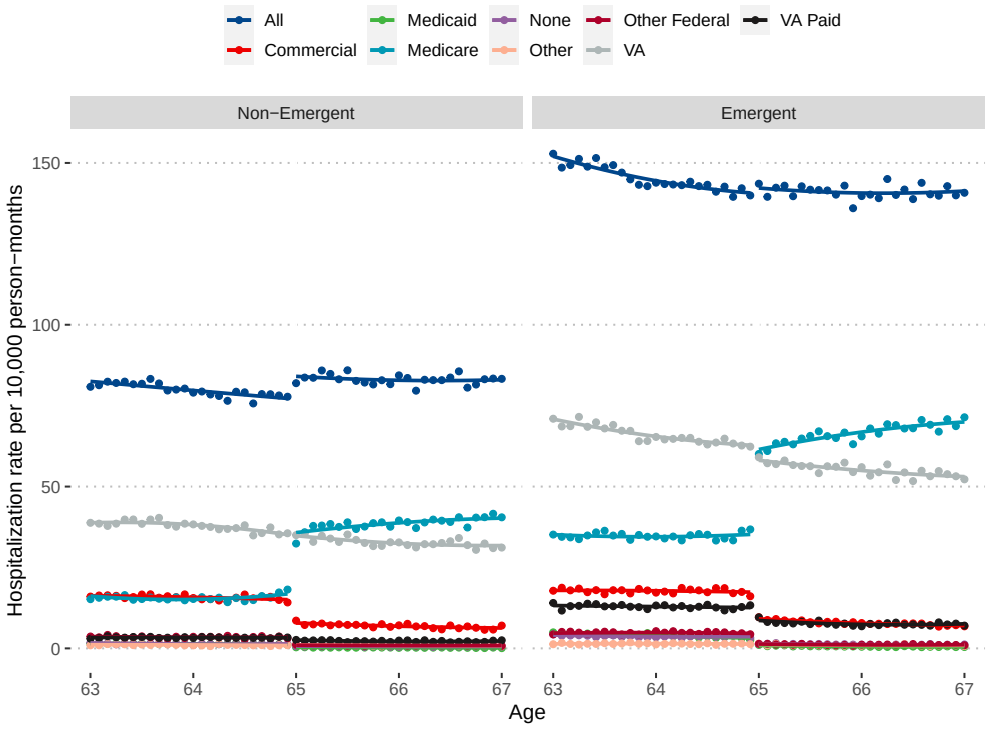
(b) Share of Hospitalizations Paid by Payer



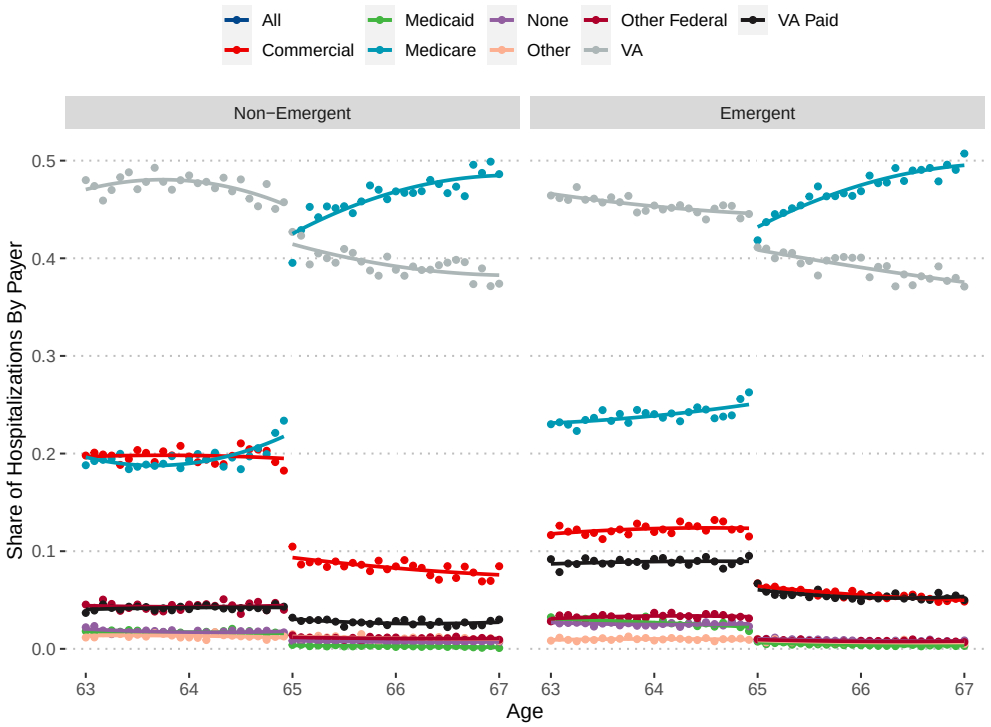
Notes: Age profile of the hospitalization rate per 10,000 person months overall and by payer (top) and share of hospitalizations paid by specified payers (bottom). *Medicare* refers to either traditional Medicare or Medicare Advantage, and *Other Federal* includes any TRICARE plan. See Table XXX for regression estimates.

Figure 4: Age Profile of Hospitalization Rate and Payer Share for Emergent and Non-Emergent Hospitalizations

(a) Hospitalization Rate



(b) Share of Hospitalizations Paid by Payer

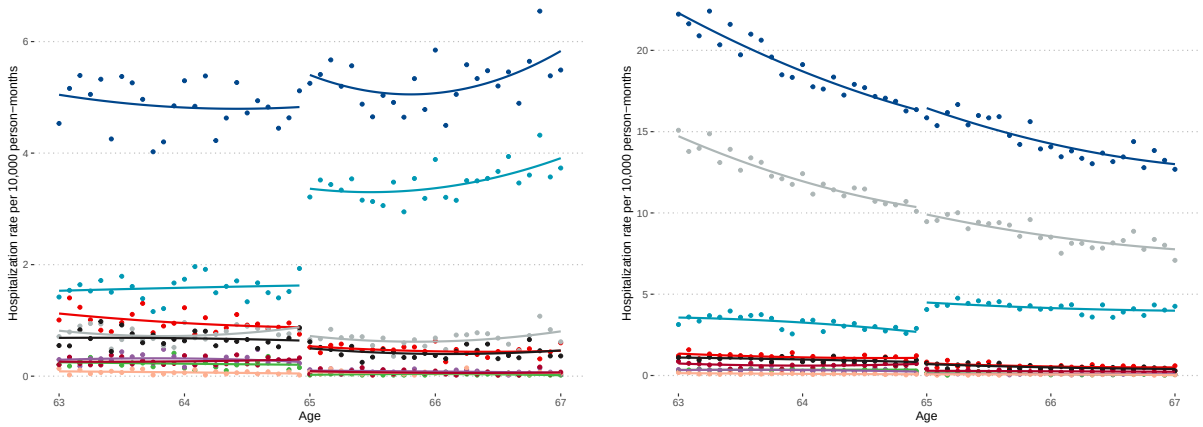


Notes: Age profile of the hospitalization rate per 10,000 person months overall and by payer (top) and share of hospitalizations paid by specified payers (bottom). *Medicare* refers to either traditional Medicare or Medicare Advantage, and *Other Federal* includes any TRICARE plan. "Emergent" refers to the admission originating from the emergency department. See Table XXX for regression estimates.

Figure 5: Age Profile of Hospitalization Rate and Payer Share for AMI-Stroke and Mental Health and Substance Abuse

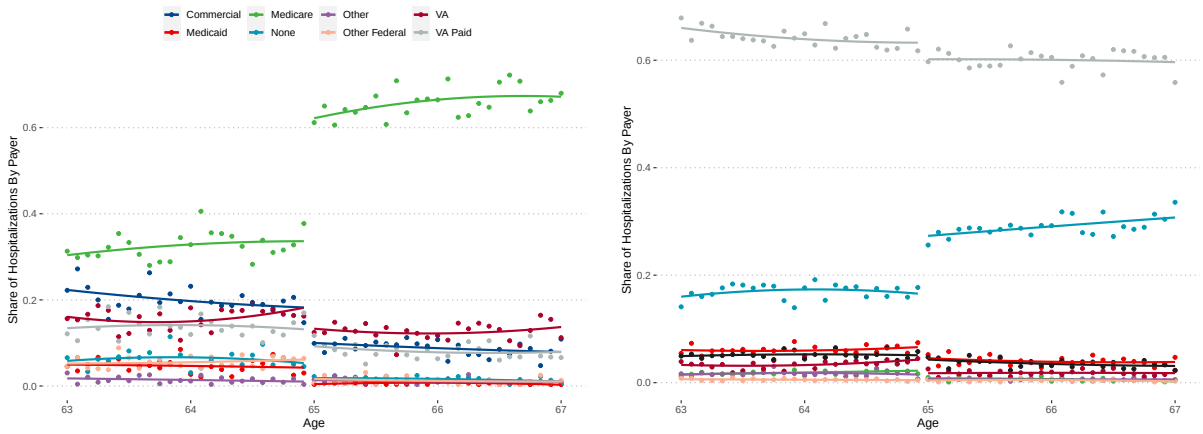
(a) AMI-Stroke Rate

(b) Mental Health-Substance Abuse Rate



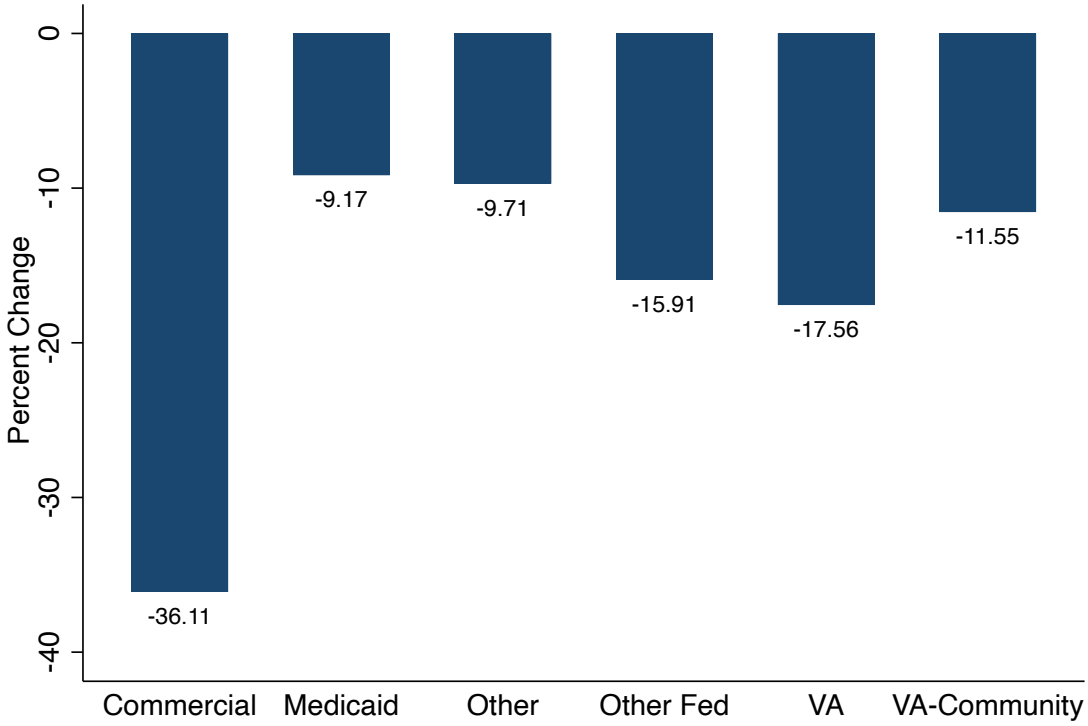
(c) AMI-Stroke Share

(d) Mental Health/Substance Abuse Rate



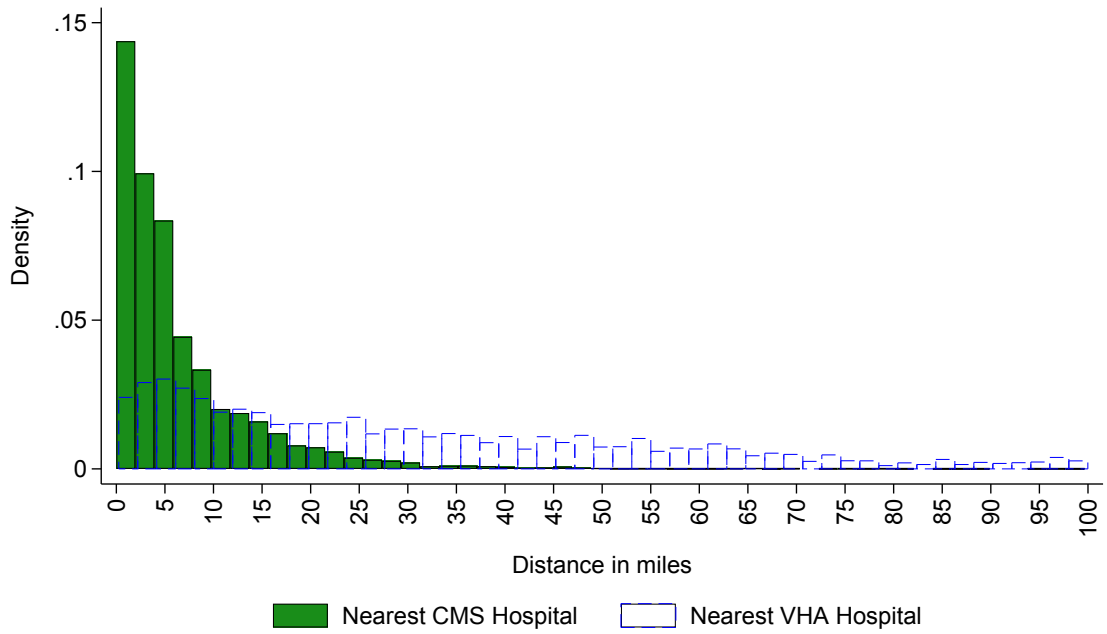
Notes: Age profile of the hospitalization rate per 10,000 person months overall and by payer (top) and share of hospitalizations paid by specified payers (bottom) for AMI and Stroke hospitalizations and Mental Health and Substance Abuse hospitalizations. Hospitalizations types are identified by DRG code. *Medicare* refers to either traditional Medicare or Medicare Advantage, and *Other Federal* includes any TRICARE plan. See Table XXX for regression estimates.

Figure 6: Payer Shift Relative to Medicare Share Increase



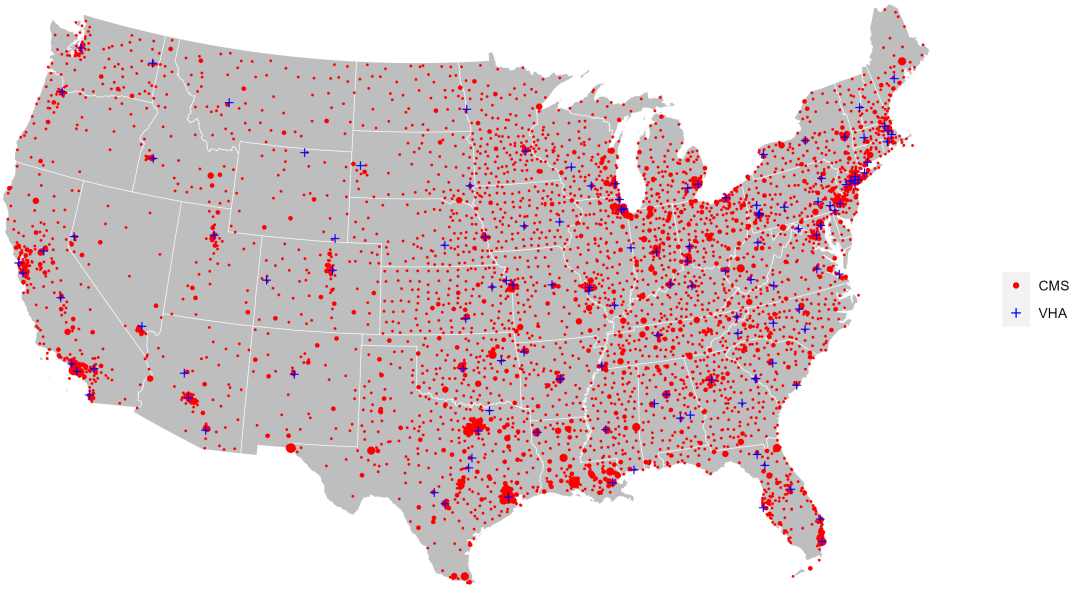
This figure depicts the change in the share of utilization for each payer group J as a change in the share of utilization paid for by Medicare at age 65 (i.e., $\frac{\Delta \text{Payer } J}{\Delta \text{Medicare}}$ from Equation 3).

Figure 7: Nearest CMS or VHA hospital within 100 miles



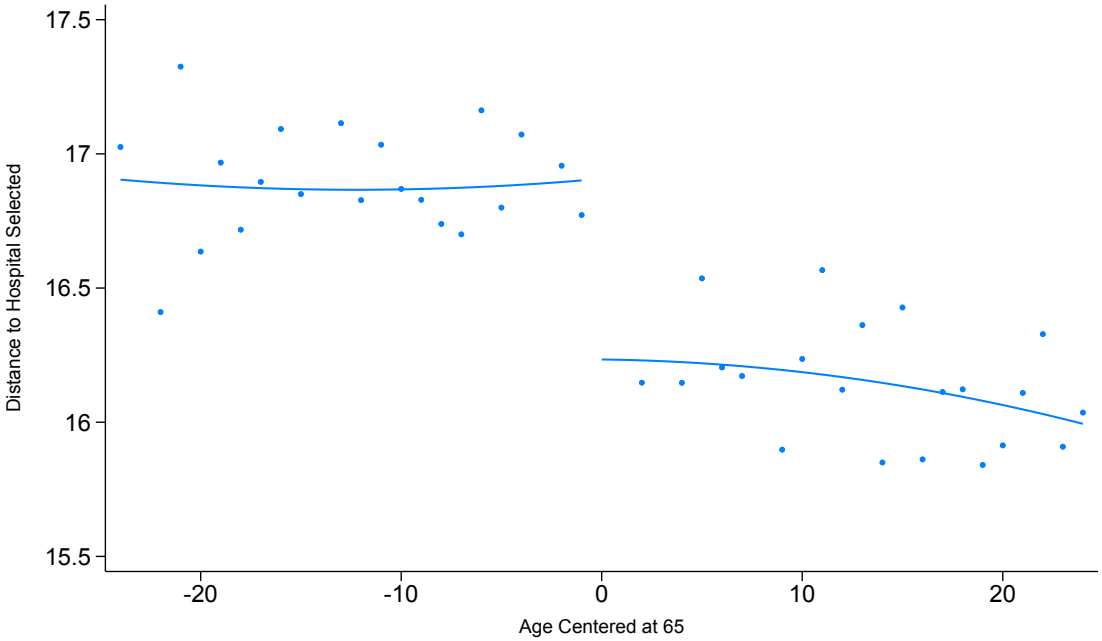
This figure depicts the distribution of the Nearest CMS and VHA hospitals within 100 miles of veterans in our sample, ages 65 - 67 years.

Figure 8: CMS and VHA hospital locations



This figure depicts the location of CMS and VA hospitals between 2009 - 2019.

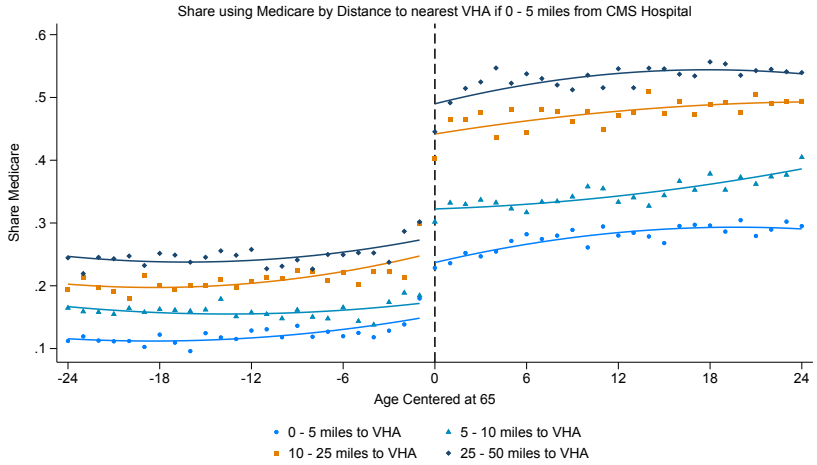
Figure 9: Distance Traveled to Selected Hospital



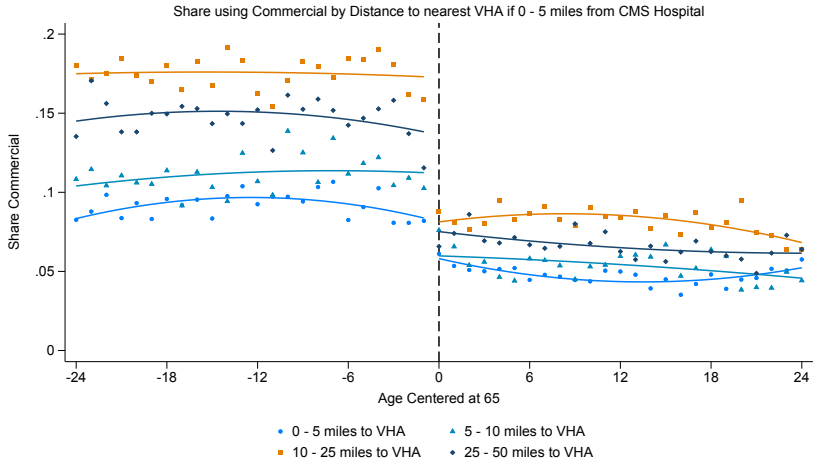
This figure depicts the estimate of β_1 from Equation 2 where the outcome is distance traveled in miles for hospitalizations occurring in Florida, New York, or Pennsylvania. See Table XX for regression estimates.

Figure 10: Payer Share Shifts by Relative Distance between CMS and VA Hospitals

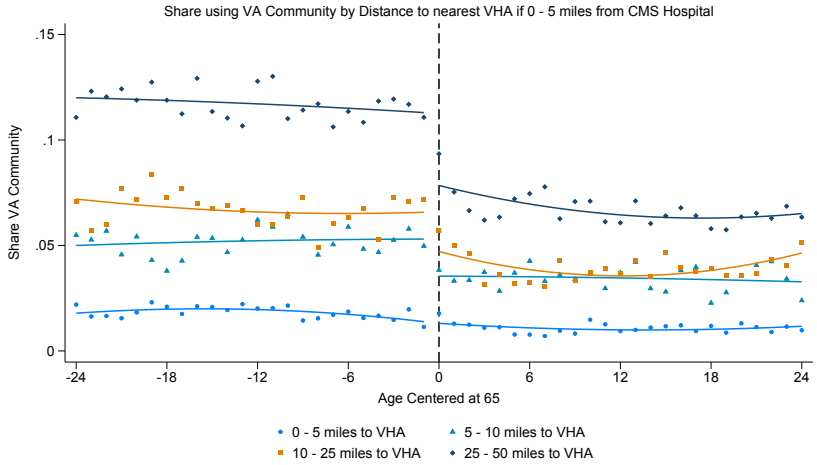
(a)



(b)

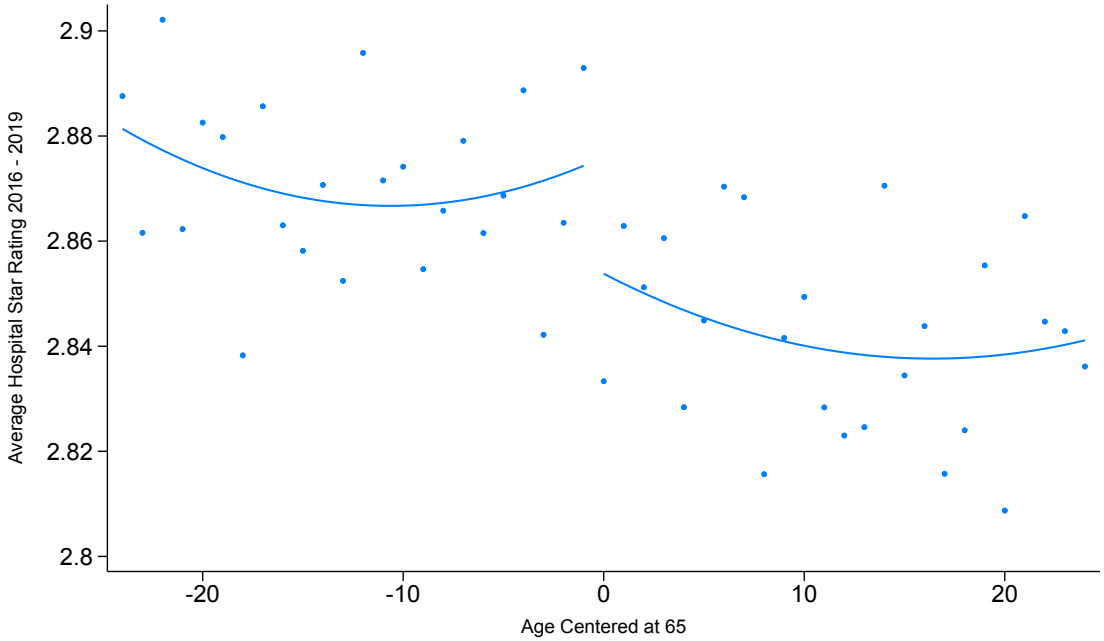


(c)



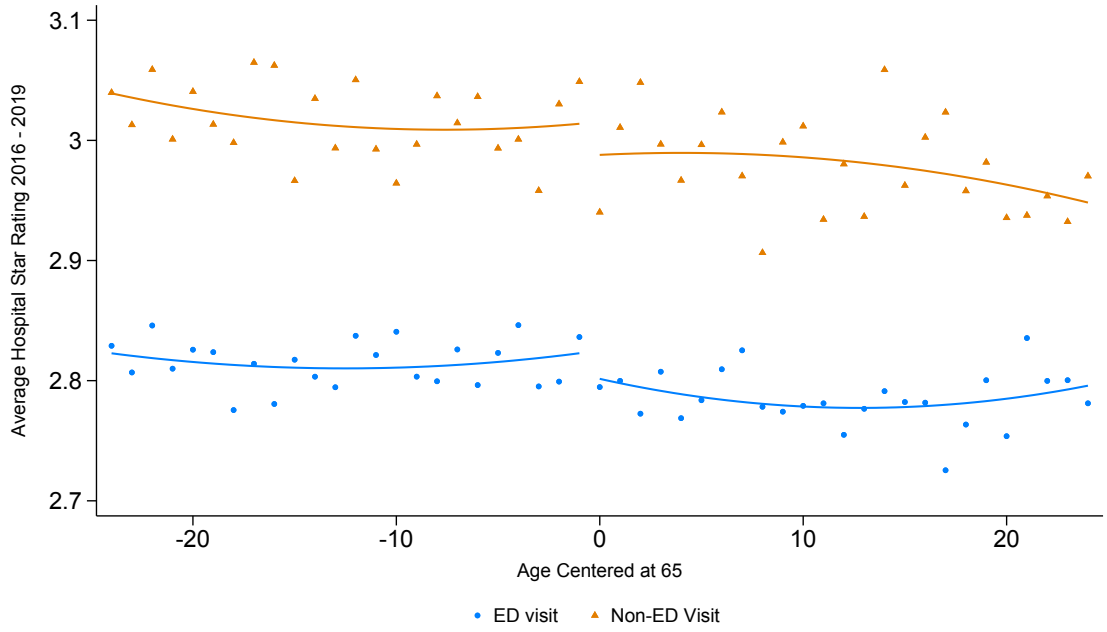
This figure presents estimates of β_1 from Equation 2 where the veteran sample lives between 0 – 5 miles from a CMS hospital, but a varied distance from a VHA hospital. Panel (a) represents the Share using Medicare; (b) the share using Commercial insurance; (c) the share using VA Community Care.

Figure 11: Average Rating of Selected Hospital



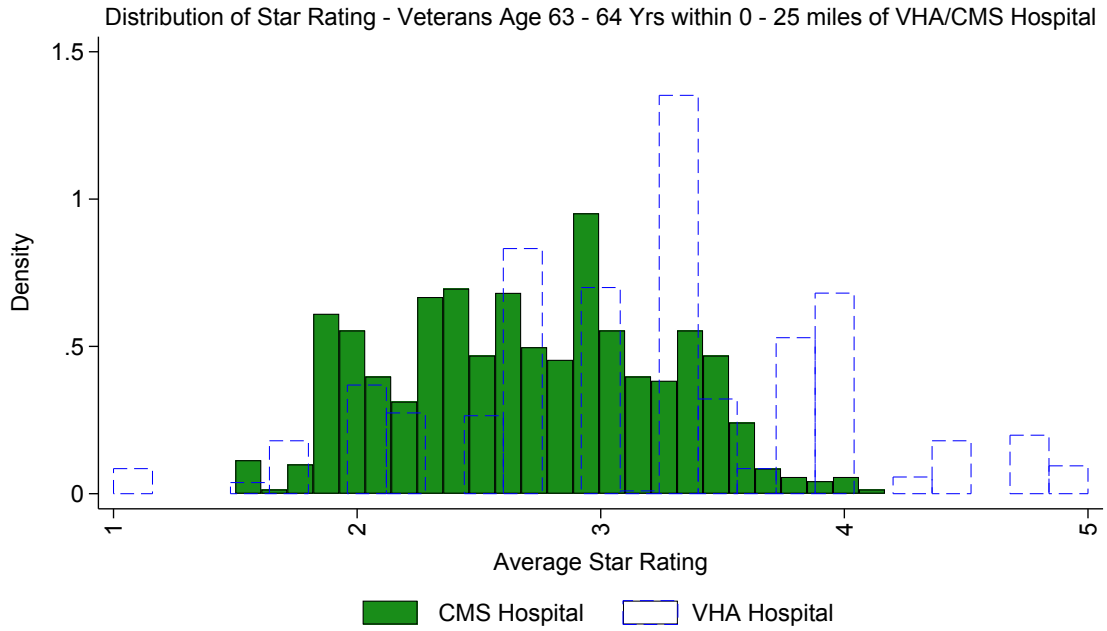
This figure depicts the estimate of β_1 from Equation 2 where the outcome is the star rating $(1-5)$ for hospitalizations occurring in Florida, New York, or Pennsylvania between 2016 – 2019. See Table XX for regression estimates.

Figure 12: Average Rating of Selected Hospital – Emergent versus Non-Emergent Admission



This figure depicts the estimate of β_1 from Equation 2 where the outcome is the star rating (1 – 5) for emergent vs. non-emergent hospitalizations occurring in Florida, New York, or Pennsylvania between 2016 – 2019. See Table XX for regression estimates.

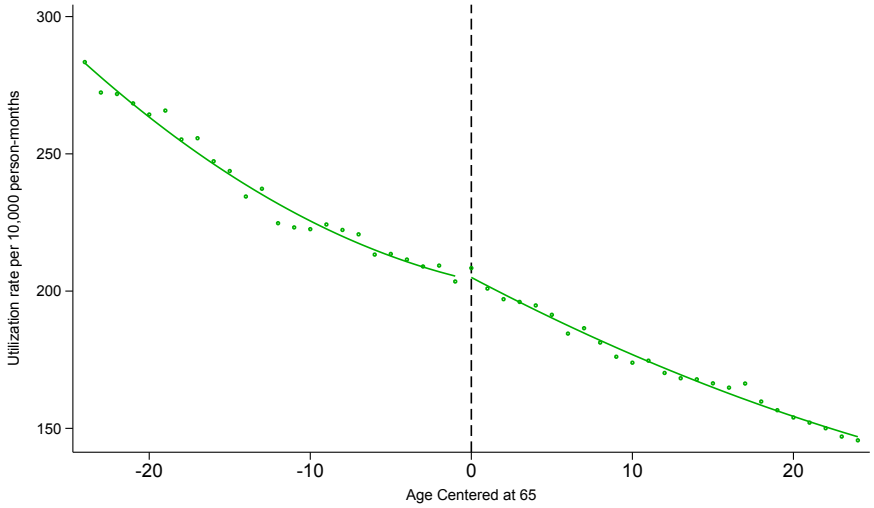
Figure 13: Average Rating of Selected Hospital



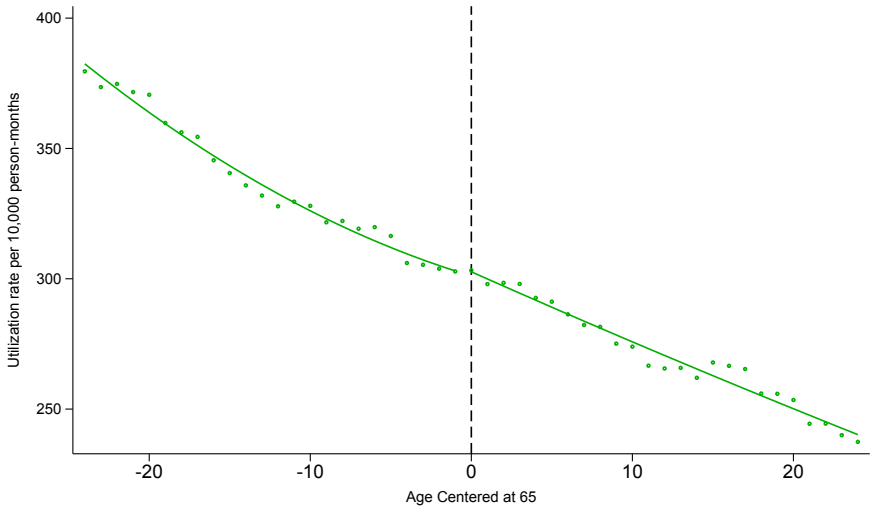
This figure depicts the average hospital rating, between 2016 to 2019, for VA and CMS hospitals located within 25 miles of a veteran.

Figure 14: Procedure Utilization Variation

(a) Utilization Rate of Audiology Exams



(b) Utilization Rate of Dental Exams



This figure presents estimates of β_1 from Equation 1 for veterans who have obtained (a) audiology exams or (b) dental exams within the VHA between 2010 – 2019.

Table 1: Summary Statistics and McCrary Test

Characteristic	63-65	65-67	Change at 65	Std. Error
Share Male	0.955	0.965	-0.0001	0.0020
Share White	0.724	0.755	0.0033	0.0029
Share Black	0.193	0.162	-0.0012	0.0029
Share Urban	0.693	0.692	0.0028	0.0037
Share Rural	0.307	0.308	-0.0027	0.0037
Priority Group				
Share PG 1 – 4	0.562	0.581	0.0069	0.0045
Share PG 5	0.275	0.238	-0.0078	0.0043
Share PG 7 – 8	0.124	0.135	0.0018	0.0024
McCrary Test	480,550	536,870	-86.3434	2351.4650

Notes: Summary statistics at the person-year level for individuals in the sample that were ages 63 – 67 during the study period. The *change in 65* column gives the coefficient estimate for β_1 from Equation 1 with the indicated characteristic as the outcome variable. The final row shows results from a McCrary test (cite me XXX) in which the outcome is the count of person-months lived by VA enrollees in the sample, estimated using Equation 1.

Table 2: Change in Insurance at Age 65

	Medicare	Medicaid	Private Insurance	TRICARE	VA	Medicare (CMS Match)	Any Other Health Insurance
Change at 65	55.78	1.84	-6.90	0.76	0.98	40.37	21.98
	(1.35)	(1.67)	(2.76)	(2.31)	(1.61)	(0.16)	(1.74)
Mean Age 64	24.33	6.70	32.78	16.33	93.28	21.04	63.34

Notes: Estimates of changes in health insurance type at age 65. Data for the first five columns comes from years 2010-2021 of the VA survey of enrollees (n = 14,609), and the data for the last column comes from a yearly match with administrative data from CMS (n = 2581558). Estimates from survey data do not include the four month period immediately after age 65 due to missing information on exact survey completion date. Robust standard errors are in parentheses below the estimates. *Mean Age 64* gives the proportion of individuals reporting that type of insurance coverage just before the age 65 cutoff.

Table 3: RD Estimates of the Change in Hospital Admission Rates at Age 65

	All Hospitalizations	Emergent	Non-Emergent	Urban	Rural	Black	White	PG 1-4	PG 5	PG 7-8
Change at Age 65	7.33	0.91	6.33	9.12	3.58	11.11	7.51	8.96	4.68	4.16
	(1.67)	(1.32)	(1.18)	(2.57)	(3.99)	(4.72)	(2.66)	(2.29)	(3.80)	(2.96)
Rate Just Before 65	222.86	143.28	79.50	241.47	186.54	261.04	216.95	272.80	250.43	123.14
% Change at 65	3.29	0.64	7.96	3.78	1.92	4.26	3.46	3.28	1.87	3.38
Observations	48	48	48	48	48	48	48	48	48	48

Notes: Changes in inpatient admission rates per 10,000 person-months at age 65 estimates from equation XXX. For *Urban*, *Rural*, *Black*, *White*, and Priority Groups, rates are calculated within group. *Emergency* admissions are those that came through the emergency department, and *Non-Emergent* are those that did not. Robust standard errors are in parentheses below the estimates. *Rate Just Before 65*gives the rate just before the age 65 cutoff, and *% Change at 65* scales the estimate by dividing it by the pre-65 rate.

Table 4: RD Estimates of the Change in Hospital Admission Rates for Specific Procedures at Age 65

	Hip and Knee	Mental Health & Substance Abuse	AMI & Stroke
Change at Age 65	1.95	0.13	0.50
	(0.33)	(0.44)	(0.27)
Rate Just Before 65	5.90	16.38	4.96
% Change at 65	33.10	0.80	10.1
Observations	48	48	48

Notes: Changes in inpatient admission rates per 10,000 person-months at age 65 estimates from equation XXX. Procedures are identified by DRG for the admission. Robust standard errors are in parentheses below the estimates. *Rate Just Before 65*gives the rate just before the age 65 cutoff, and *% Change at 65* scales the estimate by dividing it by the pre-65 rate.

Table 5: RD Estimates of the Change in Payer Share for Hospital Admissions at Age 65

	All Hospitalizations	Emergent	Non-Emergent	Urban	Rural	Black	White	PG 1-4	PG 5	PG 7-8
Medicare	16.14	15.47	17.34	15.58	17.63	12.36	16.56	13.87	12.80	24.18
	(0.36)	(0.49)	(0.59)	(0.43)	(0.70)	(0.86)	(0.43)	(0.48)	(0.72)	(1.18)
	24.73	25.65	23.09	24.58	25.13	21.96	24.65	23.74	25.02	27.50
VA	-1.32	-1.65	-0.72	-1.04	-2.07	-0.97	-1.45	-1.22	-0.22	-2.91
	(0.39)	(0.49)	(0.65)	(0.47)	(0.71)	(0.98)	(0.46)	(0.53)	(0.79)	(1.16)
	42.53	42.67	42.31	42.93	41.45	51.88	41.82	45.43	47.55	31.45
VA Paid	-1.76	-2.20	-0.85	-2.14	-0.91	-1.75	-1.86	-1.39	-2.73	-1.42
	(0.19)	(0.27)	(0.25)	(0.25)	(0.29)	(0.41)	(0.23)	(0.29)	(0.40)	(0.48)
	6.99	8.64	4.04	8.09	4.45	5.35	7.28	7.47	8.12	4.03
Commercial	-7.10	-5.74	-9.63	-6.48	-8.60	-3.90	-7.64	-6.19	-2.86	-13.83
	(0.25)	(0.29)	(0.46)	(0.30)	(0.48)	(0.51)	(0.30)	(0.32)	(0.35)	(1.02)
	14.43	12.04	18.71	13.65	16.35	9.14	15.23	12.52	6.53	27.50
Other Federal	-2.23	-1.95	-2.75	-2.30	-2.11	-1.67	-1.93	-2.74	-1.02	-1.13
	(0.12)	(0.15)	(0.22)	(0.15)	(0.21)	(0.25)	(0.14)	(0.18)	(0.19)	(0.31)
	3.37	3.00	4.03	3.56	2.98	2.51	3.10	4.09	2.02	1.80
Medicaid	-1.36	-1.48	-1.15	-1.38	-1.32	-1.70	-1.24	-0.67	-3.06	-1.29
	(0.09)	(0.12)	(0.13)	(0.11)	(0.16)	(0.27)	(0.10)	(0.10)	(0.25)	(0.24)
	1.89	2.12	1.49	1.93	18.2	2.58	1.69	1.28	3.92	1.52
Other	-2.36	-2.46	-2.23	-2.24	-2.62	-2.36	-2.43	-1.67	-2.91	-3.60
	(0.17)	(0.21)	(0.30)	(0.19)	(0.37)	(0.44)	(0.21)	(0.23)	(0.36)	(0.53)
	6.05	5.87	6.38	5.26	7.82	6.59	6.22	5.63	6.84	6.21
Observations	570839	362038	208484	397294	170468	95154	412355	321302	143860	57289