

Breaking Down Silos to Improve the Health of Older Adults:
The Case for Medicare to Cover Home Safety Renovations

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Abstract: The ageing population is increasing the financial strain on the United States health care system, and society may be underinvesting in the place-based determinants of elderly health. The leading cause of injury for older Americans is falls in the home, resulting in more deaths than any other injury, as well as a significant portion of Medicare spending. While medical interventions have yielded mixed results, home safety renovations have been shown to be a cost-effective strategy to enable senior citizens to “age in place” safely, with the health care savings outweighing the upfront investment. Conservative projections demonstrate that Medicare can undertake this investment in home safety renovations with less than 2 percent of its budget, while breaking down the silos that unnecessarily encircle health and housing.

Keywords: population health, older adults, injurious falls

1. Introduction

The ageing of the U.S. population presents one of the greatest public health challenges for the coming decades. By 2030, the entire Baby Boomer generation will pass the 65-year-old threshold. By 2035, this older demographic will outnumber children under the age of 18 for the first time in American history (U.S. Census Bureau 2018a). Currently, this 65-and-older category accounts for 34% of the country's healthcare expenditures, more than double their 15% share of the population, and importantly their per capita expenditures increase with age (Sawyer and Sroczynski 2017). Thus, if these trends continue, health spending will grow for two reasons: Older adults' share of the population will increase, and their average age will increase. These demands will further burden a healthcare system that is already exceptional for high costs, excessive waste, and socioeconomic inequality without peer in the developed world (Cutler 2018; Papanicolas, Woskie, and Jha 2018).

Fortunately, this mounting health crisis is not inevitable. In fact, both health and life satisfaction tend to improve significantly after retirement (Gorry, Gorry, and Slavov 2018). Thereafter, older persons who maintain good health do not necessarily experience the same increase in healthcare services or expenditures as the rest of their ageing cohort (Carreras, Ibern, and Inoriza 2018). A greater focus on the place-based determinants of their health, therefore, can relieve much of the growing cost burden on the medical system while simultaneously extending the quality of life experienced during these retirement years. One such place-based determinant is the safety and upkeep of the home in which the older person lives. One comparison of home-based non-medical interventions showed that the intervention that included a handyman also showed the largest reduction in costs (Ruiz 2017; Szanton 2016).

Our society has not put a priority on investing in these non-medical expenses related to the health of older adults for two reasons. First, people aged 65 years and older are increasingly unable to afford nonurgent expenses, such as home renovations and other long-term investments. Today's retirees are deeper in debt than any previous generation in American history, both in absolute terms and relative to their assets (Lusardi, Mitchell, and Oggero 2018). Second, policymakers rarely justify non-medical expenses in terms of health benefits, making it difficult to break down the "silos" that separate potential financing sources from their most efficient, valuable, and creative uses (Tett 2015; Bostic and Orlando 2018). The congressional appropriations process is at least

partially to blame here—the fiscal consequences of spending get scored only within committees (Tollestrup 2012).

In this paper, we outline an approach to move public policy in this health-oriented direction. We identify a public health problem that requires investments not in health care but rather in housing: injurious falls that happen at home and increase the likelihood of institutionalization and other expensive, intrusive interventions. We show how a simple, relatively inexpensive solution—home safety renovations like grab bars, ramps, and shower seats—may hold the potential to extend the lives, and the quality of life, of the growing cohort of older adults. We conclude with suggestions to implement this policy solution in a practical, politically feasible way: through the current statutory authority and financial capacity of Medicare.

2. Public Health Problem: Falls

The leading cause of injury for Americans aged 65 years or older is *falls*. Over one-quarter of this population falls every year, and over one-third of those falls require medical treatment or “restricted activity.” Injurious falls lead to death more than any other injury sustained by this age group and are the seventh-leading cause of death among older adults (Burns and Kakara 2018; Gurguis et al 2018), and the fear of falling can be as debilitating as a fall itself. As of 2015, these fall-related injuries cost Medicare \$29 billion, or 5.4% of its net budget in that year (Florence et al 2018; Cubanski and Neuman 2018). In the parallel pursuit of better health for older adults and lower healthcare costs, *falls* represent one of the largest—and clearest—targets for public investment.

All individuals lose some ability to maintain balance, generally starting at age 50. Comorbid conditions such as diabetes or stroke exacerbates this natural loss, and puts the individual at an even higher risk for fall. Studies have demonstrated that most medical interventions that address the risk for falls attain minimal results. In the latest meta-analyses, the vast majority of randomized controlled trials did not yield a statistically significant reduction in injurious falls, and none of the interventions led to significant reductions in hospitalizations, emergency department visits, or outpatient physician visits (Tricco et al 2017).¹ The few strategies that are sometimes associated

¹ Out of 54 RCTs, Tricco et al categorize the interventions into 16 categories: “basic falls risk assessment, calcium supplementation, cognitive behavioral therapy, devices, diet modification, electromagnetic field therapy and whole-body vibration, environmental assessment and modification, exercise, floor modifications, multifactorial

with significant improvements, such as exercise (particularly Tai Chi) and vitamin D supplements, typically rely on patient compliance, which can be difficult to maintain. Perhaps more problematic are the expense and complexity of administering these remedies within a larger “multifactorial intervention,” as the US Preventive Services Task Force recommends. None of these interventions, moreover, has demonstrated any effect on mortality.

One culprit for this inefficacy is an insufficient appreciation for the place-based determinants of population health, such as housing. While personal behavior plays a crucial role in health, an ageing body is increasingly constrained in its ability to control its own physical flexibility and strength. Thus, it may be more effective—and less costly—to brace for the inevitable slips and stumbles with well-placed safeguards at home (Gawande 2014; Bostic 2015). This will increase the probability that the individual can maintain an active lifestyle, age in place, and avoid costly (and often subsidized by Medicaid) institutionalization in a nursing facility. (Costa-Font 2008).²

“Ageing in place” requires resources, however, that people aged 65 years and older frequently lack. Living on fixed incomes and less able to access credit, they struggle to retrofit their homes in ways that will accommodate their impending decline in mobility. At a time when they need to spend more on maintenance and renovations, they spend less (Begley and Lambie-Hanson 2015). It is no wonder, therefore, that falls are increasing and healthcare interventions are disappointing: The world around older adults is deteriorating at the very time when they most need it to support them.

3. Policy Solution: Home Safety Renovations

Home safety renovations can be an efficacious strategy for reducing injurious falls. At the core of this strategy are a few simple fixtures that are both easy to use and straightforward to install: devices to call for help, grab bars, railings, ramps, shower seats, and other modifications for wheelchair accessibility. Together, they form a portfolio of options from which each household

assessment and treatment, osteoporosis medications, podiatry assessment and treatment, quality improvement strategies, social engagement, surgery, vision assessment and treatment, and vitamin D supplementation.”

² “Ageing in place” is not a costless strategy. When older generations stay in their homes longer, younger generations cannot purchase those homes. With the resulting housing shortages in many U.S. cities, these younger cohorts now have lower homeownership rates and slower wealth accumulation than previous cohorts had at their age. See Freddie Mac, *While seniors age in place, Millennials wait longer and may pay more for their first homes*. (Economic & Housing Research Insight, 2019). It is difficult to argue, however, that this problem is best solved by allowing the elderly to experience more injuries.

can select according to their home's—and their bodies'—needs. In the foregoing analysis, we will treat them as one package for ease of calculation and conservativeness of estimation.³

The causal evidence for these place-based determinants of health is growing. The households who install home safety features are not a representative sample, but Eriksen, Greenhalgh-Stanley, and Engelhardt (2015) conceive an ingenious empirical approach to identify the local average treatment effect within this group's experiences. While home safety renovations are endogenous to the person who needs them, they are plausibly exogenous to that person's spouse. If the person dies, the spouse is left with the home safety features, independent of their need for them.⁴ Thus is born a natural quasi-experiment. The authors use instrumental variable techniques: the deceased spouse's health status before death explains the likelihood of safety renovations in the surviving spouse's home, while being orthogonal to the surviving spouse's health at the time of installation. Using this instrumental variable strategy, they find that home safety renovations reduce the probability of a serious fall by 21.8 percentage points. Unlike the medical interventions in randomized controlled trials, home safety renovations have a greater impact on the *severity*, than the *number*, of falls. As a result, they also reduce the probability of institutionalization in a nursing home.

Using their incidence and cost estimates from 2006, this 21.8 percentage point reduction in serious falls corresponds to a savings of \$0.93 in medical expenditures per dollar invested in home renovations over a two-year time horizon (Stevens et al 2006).⁵ New incidence data and an ageing population, however, suggest that this benefit is an underestimate. A 2018 study finds that the per-capita medical expenditures for non-fatal falls increased by 160% since the previous study, while the consumer price index only increased 37%.⁶ If we scale up the components of the cost-benefit ratio at the same respective rates, each dollar invested in home renovations would save \$1.29 in medical expenditures. In other words, there is evidence that the benefits now outweigh the costs.

³ Due to the heterogeneity among households, it is likely that many will not need all of these renovations; thus, the costs will be lower than we are projecting.

⁴ We note that Eriksen et al. examine surviving spouses. Presumably such spouses also benefit from safety renovations while their spouse remains alive as well.

⁵ According to Eriksen et al, the cost of renovation is \$1,700 per household in 2000 dollars. Using the CPI and our projections for inflation in subsequent years, this estimate increases to \$2,579 in 2020 dollars.

⁶ Authors' calculations. The first calculation uses the 2000 dollars reported in Stevens et al (2006) and the 2015 data reported in Florence et al (2018). The second calculation uses the CPI dataset obtained from the Organization for Economic Co-operation and Development and compiled by the Federal Reserve Bank of St. Louis.

Moreover, because this program pays for itself within two years, it is a worthwhile investment even if the residents move out of the home thereafter.

This estimate is overly conservative in at least four ways. First, Eriksen, Greenhalgh-Stanley, and Engelhardt exclude fatal falls from their analysis because the sample size is too small, but the average fatal fall costs more than twice as much in medical expenditures as the average non-fatal fall. Any reduction in their likelihood would achieve an even higher savings per dollar of home renovations. Second, their data only count medical expenditures in the two years after the fall. Any longer-term savings would only increase the benefits per dollar of home renovations. Third, even this newer estimate of medical expenditures for non-fatal falls relies on data that are seven years old. As the population ages, the incidence rate tends to increase for the average older adult. Fourth, these analyses do not count non-medical savings. Aside from the well-documented stress and reduction in quality of life endured by the patient, a long literature documents the financial, psychological, time, and energy costs invested by caregivers without recompense (Schulz and Eden 2016). All of these costs might be saved with a one-time installation of home safety and accessibility features.⁷ This finding is consistent with previous studies showing that strategies combining an occupational therapist, a registered nurse, and home repairs also have significant cost savings over the following two years (Szanton et al 2019).

As mentioned earlier, however, older Americans have difficulty affording these renovations due to their fixed incomes and declining access to credit—if they are even aware of the high return they could earn on such an investment, which they probably are not. In addition, it may be difficult for some older Americans to manage the complicated task of finding a qualified trustworthy person to perform these renovations. This market failure—a high positive return to society that many private citizens cannot make and are not making—is an opportunity for public policy to correct a collective underinvestment problem. Specifically, we propose that Medicare consider financing home safety renovations for older adults to age in place, both reaping the dollar-for-dollar savings in its own budget as well as improving public health significantly.

4. Implementation: Medicare

⁷ In some cases, it may be necessary to conduct a second renovation. We consider this possibility and its effect on our cost projections in Section 4 below.

Title XVIII of the Social Security Act establishes the statutory authority for “health insurance for the aged and disabled,” or as we more commonly refer to it, Medicare. Under a reasonable interpretation of the law, it seems fair to include home safety renovations within the category of “home health services” to which beneficiaries are entitled in both Part A and Part B.⁸ It further evokes the spirit of the law as President Lyndon Johnson described it on the day he signed the Medicare bill, repeatedly referencing health expenses “in the home” (Johnson 1965). Particularly as it relates to outpatient coverage, Medicare Part B is designed for this purpose: to provide health services in the homes of older Americans.

Given this legal capacity for such an investment, we estimate three scenarios to give a sense of the budgetary impact. In the most conservative approach, a pilot program could select 100,000 beneficiaries by lottery, creating a true experiment to test the efficacy and cost-effectiveness of home safety renovations more rigorously. If we also assume an inflation rate of 2 percent for the cost of each renovation, we can project a total cost of approximately \$258 million in 2020, increasing to \$308 million by 2029.⁹ Alternatively, Medicare could offer to renovate all new enrollees’ homes. Over the coming decade, the United States will add approximately 1.7 million residents per year to the 65-years-and-older demographic (U.S. Census Bureau 2018b). Very conservatively, we can assume that only two-thirds of these residents will require their own renovation, either because they already have had one or because they live with another resident of this population who will receive one.¹⁰ Again assuming 2 percent inflation, we project a total cost of approximately \$2.9 billion in 2020, increasing to \$3.3 billion by 2029. Finally, Medicare could offer the benefit to all enrollees, regardless of cohort. Eriksen, Greenhalgh-Stanley, and Engelhardt report that half of widows already have homes with safety features installed. If we assume that the percentage is slightly lower, say one-third, for the population as a whole, then two-thirds of enrollees are eligible for this benefit. Spreading this one-time cost over the next decade and adding it to the cost of new enrollees, we project a total cost of approximately \$12.3 billion in 2020, increasing to \$12.6 billion by 2029. To put these costs into context, the three scenarios we have described range from 0.03% of the 2020 net Medicare budget for the pilot program, to 0.36% for

⁸ 42 U.S.C. 1395k. *For more detail, see* <https://www.medicare.gov/coverage/home-health-services>.

⁹ This is a very conservative estimate by recent historical standards. While the Federal Reserve has targeted 2 percent for inflation, it has been more of a ceiling than a constant. In most years since the Great Recession, the Consumer Price Index has increased less than 2 percent. A lower inflation rate, of course, would reduce our cost estimates.

¹⁰ This assumption avoids double-counting.

the middle option, to 1.49% for the highest estimate.¹¹ Since construction costs are increasing at a slower pace than medical spending, the percentages are projected to decrease every year after 2020.

These costs might increase if older adults move frequently, requiring another renovation in their new residence. The annual migration rate has been falling steadily, however, from 20% of the population in the late 1940s to less than 10% today. It is even less for older adults. Beginning when a person is in their 20s, their annual likelihood of moving declines until they reach their 70s, when it plateaus below 5% (Frey 2019). Approximately one-quarter of those moves are influenced by the built environment (Roy et al 2018); thus, it is likely that home safety renovations would diminish the need to move, reducing these added costs even further. To be conservative, however, we can assume an unrealistically high 5% migration rate—and we further assume that all of these movers require a second renovation.¹² The projected costs for the three scenarios increase to \$271-324 million, \$3.1-3.4 billion, and \$12.4-\$12.8 billion, respectively. Thus, the pilot program continues to cost 0.03% of the 2020 net Medicare budget, the middle option increases from 0.36% to 0.37%, and the highest estimate increases from 1.49% to 1.51%.

The financial feasibility, therefore, is potentially high. What remains, then, are questions of political will, bureaucratic execution, and further demonstration of cost-effectiveness. The Centers for Medicare & Medicaid (CMS) officials would need to study different implementation options, including who conducts the renovations, who vets and oversees the contractors, where this benefit belongs in the budget, and whether it requires a dedicated revenue source. They can follow the lead of the recent Cochrane protocol established to study “environmental interventions” to prevent falls in older adults (Clemson et al 2019). In this analysis, we have tried to make the case that this type of investment merits such a study—and that the public health community should advocate for CMS to take this next step. While there is not a strong precedent for health care agencies investing in housing, this analysis provides evidence in favor of this new cross-silo approach to public health. Home safety renovations have a short but demonstrable track record of improving the health and wellbeing of older adults—and in turn, of reducing health costs, both medical and non-medical. They hold the potential to reduce injurious falls, to enable older

¹¹ The “net” Medicare budget is the more conservative estimate, deducting offsetting receipts such as premiums and state contribution payments from the total spending. U.S. Congressional Budget Office, “Medicare—CBO’s May 2019 Baseline” (2019).

¹² This conservative assumption also allows for the possibility that households will need a second renovation for other reasons as well, such as errors in the first renovation or increased needs that come with ageing.

Americans to “age in place,” and if financed through Medicare, to do so without exacerbating the financial fragility of the current and forthcoming generation of retirees. Medicare has both the legal and budgetary capacity to make this investment with a potentially high positive return for society—and in so doing, to extend the quality of our lives alongside their rapidly growing expectancy. Such an opportunity ought not to go without serious consideration.

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