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IS IMMIGRATION GOOD FOR HEALTH? THE EFFECT OF IMMIGRATION ON OLDER ADULT MORTALITY IN THE UNITED STATES

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ABSTRACT

We measure the impact of increased immigration on mortality among elderly Americans, who rely on the immigrant-intensive health and long-term care sectors. Using a shift-share approach we find a strong impact of immigration on the size of the immigrant care workforce: admitting 1,000 new immigrants would lead to 142 new foreign healthcare workers, without evidence of crowd out of native health care workers. We also find striking effects on mortality: a 25% increase in the steady state flow of immigrants to the US would result in 5,000 fewer deaths nationwide. We identify reduced use of nursing homes as a key mechanism driving this result.

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Rising immigration has become one of the most contentious issues in modern political discourse both in the U.S. and around the world. This debate touches on a wide variety of issues, many inside the realm of economics. As examples, large economic literatures examine whether immigrants help or harm native workers, are a net fiscal burden or benefit for local and federal governments, and raise or lower crime (Bell, Fasani, & Machin, 2013; George J. Borjas, 2003; Card, 2009; Chalfin, 2015; Colas & Sachs, 2024; Mackie & Blau, 2017).

One area which has received less attention is the implications of increased immigration on health. A large share of immigrants works in health care, including immigrant doctors, nurses, and aides, support staff at health and long-term care facilities, and direct caregivers of those in need, from children to elderly persons. Shortages of doctors and nurses exist in many markets around the US, especially in rural areas, and direct caregiving is typically a low paid job marked by consistent vacancies (National Center for Health Workforce Analysis, 2024a). As such, increasing the supply of health care workers through immigration can help mitigate a critical workforce shortage. This is the motivation behind recent proposals to expand immigration specifically for health care workers (Harris & Marshall, 2024), and a key point of criticism of the second Trump administration's efforts to reduce immigration (Cutler, 2025).

At the same time, health care jobs require specific skills that may or may not be provided by immigrants, particularly given language barriers. If immigrants are at least partially displacing native workers in these sectors, there could be unclear implications for quality of care.

A central question for immigration policy is therefore whether increased immigration has measurable health effects on the native-born population. This question is especially salient for native-born older adults. They are the heaviest users of health and formal long-term care services in the U.S.—accounting for nearly $1 trillion in total health care spending and over $230 billion

in formal long-term care spending in the US (Dieleman et al., 2025; Gruber & McGarry, 2023)—and these industries are highly reliant on immigrant labor. Roughly 1 in 5 frontline nursing home workers are immigrants, nearly 1 in 3 home care workers are immigrants, and 18% of all health care workers are immigrants (Espinoza, 2023; Jun & Grabowski, 2024; Migration Policy Institute, 2023; Zallman, Finnegan, Himmelstein, Touw, & Woolhandler, 2019).

Prior research has established several positive effects of immigration on health-related outcomes, particularly for older adults. For example, increased immigration has been found to lead to fewer institutionalized older adults (Butcher, Moran, & Watson, 2022; Huh, Kim, & Mockus, 2024; Jung & Mockus, 2025), consistent with stated preferences of older adults to be cared for at home (Guo, Konetzka, Magett, & Dale, 2015). Similarly, increased immigration results in more nursing home staff and better quality of care in that setting (Furtado & Ortega, 2023; Grabowski, Gruber, & McGarry, 2025). Finally, the 2016 Brexit referendum was shown to sharply reduce immigration in the UK, leading to fewer nurses working in hospitals and higher readmission rates (Castro-Pires, Fischer, Mello, & Moscelli, 2025) .

Importantly, existing studies have all focused on particular sectors of the larger health and long-term care systems, and therefore offer an incomplete picture of immigration's health effects. In this paper, we take the most direct possible approach to the question of immigration's effects on health by examining the impact of increased immigration on mortality among all elderly Americans.

Although the population of immigrants that we study is distinct from the population whose health outcomes we model (because immigrants are mostly non-elderly and not immediately eligible for the Medicare program whose data we use), there are concerns about omitted determinants of both immigrant and elder mobility that may drive this relationship. That

is, immigrants do not flow to particular areas randomly. For example, a booming local economy could attract more immigrants, and past research has shown that tight labor markets can impact mortality (Finkelstein, Notowidigdo, Schilbach, & Zhang, 2024; Gerdtham & Ruhm, 2006). To address these potential unobserved correlations, we use an approach pioneered by Card (2001) and used by many others: creating a shift-share instrument for local immigrant worker flows based on national ethnicity-specific flows and the baseline distribution of immigrants by nationality. We adjust this approach to our setting by focusing specifically on the flows and location of immigrants likely to work in health care.

Likewise, it is possible that elderly individuals move to areas where immigrants are settling, perhaps because there is a larger supply of health and personal care workers to care for them. Such migration patterns could confound the relationship we are trying to recover if the elderly individuals that move to those areas are systematically in better or worse health than the general population. We address this problem by studying a fixed sample of elderly and fixing their initial locations.

We begin by assessing the impact of immigration on the health care workforce. We find a strong impact of immigration on the size of the immigrant health care workforce: admitting 1,000 new immigrants would lead to 142 new foreign healthcare workers, including 88 new aides, nurses and doctors. Importantly, we find little evidence of a "crowd-out" of domestic health care workers; indeed, we find crowd-in of domestic physicians, perhaps reflecting the ability to deliver additional care with more lower-skilled foreign workers available. On net, we estimate that 1,000 new immigrants would lead to 173 more healthcare workers of any origin, including 96 new aides, nurses and doctors.

We then turn to the impact on health. We find a striking and statistically meaningful decline in elderly mortality associated with more immigration: 1,000 additional immigrants result in 9.8 fewer deaths among the elderly annually in the average Metropolitan Statistical Area (MSA). This finding emerges clearly in event studies and, because we examine a static Medicare population and assign treatment status based on one's geographic location in our study's baseline year, cannot be driven by older adult migration or changes in the composition of the Medicare population.

We also find that increased immigration leads to a clearly identified reduction in the use of skilled nursing facilities (SNFs), consistent with the earlier studies showing that the availability of immigrant labor reduces the number of older adults residing in an institution (Butcher et al., 2022; Huh et al., 2024; Jung & Mockus, 2025). We improve on this earlier work using more recent data and confirming results persist when using administrative data to precisely identify new admissions to SNFs. Additionally, we provide evidence that reductions in SNF use are not just allowing older adults to age in their preferred setting (AARP, 2024) but are intertwined with meaningful improvements in the health of older adults.

We do not find that immigration leads to any other significant reductions in health care use or increases in overall Medicare spending. Taken together, we find that immigration saves elderly lives, and these health improvements may come through protective effects of avoiding the nursing home setting and through better treatment of those who go to nursing homes.

Our paper proceeds as follows. In Section I, we discuss the economics of immigration and health in the elderly population. We also review the existing literature on the impacts of immigration. Section II discusses our data sources and empirical strategy, Section III presents

our results on immigration and the workforce, Section IV presents our results on immigration and health, Section V presents results of our robusteness checks, and Section VI concludes.

I. BACKGROUND

U.S. Immigration

The U.S. is home to nearly 48 million immigrants, representing about 14% of the total US population (Gramlich & Passel, 2024). These immigrants play an outsized role in the US labor market, comprising almost 20% of the active labor force (USAFacts, 2024). The size of the US immigrant population has grown steadily since the 1970s (Kramer & Passel, 2025), with a net inflow of immigrants of 1.3 million 2023, which is very much in line with the 2001-2009 average, but below mean values for 2010-2020 (Macrotrends, 2025). It is estimated that about 27 percent of the immigrant population lacks full legal status, but many of these individuals have temporary permission to be in the country (e.g., asylum seekers, those with temporary protection status) (Kramer & Passel, 2025).

Immigrants can enter the US legally through multiple pathways, including family-based admissions (i.e., immediate relatives of a US citizen), diversity visa lotteries, certain protected statuses (i.e., asylum seekers and refugees), and work visas. Employment-sponsored immigration pathways are largely available to "skilled" workers, meaning individuals with a bachelor's degree (or equivalent) and/or 2 or more years of training.[1] Several of these pathways have specific provisions for health care workers. For example:

- H-1B visas are available to specialized workers, including physicians.

[1] See https://www.uscis.gov/working-in-the-united-states/permanent-workers/employment-based-immigration-third-preference-eb-3

- J-1 Exchange Visitor visas are often used by foreign medical students completing residencies or fellowships in the US. These temporary visas may be combined with a J-1 waiver to obtain permanent status in exchange for working in a medically underserved area for a defined period of time.
- TN Visas allow certain health care professionals—physicians, nurses, and physical and occupational therapists—from Canada or Mexico to reside in the US for work purposes.
- Conrad 30 Waiver program, a subset of the J-1 visas program, allows medical school graduates to forgo the mandatory two-year foreign residency requirement after their J-1 training, if they agree to practice in underserved areas.[2]
- Several green card pathways (e.g., EB-2 and EB-3) give preference to licensed health care workers, included expedited processing times, particularly when they commit to working in shortages areas.[3]

Unauthorized entry in the US is another important, and controversial, channel through which immigration occurs. In 2022, there were an estimated 11 million unauthorized immigrants (Baker & Warren, 2024), with significant increases in the inflow of this population noted in the aftermath of the Covid-19 pandemic (Bandyopadhyay & Le, 2025). Despite these individuals being in the country without permission, about half have temporary protections that allow them to work in the US labor market. For instance, asylum seekers, those with temporary protected status due to an inability to safely return to their home country, and individuals who immigrated to the US as children (ie, the Defered Action for Childhood Arrivals [DACA] program) are all permitted to work after meeting basic requirements (Passel & Krogstad, 2025). Combining

[2] For more information on the Conrad 30 Waiver Program: https://www.uscis.gov/working-in-the-united-states/students-and-exchange-visitors/conrad-30-waiver-program.
[3] See U.S. Citizenship and Immigration Services (USCIS) Policy Manual, Volume 6, Part E, Chapter 7 for more details.

unauthorized immigrants who do and do not have permission to work in the US, about 9 million unauthorized immigrants were estimated to be in the US workforce in 2022, representing about 5.5% of the total civilian workforce (Passel & Krogstad, 2025). Despite being a key part of the economy, public support for unauthorized immigration is much lower than legal immigration, with 56% of registered voters supporting mass deportation efforts of unauthorized immigrants in a 2024 survey (Mukherjee & Krogstad, 2024).

Immigrants in the health care system

Immigrants make up a substantial share of the U.S. health care workforce, accounting for over 18% of the nation's 15 million health care workers. They comprise 26% of physicians and surgeons, 40% of home health aides, 28% of personal care aides, and 21% of nurse assistants (Migration Policy Institute, 2023). Across a variety of health care settings, immigrants represent a growing share of the workforce. For instance, hospitals are increasingly hiring foreign-born registered nurses (Pillai, Rae, & Artiga, 2024), and in nursing homes, the number of foreign-born certified nursing assistants (CNAs) has held steady while native-born CNA counts have been declining since the mid-2010s (Jun & Grabowski, 2024). Many of the occupations where immigrant health care workers are concentrated face severe staffing shortages, exacerbated by growing need due to an aging population and enduring worker departures form the COVID-19 pandemic. Projections indicate that the United States will face a shortage of 17,800–48,000 primary care physicians by 2034 (Association of American Medical Colleges, 2021), and that growing demand for long-term care services will require nearly 625,000 additional direct care workers by 2037 (National Center for Health Workforce Analysis, 2024b). This has led to proposals to address worker shortages through increased immigration. Recent legislative proposals have included the recapture of unused employment-based visas to distribute to nurses

and physicians, and the provision of permanent residency for current essential workers.[4] Other proposals have suggested the creation of new visa categories for critical health care workers.[5]

Economic Literature

There is a large body of research on the effect of immigration on labor market outcomes, but papers often differ in their conclusions. Although certain studies have found that immigration resulted in reduced employment and wages for low-skilled U.S. born workers (e.g., George J Borjas (2003)), other studies have found small or positive effects on native employment and wages (Card, 1990, 2005, 2009; East, Hines, Luck, Mansour, & Velásquez, 2023; Foged & Peri, 2016; Kugler & Yuksel, 2008; Ottaviano & Peri, 2008). Albert (2021) modeled how immigration can lead to additional jobs through lower costs but raises competition for native workers, finding that the dominating effect depends on how much wage costs are lowered. Although the literature has focused on the impact on wages and employment, studies have found immigration lowered prices in immigrant-intensive sectors (Cortes, 2008) with differing effects on public finances depending on whether indirect fiscal effects are accounted for (Colas & Sachs, 2024; Mackie & Blau, 2017).

The effects of immigration on the health care labor market are less studied, despite being the largest employment sector in the US by number of workers (Health Resources & Services Administration, 2024). *A priori* the anticipated effects are unclear. The health care labor market faces persistent excess demand, and these labor shortages may not be resolved by increases in wages (Michaeli, Michaeli, Albers, & Michaeli, 2022). For example, the long training periods for physicians coupled with the fixed number of residency slots makes quickly expanding the

[4] For more details, see U.S. House Bill 6205 https://www.congress.gov/bill/118th-congress/house-bill/6205 and Senate Bill 1392 https://www.congress.gov/bill/118th-congress/senate-bill/1392.
[5] For instance, Espinoza et al. (2023) suggest the creation of a special "caregiver visa" for direct care workers: https://www.phinational.org/resource/bridging-the-gap-enhancing-support-for-immigrant-direct-care-workers/.

supply of US-born physicians infeasible (McCann & Walensky, 2025). In the long-term care sector, fixed payment rates by state-run Medicaid programs—the predominant financer of long-term services and supports—may constrain the wages paid to certified nursing assistants, home health aides, and other long-term care workers. In this context, immigrants at both ends of the skill spectrum may address critical workforce shortages and improve care access (McElvaney & McMahon, 2024). On the other hand, foreign-born health care workers may crowd-out US-born workers, and there may be concerns about lower quality of care provided by immigrants due to factors such as language barriers or differences in medical education between US and international medical schools.

Available evidence largely suggests positive effects on health care labor supply and health outcomes from immigration. Braga, Khanna, & Turner (2024) find that increases in the number of J-1 visas available to international medical school graduates increased the supply of physicians in the US without evidence of crowd out of US-born physicians, while one study found that pseudo-random assignment to an internationally-trained physician in the emergency department produced lower patient mortality compared to those assigned to physicians who graduated from US medical schools (Tsugawa, Jena, Orav, & Jha, 2017).

In the United Kingdom, Castro-Pires et al. (2025) found that the loss of immigrants due to Brexit reduced hospital staffing and increased unplanned hospital readmissions and mortality risk. In the nursing home setting, two recent papers used shift-share instruments and found that increases in immigration increased the supply of long-term care workers, direct care (nurses and certified nursing assistants) staffing levels, and the quality of care (Furtado & Ortega, 2023; Grabowski et al., 2025).

Other research has demonstrated that immigration increases older adults' access to personal care services that are adjacent to the health care system and may allow older adults to age-in-place. Kreider and Werner (2025) found that increases in immigration enforcement activity (i.e., the Secure Communities policy) reduced the immigrant labor supply and resulted in reductions in the home care workforce and the likelihood that older adults received in-home care from a non-family member. Other studies, meanwhile, have demonstrated that increases in lower skilled immigrant workers reduce older adults' likelihood of living in an institution (i.e., a nursing home), suggesting that these in-home services are critical for aging in place (Butcher et al., 2022; Huh et al., 2024; Jung & Mockus, 2025).

An important limitation of the existing literature is that these studies each focus narrowly on specific aspects of the health and long-term care sectors. Because changes in the supply of immigrant workers may shift where individuals receive care, it is difficult to infer population-level health effects from these more targeted analyses. The present paper overcomes this limitation by directly looking at the effects of immigration on older adults' health, measured by mortality. We focus on the 65 and older population as this group is among the heaviest users of the health care system and virtually all older adults have health insurance via the Medicare program.

II. DATA AND EMPIRICAL STRATEGY

Data

Annual measures of immigrant flows and labor supply were obtained from the 2000-2019 American Community Survey (ACS) micro-level dataset. This nationally representative survey, administered by the U.S. Census Bureau to more than one million respondents annually, contains detailed information on a variety of economic and demographic characteristics, including

birthplace, current occupation, and hours worked for pay. The ACS does not gather information about respondents' legal status in the US, but undocumented immigrants are eligible to participate in the ACS and included in its sampling framework. As such, estimates on immigration obtained from these data are inclusive of both the documented and undocumented populations. We end our analysis in 2019 to avoid the confounding impacts of the COVID-19 pandemic on both immigration flows and health outcomes.

Immigration measures were constructed at the level of state-MSAs, the most granular geographic area available in the ACS. We used state-MSAs rather than MSAs to account for the fact that some MSAs span more than one state and states may vary along a number of dimensions that could affect older adults' health including Medicaid eligibility, the supply of health care providers and resources, provider licensure, and policies around Medicare supplemental coverage. We restrict our measure of immigrants to those below age 55 to ensure that immigrants do not directly impact our health outcomes which we measure among those 65 and older.

For each state-MSA-year in the data, we measure the immigrant population as the total number of working age (>16 years old) individuals who were born outside of the U.S. We captured ACS-respondent birthplace using the IPUMS birthplace variable (which captures roughly 70 birthplace regions) and applied respondent weights.

The ACS also provides detailed information about labor force participation. We use these data to construct measures of labor supply at the state-MSA level across a wide-range of occupations that may affect health outcomes.

Information on older adults' health outcomes comes from 2008-2019 Medicare enrollment and claims data. We use the Centers for Medicare and Medicaid Services (CMS)

Master Beneficiary Summary file to obtain information, at the individual level, on older adults' demographics—including age and race/ethnicity—and dates of death. We also use the Medicare Provider Analysis and Review file which provides detailed information for 100% of traditional Medicare (TM) hospital stays and nearly 90% of Medicare Advantage (MA) hospitalizations (Cotterill, 2023), the Minimum Data Set which provides information on all nursing stays in Medicare and Medicaid certified nursing homes, and the Home Health Outcome and Assessment Information Set (OASIS) which provides information on all Medicare-covered home health care episodes. Critically, these data sources capture all, or nearly all, instances of care use, regardless of beneficiaries' type of Medicare coverage. This ensures that our estimates of care use are not subject to bias from older adults' movement between fee-for-service "traditional" Medicare (TM) and managed Medicare Advantage (MA).

Sample

Our sample encompasses Medicare beneficiaries who were 65 and older in 2008 and residing in one of our 276 sample state-MSAs. We measure health outcomes at the individual level and assign exposure at the level of the state-MSA as identified through the beneficiaries' residential ZIP code.

Health Care Related Labor Supply Outcomes

To assess the effect of immigration on the supply of health and long-term care workers, we used ACS data to measure, at the state-MSA level, the total number of individuals working in the health care sector. We defined health sector workers broadly, encompassing occupations in both the health and personal care systems. Occupations were defined using the Standard Occupation Codes and included aides, technicians, nurses, physician assitants and other physician extenders, physicians, therapists, as well as other occupations that work in hospitals,

skilled nursing facilities, (unskilled) residential care facilities, home care, and doctors' offices in the community. In our main analyses, we focus more specifically on direct care providers, which included aides, nurses, physicians, and advanced practice providers. We refer to this bundle of occupations as care providers.

ACS respondents were considered in the labor force if they reported positive hours worked in the weeks prior to the survey. Worker count estimates were produced for each MSA-year and were normalized by the number of Medicare beneficiaries aged 65 and older residing in that MSA year. We further split worker counts by whether the workers were foreign-born or born in the US using the birthplace information in the ACS.

Health Outcomes

Our health outcome of interest was annual mortality rates among the 65 and older population. Using the Medicare enrollment data, we quantify this outcome at the beneficiary level for all Medicare beneficiaries aged 65 and older as a binary indicator for death in a given calendar year, conditional on being alive and enrolled in Medicare at least one day in that year.

Health Care Use Outcomes

Changes in older adults' use of key health care services may provide important information about the mechanisms underlying any improvements in mortality. We examine health care use with an emphasis on services we can observe for the full Medicare population. These include nursing home use (including short-term rehab stays and long-term residential placements), home health care use, and hospitalizations. For all outcomes, we construct a binary indicator for whether the outcome of interest occurred at least once in the year.

Empirical Strategy

We use year-to-year variation within state-MSAs in the size of the immigration population, normalized by the size of the 65 and older population, to estimate the impact of changes in the immigrant population on older adults' health outcomes. That is, we estimate regressions described in Equation 1.

$$Y_{i,m,t} = I_{m,t} + X_{i,m,t} + \gamma_m + \delta_t + \varepsilon_{i,m,t} \quad (1)$$

Where $Y_{i,m,t}$ is the health outcome of interest for Medicare beneficiary i residing in state-MSA m in year t and $X_{i,m,t}$is a vector of beneficiary level controls (i.e., sex, age, and Medicaid status), γ_m and δ_t are unit fixed effects, and $\varepsilon_{i,m,t}$ is a robust standard error clustered at the state-MSA level. $I_{m,t}$ represents the number of immigrants in state-MSA m in year t normalized by the size of the elderly Medicare population in m in our base year of 2005.

We expect that where new immigrants settle may be endogenous to numerous factors that affect older adults' health. For example, immigrants may locate in areas experiencing economic growth or places with high demand and willingness-to-pay for care services, and such conditions may independently improve older adults' life expectancy. To address the potential endogeneity between the location where immigrants choose to settle and our outcomes of interest, we employ a shift-share instrument approach developed by Card (2001). Specifically, we instrument for changes in the local immigrant population per 65+ population using national immigration flows and the historic propensity of certain immigrant groups to settle in certain geographic regions.

We extend this approach by leveraging the fact that certain immigrant groups tend to work in health care (Grabowski, Gruber, & McGarry, 2023). We observe wide differences in the share of immigrants who work in health sector jobs with direct patient care responsibilities,

including aides[6], nurses[7], and doctors or advanced practice providers.[8] For instance, we estimate, using the ACS, that 14% of immigrants from the Philippines work in one of these occupations compared to just 1.2% of immigrants from Mexico. We use this variation to identify years where the national shock to the immigrant population is more concentrated among immigrants who are likely to work in the care economy. More formally, we construct weights for ethnicity observable in our data by calculating the share of immigrants of ethnicity e who work as an aide, nurse, or doctor in our base year (2005) and dividing that number by the share of all immigrants who work in these occupations. We then create the following weighted instrument.

$$\widehat{I_{m,t}} = \sum_{e} \widehat{I_{m,e,t}} = \sum_{e} \left(S_{t,e} * I_{m,e,2005}\right) * W_{e,2005} \quad (2)$$

$\widehat{I_{m,e,t}}$ is the estimated stock of immigrants of ethnicity e in state-MSA m in year t normalized by the size of the 65 and older Medicare population in m, t. $\widehat{I_{m,e,t}}$ is derived by determining the national stock of this immigrant group in the same year, relative to the size of the population in our base year of 2005 ($S_{t,e}$). We multiply this ratio by the observed size of the immigrant population of ethnicity e in state-MSA m in 2005, and further weight the estimate by the propensity to work as an aide, nurse, or doctor. We instrument for the endogenous variable $I_{m,t}$ in Equation 1 with $\widehat{I_{m,t}}$ and estimate models using two-stage least squares.

To assess the validity of our estimates and check for the presence of existing pre-trends in our outcomes of interest that correlate with local shocks to the immigrant population, we also estimate reduced-form distributed lag models (continuous event study models) where we regress our outcomes on leads and lags of our instrument to produce estimates that are analogous to

[6] Aides include nursing, psychiatric, home health, and personal care aides.
[7] Nurses include licensed practical nurses (LPNs) and registered nurses (RNs).
[8] Doctors and advanced practice providers include physician assistants, pharmacists, physicians and surgeons, and other health diagnosing and treating practitioners.

event study estimates (Gruber, Howard, Leder-Luis, & Caputi, 2025; Schmidheiny & Siegloch, 2023). Specifically, we estimate versions of the model below.

$$Y_{i,m,t} = \widehat{I_{m,t-3}} + \widehat{I_{m,t-2}} + \cdots + \widehat{I_{m,t+3}} + X_{i,m,t} + \gamma_m + \delta_t + \varepsilon_{i,m,t} \quad (3)$$

Estimates obtained from the leads and lags are cumulated and normalized by the coefficient estimated when $t = -1$ to produce estimates that can be interpreted in a manner similar to traditional event study plots. We graph these cumulated estimates for our primary results in addition to reporting standard 2SLS estimates obtained from two-way fixed effects models. We also provide a series of other robustness checks detailed in Section V.

A different but related concern is that, even given exogenous migrant locations, there is an endogeneity in the health of older adults who live in areas receiving more immigrants. For example, the sickest elders may move to the cities receiving the most immigrants because health care is more accessible. Indeed, if we regress the size of the elderly population on our (instrumented) immigration shock measure, we get a significant and positive impact of immigration that is not simply explained by our estimated reduction in mortality, suggesting that such mobility responses are present.[9] To remove any bias this causes to our estimates, we use a sample of elders already enrolled in Medicare in 2008, and follow them for the next decade. We hold their location fixed at their 2008 location even if they move, to avoid endogenous elder mobility. This "static population" approach has another advantage – it rules out the direct effects of immigrant flows of elders on our results, by focusing on a fixed sample of enrollees.[10]

[9] Our 2SLS estimates indicate that a one unit increase in the number of immigrants per 65 and older population results in 0.571 (se=0.122) additional Medicare beneficiaries. Put differently, we estimate that 1000 additional immigrants increases the Medicare 65 and older population in an MSA by 0.5%.

[10] Although given that new immigrants do not qualify for Medicare, this should not have been reflected in our results in any case.

III. IMMIGRATION AND THE HEALTH CARE WORKFORCE

Our analytic sample contains observations on 18,017,453 unique Medicare beneficiaries aged 65 and older residing in 276 state-MSAs. The sample reflects 170,681,480 beneficiary years. Across all study years, the mean annual mortality rate is 5.6%.

Table 1 presents results of our first stage regression examining the relationship between our weighted shift-share instrument and the observed size of the immigrant population in a given MSA and year. We find strong empirical support for our instrument with each one unit increase in the instrument being associated with a 0.9 increase in the local stock of immigrants (F-statistic=21.2).

Table 2 presents estimates of the effect of immigration on the total supply of health care workers.[11] Naïve OLS estimates indicate that increases in immigration are significantly associated with increases in the supply of health care workers—1,000 additional immigrants (a 1.1% increase in the size of the immigrant population in the average state-MSA) result in 120 additional health care workers. After accounting for the endogeneity of local immigrant flows, we find OLS estimates understate the effects of immigration on health care labor supply. Specifically, we estimate that an additional 1,000 immigrants result in an additional 173 health care workers, representing a 0.4% increase relative to the sample mean. Columns 2 and 3 of Table 2 show that these effects are almost entirely driven by increases in the number of foreign-born health care workers. Specifically, we estimate that an additional 1,000 immigrants result in 142 additional foreign workers, or a 1.6% increase. We find no significant change in the number

[11] Health care workers are defined as those working in the following occupations: personal care aides; nursing, psychiatric, and home health aides; registered nurses (and nurse anesthetists and nurse practioners and nurse midwives; licensed practical and licensed vocational nurses; physician assistants; pharmacists; physicians and surgeons; other health diagnosing and treating practitioners.

of domestic health care workers, suggesting that immigrants do not crowd out native health care workers.

Figure 1 presents results from a reduced form distributed lag model examining the same outcome, total health care worker supply. This figure indicates the absence of pre-trends in our outcome of interest and illustrates that the labor supply effects grow larger over time following the immigration shock, consistent with training and licensing requirements to enter the health care workforce. Looking at the effect of immigration on foreign-born and domestic health care workers separately confirms the findings in for these outcomes in Table 2 (Appendix Figure A1).

Focusing on the worker types most involved in direct patient care—nurses, aides, physicians, and physician extenders—we find the effects of immigration are widespread and not obviously concentrated among one type of care providers (Table 3). We estimate that an increase of 1,000 immigrants results in an additional 28 aides (0.3%), 49 nurses (0.5%) and 19 doctors (0.5%) of any origin, and 33 aides (1.1%), 32 nurses (1.6%) and 13 doctors (1.2%) of foreign origin.

We also find evidence that increases in immigration modestly increase the supply of domestic physicians—an additional 1,000 immigrants result in 6 domestic physicians (0.2%). This crowd-in effect may reflect health systems' ability to expand capacity in the presence of an increased supply of health care support staff (i.e., nurses and aides). We also find significant positive effects for other health care occupations, which includes therapists, dentists, and other support staff (Appendix Table A1).

IV. IMMIGRATION AND OLDER ADULT HEALTH

As noted earlier, the robust increase we see in the health care workforce associated with immigration has ambiguous implications for patient health. One the one hand, a larger health care workforce may improve outcomes by increasing access to care, consistent with prior research in the nursing home setting (Furtado & Ortega, 2023; Grabowski et al., 2023). On the other hand, there may be concerns that the marginal health care workers provided through immigration may not reflect the average effect of raising workforce size. In particular, research has documented the important role that trust and communication play in intermediating the effects of medical care, and that concordance between provider and patient is strongly associated with better outcomes (Alsan, Garrick, & Graziani, 2019; Frakes & Gruber, 2022). Language barriers and even native xenophobia may limit the positive effects of immigrant health care providers.

Table 4 presents OLS (Column 1) and 2SLS (Column 2) results on overall mortality among Medicare beneficiaries 65 and older. In our naïve models, we find a modest protective effect of immigration on older adults' mortality—1,000 additional immigrants result in 0.03% decline in mortality. After instrumenting for immigrant flows, effects are nearly 5 times as large and strongly significant, consistent with the first stage finding that OLS understimates the effects of immigration on the health care labor supply. Our IV estimates indicate that each additional 1,000 immigrants result in 9.8 fewer deaths in the average sample MSA, a 0.15% reduction relative to the sample mean. In Figure 2, we see no pre-trends for this result, and the effect grows over time in parallel to the growing impact on provider supply.

As noted earlier, the net flow of immigrants into the US was 1.3 million in 2023 (Macrotrends, 2025). Increasing that number by 25%, or allowing in 325,000 more immigrants

per year, our model suggests a reduction in the number of seniors dying per year by roughly 5000.[12]

In column 3 of Table 4, we examine effects when we weight our immigration measure by the likelihood of working in any job that is not classified as being in the health care sector. This instrument yields results that are much smaller and insignificant – but not significantly different from the weighted estimate. To further assess the differences, we include both measures in one regression. Doing so, we find a stronger effect from our health care weighted measure and a wrong-signed and insignigificant effect for the unweighted measure.

Health Care Use

To understand the mechanisms behind the reduction in elderly mortality as immigration rises, we next turn to examining the impact of immigration on health care use. The results of this analysis are shown in Table 5, using the same 2SLS regression framework used for the mortality analyses. Importantly, we focus on health care use that we can measure for all Medicare beneficiaries, regardless of whether they obtain their coverage through traditional fee-for-service Medicare or Medicare Advantage. These outcomes include inpatient hospitalizations, SNF (nursing home) use, and home health care use.

The first column of Table 5 shows immigration's effect on SNF use. We find a highly significant reduction in SNF use. We estimate that 1,000 additional immigrants result in 17.3 fewer older adults using a SNF for any duration in the typical MSA. This represents a 0.22% reduction relative to the sample mean for a roughly 1% increase in the immigrant population.

[12] A national increase of 325,000 immigrants translates to a 0.01 unit increase in the rate of immigrants per 65 and older population. We multiply this unit change by our 2SLS effect estimate to obtain the reduced mortality probability (ie, -0.00008). We scale this estimate by the size of the 65 and older population in 2024 (roughly 60 million) to arrive at the estimated number of deaths prevented.

Results are confirmed using distributed lag models and event study graphs, with evidence that the protective effects of immigration against SNF use grow larger over time (Figure 3; Panel A).

Our estimates are directionally consistent with earlier work by Huh et al. (2024) and Butcher et al. (2022) though the magnitude of our estimates lies between these two papers. For instance, Huh and colleagues estimate that a 1 percentage point increase in the share of low-skilled workers who are immigrants, equivalent to an increase of approximately 6,000 additional immigrants in an MSA,[13] results in a roughly 0.8% decline in the number of older adults residing in an institution (or a 0.13% decline per 1,000 immigrants). Similarly, the Butcher estimates imply a 0.6% reduction in institutionalized older adults for an additional 1,000 immigrants. Our estimates may differ from this prior work for several reasons. We measure nursing home use precisely, as opposed to relying of survey reports of residing in any institutional setting, and we leverage higher frequency data that captures year-to-year variation in immigrant flows. Furthermore, our estimates include SNF use that is rehabilitative (i.e., short stays) rather than exclusively focusing on long-stay residential placement in a nursing home.

In the second and third columns of Table 5, we find no significant effects on the rates of hospitalizations and home health care use. When examining these outcomes using distributed lag models, it appears that the probability of being hospitalized declines in the year of an immigration shock, but these declines are not significant in later years and hospitalization probabilities return to baseline by year 3 (Figure 3, Panel B). For home health care use, we see evidence of pre-trends indicating growing home health care use in areas that experienced an

[13] We estimate that the typical MSA has about 310,000 low-skilled workers and about 16% of these workers are immigrants. About 50% of newly arriving immigrants are low-skilled (see for example, https://www.migrationpolicy.org/article/college-educated-immigrants-united-states), suggesting that 6,000 total new immigrants are needed to increase the share of the low-skilled workforce who are immigrants by 1 percentage point.

immigration shock, and these trends are reversed after an influx of immigrants (Figure 3, Panel C). The distributive lag model esitmates therefor provide suggestive evidence that immigration reduces home health care use. This finding may appear to contrast with earlier papers on the effect of immigration on institutionalization rates because those papers suggest that an important mechanism to prevent nursing home entry is greater access to in-home personal care services. However, Medicare home health care does not include such personal care services which are typically paid for privately or by state-administered Medicaid programs. Instead, the reduced use of home health care, which is often focused on rehabilitation and recovery following an injury, may be consistent with broader improvements in older adults' health that might reduce demand for in-home health care.

To examine other forms of health care use—and look at overall spending effects—we need to restrict analyses to the subgroup of Medicare beneficiaries who are consistently enrolled in TM throughout the study window, which accounts for about 65% of our total sample, to ensure that the Medicare FFS claims data accurately reflect actual care use. The first 4 columns of Table 6 replicate our overall findings for mortality and the use of SNFs, hospitals, and home health care. Columns 5 to 7 display the effects on emergency department (ED) treat and release visits (i.e., visits to the ED that do not results in an inpatient hospitalization) and any outpatient care, which include primary care visits, and any hospice care. We do not find effects of immigration on these forms of care use.

Table 7 display results for two measures of total TM spending as captured by the CMS Cost and Use File within the Medicare enrollment data. We find that immigration is associated with increases in spending, though this relationship is only signficant when spending amounts are inverse hyperbolic sine transformed (to handle instances of $0 spending). When examining

these outcomes graphicaly, Figure 4 shows evidence that pre-trends likely drive the 2SLS results for inverse hyperbolic sine transformed spending. As such, we collectively interpret the spending results to indicate that immigration does not meaningfully affect Medicare spending, suggesting that reductions in SNF spending are likely offset by increases in spending in other areas and the mechnical increase in spending that likely results from reduced mortality.

V. ROBUSTNESS

To test the assumption that our instrument is exogenous to confounders that may effect older adults' health, we estimate a reduced form regression model where the outcome variable is predicted mortality—constructed using beneficiary characteristics (e.g. age, gender, race/ethnicity, Medicaid status) —and the right hand side variables include our instrument and the same fixed effects as our main 2SLS models. Results of this regression reveal a small, wrong-signed, and statistically insignificant relationship between our instrument and predicted mortality, suggesting that beneficiaries' characteristics are balanced across time-varying national immigration shocks (Appendix Table A2).

Additionally, following Goldsmith-Pinkham, Sorkin, and Swift (2020), we decompose our shift-share estimator into the weighted combination of individual-share-instrument estimators. Of the 73 ethnicities in our sample, immigrants from Africa, India and the West Indies drive our results, accounting for 68% of the absolute weight in the estimator (Appendix Table A3). *A priori*, these are ethnic groups we would expect to drive estimated effects given their relatively high propensity to work in health care (Appendix Table A4).[14] We further assess the risk of negative weights by comparing the contributions of positively and negatively

[14] Estimated relative probabilities of working in health care are as follows: Africa=2.8, West Indies=2.8, India=1.4

weighted ethnicities. When applied to our foreign staffing estimate, positively weighted ethnicities drive our effect while negatively instruments contribute little to the overall estimate. This suggests that even under treatment effect heterogeneity our estimates would retain a LATE-like interpretation (Appendix Table A5).

VI. DISCUSSION

Increases in the immigration of individuals under age 55 produce meaningful declines in the mortality rates of older adults. A 25% increase in the net inflow of immigrants each year would result in 5000 fewer elder deaths annually, roughly a 0.2% reduction in older adult mortality. These reductions in mortality are driven by immigration from ethnic groups that traditionally work in the health and long-term care sectors and correspond to sizeable increases in the supply of health care workers, particularly aides, nurses, physicians, and advanced practice providers.

As such, targeted immigration reform policies that tie immigration approvals to agreements to work as a care provider could result in even larger mortality reductions. For context, our estimates suggest that increases in general immigration result in increases in health care labor supply at a rate of 0.17. To the extent that all our the estimated mortality benefits derive from improving the health care labor supply, the same mortality reduction could be achieved with an increase in immigrant health care workers of only 55,000, or a 0.03% rise in the US workforce through immigration.

Further research is needed to isolate the mechanisms through which immigration improves older adults' health. Interestingly, we do not find clear evidence of increased health care use in our data, suggesting that improved access to care via an increased supply of physicians and other health care workers (Basu et al., 2019; Iizuka & Watanabe, 2016) are not

driving the health improvements. A possible competing explanation is that immigrant health workers may improve the overall quality of the health workforce, resulting in improvements in health through better care, as opposed to higher volumes of care, which is more challenging to measure with administrative data.

Another potential mechanism is that immigrants alter the landscape of long-term care for older adults in ways that improve health. These machisms are two-fold. First, immigrants, particularly those working as in-home or personal care aides, may make it easier for older adults to age in place and avoid a nursing home, consistent with our finding of reduced nursing home use and the findings of earlier work (Butcher et al., 2022; Jung & Mockus, 2025). Poor care quality has been a persistent concern in the U.S. nursing home industry (National Academies of Sciences & Medicine, 2022) and there may be inherent risks to vulnerable older adults to living in congregate care settings that facilitate the spread of infectious diseases (Brown et al., 2021; Strausbaugh, Sukumar, Joseph, & High, 2003). As such, it is plausible that better access to in-home supports that facilitate aging in place may confer direct health benefits in addition to better aligning with most older adults' preferences. Further research with data that captures the actual receipt of in-home personal care, which is not covered by Medicare, is needed to directly interrogate this explanation (Wang, Qi, & Konetzka, 2025).

Second, for those older adults who continue to use nursing homes, immigrants may improve staffing ratios and care quality within these facilities. Our prior work, as well as that of Furtado and Ortega, support this explanation (Furtado & Ortega, 2023; Grabowski et al., 2025). For instance, we found that increases in immigration increase staffing ratios among full-time nursing home staff and reduce the occurrence of several adverse outcomes, including hospitalizations, the occurrence of pressure ulcers, and the use of physical and chemical

restraints. Our earlier work did not detect significant mortality effects within the nursing home population, but our study design may have been underpowered for this outcome.

In summary, immigration increases the supply of US health workers and results in meaningful reductions in older adults' mortality and nursing home use. Targeted policies that encourage immigration to the US for the purpose of working in the health sector may be a viable mechanism to address health workforce shortages and support an aging population.

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Tables

Table 1: First Stage Regression Results

	(1) Immigrants per 65+ (weighted; base 2005)
Weighted Shift-Share Instrument	0.907***
	(0.197)
Obs.	4,020
Sample Average	1.114
F-statistic	21.17

Table presents the first stage of our 2SLS regression where the endogenous variable is the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005), and the instrument is the shift-share predicted number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005) weighted by immigrant ethnic groups' propensity to work in health care. Models contain state-MSA and year fixed effects, as well as controls for the state-MSA unemployment rate. Observations are weighted by the 65 and older population in a state-MSA in 2005.

Table 2: Effect of Immigration on Total Health Care Workers

	(1)	(2)	(3)
	Total Health Workers	**Foreign Health Workers**	**Domestic Health Workers**
Panel A: OLS Results			
Immigrants per 65+ (weighted; base 2005)	0.121***	0.0601***	0.0609***
	(0.0225)	(0.0146)	(0.00932)
Obs.	4020	4020	4020
Sample Average	0.467	0.268	0.199
Staff per 1000 immigrants	120.6	60.11	60.93
Percent Change (per 1000 immigrants)	0.279	0.242	0.332
Panel B: Instrumental Varaible Results			
Immigrants per 65+ (weighted; base 2005)	0.174***	0.143***	0.0436
	(0.0422)	(0.0208)	(0.0489)
Obs.	4020	4020	4020
Sample Average	0.467	0.0959	0.37
Staff per 1000 immigrants	173.5	142.7	43.55
Percent Change (per 1000 immigrants)	0.402	1.609	0.127

Table presents results of ordinary least squares (OLS) and two-stage least squares (2SLS) regression where the key independent variable is the annual number of immigrants age 54 or younger per 65 and older population in a state-metropolitan statistical area (MSA) (fixed in 2005). In Panel B, a shift-share instrument that is weighted by immigrant ethnic groups' propensity to work as an aide, nurse, physician, or physician extender is used. The primary outcome is the total number of individuals working in health care per 65 and older population (fixed in 2005). Models contain state-MSA and year fixed effects, as well as controls for the state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. Observations are weighted by the 65 and older population in a state-MSA in 2005. The staff per 1,000 immigrants' statistic is the implied expected change in staff (in levels) from 1,000 new immigrants arriving in the average state-MSA. The percent change per 1,000 immigrants' statistic is the expected change in the staff rate from 1,000 new immigrants arriving in the average state-MSA as a percent of the mean staff rate.

Table 3: Effect of Immigration on the Supply of Aides, Nurses, and Physicians

	(1) **Aides**	(2) **Nurses**	(3) **Doctors**	(4) **Foreign Aides**	(5) **Foreign Nurses**	(6) **Foreign Doctors**	(7) **Domestic Aides**	(8) **Domestic Nurses**	(9) **Domestic Doctors**
Immigrants per 65+ (weighted; base 2005)	0.0290**	0.0498***	0.0196***	0.0331***	0.0328***	0.0134***	-0.00487	0.0139	0.00649**
	(0.0136)	(0.0158)	(0.00389)	(0.00896)	(0.00709)	(0.00203)	(0.0104)	(0.0167)	(0.00296)
Obs.	4020	4020	4020	4020	4020	4020	4020	4020	4020
Sample Average	0.107	0.118	0.0435	0.032	0.0221	0.0124	0.0747	0.0957	0.0312
Staff per 1000 immigrants	28.96	49.85	19.65	33.12	32.8	13.44	-4.869	13.92	6.492
Percent Change (per 1000 immigrants)	0.293	0.457	0.488	1.121	1.604	1.173	-0.071	0.157	0.226

Table presents results of a 2SLS regression where the key independent variable is the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005), instrumented with a shift-share instrument that is weighted by immigrant ethnic groups' propensity to work in health care. The outcomes are the total number of individuals working in specific health care occupations per 65 and older population (fixed in 2005). Columns 1-3 show staffing effects separately for aides, nurse and doctors. Columns 4-6 repeat these specifications, but restrict to immigrants to the United States (determined by place of birth). Columns 7-9 repeat the specifications, but restrict to workers born in the United States. Models contain state-MSA and year fixed effects, as well as controls for the state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. Observations are weighted by the 65 and older population in a state-MSA in 2005. The staff per 1,000 immigrants' statistic is the implied expected change in staff (in levels) from 1,000 new immigrants arriving in the average state-MSA. The percent change per 1,000 immigrants' statistic is the expected change in the staff rate from 1,000 new immigrants arriving in the average state-MSA as a percent of the mean staff rate.

Table 4: Effect of Immigration on Medicare Beneficiary Mortality

	(1) OLS Probability of Death	(2) 2SLS Probability of Death	(3) 2SLS Probability of Death – Non-Health Care Weights	(4) Probability of Death - Combined
Immigrants per 65+ pop (aides, nurses and doctors' weight)	-0.00154*	-0.00761***		-0.0105***
	(0.00060)	(0.00208)		(0.00338)
Immigrants per 65+ pop (Non-Health Care weight)			-0.00252	0.00836
			(0.00370)	(0.00581)
Obs.	170681483	170681483	170681483	170681483
Sample Average	0.056	0.056	0.056	0.056
Deaths from 1,000 immigrants	-1.940	-9.821	-3.254	-13.58
Percent Change (per 1,000 immigrants)	-0.029	-0.148	-0.049	-0.204

Table presents results from OLS and 2SLS regression where the key (endogenous) independent variable is the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005), and the main instrument is a shift-share instrument that is weighted by immigrant ethnic groups' propensity to work in health care. The outcome is a binary variable indicating if a given Medicare beneficiary age 65 or older died in that year. Column 3 presents results when the instrument is weighted by immigrant groups' propensity to work in non-health care job (i.e., all other jobs not included in our definition of health care jobs). Column 4 presents results when both instruments are included in the same model. All models contain state-MSA and year fixed effects, as well as controls for the beneficiary's age ,sex, and Medicaid status, and state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. The deaths per 1,000 immigrants' statistic is the expected change in probability of death from 1,000 new immigrants arriving in the average state-MSA times the average number of individuals aged 65 or older. The percent change per 1,000 immigrants' statistic is the expected change in the probability of death from 1,000 new immigrants arriving in the average state-MSA as a percent of the mean probability of death. In column for, these interpretable statistics reflection the estimated effect from a one unit change in the instrument weighted by the likelihood of working in the a health care job. *P<0.1; *P<0.05; ***P<0.001

Table 5: Effect of Immigration on Health Care Use

	(1)	(2)	(3)
	Skilled Nursing Facility Use	Hospital Use	Home Care Use
Immigrants per 65+ pop (aides, nurses and doctors' weight)	-0.0134***	0.00104	-0.00513
	(0.00476)	(0.00616)	(0.0109)
Obs.	170681483	170681483	170681483
Sample Average	-17.33	1.346	-6.619
Effect from 1,000 immigrants	-0.215	0.00597	-0.0553
Percent Change (per 1,000 immigrants)	-0.0134***	0.00104	-0.00513

Table presents results of a 2SLS regression examining health care use effects, where the key independent variable is the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005), instrumented with a shift-share instrument that is weighted by immigrant ethnic groups' propensity to work in health care. The primary outcomes are binary variables indicating if a given Medicare beneficiary age 65 or older had any (1) skilled nursing facility, (2) inpatient hospital, or (3) home health care use. Models contain state-MSA and year fixed effects, as well as controls for the beneficiary's age, sex, and Medicaid status, and state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. The effects per 1,000 immigrants' statistic is the expected change in thr outcome of interest from 1,000 new immigrants arriving in the average state-MSA times the average number of individuals of aged 65. The percent change per 1,000 immigrants' statistic is the expected change in the probability of the outcomes from 1,000 new immigrants arriving in the average state-MSA as a percent of the mean probability of the outcome. *P<0.1; *P<0.05; ***P<0.001

Table 6- Effect of Immigration on Health Care Use among Traditional Medicare Beneficiaries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mortality	Skilled Nursing Facility Use	Hospital Use	Home Health Care Use	ED Treat and Release	Outpatient Care Use	Hospice Care Use
Weighted Immigrants per 65+ Pop in 2005	-0.00706***	-0.0121***	0.00207	-0.000716	0.00126	0.0248	-0.00298
	(0.00228)	(0.00446)	(0.00759)	(0.0116)	(0.0117)	(0.0150)	(0.00253)
Obs.	112012759	112012759	112012759	112012759	112012759	112012759	112012759
Sample Average							
Effect from 1000 immigrants	-9.116	-15.62	2.674	-0.924	1.631	31.95	-3.850
Percent Change (per 1000 immigrants)	-0.131	-0.188	0.0112	-0.00730	0.00645	0.0393	-0.0811

Table presents results of a 2SLS regression examining health care use effects, where the key independent variable is the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005), instrumented with a shift-share instrument that is weighted by immigrant ethnic groups' propensity to work in health care. The sample is restricted to beneficiaries enrolled in Traditional Medicare throughout the study. Models contain state-MSA and year fixed effects, as well as controls for the beneficiary's age, sex, and Medicaid status, and state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. The effects per 1,000 immigrants' statistic is the expected change in thr outcome of interest from 1,000 new immigrants arriving in the average state-MSA times the average number of individuals of aged 65. The percent change per 1,000 immigrants' statistic is the expected change in the probability of the outcomes from 1,000 new immigrants arriving in the average state-MSA as a percent of the mean probability of the outcome. *P<0.1; *P<0.05; ***P<0.001

Table 7 – Effect of Immigration on Traditional Medicare Spending

	(1)	(2)
	Total Spending ($, Winsorized)	Total Spending ($, inverse hyperbolic sine)
Weighted Immigrants per 65+ Pop in 2005	3207.1	0.263***
	(3666.0)	(0.0836)
Obs.	22417726	22417726
Sample Average		
Effect from 1000 immigrants	4138749.1	339.1
Percent Change (per 1000 immigrants)	0.0730	0.0297

Table presents results of a 2SLS regression examining Medicare spending effects, where the key independent variable is the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005), instrumented with a shift-share instrument that is weighted by immigrant ethnic groups' propensity to work in health care. The outcome is total Medicare spending as obtained from the CMS Cost and Use files. The sample is restricted to beneficiaries enrolled in Traditional Medicare throughout the study window. Models contain state-MSA and year fixed effects, as well as controls for the beneficiary's age, sex, and Medicaid status,, and state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. The effects per 1,000 immigrants' statistic is the expected change in thr outcome of interest from 1,000 new immigrants arriving in the average state-MSA times the average number of individuals of aged 65. The percent change per 1,000 immigrants' statistic is the expected change in the probability of the outcomes from 1,000 new immigrants arriving in the average state-MSA as a percent of the mean probability of the outcome. *P<0.1; *P<0.05; ***P<0.001

Figures

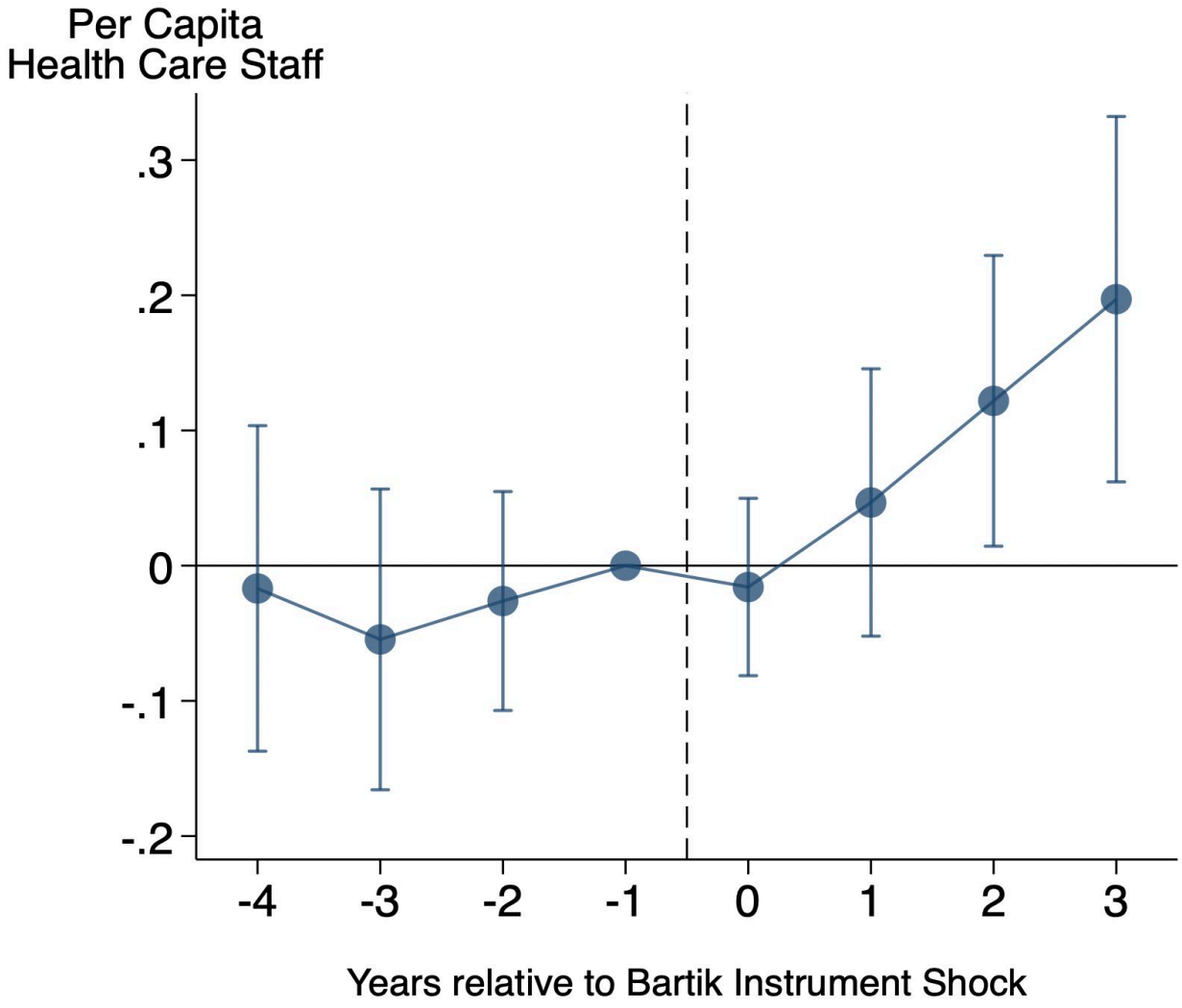


Figure 1: Health care staffing. Figure presents results of a reduced-form regression where the key independent variables are leads and lags of the shift-share (Bartik) instrument for the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005) weighted by immigrant ethnic groups' propensity to work in health care. The outcome is the total number of individuals working in health care per 65 and older population (fixed in 2005). Models contain state-MSA and year fixed effects, as well as controls for the state-MSA unemployment rate and beneficiary age, sex, and Medicaid status. Standard errors are clustered at the state-MSA level. Observations are weighted by the 65 and older population in a state-MSA in 2005. Coefficients are the cumulative effects of a 1 unit increase in the instrument normalized by coefficient for event-time -1.

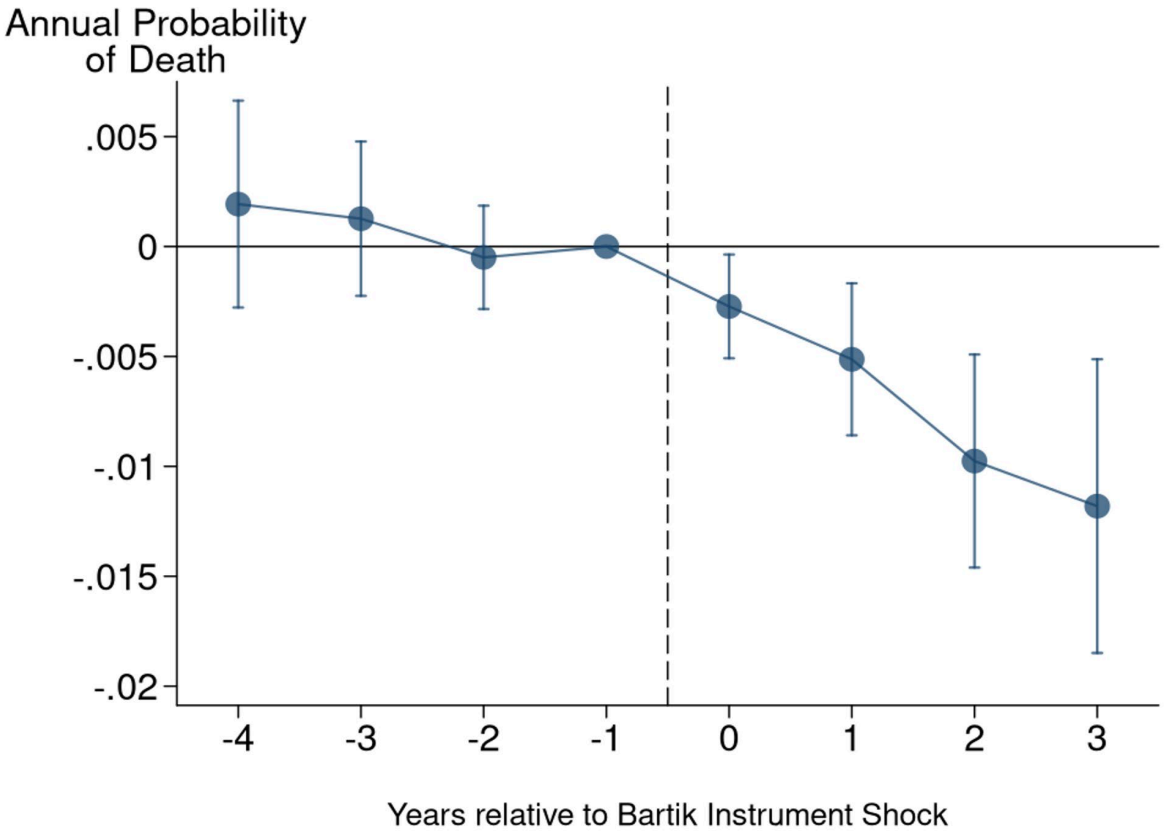


Figure 2- Medicare Beneficiary Mortality. Figure presents results of a reduced-form regression where the key independent variables are leads and lags of the shift-share (Bartik) instrument for the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005) weighted by immigrant ethnic groups' propensity to work in health care. The outcome is a binary variable for death in that year. Models contain state-MSA and year fixed effects, as well as controls for the beneficiary's age, sex, Medicaid status, and state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. Coefficients are the cumulative effects of a 1 unit increase in the instrument normalized by coefficient for event-time -1.

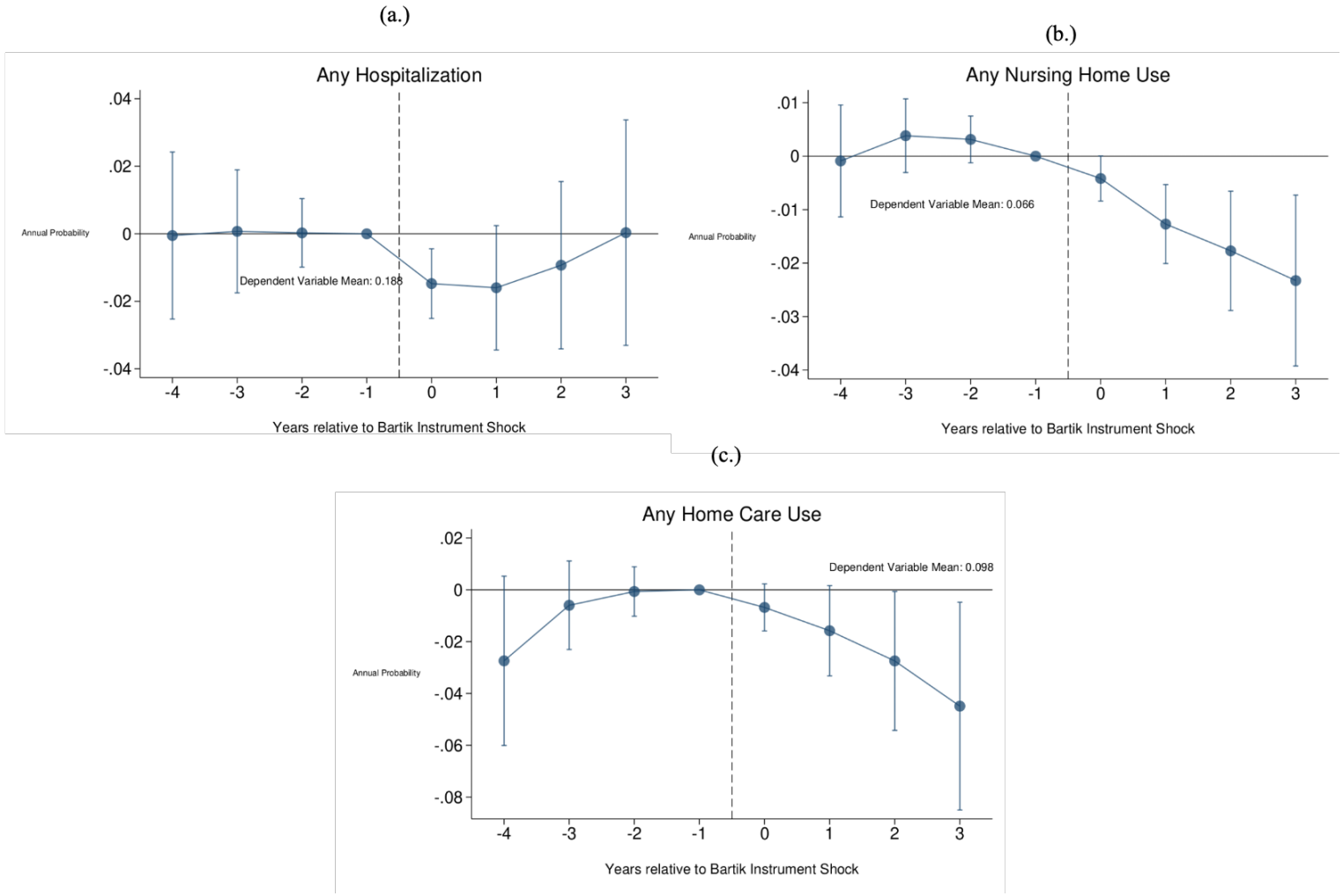


Figure 3- Medicare Beneficiary Health Care Use. Figure presents results of a reduced-form regression where the key independent variables are leads and lags of the shift-share (Bartik) instrument for the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005) weighted by immigrant ethnic groups' propensity to work in health care. The outcome is a binary variable indicating if a given Medicare beneficiary age 65 or older had any care use in that year. Models contain state-MSA and year fixed effects, as well as controls for the beneficiary's age, sex, and Medicaid status, and state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. Coefficients are the cumulative effects of a 1 unit increase in the instrument normalized by coefficient for event-time -1.

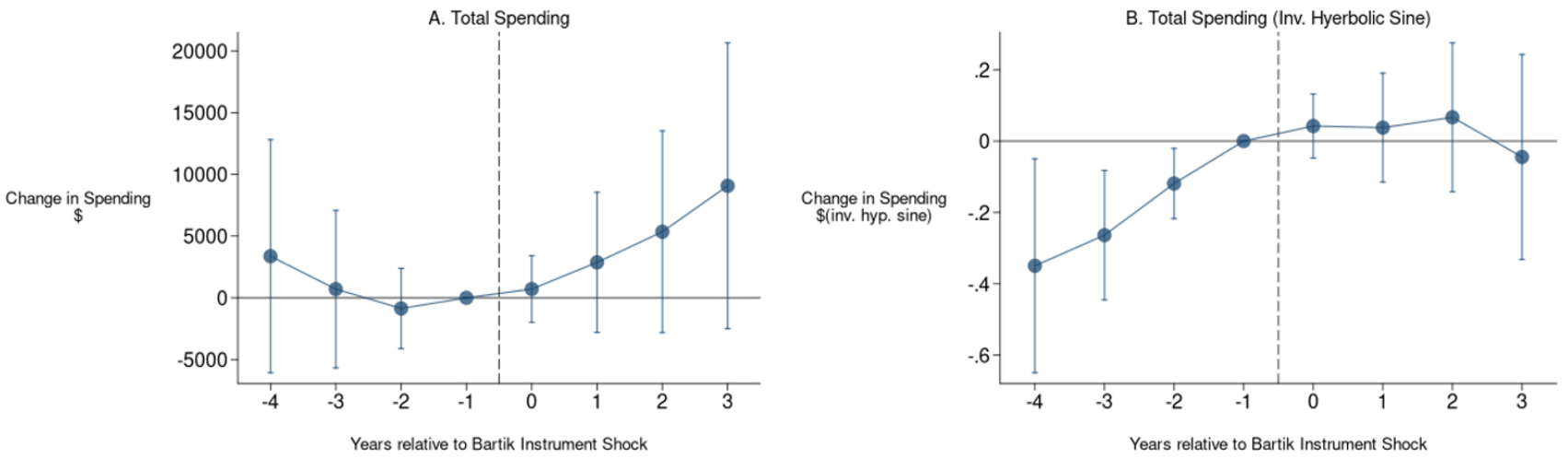
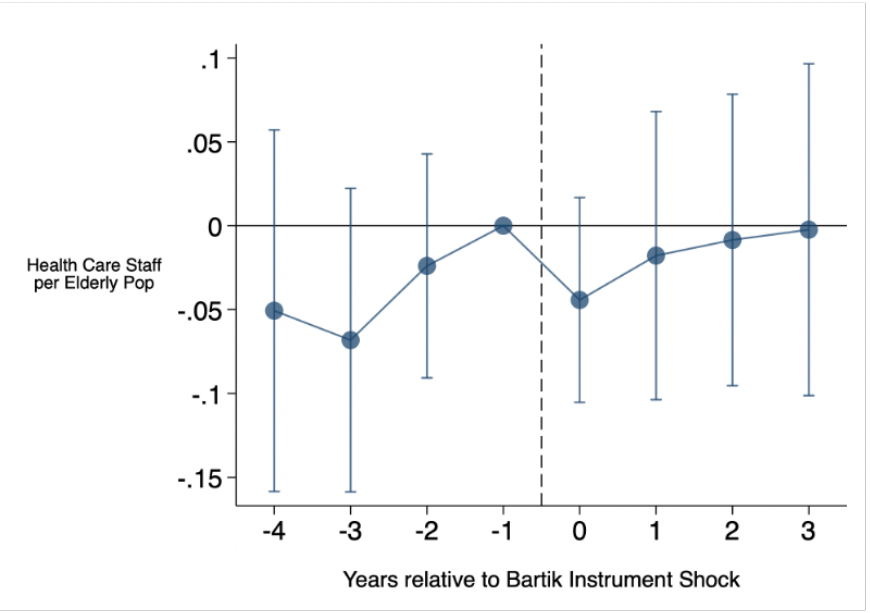


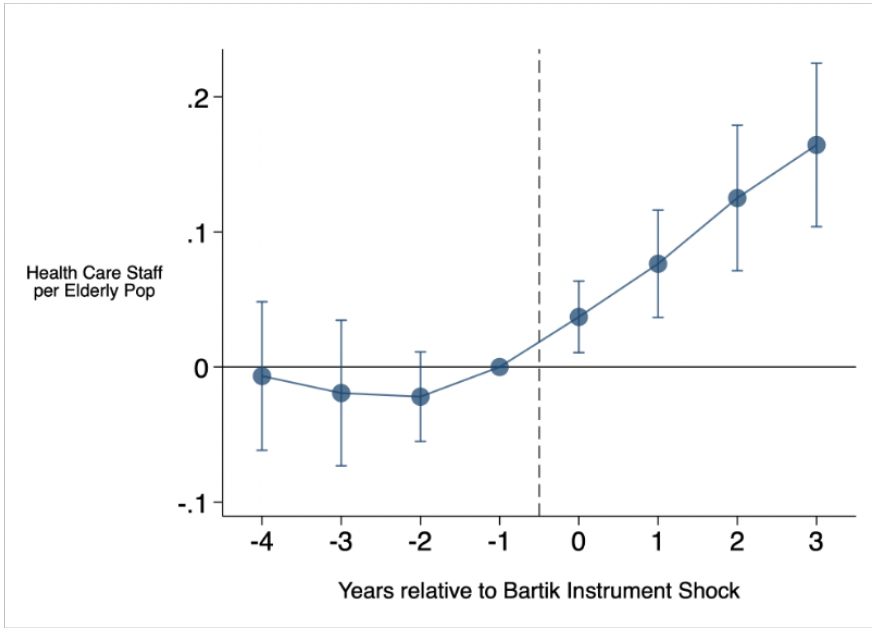
Figure 4- Total Medicare Spending for Tarditional Medicare Beneficiaries. Figure presents results of a reduced-form regression where the key independent variables are leads and lags of the shift-share (Bartik) instrument for the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005) weighted by immigrant ethnic groups' propensity to work in health care. The outcome is a binary variable indicating if a given Medicare beneficiary age 65 or older had any care use in that year. Models contain state-MSA and year fixed effects, as well as controls for the beneficiary's age, sex, and Medicaid status, and state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. Coefficients are the cumulative effects of a 1 unit increase in the instrument normalized by coefficient for event-time -1.

Appendix

a. Domestic



b. Foreign-Born



Appendix Table A1- Foreign and Domestic Health care staffing. Figure presents results of a reduced-form regression where the key independent variables are leads and lags of the shift-share (Bartik) instrument for the annual number of immigrants age 54 or younger per 65 and older population in a state-MSA (fixed in 2005) weighted by immigrant ethnic groups' propensity to work in health care. The outcome is the total number of domestic (Panel A) and foreign-born (Panel B) individuals working in health care per 65 and older population (fixed in 2005). Models contain state-MSA and year fixed effects, as well as controls for the state-MSA unemployment rate and beneficiary age, sex, and Medicaid status. Standard errors are clustered at the state-MSA level. Observations are weighted by the 65 and older population in a state-MSA in 2005. Coefficients are the cumulative effects of a 1 unit increase in the instrument normalized by coefficient for event-time -1.

Table A1 – 2SLS Estimate of Effect of Immigration on Health Care Workers who are not Nurses, Aides, and Doctors (NADs)

	(1) **Total non-NAD Health Workers**	(2) **Foreign non-NAD Health Workers**	(3) **Domestic non-NAD Health Workers**
Immigrants per 65+ (weighted; base 2005)	0.078***	0.0455***	0.0298
	(0.0172)	(0.00766)	(0.0223)
Obs.	4020	4020	4020
Sample Average	0.199	0.0301	0.169
Staff per 1000 immigrants	78.4	45.5	29.8
Percent Change (per 1000 immigrants)	0.43	1.64	0.19

Table presents results of two-stage least squares (2SLS) regression where the key independent variable is the annual number of immigrants age 54 or younger per 65 and older population in a state-metropolitan statistical area (MSA) (fixed in 2005). The shift-share instrument is weighted by immigrant ethnic groups' propensity to work as an aide, nurse, physician, or physician extender is used. The primary outcome is the total number of individuals working in health care per 65 and older population (fixed in 2005). Models contain state-MSA and year fixed effects, as well as controls for the state-MSA unemployment rate. Standard errors are clustered at the state-MSA level. Observations are weighted by the 65 and older population in a state-MSA in 2005. The staff per 1,000 immigrants' statistic is the implied expected change in staff (in levels) from 1,000 new immigrants arriving in the average state-MSA. The percent change per 1,000 immigrants' statistic is the expected change in the staff rate from 1,000 new immigrants arriving in the average state-MSA as a percent of the mean staff rate.

Table A2- Balance Test of Instrument

	(1) **Mortality**	(2) **Predicted Mortality**
Immigrants per 65+ (weighted; base 2005)	-0.00921***	0.0000365
	(0.00152)	(0.000271)
Obs.	170,681,483	170,681,483
Sample Average	0.0557	0.0557

Table presents reduced form estimates from linear regressions where the outcome is: (Column 1) an indicator for whether a beneficiary died in a given year; (Column 2) the predicted probability of death, where death is predicted according to observable beneficiary characteristics (i.e., age, gender, and race/ethnicity). The wrong signed and not statistically distinguishable from 0 results in column 2 suggests that our instrument is not correlated with observable patient characteristics, indicating good instrument balance.

Table A3- Decomposition of Staffing Effects by Immigrant Ethnic Groups (Instrument Shares)

Rank	Immigrant Birth Place / Origin	Rotemberg Weight	Cumulative Absolute Weight	Cumulative Share of Total Absolute Weight
1	Africa	0.4957821	0.4957821	.4204328
2	India	0.2335888	0.7293708	.6185206
3	West Indies	0.072284	0.8016548	.6798188
4	Central America	0.0526543	0.8543091	.7244706
5	China	0.0517473	0.9060563	.80915993
Total (of all 73 Ethnicities):		**1**	**1.1792184**	**1**

Table displays the decomposition of our shift-share estimator for the top 5 immigrant birth places (by weight) while the bottom row presents the totals across all 73 ethncities in our sample. The Rotemberg weights characterize the importance of each share-estimator in our decomposition and are computed following Goldsmith-Pinkham, Sorkin, and Swift (2020). The cumulative absolute weight column shows the contribution of the top 5 ethncities to the overall estimate, and the final column presents these contributions as a share of the total of the absolute values of the weights (i.e. the cumulative aboslute weight divided by 1.1792184). Note: the analytic sample underlying this decomposition excludes state-MSA with outlier (1st and 99th percentile) immigration.

Table A4- Top Health Care Weights by Immigrant Ethnic Groups

Rank	Immigrant Birth Place / Origin	Relative Probability Weight
1	Philippines	3.52207
2	Africa	2.793683
3	West Indies	2.787404

Table displays the probability of working in health care relative to the average immigrant for the top 3 ethnicities (by health care probability).

Table A5- Positive and Negative (Rotemberg) Weighted Ethnicity Contributions

Staffing Effect	Overall Estimate	Contribution from Positive Rotemberg weight Ethnicities	Contribution from Negative Rotemberg weight Ethnicities
Foreign Health Worker Staffing	.1517	.1676	-.0158
Foreign Aide, Nurse and Doctor Staffing	.0965	.1063	-.0098
Foreign Aide Staffing	.0473	.0514	-.0041
Foreign Nurse Staffing	.0372	.0414	-.0043
Foreign Doctor Staffing	.0120	.0134	-.0015

Table displays the decomposition of the estimate for foreign staffing estimates by the contribution from positively-weighted ethnicities and negatively-weighted ethnicities. Decomposition and computation of Rotemberg weights follows Goldsmith-Pinkham, Sorkin, and Swift (2020). Note: the analytic sample underlying this decomposition excludes state-MSA with outlier (1st and 99th percentile) immigration.