

The Bulletin on the Economics of Alzheimer's Disease and Related Dementias

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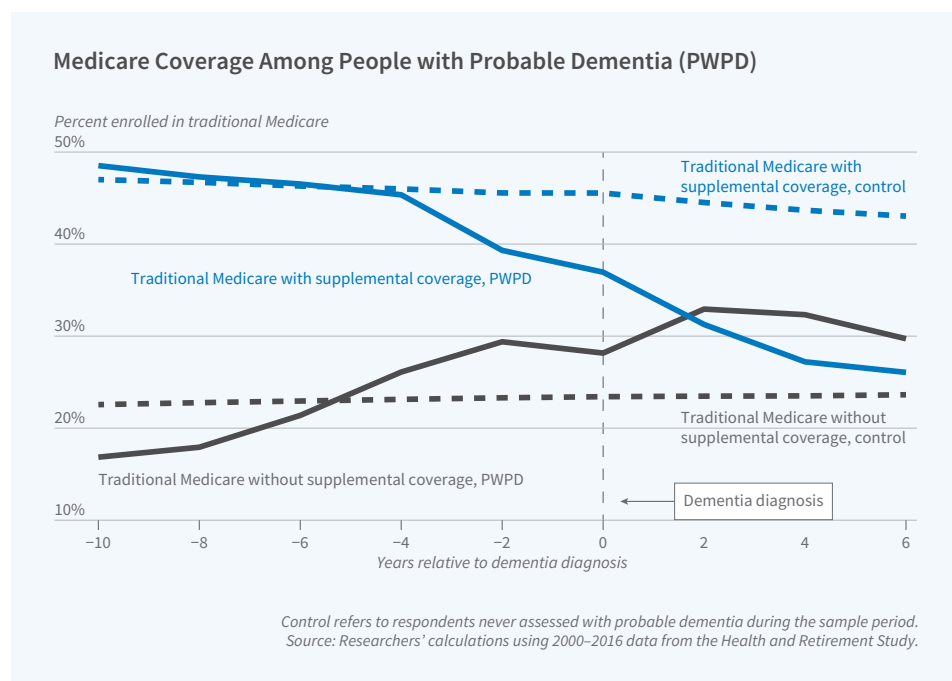
Second Annual Meeting of the NBER Coordinating Center on the Economics of AD/ADRD Prevention, Treatment, and Care

Probable Dementia and Health Insurance Choices

Nearly one in ten older Americans lives with dementia, a condition that gradually erodes memory and the cognitive skills needed for complex decision-making. Even though Medicare coverage is nearly universal among this age group, traditional Medicare alone leaves significant gaps as it does not cover dental, vision, or hearing care, and it carries substantial cost-sharing. To fill these gaps, beneficiaries must actively choose among several insurance options—enrolling in Medicare Advantage, adding private supplemental insurance to traditional Medicare, or, for those with sufficiently low income and assets, applying for Medicaid. Beneficiaries may make changes during open enrollment each year, and must re-enroll in private supplemental coverage or Medicare Advantage if their plan is no longer offered or they failed to pay premiums. Those who are eligible for Medicaid must recertify each year.

This annual decision-making process, which may involve interacting with multiple agencies, may be especially difficult for individuals whose cognitive abilities are declining. This may leave them with incomplete insurance protection at a time when they need it most. In [Supplemental Medicare Insurance Coverage for Older Adults with Probable Dementia](#) (NBER Working Paper 35606), [Melissa McInerney](#), [Lorena Moreno](#), and [Jennifer M. Mellor](#) examine whether previously documented gaps in supplemental insurance coverage among those with cognitive impairment actually begin to emerge before individuals meet the criteria for probable dementia.

The researchers use the 2000–2016 Health and Retirement Study, a nationally representative longitudinal survey of Americans age 50 and older. Probable dementia is identified using the Langa-Weir algorithm, a standard method that scores cognitive function based on tests



of memory and other skills. The study sample includes 3,001 Medicare-enrolled adults age 65 and older who eventually meet criteria for probable dementia and 14,055 people who never do. For each respondent with probable dementia, the researchers identify the wave in which they first meet the algorithm's criteria for probable dementia, referred hereafter as onset, and track insurance outcomes from ten years before onset to six years after.

Comparison groups are constructed separately for each time period using propensity score weighting, which adjusts for differences in age, sex, education, and marital status so that people with and without probable dementia are compared to similarly situated peers. Beginning four years before onset, those later classified as having probable dementia are 3 percentage points more likely than matched peers to have no supplemental Medicare

coverage. This gap is even larger after onset, peaking at 9.5 percentage points two years later.

This gap in “bare” Medicare coverage reflects the net effect of lower enrollment in Medicare Advantage and traditional Medicare with private supplemental coverage, partly offset by higher Medicaid enrollment.

Individuals who develop probable dementia also become significantly more likely to have income at or below the federal poverty level—a standard proxy for Medicaid eligibility. This gap emerges six years prior to onset and continues to widen. However, among those who meet this income-based eligibility threshold, the rate of Medicaid enrollment does not differ significantly between the two groups in the years before or immediately after onset.

Employment and Cognitive Decline

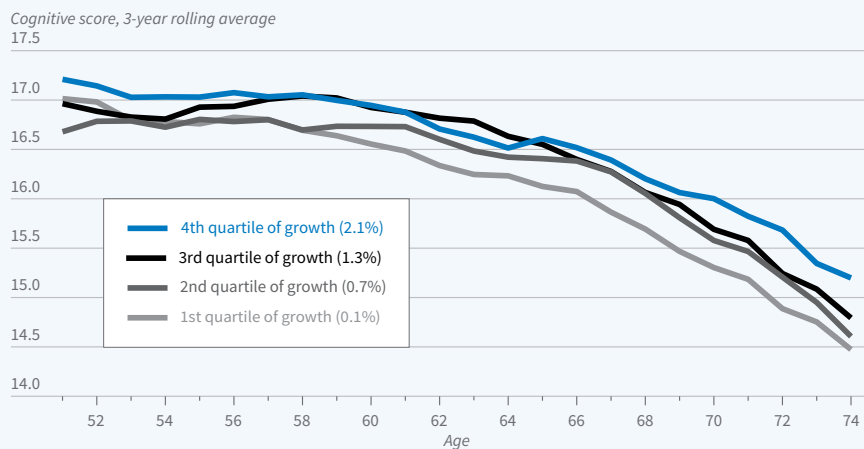
Many workers leave the labor force well before the traditional retirement age of 65.

In [Does Employment Slow Cognitive Decline? Evidence from Labor Market Shocks](#) (NBER Working Paper 35117), Noah Arman Kouche-kinia, David Neumark, and Tim A. Bruckner investigate whether early retirement is associated with an increased risk of cognitive decline. They use data from the Health and Retirement Study, a long-running biennial survey of older Americans, for the period 1996 to 2018. The researchers focus on a four-item measure of memory, mental processing, and working memory known as the global cognitive score, tracking how it changes for the same individuals over time.

The researchers recognize that cognitive decline may influence whether people keep working. To avoid this reverse causation effect, they predict employment changes by location from each area's preexisting industry mix combined with national industry growth trends. This approach isolates variation in employment that is plausibly not driven by changes in local residents' cognitive health, and it yields a larger estimated effect of employment on cognitive decline than simple comparisons.

Using the full sample of adults aged 51 to 74, the researchers estimate that a 10-percentage-point decrease in the employment-to-population ratio is associated with a decline in cognitive scores equivalent to 0.19 standard deviations. The relationship is concentrated among men below traditional retirement age. When the sample is restricted to those aged 51 to 64, the estimated effect is 27

Commuting Zone Employment Growth and Cognitive Performance, 1996–2018



Cognitive score is measured using the Langa-Weir index, which scales from 0 to 27. Commuting zones are ranked into quartiles based on their average annual employment growth over the sample period. Source: Researchers' calculations using data from the Health and Retirement Study.

Job loss before retirement age accelerates cognitive decline among men aged 51 to 64.

percent larger than the full-sample estimate.

There is no clear evidence of this impact of employment for individuals in the 65-to-75 age group. This does not imply that employment does not slow their cognitive decline as well. Rather, the approach the authors take may be less informative for this group. For older workers at or past retirement ages, benefit eligibility rules and social norms surrounding retirement play a larger role. In contrast, local economic conditions may exert more influence over employment decisions before retirement ages.

The employment rate for men declines by 18 percentage points between ages 51 and 61. If that decline were cut in half, the authors calculate

that the average cognitive score would increase by about one-tenth of a standard deviation—comparable to the average cognitive decline men experience over that same age range.

Estimates remain stable when the researchers control for local exposure to the opioid epidemic, a potential confounding factor since opioid use could independently affect both local employment and cognition. Results are also similarly stable across varying levels of industry classification detail, and diagnostic tests do not show any single industry receiving a disproportionate share of influence. The latter results bolster the validity of the authors' empirical strategy for isolating exogenous shocks in labor demand to estimate the effects of employment on cognition.

The researchers acknowledge support from the UCI Office of Research Seed Grant program and the Center for Population, Inequality, and Policy at UCI.

Q&A with Professor Rhoda Au, Co-Principal Investigator of the NBER Coordinating Center on the Economics of Alzheimer's Disease and Alzheimer's Disease-Related Dementias (AD/ADRD) Prevention, Treatment, and Care

Introduction

Rhoda Au is Professor of Anatomy & Neurobiology, Neurology, Medicine and Epidemiology at Boston University Chobanian & Avedisian School of Medicine and School of Public Health, and a long-time investigator at the Framingham Heart Study. Leveraging technological advances in software, hardware, and deep machine learning/artificial intelligence analytic strategies, her current research objectives are to develop and validate globally feasible screening and monitoring tools for Alzheimer's disease and related dementias and to redefine and generate multi-sensor digital biomarkers. Her strategic vision is to shift the focus on brain-related disorders to a broader emphasis on brain health.

Research Background and Expertise

Question: What initially drew you down the path of studying aging and dementia?

Au: I don't have a typical story related to this question. It is much more of a pragmatic "fell into it" and then "moved to an area that wouldn't put me in competition with much more senior researchers at the time." Thus, my path was more serendipitous than deterministic.

Question: How does your research draw upon a clinical understanding of dementia and how can that inform insights into health economics?

Au: My research has always been centered on what I think we are not doing effectively. The blunt instrument tools used to measure highly heterogeneous behaviors, not detecting symptoms early enough in the course of the disease, not having research methods that are applicable globally, including in low-to-middle

income countries. This means that, from an economic standpoint (or any standpoint), what is being measured is based on highly biased data. Currently, I think a lot about "how do we achieve the goals of precision AD medicine" and the prevention side of this to precision brain health. And if we achieve the objectives of precision, how much that will lead to significant economic impact, domestically and internationally.

Question: Could you briefly summarize the most significant, or perhaps surprising, findings from your research on aging and dementia.

Au: Since I think a lot on the edges of research, where there is not always scientific precedent, my hypotheses are just that—hypotheses. Thus, I'm always surprised when what I thought should be the case turns out to be the case. Research is supposed to be exploring what is unknown. If there is certainty in what you will find, then I don't think it is really research. I find it interesting that there is research defined as "high risk, high reward," which implies "low risk, low reward" research is the mainstream. It feels like the reverse should be true. I seem motivated to do research where most of the time I am surprised and then, because I'm surprised, each finding should be trying to push some part of the research forward in a significant way. It seems that what is most significant in my work is connecting dots where, initially, most don't see the connection, and then I stick with it until the connections finally become more evident. When I first used the words "digital" and "biomarker" together, I was reprimanded for doing so. Today, these two words together are commonly bandied about in a way that I don't think reflects the true potential of what they could be.

My most significant work today is increasing access to the Framingham

Heart Study brain aging data. I don't think any of my own research is distinctly impactful. It takes me too long to get my ideas funded, so even though I can see ahead, I can't make any of it happen until its initial potential significance is diluted. So instead, I focus on the research I can enable. If I can help lots of researchers, then science will go forward in ways that I cannot do or imagine.

Question: What role can economic research play in improving the quality of life for both patients and caregivers?

Au: Since I'm not an economist, I'm not sure I can answer this question appropriately. What I think about is how reactive the current medical model is and where even prevention is viewed within this context. I think there is an opportunity to evaluate how much technological advances that are available at the consumer level will lend themselves to prevention measures outside of the traditional medical model, that could lead to reduction in disease prevalence, delay disease onset, assist with symptom management, and decrease disease incidence. These are just some of the outcomes that will improve the quality of life for both patients and caregivers.

Question: What do you see as the greatest challenges, be they social, economic, or medical, for the United States as we move forward to a population with a significantly higher share of dementia?

Au: The necessary shift in research and clinical mindset is the biggest barrier to meeting this significant challenge. We currently are locked into doing science based on the methods we know, but the complexity of what we are confronting requires developing new methods to match the science we need to do.

About the NBER Coordinating Center

Question: Can you explain the mission and goals of the NBER Coordinating Center on the Economics of Alzheimer's Disease and Alzheimer's Disease-Related Dementias?

Au: Since I came into NBER completely unaware of how to do economics research in AD/ADRD, my objectives have centered around how to bring different worlds of talent (e.g., clinical, technical, and economic) to work together in ways that are different than each has done in isolation.

Question: I understand the Center is prioritizing some topics of research. Could you expand upon some of the most important?

Au: I know that there is a natural experiment currently underway with the update of GLP-1, that many are using today to reduce BMI, where there seems to be some pretty interesting opportunities to think about what is going to be the overall economic impact since there are many comorbidity risk factors that are impacted by reduction in BMI, which in turn are comorbidity risk factors for

all chronic diseases, including AD/ADRD. There are, however, known and unknown side effects of these drugs where the balance between benefit and harm needs to be better quantified. In addition, in this world of information—that includes a continuum of veracity—every person is now a citizen scientist and much more of a determinant of their healthcare decision-making that may or may not align with that of their healthcare provider. These are areas that are not priorities of the Center today but are ideas I wonder about and whether they should be priorities to consider.

Question: Is the Center taking any specific steps to facilitate collaboration between economists, healthcare researchers, and policymakers?

Au: Yes, all the open meetings and symposiums have the objective of doing just that. The series of mini symposiums are intended to facilitate collaboration between those that don't normally intersect with each other and are a bit more challenging to think about in terms of design and sustainable impact.

Question: What opportunities exist for junior researchers to get involved

with the Center's work? And if you were advising a junior researcher in the field, what would you flag as particularly important topics to work on?

Au: The Center's EC-READ awards are the most concrete way to get junior researchers involved, as well as the open meetings/symposiums. For those whose goals are to remain in academia, given the realities of needing to meet criteria for tenure, the Center will be helpful in highlighting areas of research that will boost their tenure efforts. For those whose goals are to move outside of academia, I often think about how one distinguishes oneself, and currently we have a growing gap between the health span and the lifespan, and that might be something to think about in terms of what factors are leading to this growing gap and what are the myriad of approaches that can start to decrease it.

Question: What would success look like for the Coordinating Center five years from now?

Au: For me, evidence of new collaborations that span disciplines, geographic representation, and areas of focus.

Second Annual Meeting of the NBER Coordinating Center on the Economics of AD/ADRD Prevention, Treatment, and Care

The [National Bureau of Economic Research \(NBER\) Coordinating Center on the Economics of Alzheimer's Disease and Alzheimer's Disease-Related Dementias \(AD/ADRD\) Prevention, Treatment, and Care](#) held its [second annual meeting](#) in Rockville, Maryland, on June 18, 2026. The meeting featured research funded by the National Institute on Aging through the Coordinating Center and direct awards.

In her [opening remarks](#), Julie Bynum, University of Michigan, stressed the significance of the Coordinating Center's work, stating, "I view this population of people as probably the most vulnerable, at least within the American healthcare system.... If something is not going to work well, it's not going to work well for the people who can't manage their own care or their own finances." Under the direction of the Coordinating Center's principal investigators—Rhoda Au, a neuropsychologist at Boston University; Kathleen McGarry, an economist at the University of California, Los Angeles and NBER; and Bynum, a geriatric medicine physician—the Coordinating Center is expanding the network of researchers working within this interdisciplinary field. The Coordinating Center funds short-term and early-career research projects to expand participation in the field, strengthen the field's evidence base, and translate research findings into actionable insights for relevant decision-makers.

NIH Director Remarks

Jay Bhattacharya, National Institutes of Health (NIH)

Jay Bhattacharya, NIH director, began his remarks with an overview of NIH's priorities related to health economics and AD/ADRD research. Bhattacharya explained that US life expectancy gains have increasingly lagged those of peer nations since 2010, and he ascribed the cause to a preference for funding safe and incremental science, constrained

institutional support for replication research, and funding concentrated in a small group of institutions. He outlined NIH's Unified Funding Strategy, which will consider peer-review scores, reviewers' critiques, portfolio balance, mission priorities, and public health needs when making funding decisions, instead of the conventional score-based criteria. This strategy will prioritize "research that is at the bleeding edge and that has the potential to overturn fields."

Bhattacharya stated that "the [scientific research] replication crisis is a symptom of the epistemological crisis [in science]" and proposed initiatives to respond to this crisis, such as directly funding replication studies, establishing a peer-reviewed journal focused on replication work, and creating a PubMed AI-enabled tool that allows users reading an article to generate an automated summary of studies replicating or disputing its findings.

Bhattacharya presented a proposed set of principles to protect NIH's portfolio from politics; future NIH-funded research must be in scope, rigorous, and actionable. Citing inspiration from a similar long-standing NBER principle, NIH will no longer fund research primarily aimed at steering policy. Secondly, to be rigorous, research design must test falsifiable hypotheses and contain measurable outcomes. Finally, for research to be actionable, the intended audience should be able to enact a change using the results that would improve people's health.

Research Panel 1

Moderator: *Julie Bynum, University of Michigan*

Presenters: *Péter Hudomiet, RAND Corporation; Victoria Shier, University of Southern California; Brian McGarry, University of Rochester and NBER*

Péter Hudomiet, RAND Corporation, presented on a dementia severity scale: "From Normal Cognition to

Severe Dementia: Measurement, Validation, and Consequences for Care Arrangements and Health."

The Clinical Dementia Rating (CDR) scale stratifies dementia severity across five categories from "no dementia" to "severe dementia," with increased severity correlating with increased care needs and healthcare costs. Prior to this research, most literature examining these correlations used nonrepresentative samples, such as small clinical datasets. Instead, the current project develops a dementia severity measure using Health and Retirement Study (HRS) data. Researchers applied cutoff points to the [Hudomiet, Hurd, and Rohwedder \(2022\)](#) continuous cognition score that correlates with each clinically relevant dementia severity category. Researchers validated findings using CDR results from the Aging, Demographics, and Memory Study. Results showed that the severity measure exactly matched clinically observed severity in 62.7 percent of cases and deviated by two or more categories in less than 5 percent of cases. Using the validated measure, the study found associations between increased dementia severity and an increased likelihood of residing in a nursing home (NH) and of having unpaid help, higher out-of-pocket health expenditures, and lower dental health expenditures.

Victoria Shier, University of Southern California, discussed "Effects of Medicare Advantage (MA) Enrollment on Healthcare Use and Patient Outcomes Among Beneficiaries with AD/ADRD."

People living with dementia (PLWD) and comorbid conditions require a distinct care mix and benefit from greater coordinated care and support, which may be provided by a MA plan. Between 2017 and 2019, five states changed their retiree health benefits from Supplemental + Part D plans to MA plans. This study used this shift as a natural experiment for MA enrollment; researchers compared

new MA enrollees (new MA + Part D) with AD/ADRD to traditional Medicare enrollees with Part D in the same state to determine whether shifting to MA resulted in better disease management. Findings suggested that MA enrollment was associated with a shift from skilled nursing facility care to home health care, with no observed effect on patients' days spent in the community or mortality rate. Although MA enrollment had no significant effect on overall resource use, it was associated with an increase in the Medicare risk score. The increased risk score translated to higher payments in the subsequent year, despite no change in resource utilization.

Brian McGarry, University of Rochester and NBER, concluded the panel with "Medicare Coverage Decisions in the Presence of Dementia: Evidence from Medicare Part D."

The Medicare program generally provides enrollees with more plan options than comparable employer-provided plans. During the Medicare annual open enrollment period, beneficiaries can change their coverage to better match their anticipated health needs for the upcoming year. However, actively managing plans can be challenging for individuals who are cognitively impaired. Researchers used 2006–2024 HRS data linked to Medicare enrollment and claims data to investigate Medicare Part D plan enrollee activity. Results showed that starting two years prior to dementia diagnosis, individuals with AD/ADRD were 5 to 6 percentage points less likely to change plans during the enrollment period than individuals without AD/ADRD. This shift coincides with the period when individuals with AD/ADRD begin to experience increases in premiums and out-of-pocket costs and decreases in plan quality. Furthermore, individuals with AD/ADRD who switch plans around the time of their diagnosis are more likely to be prescribed AD/ADRD medications than those who do not switch plans. These findings suggest that additional support for plan decision-making for individuals with AD/ADRD is needed.

Keynote: The Economics of Long-Term Care (LTC): Challenges, Non-Solutions, and Potential Solutions

R. Tamara Konetzka, University of Chicago

"We spend a lot of money on long-term care in this country, more than \$400 billion a year...almost 9 percent of total health expenditure. On an individual level, we face a large and uncertain risk of needing long-term care. ... I would say the most serious uninsured financial risk seniors face as they age."

**-R. Tamara Konetzka, PhD,
University of Chicago**

In her keynote, R. Tamara Konetzka, University of Chicago, shifted the discussion to the lack of a long-term care (LTC) financing system in America, even though LTC expenses are likely the greatest financial risk for people without LTC coverage as they age. Because Medicare does not cover LTC and private LTC insurance plays only a marginal role, the costs are borne by Medicaid, by patients paying out of pocket, and by unpaid caregivers.

Konetzka presented the three major, enduring challenges of the US LTC sector: (1) many Americans need LTC, but few can afford it; (2) current policies insufficiently address existing NH quality issues; and (3) both problems vary by gender, race, and geography. Konetzka underscored that LTC workforce issues, such as staff shortages and a lack of training, cut across all three challenges.

She cautioned about an overreliance on informal caregiving, which is often considered free, noting "we know from a large body of research, much of it done by people in this room, that there are a lot of indirect costs, and the care is not actually free." The effects of informal caregiving on workforce participation and caregiver health are significant and disparate by gender. Because of shifting demographics and decreasing

fertility rates, US reliance on informal care is likely unsustainable. Medicaid is currently the dominant LTC payer; however, strict asset and income limits leave many individuals, particularly those in the middle class, with few options when cognitive decline affects them or a family member.

Konetzka critiqued several commonly suggested solutions. She questioned the feasibility of expanding private LTC insurance and its affordability given its current cost. Although expanding home and community-based services (HCBS) would be a positive step, the complexities of matching patients' shifting needs with the right care, in the right place, at the right time pose challenges. She suggested that indiscriminate replacement of NH care with HCBS would be inappropriate for many patients, particularly those in the more severe stages of dementia. Further, although likely to improve quality, modification of NH regulations and incentive structures will probably be insufficient because the current LTC market is characterized by less-than-optimal responsiveness to patient care needs, complex organizational structures, and low Medicaid rates.

Konetzka concluded by identifying the principles that may underpin any national LTC funding system: a mix of private funds and public subsidies; broad accessibility across the entire population, with no restrictive policies such as eligibility cliffs or state-to-state inequities; and a comprehensive range of coordinated LTC services, including institutional care and HCBS.

Research Panel 2

Moderator: Kathleen McGarry, University of California, Los Angeles and NBER

Presenters: Corina Mommaerts, University of Wisconsin–Madison; Yunan Ji, Georgetown University and NBER; Eric Slade, Johns Hopkins University

Corina Mommaerts, University of Wisconsin–Madison, opened the panel with "Medicaid Managed Long-Term Services and Supports (LTSS) for AD/ADRD: Evidence from Wisconsin."

Many states are shifting LTSS payment programs from a Medicaid direct-to-care-provider payment model to a managed care model whereby Medicaid pays an organization a fixed amount to manage an enrollee's care. This study used the gradual rollout of managed care for Medicaid LTSS in Wisconsin (i.e., Family Care) to identify self-selection entry patterns into the new managed care organization (MCO) model and the impact on healthcare utilization. Examination of medical and LTSS claims data, and of LTSS eligibility screenings, revealed that in the two years following rollout, 15 percent of individuals with and without AD/ADRD enrolled in Family Care. In the four years following Family Care rollout, average NH use declined by 2 percentage points overall, with NH rates declining more for individuals with AD/ADRD than for those without. LTSS eligibility screening analysis revealed a mismatch between the enrollees' current residence and their preferred residence. The mismatch was more prevalent for individuals with AD/ADRD but declined across both groups over time.

Yunan Ji, Georgetown University and NBER, shifted the focus from LTSS to end-of-life care in "Hospice Expansion and End-of-Life Care for Alzheimer's Disease and Related Dementias."

This study examined the impact of hospice care on patients with AD/ADRD using Medicare claims and clinical assessments over 21 years, a period during which hospice use by PLWD has dramatically increased. The study compared hospice agency entry across counties with expanded hospice availability matched with counties without hospice entry. Hospice agency entry was associated with higher hospice costs; however, additional costs were largely offset by reductions in other types of patient care spending. Hospice entry was not associated with any significant changes in mortality but was associated with reduced high-intensity interventions (i.e., catheterization, trunk restraint) and increased comfort services. These benefits were observed for patients across all conditions,

suggesting that expanding hospice access can improve end-of-life care for patients with AD/ADRD at no net cost for Medicare.

Eric Slade, Johns Hopkins University, presented "Impacts of Integrated Dual Eligible Special Needs Plans on Access to Medicaid Home and Community-Based Services among Adults with Alzheimer's."

Eligible beneficiaries can receive benefits from Medicare, a federal program, and Medicaid, a state program, through Dual Eligible Special Needs Plans (D-SNPs), a type of MA plan. D-SNPs can be either coordination-only plans, which do not cover Medicaid LTC but do have limited coordination with Medicaid, or Fully Integrated D-SNPs (FIDEs), which cover Medicaid LTC. FIDEs are incentivized to reduce unnecessary expenses, regardless of payer, and to coordinate any needed Medicaid-financed community-based services and supports. This study investigated how plan types affected HCBS use in PLWD in states that offered both FIDEs and coordination-only D-SNPs. Researchers found that PLWD enrolled in FIDE plans used HCBS (i.e., daily living support, nonmedical transportation, home health devices/equipment, day/respite care, and residential care) more often than PLWD in coordination-only plans. However, variation in HCBS use was observed between states, illustrating that service use was also affected by the availability of state services.

Research Panel 3

Moderator: Rhoda Au, Boston University

Presenters: Arseniy Yashkin, Duke University; Rebekah Carpenter, Florida State University; Yulya Truskinovsky, Syracuse University and NBER

Arseniy Yashkin, Duke University, discussed "Cohort Replacement, Trajectory Heterogeneity, and the Fiscal Architecture of Dementia Forecasting."

Many forecasting models for dementia costs assume that dementia risk will remain stable across cohorts and that individuals with the

same diagnosis will require similar care at similar cost. However, these assumptions are inherently flawed. First, dementia risk has fallen over survey years, suggesting that subsequent generations may also have a lower risk of developing dementia. This decreasing risk is likely due to a decline in smoking, improved cardiovascular health, and higher educational attainment. Second, many models assign individuals to discrete disease stages and apply an average per-case expenditure to each stage; however, this stage-average costing compresses disease heterogeneity (e.g., onset timing, institutionalization timing, duration), which can significantly impact cost forecasts. To address these limitations, the research team created the longitudinal Grade of Membership (L-GoM) model, which models individuals' health before grouping them by trajectory. Four major groupings emerged to describe disease progression from the point of AD/ADRD diagnosis: slow progression with few symptoms at presentation; rapid progression with few symptoms at presentation; moderate progression with pronounced behavioral symptomatology; and terminal stage. Findings suggest the L-GoM model is useful for forecasting LTC needs among patients with AD/ADRD and studying intervention effects.

Rebekah Carpenter, Florida State University, elaborated on factors that can impact dementia prevalence in "Job Conditions and Cognitive Health."

Work is a major influence on life, taking up a large share of waking hours and shaping cognitive health through occupational exposure. However, little research exists assessing lifetime exposure to both protective and adverse occupational conditions using longitudinal, population-level data. Using data from the HRS linked to the Occupational Information Network, this study examined which lifetime occupational exposures are associated with cognitive function in midlife. The researchers found that high exposure to operational demands and occupational hazards and low exposure to mental enrichment, autono-

my, interpersonal demand, and social enrichment were threshold risks for cognitive decline. A linear relationship between the amount of physical demand, the extent of extreme temperature exposure, and the risk of cognitive decline was observed. At age 70, no linear relationships were observed, although threshold risks were observed. High exposure to operational and/or physical demand, moderately high exposure to occupational hazards, and moderately low mental enrichment were also observed, all of which increase the risk of cognitive decline.

Yulya Truskinovsky, Syracuse University and NBER, finished the panel with “Who Enters and Who Exits Direct Care Jobs?”

Millions of older adults and people with disabilities require LTC that is largely delivered by the LTSS workforce. Research suggests that the quality of the care received is directly related to the levels and consistency of staffing. Despite the rising demand for and importance of this workforce, LTC staff face persistent challenges (e.g., low pay, understaffing, and high turnover). This study examined certified nursing assistants (CNAs) entering or leaving the LTSS workforce using data from the monthly Current Population Survey and the Annual Social and Economic Supplement. LTSS CNAs are more likely to be female and foreign-born, less likely to be White, and less educated than CNAs, nurses, and other healthcare workers in non-LTC settings.

They also earn lower wages and receive fewer benefits. LTSS CNA occupation retention is higher than for some lower-wage workers (e.g., cleaners, servers) but lower than for credentialed workers (e.g., registered nurses, teachers). LTSS CNAs tend to enter from and exit to the same pool of jobs, mostly other CNA work and non-employment. Those who enter and exit the LTSS workforce have similar characteristics, but those who remain in the field tend to be female, older, foreign-born, and less educated, fewer outside employment options.

Concluding Keynote: Measuring the Cost of Disease with Applications to ADRD

Keynote: David Cutler, Harvard University and NBER

Respondents: Karen Joynt Maddox, Washington University in St. Louis; Jonathan Skinner, Dartmouth College and NBER

“It’s [measuring disease cost] a tricky business, but not just for statistical reasons. ... I think fundamentally what we really ought to think about are the conceptual issues behind what we’re trying to do and...be precise.”

**-David Cutler, PhD,
Harvard University**

David Cutler, Harvard University and NBER, delivered the concluding [keynote](#) address on measuring the cost of disease, with Karen Joynt Maddox, Washington University in St. Louis, and Jonathan Skinner, Dartmouth College and NBER, as respondents.

Estimating the cost of dementia is a commonly used metric for allocating resources to programs that provide care and understanding its impact on society. Despite their utility, cost estimates can vary greatly. For example, the [Alzheimer’s Association](#) and the [University of Southern California’s Schaeffer Institute](#) estimated annual dementia costs at \$409 billion and \$781 billion, respectively. This discrepancy is, at least partially, due to what costs are included within the estimates. Understanding precisely what question the estimate is answering, or the purpose of the estimate, is essential when deciding what costs are appropriate to include in the estimate (i.e., “How would medical spending be different if we could slow the progression of AD/ADRD?” rather than “What is the cost of AD/ADRD?”). The loss of utility (i.e. quality of life) is often the largest component of a disease’s cost. However, measuring the disutility of AD/ADRD is challenging because disutility is typically measured via self-assessment, which is hindered by cognitive impairment.

Cutler indicated that determining the cause of a specific cost is especially challenging in aging populations because of confounding factors, such as comorbid conditions. Using a patient admitted to the hospital after a stroke as an example, Cutler explained, “Is the person in the hospital because they had a stroke or because they had physical and mental health challenges that made taking antihypertensive medications difficult? So, should I chalk this up to frailty and mood disorders at least as much as I chalk it up to the stroke?” Cutler explained that one way to mitigate these confounding factors is to compare costs between a person with AD/ADRD and an otherwise similar person without it. Another approach that takes the causality chain into account is to examine conditions as risk factors rather than as final diseases or causes of death.

Joynt Maddox further explored the attribution causality pathway in her response, drawing upon her clinical experience in cardiovascular disease. Joynt Maddox explained that the traditional framework for disease attribution splits factors into two artificial silos: (1) risk factors cause disease and (2) diseases cause outcomes. However, this causality chain demonstrates the artificiality of the silos, particularly when considering how far upstream the causality chain should go when calculating disease cost. For example, hypertension can cause dementia, stroke, kidney disease, myocardial infarction, and heart failure. However, both stroke and heart failure can also cause dementia, and myocardial infarction can cause heart failure.

Joynt Maddox contended that the causality chain is more of a web that becomes more complicated with the addition of contributing factors to those conditions. Obesity, a current US epidemic, can cause hypertension along with inflammation, directly contributing to a host of other conditions such as cancer and rheumatologic disease. However, a major risk factor for obesity is childhood poverty, which also independently increases an individual’s risk of many other diseases. Joynt Maddox suggested that where to draw costs and attribution on the

causality pathway—from upstream determinants to downstream consequences—heavily depends on the purpose of the cost estimate: “How we measure costs may be less important than why we measure costs. ... Both upstream and downstream costs matter, but the attribution frameworks are useful for different purposes and different decisions.”

Skinner finished the session by providing historical background on cost-of-disease studies. He said that economists have long debated the utility and validity of cost-of-disease

studies, but he called the debate superfluous: “The basic criticism is, who cares? Do we live our life differently if it’s [the annual cost of dementia] \$409 billion or \$781 billion?” Skinner contended that presenting the cost of disease as one large lump sum disguises actionable outcomes but that such studies still have value. They are useful tools for decision-makers to spur action. They also can inform assessment of the cost-effectiveness of specific classes of treatment, which can inform health spending prioritization.

Skinner added that disaggregating large disease costs by population characteristics enables the identification of groups most affected by the disease. Cost-of-disease studies can help researchers and others determine whether technological solutions for dementia care are cost-saving. He closed by emphasizing that the potential of cost-of-disease methodology to identify the fundamental causes of AD/ADRD, and their associated costs, is extremely important: “It’s not just measurement; it’s also thinking about where the greatest return on our investments might be.”

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