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The Long-Term Impact of Medicare's Introduction on Adult Mortality

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Introduction

Today, almost all countries in the world provide some form of public health insurance. A primary aim, alongside financial protection, is to maintain population health by providing access to basic health care for all. Because the incidence and severity of medical problems increase with age, older people account for the largest portion of public health insurance costs and may also enjoy its largest benefits.

Estimating the causal effects of public health insurance on the health of older people has proved difficult, however. One reason is the lack of variation to identify these effects in countries with universal coverage. Yet even in the United States, where universal public health insurance under Medicare begins at age 65, most research has focused on younger people for whom means-tested eligibility has changed substantially. This evidence consistently shows that public insurance coverage improves health and reduces mortality for poor children in the short- and the long-run (Currie and Gruber, 1996a, b; Goodman-Bacon, 2018, 2021; Wherry et al., 2018), but results for low-income adults are mixed (Baicker et al., 2013; Borgschulte and Vogler, 2020; Finkelstein et al., 2012; Miller et al., 2021; Newhouse et al., 1993; Wyse and Meyer, 2023).

Studies investigating the effects of public health insurance provision on the elderly also find mixed results. The introduction of Medicare in 1966, for example, reduced the mortality gap between elderly and near-elderly Americans (Chay et al., 2010) but did not lower the gap in elderly mortality rates between regions with different pre-Medicare health insurance coverage (Finkelstein and McKnight, 2008). Card et al. (2009), however, use an age-based discontinuity approach to document that Medicare lowers the mortality of individuals admitted to hospitals for a subset of conditions that need urgent care. Eligibility expansions of Medicare to people with disabilities and the inclusion of prescription drug coverage significantly reduced mortality in the short run (Andersen, 2018; Dunn and Shapiro, 2019; Huh and Reif, 2017).

A major reason for a lack of evidence about the causal effects of public health insurance on the health of older people is that most studies only investigate short-term effects.[1] Theoretical models of health (Dalgaard and Strulik, 2014; Grossman, 1972; Lleras-Muney and Moreau, 2022), as well as empirical studies (Leinonen et al., 2001; Levinsky and Schiff, 2021), document that health is a stock that is built slowly over time and that also deteriorates slowly. Therefore, the benefits of

[1] Furthermore, medical care is only one of many factors that determine health, including environmental exposure, social conditions, as well as health behaviors and genetic endowments and expression. Additionally, public insurance merely finances care from existing providers. Depending on the supply and quality of medical providers, consumers may not be able to get effective care even if they have a way to pay for it.

health insurance may not materialize for many years, especially among relatively healthy people. Indeed, recent evidence tracking the impact of health insurance on children suggests that there are large long-term impacts of health insurance provision.[2] Whether this evidence applies to adults who are no longer growing is unknown.

This paper estimates the shorter- and longer-term causal effects of the introduction of Medicare on the mortality rates and life expectancy of the program's early recipients. Medicare began providing health insurance for hospital stays and physician visits to (almost) all Americans over the age of 65 in July 1966. To evaluate this historic change, we construct a new dataset of more than 18 million individuals observed in the 1940 census who can be linked to a death record in the FamilyTree database at FamilySearch. These data accurately describe the mortality profiles of the affected cohorts, as they closely match the cohort life tables recently produced by the Social Security Administration. They also include many covariates that allow us to investigate heterogeneity in ways that are not possible using vital records or aggregated data.

We pre-specify three research designs that identify Medicare's average treatment effect on the treated under distinct assumptions about mortality rates in the absence of Medicare. First, based on a theoretical model that implies a log-linear relationship between mortality and age, we estimate changes in the slope of the age profile of log mortality for each cohort after they gain Medicare. This interrupted time series (ITS) approach identifies Medicare's average treatment effect (ATT) on log mortality rates for cohort c at age a under the assumption that the observed trend in log mortality in the ages leading up to Medicare eligibility would have continued had Medicare not been enacted.

Second, we employ a difference-in-differences (DiD) design that compares mortality rates for cohorts before and after they gain Medicare to the change in mortality at the same ages for older comparison cohorts who did not have Medicare coverage. This DiD approach identifies the same ATT parameter under the assumption that the change in mortality in the absence of Medicare for treated cohorts would have been the same as the observed change in mortality across the same ages for older cohorts. We develop new econometric results relating this parallel trends assumption to restrictions on the pattern of age, period, and cohort effects considered in demography.

Third, we estimate both the ITS and DiD designs by region to study how estimated ATT parameters vary across areas with different pre-Medicare private health insurance coverage rates, similar to Finkelstein and McKnight (2008). Prior to Medicare's passage, an estimated 50% of the population had hospital insurance, but this rate varied substantially across regions and by socio-economic status. We expect larger effects among populations with lower pre-existing coverage. Under an additional assumption about the comparability of ATTs across regions, we can interpret this heterogeneity as the causal effect of incremental changes in population-level insurance coverage (see Callaway et al. 2024). Relatedly, we generate predicted health insurance coverage at the

[2] Goodman-Bacon (2018, 2021) documents that the introduction of Medicaid in 1965 resulted in immediate reductions in US infant and child mortality followed by reductions in mortality and disability up to 50 years later. Other work also finds evidence that that Medicaid expansions during childhood led to better self-reported health at later ages, fewer chronic diseases and related hospitalizations, and lower mortality (Currie, Decker, and Lin 2008; Thompson 2017; Wherry and Meyer 2016; Wherry et al. 2018; Miller and Wherry 2019; Brown, Kowalski, and Lurie 2020).

individual level by combining covariates from our analysis dataset with a predictive model of health insurance coverage using the 1963 National Health Interview Survey. This generates a much larger amount of pre-existing variation in insurance rates than previously used.

To empirically ground our design choices and still conduct valid statistical inference, we use a random 20 percent of our sample to test identifying assumptions and make key specification choices. For example, our detailed microdata allows us to assess how Medicare's effects vary by SES, but we do not know a priori how best to measure SES in order to capture relevant heterogeneity and be able to detect it. Our training sample allows us to test different ways to measure SES in the 1940 Census without inducing pre-test bias. We will archive our analysis plan (and code) and the evidence from our training sample that justifies it with the Open Science Framework before conducting our main analysis.[3] Results in this abstract use training data only.

In this extended abstract we report a few of these preliminary results.

We find that Medicare increases life expectancy for men at age 55 by 0.82 years on average: the effect gradually increases from zero to two for birth cohorts 1885-1910 and then decreases to one for 1910-1915 birth cohorts. We discuss the reasons for these declines. As predicted by theory and consistent with the empirical evidence for children, these increases in lifespan are driven by small impacts on mortality in the short term that become larger over time. The results for women, however, are somewhat less robust, highlighting important sex differences that are poorly understood in the literature.

In addition to providing the first long-term estimates of the effects of public insurance among the elderly, our study also contributes to our understanding of the success of the Great Society programs implemented by President Johnson. A substantial literature has investigated whether these programs succeeded. This work includes examinations of the impacts of Medicaid (Goodman-Bacon, 2018, 2021; Miller et al., 2021; Wyse and Meyer, 2023), Head Start (Ludwig and Miller, 2007), community health centers (Bailey and Goodman-Bacon, 2015), etc. Many of these programs survive today, yet they remain controversial. Recent efforts to evaluate them have found large impacts, particularly once the long-term effects of these evaluations are taken into account. Our findings align with these previous results: like Finkelstein and McKnight (2008), we do not find large impacts in the short term for the population as a whole, but we do find effects over time.

We also contribute to the literature estimating the impacts of Medicare. In addition to reporting the first long-term impacts, we also document substantial heterogeneity in Medicare's causal effects over time and across sub-populations, which the more recent literature has documented (Card et al., 2008). Medicare has grown tremendously in scope, scale, and cost since 1966. Today, the program serves more than 65 million Americans at a cost of $800 billion, which is one of the largest expenditures in the federal budget. Our findings suggest that these outlays likely still confer meaningful benefits to population health.

[3] Prior to creating our analysis sample, we did estimate preliminary versions of our ITS design and regression versions of the DiD design. We committed to preregistration prior to refining these strategies and all subsequent choices about our analytical approach were chosen using only the training sample.

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