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HOW DOES SUPPLEMENTAL MEDICARE COVERAGE AFFECT THE DISABLED UNDER-65 POPULATION?: AN EXPLORATORY ANALYSIS OF THE HEALTH EFFECTS OF STATES' MEDIGAP POLICIES FOR SSDI BENEFICIARIES

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How Does Supplemental Medicare Coverage Affect the Disabled Under-65 Population?: An Exploratory Analysis of the Health Effects of States' Medigap Policies for SSDI Beneficiaries

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ABSTRACT

A substantial portion of the costs associated with, and the value to beneficiaries of, Social Security Disability Insurance is Medicare eligibility. However, the benefits of this eligibility can vary due to differences in state policies on supplemental Medicare coverage, also known as Medigap. Although Medigap policies are federally regulated to be issued to 65-and-over Medicare beneficiaries with specific restrictions over underwriting, these policies are left to states to regulate with regard to the under-65 SSDI population, generating substantial cross-state and temporal variation. This paper documents the variation in availability and generosity of under-65 Medigap eligibility for the SSDI population. Furthermore, it exploits this variation to provide initial estimates of how this eligibility affects the health status of non-Medicaid-eligible SSDI recipients. Our main finding is that requiring Medigap plans be offered for under-65 SSDI recipients substantially improves self-reported health of this population, with suggestive evidence that this improvement is stronger as underwriting restrictions increase and among SSDI beneficiaries with mental health conditions. The estimated effect is highly robust to alternative scaling or categorizations of self-reported health, choice of data set, inclusion of fixed effects, controls for local Medicare Advantage penetration, and falsification tests. This effect is nearly three times the size of the estimated increase in self-reported health in the Oregon Medicaid expansion.

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Introduction

A substantial portion of the costs associated with, and the value to beneficiaries of, Social Security Disability Insurance is Medicare eligibility. SSDI recipients are the vast majority of under-65 Medicare-eligible population in the US,[1] and while previous work has focused on behavior and outcomes during the two-year waiting period between cash benefit and Medicare eligibility or the effects of eliminating this waiting period, there is much less research on the impact of differences in Medicare coverage itself, including private supplemental coverage (Medigap) and Medicare Advantage (MA). These differences arise from two sources: first, although the over-65 Medicare population faces federally required guaranteed issuance and open and special enrollment periods limiting underwriting, Medigap policies for under-65 SSDI recipients depend on state regulations; and second, the availability of managed care options through Medicare Advantage and Special Needs Plans (SNPs), also varies dramatically from market to market. This paper documents the variation in availability and generosity of cost-sharing Medigap options, then uses this variation to provide new evidence of the impact of the structure of health care coverage on health for this population.

There is a long history of estimating the effects of health insurance coverage on a range of outcomes, including health service usage, health status, mortality, and labor market outcomes. Measuring these effects is of central policy interest, given that over a quarter of the US federal budget is dedicated to Medicare and Medicaid, and numerous government programs insure or directly provide health care for certain subpopulations. But an early and consistent finding in in this literature was a lack of evidence of a positive effect of health insurance coverage on health outcomes on average (e.g., Newhouse et al. 1993, Finkelstein and McKnight 2008, Baicker et al. 2013; see Levy and Meltzer 2008 and Rutledge 2016 for reviews). Although many of these studies find a substantial monetary welfare benefit due to increased coverage, the average newly covered individual experienced little detectable gain in health or work capacity.

[1] End stage renal disease (ESRD) and amyotrophic lateral sclerosis (ALS) are the only other two groups, and are substantially smaller than the over 9 million SSDI Medicare beneficiaries.

This lack of an average effect on health and work outcomes belies the potential importance of coverage for vulnerable subpopulations, including the elderly, low-income groups, those with chronic health conditions, and those seeking behavioral health services (Dow et al. 1997, Card, Dobkins, and Maestas 2009, Andersen 2015). One particular subpopulation for which we would expect positive benefits of health coverage is the long-term disabled, especially given recent quasi-experimental evidence that larger SSDI cash benefits decrease beneficiary mortality (Gelber et al. 2018). Despite Medicare eligibility after two years of SSDI cash benefit eligibility, there are a limited number of prior studies on the role of Medicare in the health of this population. This prior work primarily identifies the effect of health insurance using the two-year waiting period between Social Security Disability Insurance (SSDI) cash-benefit eligibility and Medicare eligibility (Riley 2006, Livermore et al. 2009, and Michalopoulous et al. 2011). However, limited follow-up periods and lack of variation in anything but the timing of eligibility naturally limit the policy margins for which conclusions can be drawn. As a result, we know little about how the disabled population's health and work capacity is affected by health insurance coverage, and even less about how structural differences in this coverage could translate into differential health effects.

This study presents a preliminary analysis of the impact in varying access to Medicare supplemental coverage on the health of the SSDI population. It exploits cross-state and temporal variation in these measures, most notably state-level changes in required Medigap issuance for the under-65 Medicare population, and draws on the Survey of Income and Program Participation (SIPP) to estimate the impact of such required Medigap issuance and limitations on underwriting on the self-reported health of the long-term disabled population. Although the data in question allow for only estimation of the impact of Medigap policies on this measure of health, self-reported health has been shown to provide an independent explanatory component to a range of health outcomes. Most notably, those reporting poor health have twice to four times the estimated mortality odds ratios (Idler and Benyamini 1997). Furthermore, self-reported health is likely to be more sensitive to changes in quality of life, morbidity severity, and functional impairments than mortality measures (Levy and Meltzer 2008).

There are two direct policy implications for exploring the effect of the structure of Medicare benefits on the SSDI population. First, since the role of government in the health care sector continues to be an actively discussed area of policymaking, understanding the subpopulations most likely to be helped or hurt by changes in government-provided insurance coverage, by how much, and by which insurance structures, directly informs these discussions. Second, the SSDI population is large and diverse, with approximately 9 million disabled workers and millions more dependents and survivors (SSA 2016), so understanding the health needs and work capacity responses to the structure of health insurance coverage can provide insight as to how to optimally design this program and its benefit structure going forward.

Social Security Disability Insurance and Medicare Eligibility

In addition to retirement benefits, the Social Security Administration provides disability coverage for workers in the US. Coverage and benefit level is determined by prior Social Security-taxable wages, but benefit eligibility requires a health condition or set of health conditions expected to last for at least 12 months or result in death, and which prevent earning at a Substantial Gainful Activity level ($1,180 per month in 2018). The application process can be lengthy, with many stages of potential appeal if rejected, and requires *de facto* labor force exit. If determined to be disabled, individuals are entitled to monthly cash benefits five calendar months after their disability established onset date. Twenty-four months after initial monthly cash benefit entitlement, SSDI beneficiaries gain eligibility for Medicare coverage.

However, on its own, fee-for-service Medicare carries with it a range of deductibles and a 20% coinsurance rate for physician expenditures. Additionally, there is no lifetime out-of-pocket maximum. As such, most Medicare beneficiaries purchase or otherwise obtain supplemental coverage, via Medicaid, Medigap, Medicare Advantage, employer-provided plans, VA health benefits, or TRICARE. However, this supplemental coverage differs across type of Medicare beneficiary: in 2012, nearly 90% of over-65 Medicare beneficiaries had supplemental coverage, while under 80% of the under-65 Medicare population had supplemental coverage (Cubanski 2016). Due to the relatively lower assets and income of this population, the SSDI population has historically been substantially more likely to be eligible for

Medicaid benefits, with 35% of the under-65 Medicare population being dually enrolled in Medicaid compared to 10% of the over-65 Medicare population.

For the non-dual-eligible SSDI beneficiaries, the focus of this paper, the alternative sources of supplemental coverage are employer-sponsored insurance (minimal for this group due to the work restrictions for SSDI eligibility), Medicare Advantage, and Medigap supplemental insurance. These latter two options, although accounting for nearly half of the over-65 Medicare population's supplemental insurance (31% MA and 17% Medigap in 2012), have a different structure for the disabled population; while a similar proportion of the under-65 Medicare population have MA (27%), only 2% have Medigap (Cubanski 2016).

Medigap

Medigap insurance arose to meet the demand for wrap-around coverage for extra expenses not covered by Medicare, with the plans' coverage characteristics federally standardized in 1990. Appendix Table 1 shows the standardized plan designs for plans A through N; beneficiaries pay a monthly premium to enroll in a particular plan. An insurer need not offer every plan type, but if it offers any, it must offer a Plan A and either a Plan C or Plan F, although these requirements apply only to plans offered to the over-65 population. Due to its extensive coverage, Plan F is the most popular Medigap plan, accounting for over 50% of Medigap enrollees (Starc 2014). Unlike Medicare Advantage plans, Medigap coverage is not restricted to a network. During open enrollment and special enrollment periods (e.g., if an over-65 Medicare MA beneficiary's MA plan is discontinued), insurers are not allowed to underwrite Medigap policies.

However, states have separate policies governing the availability and allowable price discrimination of these Medigap policies for the under-65 population (Harrison 2017). Certain states have enacted protections to ensure that Medicare enrollees under-65 can purchase Medigap plans, but there is wide variation across states as to whether and what kinds of Medigap plans are available. These state policies vary on a number of attributes. First, some states differentiate between Medicare enrollees

enrolled because of disability and those enrolled due to end-stage renal disease (ESRD); states may have Medigap guaranteed issue requirements that apply to one group, both groups or neither. States that have some form of guaranteed issue requirement for disabled enrollees under 65 also vary with respect to their requirements for open enrollment periods, during which available policies cannot be underwritten. Lastly, states vary on their policies related to Medigap premiums. State rules also vary with respect to their premium rating rules (attained age, issue age, or community rating), whether insurers can charge different premiums to those enrollees over 65 as those under 65 (or limits to the extent that premiums can vary), and whether insurers must charge the same premium to all enrollees under 65 (or limits to the periods and types of plans to which this applies). Further, some insurers offer Medigap plans to enrollees even if they are not required to do so, or offer rate setting, underwriting, or premiums that exceed state requirements.

We examined the prevalence of these laws to require Medigap insurers to offer plans to the under-65 population over the period 2004 to 2018 using annual editions of *Choosing a Medigap Policy: A Guide to Health Insurance for People with Medicare* from the Centers for Medicare & Medicaid Services (CMS), accessed through the Internet Archive's Wayback Machine. For this time period, Table 1 shows which states never had such a requirement, which states always did, which states added the requirement, and which ones had a requirement they then removed, along with the year that any change took place. Although the majority of states did not change their requirement status of this time period, nine states added the requirement and two removed it, with Kentucky having added, removed, and re-added the requirement. Furthermore, Table 2 shows the additional regulations surrounding open enrollment periods and underwriting restrictions. The vast majority of states requiring issuance of at least one type of Medigap plan also require an open enrollment period. However, there is substantial variation surrounding the premium rating rules in these states. A majority restrict underwriting to some degree, with fourteen requiring parallel underwriting of under- and over-65 Medicare beneficiaries, and nine requiring only that all under-65 Medicare beneficiaries be rated equally.

As such, there is substantial variation across the country in the requirement of insurers to offer these Medigap plans to the under-65 Medicare population. At the current time, we do not have historical

Medigap plan availability for this population over this time period; however, we do have availability of current 2018 Medigap policies through https://www.medicare.gov/download/downloaddb.asp, which provide which plans are available in each state and whether these plans are available for the under-65 population.

In 2018, for states not requiring Medigap insurers to offer plans to the under-65 Medicare population, there were an average of 24.2 Medigap total plans offered to the under-65 Medicare beneficiaries per state. For states that did require such plans be offered for the under-65 Medicare population in 2018, there were an average of 126.2 Medigap plans offered to this population per state. Additionally, only 41% of non-requiring states had a Plan F offered for the under-65 population; 81% of requiring states had such a plan available. These differences are highly statistically significant. Although we do not have comparisons for the entire period shown, these statistics indicate that this state-level requirement is strongly associated with greater availability of Medigap plans, especially the high-coverage Plan F.

Enactment of state policies related to disabled Medicare enrollees under 65 are trending toward more protections; in 2004, 24 states had these protections, whereas in 2018, 32 do. It is not obvious that this policy variation is related to health trends in these populations or state-level political attitudes toward expanded health coverage.[2] However, Appendix Table 2 provides OLS estimates of state-level characteristics on under-65 Medigap policy. When controlling for an array of sociodemographic characteristics as well the Democratic margin in the 2008 Presidential Election, more populous states, more rural states, and more Democratic states are more likely to required guaranteed issuance of Medigap plans for the under-65 Medicare population. Although there are serious power concerns (N=9), there are no statistically significant correlates of *when* a state chose to require this issuance. Moreover, there are no significant correlates of the specific under-65 Medigap policies. As such, our preferred specifications include state fixed-effects to account for any persistent confounding differences across states.

[2] For example, the correlation between 2014 Medicaid expansion states and the states which required issuance of a Medigap policy to the under-65 Medicare population is only -0.112, with a p-value of 0.429.

In our analysis of SIPP data below, survey respondents who experienced a change in state policy over under-65 Medigap policy resided in Florida, Georgia, Kentucky, or Tennessee, with the majority residing in Florida or Georgia. Both Florida's adoption of these protections in 2009 and Georgia's adoption in 2010 were primarily motivated by lobbying of NBA All-Star Alonzo Mourning, a former player for the Miami Heat and ESRD survivor. Before the signing the bill, Florida Governor Charlie Crist was quoted: "When somebody of his celebrity status ... undertakes a cause like this and really gets behind it and really pushes it, it's hard to say no." While many news outlets picked up the story, news coverage of the law emphasized its implications for ESRD patients in Florida, even though they represent only 1% of people impacted by the law, far fewer than the Floridians with Medicare coverage through SSDIbecause of disability. The idiosyncrasy of such political motivation[3] is indicative of the plausible exogeneity of under-65-Medigap policy changes to the underlying health of the affected population.

Medicare Advantage

Individuals who are eligible for Medicare may opt to gain coverage through a private plan chosen in the Medicare Advantage (MA) market, many of which charge no additional premium for enrollment. Although they offer more supplemental coverage, like Medigap, and are underwritten only by service area, the tradeoff faced by beneficiaries selecting an MA plan is that most of these plans are managed care plans or bundle Part D prescription drug plans with formulary limitations. Hence, they restrict enrollees to a particular network of doctors and require referrals for specialists, as well as potentially limit covered prescription drugs.

Additionally, insurers may offer Special Needs Plans (SNPs) in select counties or states; SNPs can be one of three varieties based on the eligible population: those with chronic health conditions, those dually eligible for Medicaid and Medicare, or institutionalized populations. Although there are a range of

[3] See, for example, the genesis of Delaware's under-65 Medigap policy change spearheaded by a local patient advocacy lobbyist diagnosed with breast cancer: https://khn.org/news/buying-supplemental-insurance-can-be-hard-for-younger-medicare-beneficiaries-2/

chronic health condition categories that chronic health condition SNPs (C-SNPs) can offer eligibility to, insurers are free to limit eligibility to a subset of these conditions, in some cases focusing the SNP on one specific type of health condition. Since we generally exclude Medicaid dual-eligibles in our analysis to avoid conflation of cross-state differences and changes in Medicaid policy with Medicare coverage options,[4] and the institutionalized population is not included in the sampling frame of our data, we focus here on C-SNPs, which are of particular applicability to the long-term disabled SSDI population as well.

A recent spate of research has exploited variation in the availability and generosity of Medicare Advantage (MA) plans, private managed care plans offered by insurers to all Medicare beneficiaries in a particular coverage area, for the over-65 Medicare population (Geruso and Layton 2015, Cabral et al. 2014). Although the original introduction of SNPs was accompanied with pilot program evaluations and observational comparisons in plan quality (Cromwell et al. 2008; Maciejewski et al. 2011), there is no research that we are aware of that examines the impact of MA plans, and specifically the availability and generosity of SNPs, on the health market outcomes of the SSDI population.

The central difficulty in estimating the impact of MA and MA SNP availability on health outcomes is the endogeneity of these plans' being offered. Not every county or state has every SNP, and the introduction of a particular chronic condition SNP, for example one for diabetes, may be responding to increasing rates of diabetes in the population. In this analysis, we do not attempt to estimate the causal relationship between the availability of MA and MA SNPs on health outcomes, although as a robustness check, we control for prior years' availability of these plans in order to control for alternative supplemental options that would affect those potentially considering purchasing a Medigap policy. We leave for future research the implementation of a causal estimation strategy of the availability of and enrollment in these plans on SSDI beneficiaries' health. Appendix Figures 1 and 2 show the enrollment and availability in MA and C-SNP plans based on cms.gov enrollment figures. Enrollment in both types of plans have increased from 2008 to 2016, although C-SNP plans experienced a dip in enrollment in

[4] We do perform a falsification check of state Medigap policies on the dual eligible Medicaid population, which should be unaffected by such policies, and indeed estimate null results.

between. Figure 2 shows the fraction of states[5] that had any enrollment in C-SNP plans in three specific categories of chronic health conditions: cardiovascular, mental/behavioral health, or diabetes.[6] It is clear that the pronounced dip from 2010 to 2011 corresponds to a similar drop in the number of states with cardiovascular or diabetes C-SNPs. Regardless, most states have a C-SNP plan that allows those with cardiovascular or diabetes chronic conditions to enroll. However, there are far fewer states with C-SNP plans for those with mental or behavioral health chronic conditions. This lack of C-SNP availability may suggest that for those with chronic mental health issues, supplemental Medicare coverage may be less available.

Analysis of Impact on SSDI Population

Data

In order to test the effects of Medicare supplementation policies on the health of the SSDI population, one needs a data source that contains SSDI or Medicare coverage, age, geographic location, and health. Such requirements are satisfied by the Survey of Income and Program Participation (SIPP), a panel survey traditionally started every four years, with approximately 100,000 respondents. These respondents are interviewed with a core survey ever four months, eliciting information on income, work activity, public program participation, health insurance coverage, and living situation for each of the four months since the last interview. Topical modules are also included in each interview wave. We draw upon the 2008 SIPP, which in late 2009, 2010, and 2011 (interview waves 4, 7, and 10) fielded the same topical module: Medical Expenses/Utilization of Health Care. This module elicited detailed information on medical costs and usage of the health care system. In this analysis, we focus on the five-point self-reported health measure, which varies from 1 for "Excellent" to 5 for "Poor." In this analysis, we follow the Ware et al.

[5] C-SNPs are generally not offered at the state-level; they are offered at the county or collection of county level. However, the empirical analysis conducted in this study is at the state level, and thus we aggregate availability of such plans at the state level. Although not shown, we include measures of size of C-SNP plan types as well (e.g., at least 100 enrollees or at least 1,000 enrollees), without any notable difference in our findings.

[6] Many C-SNP plans are open to multiple types of chronic conditions. We count a plan as belonging to one of these categories if any of the conditions it covers is one of these condition types.

(2002) rescaling of this measure,[7] as these authors' scaling analyses suggest that these categorizations do not represent equal differences in self-rated health. Tables 6 and 7 present results using alternative categorizations of these health variables, with broadly similar findings.

Although there are approximately 105,000 respondents in the 2008 SIPP, we limit our analytic sample to only those respondents in each of these interview waves who were:

1) Current recipients of Social Security income *for a disability* in at least one month of the current wave
2) Aged 21 to 64
3) Currently covered by Medicare in at least one month of the current wave
4) Not covered by Medicaid in any of the months of the current wave

These restrictions limit the sample to 1,586 unique individuals. Table 3 presents descriptive statistics of this group. Not surprisingly given their status as SSDI beneficiaries, their health tends to be at the poor end of the spectrum, with nearly two thirds reporting either Poor or Fair health. We construct a measure of whether the same individual reports the same or better health as in the last topical module to allow for comparability with Baicker et al. (2013). This measure excludes all those who reported "Poor" health in the prior wave, since mechanically such individuals would always have an outcome of one. This measure shows that the majority of respondents maintain or improve their health between interviews. This under-65 Medicare population is also relatively old for this age window, with an average age of 54.44.

Nearly two-thirds of respondents reside in a state with a requirement for insurers to issue at least one Medigap plan for the under-65 population, whereas only a quarter require that during the open enrollment period, such under-65 Medicare beneficiaries must not have a higher premium than over-65 Medigap beneficiaries.

From 2009 to 2011, four states change their Medigap requirement policy: Florida, Georgia, and Tennessee added the requirement, while Kentucky removed it. In our sample, there are 108 under-65 Medicare beneficiaries for whom we observe self-reported health before and after such a change.

[7] This rescaling assigns values as such: 5 (Excellent), 4.4 (Very Good), 3.4 (Good), 2.0 (Fair), and 1.0 (Poor).

Analysis

Our analytic approach is weighted least squares, using the person-level probability weights from the SIPP. The most common specification we fit is:

$$Health_{it} = \alpha + \beta * Medigap\_Required_{st} + \rho_t + \delta_s + \boldsymbol{X}_{it} + MA_{st-1} + CSNP_{st-1} + \varepsilon_{st}$$

Where the outcome variable is SSDI-Medicare beneficiary *i*'s self-reported health in year *t*. The coefficient of interest is β, which measures the effect of being in a state that requires Medigap insurers provide a Medigap plan for the SSDI-Medicare population. Fixed effects for each state and year are included, denoted by δ and ρ, while each state's MA and C-SNP enrollment in the prior year are included to control for general availability of such alternatives without confounding any effect of the Medigap policy with same-year MA enrollment, although these measures, given their endogeneity, are not always included (regardless, there is no statistically significant impact on the estimate if they are included or not). Finally, $\boldsymbol{X}$ is a matrix of individual-level covariates, including race, ethnicity, sex, and age. Standard errors are two-way clustered at the state and year level, given that the variation in treatment is at the state-year level. The inclusion of state- and year-fixed effects thereby identifies the impact of Medigap policy from states changing their under-65 Medigap policy.

Table 4 presents linear regression results of the impact of this change on self-reported health, where health is rescaled according to Ware et al. (2002)'s methodology, which varies from 1 to 5, but assigns higher values to Good and Very Good health. The columns employ different specifications, with the addition of demographic controls, state and year fixed effects, and clustering standard errors in a two-way cluster at the state and year levels. All specifications provide statistically significant and substantial improvements in self-reported health. Additionally, as we add more controls, the size of the effect generally becomes larger. Column 4 is the preferred specification for estimating the impact of a state requiring a Medigap insurer offer plans to the under-65 Medicare population, since it corresponds to a fully saturated difference-in-differences analysis of the impact of the Medigap requirement on health.[8]

[8] Note that with the limited pre- and post-periods, parallel trends assumptions cannot be tested.

There is a 0.193 increase in the five-point health measure, representing an average improvement of approximately a fifth of a point, or one in five beneficiaries reporting a one point improvement in self-reported health.[9] Columns 5 and 6 include measures of lagged Medicare Advantage enrollment and for whether that state had enrollment in one of the three types of C-SNPs shown in Figure 2 in the prior year, but this inclusion has little statistically significant impact on the estimate.

Column 7 includes not just the overall under-65 guaranteed issue requirement, but also the additional types of Medigap regulation; it is worth noting that changes in these types of regulation occurred only when the guaranteed issuance requirement changed. Nevertheless, the overall coefficient shows that guaranteed issuance improves health even more. However, having an open enrollment period requirement mitigates this effect. This finding may initially seem counterintuitive, but such an open enrollment period without premium rating regulations may limit the affordability of such plans to the under-65 population. Indeed, the coefficient estimate for states with the strongest premium rating restriction – under-65 Medicare beneficiaries must be charged the same premium as over-65 beneficiaries – the effect on improved health is even stronger, if only marginally statistically significant. Finally, Column 8 estimates the health impact including individual-level fixed effects, thereby absorbing many potentially confounding selection effects. The estimate, albeit noisier, is statistically indistinguishable from our preferred specification in Column 4.

Our overall conclusion from these regressions is that states requiring Medigap insurers to offer at least one Medigap plan to the under-65 Medicare population measurably and substantially improves this population's self-reported health. This improvement is consistent across a range of specifications and appears even stronger in the presence of additional regulations limiting premium underwriting, although inference of these regulations is limited by the sample window in question. But to test the robustness and

[9] Although we are applying a linear regression to a 5-point discrete scale, applying an ordered probit analysis leads to nearly identical estimates, both in terms of the point estimate and its statistical significance; these estimates are available upon request.

incidence of our findings, Tables 5 and 6 presents estimates by subpopulation, an alternative data set, and over populations which should not be directly affected by under-65 Medigap policies.

Column 1 in Table 5 presents results from our preferred specification (Column 4 in Table 4) for the purposes of comparison. Column 2 provides a separate interacted marginal effect by sex, indicating that the improved health effect is stronger for male SSDI beneficiaries. Column 3 provides estimates of interactions with type of health condition reported by the SIPP respondent: the improved health effect is even stronger among those with mental health conditions.[10] Given the relative paucity of mental or behavioral health-specific SNPs and historical restrictions in Medicare coverage of mental-health-related care (Donohue et al. 2009, Busch et al. 2016), affordable Medigap policies may be of particular use for SSDI beneficiaries with mental health conditions. Column 4 provides four robustness checks: given that the within-state variation in Medigap coverage arises from only four states, we conduct four separate estimates dropping each of these states to determine whether the estimated effect is driven by just a single state and potential confounding idiosyncrasies of such a state. The estimated effect remains highly statistically significant and is statistically unchanged from the estimate shown in Column 1. Table 5 therefore shows that there is not a single state driving the estimated effect, and that this effect is strongest among male SSDI beneficiaries and those beneficiaries reporting a mental health condition.

Table 6 provides further robustness and falsification tests. Columns 3 through 7 all use the same Ware-rescaled self-reported health measure from Tables 4 and 5, with Column 3 reporting the result from the same regression as in Column 4 of Table 4 and Column 1 of Table 5. Columns 1 and 2 show estimates based on different rescalings of the self-reported health measure: Column 1 shows the effect from a lack of any scale, preserving the 1 (Excellent) to 5 (Poor) health metric, and providing a nearly identical effect on health as the Ware-rescaled estimate. Column 2 provides an estimate with the Diehr et al. (2000) rescaling, from 15 for Poor, 30 for Fair, 80 for Good, 90 for Very Good, and 95 for Excellent. Although noisier (the Diehr rescaling leads a strongly bimodal rescaling of the self-reported health distribution), the

[10] Although the absolute value of the combined effect for those with a heart condition or diabetes indicates a worsening of health for these groups, this combined effect is not statistically significantly different from zero.

estimated impact is still statistically significant. Furthermore, the estimated change from our preferred specification in Column 3 is 3.9% of the maximum health value in the Ware et al. (2002) scale,[11] while the estimated change in Column 2 is 3.7% of the maximum health value in the Diehr et al. (2001) scale,[12] representing similar impacts on health. Although the Ware-rescaled health measure is our preferred metric, our results are not dependent on that preference.

Although the nature of our SIPP sample window is fortunate for its position after the large Medicare changes of the mid-2000s and before the implementation of the ACA, having health measures in only 2009, 2010, and 2011 precludes tests of parallel trends or other common difference-in-differences validation tests. To provide evidence that the policy variable in question is not confounded by other broader policy changes or effects that could differentially affect health even while controlling for state and year fixed effects, Columns 4 and 5 report falsification tests where the same analysis is performed on groups that are not directly affected by under-65 Medigap policies: SSDI beneficiaries who are dually eligible for Medicaid, and 18-64 year-olds who are not Medicare beneficiaries at all. The former group, although generally poorer than non-Dual-Eligibles, are nevertheless similar to non-Dual-Eligible population in being covered by SSDI and having serious health conditions. Medigap insurers are generally legally barred from selling policies to the Dual Eligible population except in certain situations, and, in the absence of health spillovers, there should be no effect of state under-65 Medigap regulation on this group. Although we find a positive point estimate of the Medigap guaranteed issuance requirement on the health of this population, this estimate is markedly smaller than our prior estimate, and is not nearly statistically significant. Furthermore, estimates of state Medigap policy on the non-Medicare adult population are virtually zero. Both these estimates suggest that the estimated effect is due to the state Medigap policy under question and is not being driven by other unobservable trends.

Finally, we test whether our results are being driven specifically by the SIPP data set. We draw upon the cross-sectional CPS Annual Social and Economic Supplement (i.e., the "March CPS" or CPS

[11] 0.193/5 = 0.0386.
[12] 3.507/95 = 0.0369.

ASEC) which contains self-reported health, SSDI receipt, age, state, Medicare coverage, and Medicaid coverage. Because it is limited in measures of disabling health conditions and is cross-sectional (and thus does not allow for including individual fixed effects, as in Table 4, Column 8, and does not allow for estimates of improvements in health as reported in Table 7 which enables comparison to health estimates from other studies), we prefer the SIPP as our primary data set.

However, it does have more years of observation, and thus more states' changes in guaranteed issuance policy, and Column 6 shows the estimated impact from 2004 to 2013. We find a statistically similar improvement in health, albeit with a smaller point estimate, in states with Medigap guaranteed issuance policies for the under-65 Medicare population, following the same state- and year-fixed-effects approach as in our preferred SIPP specification. However, as discussed above, there were substantial policy changes to Medicare in the mid-2000s, including the introduction of Part D (and as a result, the removal of prescription drug coverage from Medigap plans). Column 7 presents the estimate for the same years used in the SIPP analysis; the estimated improvement of 0.182 health points is remarkably similar to the SIPP estimate of 0.193, and statistically indistinguishable. Table 6 suggests that our results are not dependent on any specific SIPP-related issues, and our estimated health improvement passes the falsification tests, providing null estimates on untreated groups over the same time period. Furthermore, our results are not dependent on the rescaling of the self-reported health measure.

We next turn to estimates based on the binary categorization of the self-reported health measure, a common transformation of self-reported health (Manor, Matthews, and Power 2000). Table 7 shows estimates on three such binary transformations: an indicator for being in poor or fair health, an indicator for just being in poor health, and an indicator for whether the self-reported health is at least as good as in last year's interview. The latter definition requires limiting the analysis to under-65 Medicare beneficiaries interviewed in two adjacent years; we also exclude individuals who reported poor health in the first interview, since such individuals cannot have worse health. This latter measure is comparable to the Baicker et al. (2013) measure of the impact of the Oregon Medicaid expansion on self-reported health,

wherein the estimated impact of expanded Medicaid coverage was an increased likelihood of reporting same or better health of 7.84 percentage points.

Although the impact on the first outcome variable – reporting poor or fair health – is small (approximately a 3-percentage point reduction in the least squares and probit average marginal effects specifications) and not statistically significant, the majority of SSDI beneficiaries report being in one of these two categories, and medical recovery among this population is generally rare (SSA 2016). Limiting the analysis on the likelihood of reporting poor health, we estimate a decline of approximately 9 percentage points across both the least squares and probit marginal effects specifications, both highly significant. Since the sample average is 20%, this effect is sizable. These two findings – a small, statistically insignificant reduction in reporting poor *or* fair health and large, highly significant reduction in reporting poor health – suggests that much of the estimated improvement in self-reported health of the under-65 Medigap guaranteed issuance policy is in moving respondents from poor to fair health.

For the impact on same or improved health, the estimated effect is approximately 19-20 percentage points across the least squares and probit specifications, nearly three times the size of the estimate from Baicker et al. (2013). Although this measure is constructed differently and limits its sample to those not reporting poor health, who, the prior analyses suggest, likely experience the largest health improvement, this estimate indicates that the impact of state-level Medigap policy on the health of the under-65 Medicare population is large relative to other health insurance expansion margins, especially given Medigap is a supplemental insurance policy.

Conclusion

This study examines the impact of state-level regulation of Medigap policies for under-65 Medicare beneficiaries on these beneficiaries' health. The overall finding is that when states require insurers to issue Medigap plans to under-65 Medicare beneficiaries, their self-reported health is substantially higher. This result is robust to alternative specifications and data sets, as well as to a range of falsification tests and robustness checks. This effect is strongest for men, those with mental health conditions, and states that also regulate the premiums that can be charged to under-65 Medicare beneficiaries.

However, future analyses may provide additional detail as to relevant mechanisms. Currently, the inclusion of recent enrollment in MA and SNP plans as controls do not statistically impact our central findings, but policy induced variation in these plans may uncover additional margins for health impacts (Geruso and Layton 2015, Cabral et al. 2014).

Finally, although the SIPP data is publicly available, contains repeated health measures, elicits SSDI, SSI, Medicare, and Medicaid coverage, and has geographic identifiers, it was not designed as a health survey and does not elicit information on the type of Medicare supplementation beneficiaries have. Future research will include drawing on the Medicare Current Beneficiary Survey to measure how state policies and changes in MA and C-SNP availability change enrollment, utilization, and health, especially for the populations potentially most affected by the availability and affordability of Medicare supplementary options, such as those with chronic mental health conditions.

Overall, the size and robustness of the estimated effect indicates that the SSDI Medicare population's health is very sensitive to even supplemental coverage; that is, the policy variation in question is over the remaining 20% coinsurance and insurance products that limit this cost sharing. The size of the impact on changes in health indicates that state-level Medigap policy has not just a comparable, but a substantially larger effect on health for under-65 Medicare beneficiaries than Medicaid expansion on the marginal Oregon Medicaid entrant. Although this estimated effect on self-reported health is large and robust, additional research is required to estimate the effects of these Medigap policies on specific morbidity and mortality outcomes, as well as functional impairments and limitations to daily living activities.

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Table 1: States Requiring Guaranteed Issuance of at Least One Medigap Plan for Under-65 Medicare Beneficiaries, 2004-2018

Never Required	Added Requirement	Removed Requirement	Always Required
Alabama	Delaware (2014)	Kentucky (2010)	California
Alaska	Florida (2010)	Washington (2007)	Colorado
Arizona	Georgia (2011)		Connecticut
Arkansas	Hawaii (2006)		Kansas
Indiana	Idaho (2018)		Louisiana
Iowa	Illinois (2008)		Maine
Nebraska	Kentucky (2008, 2016)		Maryland
Nevada	Montana (2014)		Massachusetts
New Mexico	Tennessee (2011)		Michigan
North Dakota			Minnesota
Ohio			Mississippi
Rhode Island			Missouri
South Carolina			New Hampshire
Utah			New Jersey
Virginia			New York
West Virginia			North Carolina
Wyoming			Oklahoma
			Oregon
			Pennsylvania
			South Dakota
			Texas
			Vermont
			Wisconsin

Table 2: Type of Under-65 Medigap Regulation

	Yes	No
States with Medigap Guaranteed Issuance Requirement for Under-65 Beneficiaries at least once from 2009-2011	29	21
Among States Requiring Guaranteed Issue for Under-65		
Any Open Enrollment Period Requirement for Under-65	27	2
Any Regulation Requiring Equal Underwriting of Under- and Over-65	14	15
Any Regulation Requiring Equal Underwriting among only Under-65	9	20

Source: Kaiser Family Foundation

Table 3: Summary Statistics of Under-65 Non-Dual SSDI-Medicare 2008 SIPP Sample

	Mean	Standard Deviation
Male	0.56	0.50
Age	54.44	9.34
Race		
White	0.79	0.41
Black	0.17	0.37
Asian	0.01	0.10
Other	0.03	0.18
Ethnicity		
Hispanic	0.10	0.31
Health Measures		
Ware et al. Rescaled Health	2.43	1.09
In Poor Health	0.20	0.40
In Fair Health	0.44	0.50
In Good Health	0.27	0.44
In Very Good Health	0.07	0.25
In Excellent Health	0.03	0.17
Health Same or Better in 2010 (N=433)	0.75	0.44
State Under-65 Medigap Policies		
Guaranteed Issue State (i.e., "Medigap-Required State")	0.63	0.48
Open Enrollment	0.58	0.49
Same Premium as for Over-65	0.24	0.43
Same Premium among all Under-65	0.23	0.42
State Medicare Advantage Controls		
Prior Year's MA Enrollment, as Fraction of All Part A&B	0.25	0.10
Prior Year's C-SNP Enrollment, as Fraction of All Part A&B	0.01	0.01
Any Cardio C-SNP in Prior Year	0.82	0.38
Any Mental C-SNP in Prior Year	0.09	0.29
Any Diabetes C-SNP in Prior Year	0.92	0.27
N		1,586

Source: 2008 SIPP

Table 4: Regression Estimates of Effect of State-Level Medigap Policies on Ware-Rescaled Self-Reported Health

Policy Variable	Outcome Variable: Ware-Rescaled Self-Reported Health							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Medigap-Required State	0.118**	0.118**	0.128**	0.193***	0.159***	0.151***	0.229***	0.188**
	(0.0473)	(0.0523)	(0.0554)	(0.0481)	(0.0479)	(0.0499)	(0.0390)	(0.0881)
Type of State Medigap Policy								
Any Open Enrollment Period							-0.153	
							(0.1007)	
Same Premium as for Over-65							1.068*	
							(0.5872)	
Same Premium among all Under-65							0.133	
							(0.1200)	
Standard Error Cluster	None	Two-Way, State by Year	Two-Way, State by Year	Two-Way, State by Year	Two-Way, State by Year	Two-Way, State by Year	Two-Way, State by Year	Two-Way, State by Year
Demographics	None	None	Race, Age, Sex	Race, Age, Sex	Race, Age, Sex	Race, Age, Sex	Race, Age, Sex	None
Fixed Effects	None	None	None	State, Year	State, Year	State, Year	State, Year	Individual, Year
Medicare Advantage Controls	None	None	None	None	Prior Year's MA and C-SNP Enrollment	Prior Year's MA and C-SNP Enrollment and C-SNP Types	Prior Year's MA and C-SNP Enrollment and C-SNP Types	Prior Year's MA and C-SNP Enrollment and C-SNP Types
Observations	2,806	2,806	2,806	2,806	2,806	2,806	2,806	2,806
Unique N's	1,586	1,586	1,586	1,586	1,586	1,586	1,586	1,586
R-squared	0.003	0.003	0.026	0.081	0.082	0.082	0.082	0.812

Weighted least squares. Standard errors in parentheses. Outcome variable, five-value health, rescaled according to Ware et al. (2002).
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Regression Estimates of Effect of State-Level Medigap Policies on Self-Reported Health, by Interacted Characteristics, Dual Medicaid Eligibility, and Excluding Select States

Policy Variable	Outcome Variable: Ware-Rescaled Self-Reported Health						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Medigap-Required State	0.193***	0.271***	0.207***	0.165***	0.194***	0.187***	0.217***
	(0.0481)	(0.0588)	(0.0506)	(0.0577)	(0.0558)	(0.0588)	(0.0473)
Medigap-Required X							
Female		-0.178**					
		(0.0834)					
Lung Condition			-0.00631				
			(0.177)				
Mental Health Condition			0.240***				
			(0.0918)				
Heart Condition			-0.408***				
			(0.116)				
Diabetes			-0.385***				
			(0.144)				
Sample	SIPP, Non-Dual	SIPP, Non-Dual	SIPP, Non-Dual	SIPP, Non-Dual, Dropped FL	SIPP, Non-Dual, Dropped GA	SIPP, Non-Dual, Dropped KY	SIPP, Non-Dual, Dropped TN
Observations	2,806	2,806	2,806	2,652	2,706	2,748	2,661
R-squared	0.081	0.083	0.09	0.080	0.081	0.082	0.075

Weighted least squares. Standard errors, two-way clustered by state and year, in parentheses. Outcome variable, five-value Ware et al. (2002) rescaled health. All regressions control for race, age, and sex. All regressions control for state and year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Regression Estimates of Effect of State-Level Medigap Policies on Self-Reported Health, by Health Measure, SIPP or CPS, Dual Medicaid Eligibility, and Sample

	Outcome Variable						
Policy Variable	Unscaled (Un)Health	Diehr-Rescaled Self-Reported Health	Ware-Rescaled Self-Reported Health				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Medigap-Required State	-0.192***	3.507**	0.193***	0.0688	0.0152	0.125**	0.182***
	(0.0415)	(1.430)	(0.0481)	(0.181)	(0.00949)	(0.0556)	(0.0434)
Sample	SIPP, Non-Dual, 2009-2011	SIPP, Non-Dual, 2009-2011	SIPP, Non-Dual, 2009-2011	SIPP, Dual, 2009-2011	SIPP, 18-64, Non-Medicare, 2009-2011	CPS, Non-Dual, 2004-2013	CPS, Non-Dual, 2009-2011
Observations	2,806	2,806	2,806	1,717	140,809	7,734	4,726
R-squared	0.08	0.081	0.081	0.187	0.067	0.045	0.054

Weighted least squares. Standard errors, two-way clustered by state and year, in parentheses. Outcome variable in Column 1 is the unscaled measure of self-reported health, from 5 (Poor) to 1 (Excellent). Column 2 outcome variable is rescaled according to Diehr et al. (2001) rescaling technique. Columns 3 through 7 use five-value Ware et al. (2002) rescaled health. All regressions control for race, age, and sex. All regressions control for state and year fixed effects.

*** p<0.01, ** p<0.05, * p<0.1

Table 7: OLS and Probit Estimates of Effect of State-Level Medigap Policies on Likelihood of Reporting Poor Health and Reporting Improved Health

	Outcome Variable					
Policy Variable	Reporting Poor or Fair Health		Reporting Poor Health		Health Same or Better Since One Year Earlier	
	Weighted Least Squares	Probit Marginal Effect	Weighted Least Squares	Probit Marginal Effect	Weighted Least Squares	Probit Marginal Effect
Medigap-Required State	-0.0333	-0.030	-0.0905***	-0.080***	0.199**	0.193***
	(0.0275)	(0.0265)	(0.0228)	(0.0210)	(0.0770)	(0.065)
Sample Mean	0.64	0.64	0.20	0.20	0.75	0.75
Observations	2,806	2,806	2,806	2,806	957	957
Unique N's	1,586	1,586	1,586	1,586	433	433
(Pseudo) R-squared	0.076	0.055	0.052	0.049	0.075	0.053

Weighted least squares and weighted probit. Standard errors, two-way clustered by state and year, in parentheses. Outcome variable is binary, indicating value of self-reported health (Poor/Fair or Poor), or that self-reported health is the same or improved since the last interview. In the latter analysis, only individuals with initial health better than Poor are included. All regressions control for race, age, and sex. All regressions control for state and year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 1: Details of Standardized Medigap Plans

	Medigap Plans									
Medigap Benefits	A	B	C	D	F	G	K	L	M	N
Part A coinsurance and hospital costs up to an additional 365 days after Medicare benefits are used up	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Part B coinsurance or copayment	Yes	Yes	Yes	Yes	Yes	Yes	50%	75%	Yes	Yes
Blood (first 3 pints)	Yes	Yes	Yes	Yes	Yes	Yes	50%	75%	Yes	Yes
Part A hospice care coinsurance or copayment	Yes	Yes	Yes	Yes	Yes	Yes	50%	75%	Yes	Yes
Skilled nursing facility care coinsurance	No	No	Yes	Yes	Yes	Yes	50%	75%	Yes	Yes
Part A deductible	No	Yes	Yes	Yes	Yes	Yes	50%	75%	50%	Yes
Part B deductible	No	No	Yes	No	Yes	No	No	No	No	No
Part B excess charge	No	No	No	No	Yes	Yes	No	No	No	No
Foreign travel exchange (up to plan limits)	No	No	80%	80%	80%	80%	No	No	80%	80%
Out-of-Pocket Limit	N/A	N/A	N/A	N/A	N/A	N/A	$5,240	$2,620	N/A	N/A

Source: medicare.gov website

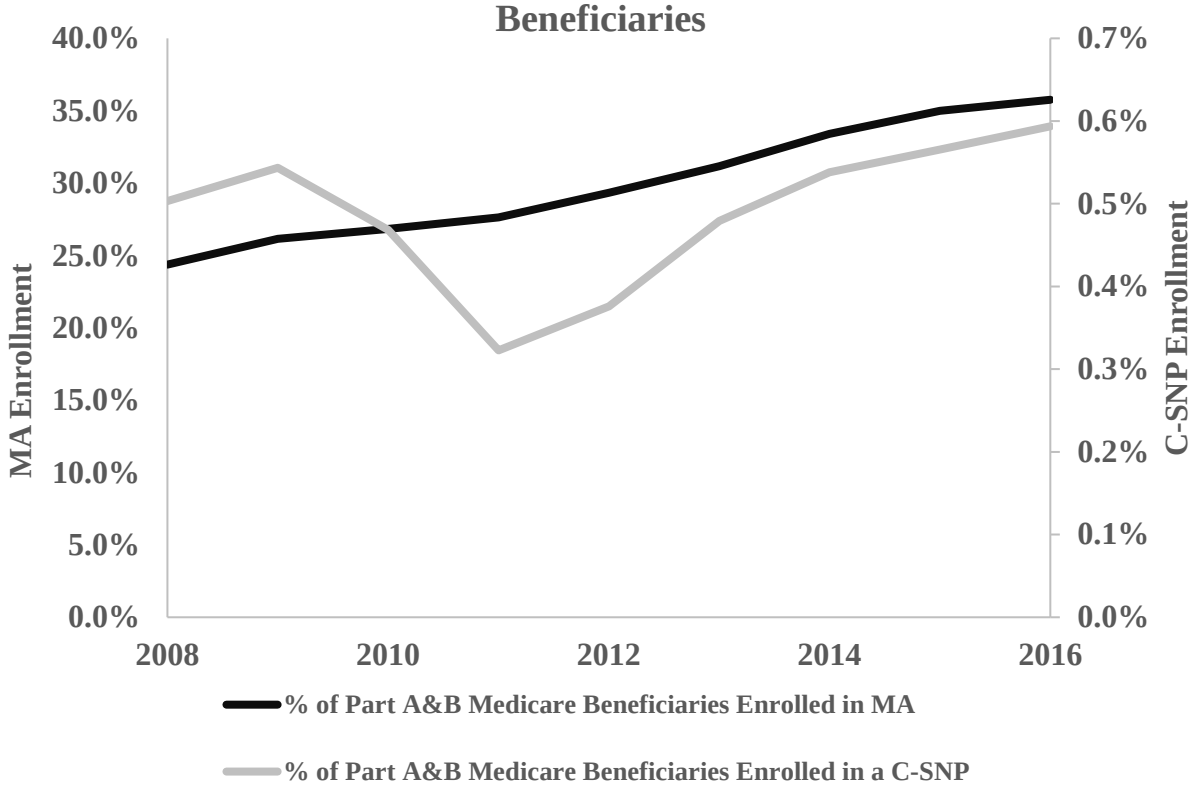
Appendix Table 2: OLS Regression Coefficients Predicting Variation in State Medigap Policy

Dependent Variable (Mean, SD)	Guaranteed Issuance State at any point, 2004-2018 (1)	Open Enrollment State (2)	Equal Underwriting for all Medigap (3)	Equal Underwriting for all Medigap for only under 65 (4)	Year Guaranteed Issuance Enacted (5)
Log Population (15.1, 1.0)	0.205**	0.0980	-0.0815	0.135	-1.160
	(0.0890)	(0.128)	(0.138)	(0.152)	(1.385)
Fraction of Population Black (0.11, 0.11)	0.394	0.460	-0.504	-0.184	32.50
	(0.780)	(0.812)	(0.875)	(0.967)	(20.67)
Fraction of Population Age 18-65 (0.63, 0.02)	-0.456	2.501	-11.65	-7.154	-316.2
	(6.114)	(8.614)	(9.282)	(10.25)	(143.9)
Fraction of Populaiton Rural (0.25, 0.18)	1.132**	0.185	-0.377	1.139	16.70
	(0.549)	(0.883)	(0.952)	(1.051)	(18.33)
Log Median HH Income (10.3, 0.13)	0.425	0.406	1.486	0.924	-2.238
	(0.625)	(0.986)	(1.063)	(1.174)	(17.61)
Democratic Lean in 2008 Election (4.3, 22.1)	0.00953**	0.000924	0.00761	0.0110	0.0216
	(0.00411)	(0.00562)	(0.00606)	(0.00669)	(0.139)
Sample	All States	States with Guaranteed Issuance at any point from 2004-2018	States with Guaranteed Issuance at any point from 2004-2018	States with Guaranteed Issuance at any point from 2004-2018	Only States that Added Guaranteed Issuance after 2004
Observations	50	33	33	33	9
R-squared	0.238	0.094	0.360	0.176	0.933

OLS regression estimates, standard errors in parentheses

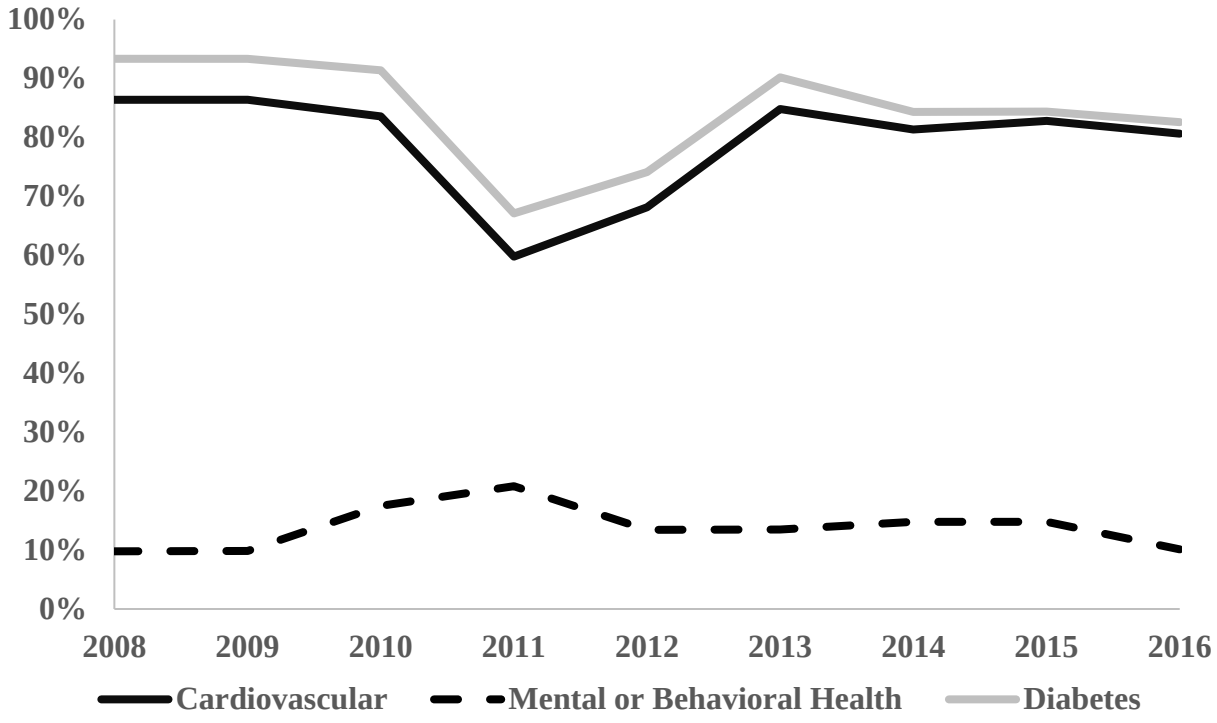
*** p<0.01, ** p<0.05, * p<0.1

Appendix Figure 1: Average Medicare Advantage and Chronic Special Needs Plan Enrollment, as a Percentage of Total Beneficiaries, Weighted by State Medicare Beneficiaries



Source: cms.gov

Appendix Figure 2: Percentage of States with at Least One Chronic Special Needs Plan with Enrollees, by Type of Chronic Condition



Source: cms.gov