Updates in Geriatric Medicine: The 4M Framework

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Disclosure

I have no financial interests or relationships to disclose.

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Learning Objectives

- Describe the four key principles of the Age Friendly Health System® 4 M Framework (What Matters, Medication, Mentation, and Mobility) and their relevance to improving care for older adults.
- Identify new medications to avoid in older adults based on the updated AGS Beers Criteria.
- Define updates in fall prevention from STEADI guidelines.

What Is Geriatric Medicine?

- Medical subspeciality focused on providing care for older adults
- No defined age
- Aims to promote health by preventing, diagnosing, and treating disease in older adults
- Distinct from Gerontology-which is the multidisciplinary study of aging

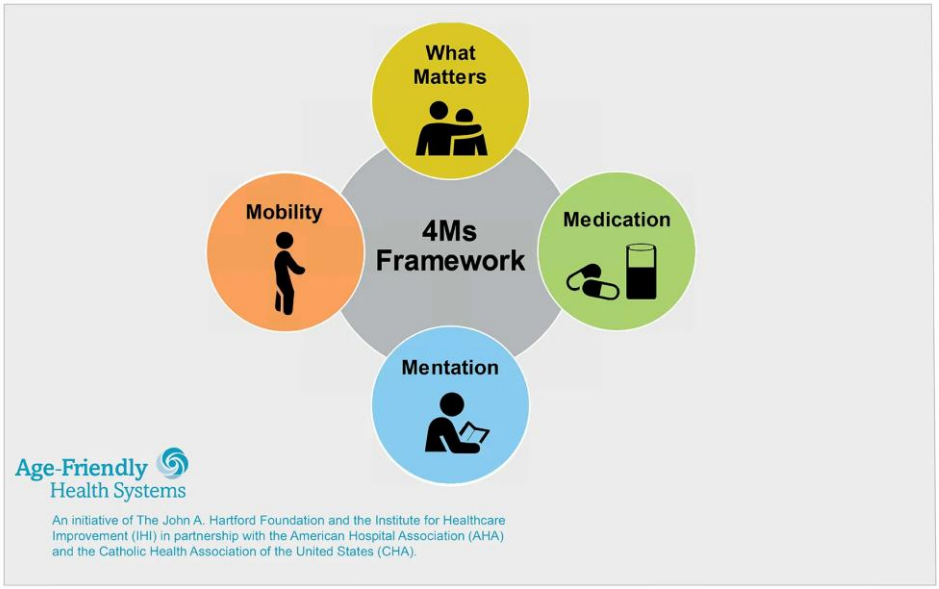

Photo: https://www.ihi.org/Engage/Initiatives/Age-Friendly-Health-Systems/Pages/default.aspx

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You Are Treating a 74 y/o Male Who Is APOE4 + with MCI, Afib on Apixaban, DM2, and OSA Who Is Interested in the New IV Medications for Dementia.

What Do You Recommend?

A. Start Donepezil
B. Start Lecanemab
C. Start Donanemab
D. Advise against any medications at this time

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Mind

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MENTATION/MIND

Distinguishing the 3 D's

	Dementia	Delirium	Depression
Onset	Gradual	Sudden (acute)	Slow, persistent
Course	Progressive cognitive decline; irreversible	Reversible but fluctuates over days/weeks/ months	Variable; remits, but can later relapse
Memory	Progressive impairments	Inattention, dramatic fluctuations	Selective, difficulty concentrating
Mood	Apathy can be confused with depression	Fluctuations in mood can be observed	Depressed, hopeless, anhedonia

The 3 D's

- Dementia
- Delirium
- Depression

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MIND

Mild Neurocognitive Disorder / Mild Cognitive Impairment (MCI)

- Intermediate state between normal cognition and dementia in which there are objective cognitive impairments but no decline in overall level of function
- Clinical trials of donepezil, galantamine, and rivastigmine in the treatment of MCI have not provided support for the use of acetylcholinesterase inhibitors in preventing progression of MCI to dementia

Major Neurocognitive Disorder/ Dementia

- Decline in cognition involving one or more cognitive domains (learning and memory, language, executive function, complex attention, perceptual-motor, social cognition)
- Deficits must represent a decline from previous level of function and be severe enough to interfere with daily function and independence.

Russ et al. Cholinesterase inhibitors for mild cognitive impairment. Cochrane Database Syst Rev 2012; :CD009132
Cooper et al. Treatment for mild cognitive impairment: systematic review. Br J Psychiatry 2013; 203:255.
Tricco et al. Efficacy and safety of cognitive enhancers for patients with mild cognitive impairment: a systematic review and meta-analysis. CMAJ 2013; 185:1393.
Birks J, Flicker L. Donepezil for mild cognitive impairment. Cochrane Database Syst Rev 2006; :CD006104.

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Dementia - Monoclonal Antibodies


Lecanemab in Early Alzheimer's Disease


Donanemab in Early Symptomatic Alzheimer Disease
The TRAILBLAZER-ALZ 2 Randomized Clinical Trial

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Dementia - Monoclonal Antibodies

- Double blind RCT comparing anti-amyloid infusion (Lecanemab q 2 weeks or Donanemab q4 weeks) to placebo infusion for 18 months in patients with MCI or early AD with confirmed evidence of Amyloid on PET or CSF
- Primary Outcomes: Clinical Dementia Rating Scale Sum of Boxes (CDR-SB)
  - **Minimum clinically important difference = 1 point**
- Primary Harm: ARIA (MRI q3 months)

van Dyck CH, Swanson CJ, Aisen P, Bateman RJ, Chen C, Gee M, Kanekiyo M, Li D, Reyderman L, Cohen S, Froelich L, Katayama S, Sabbagh M, Vellas B, Watson D, Dhadda S, Irizarry M, Kramer LD, Iwatsubo T. Lecanemab in Early Alzheimer's Disease. N Engl J Med. 2023 Jan 5;388(1):9-21. doi: 10.1056/NEJMoa2212948. Epub 2022 Nov 29. PMID: 36449413.
Sims JR, Zimmer JA, Evans CD, Lu M, Ardayfio P, Sparks J, Wessels AM, Shcherbinin S, Wang H, Monkul Nery ES, Collins EC, Solomon P, Salloway S, Apostolova LG, Hansson O, Ritchie C, Brooks DA, Mintun M, Skovronsky DM; TRAILBLAZER-ALZ 2 Investigators. Donanemab in Early Symptomatic Alzheimer Disease: The TRAILBLAZER-ALZ 2 Randomized Clinical Trial. JAMA. 2023 Aug 8;330(6):512-527. doi: 10.1001/jama.2023.13239. PMID: 37459141; PMCID: PMC10352931.

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Dementia - Monoclonal Antibodies

	Lecanemab	Donanemab
Primary Outcome (CDR-SB)	Placebo: worsened by 1.66 Lecanemab: Worsened by 1.21 Difference: **0.45 points** (95% CI= 0.23-0.67)	Placebo: worsened by 1.88 Donanemab: Worsened by 1.20 Difference**: 0.67 points** (95% CI= −0.95 to −0.40]
Secondary Outcome (Amyloid Clearing	Lecanemab -55.48 Placebo +3.64	Lecanemab -88 Placebo +0.2

van Dyck et al. Lecanemab in Early Alzheimer's Disease. N Engl J Med. 2023 Jan 5;388(1):9-21. doi: 10.1056.
Sims JR, et al; TRAILBLAZER-ALZ 2 Investigators. Donanemab in Early Symptomatic Alzheimer Disease: The TRAILBLAZER-ALZ 2 Randomized Clinical Trial. JAMA. 2023 Aug 8;330(6):512-527. doi: 10.1001

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Dementia - Monoclonal Antibodies

- Primary Outcomes: Clinical Dementia Rating Scale Sum of Boxes (CDR-SB)
  - **Minimum clinically important difference = 1 point**
- Lecanemab 0.45
- Donanemab 0.67
- Donepezil 0.53

Andrews et al., Alzheimer's Dement. Transl. Res. Clin. Interv. (2019)
Birks and Harvey, Cochrane Database Syst Rev (2018)

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Dementia - Monoclonal Antibodies

- ARIA Amyloid Related Imaging Abnormalities
  - ARIA E =edema
  - ARIA H =hemorrhages/hemosiderin deposition
  - Asymptomatic (84% Clarity AD 76% Trailblazer) or Symptomatic
    - Mild (headache, confusion, vomiting, visual and gait changes)
    - Serious (seizure, status epilepticus, encephalopathy, stupor, focal neurological deficits)
    - ARIA-E more serious and symptomatic adverse events
- Risk factors for ARIA H
  - Anticoagulation
  - APOE4 gene carrier status
  - CAA

van Dyck et al. Lecanemab in Early Alzheimer's Disease. N Engl J Med. 2023 Jan 5;388(1):9-21. doi: 10.1056.
Sims JR, et al; TRAILBLAZER-ALZ 2 Investigators. Donanemab in Early Symptomatic Alzheimer Disease: The TRAILBLAZER-ALZ 2 Randomized Clinical Trial. JAMA. 2023 Aug 8;330(6):512-527. doi: 10.1001

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ARIA

	Lecanemab	Donanemab
ARIA-E (Edema)	12.6 % (placebo 1.7%)	24% (placebo 2.1 %)
ARIA-H (Hemorrhages/ Hemosiderin deposition)	17% (placebo 9%)	31.4% (placebo 13.6%)

van Dyck et al. Lecanemab in Early Alzheimer's Disease. N Engl J Med. 2023 Jan 5;388(1):9-21. doi: 10.1056.
Sims JR, et al; TRAILBLAZER-ALZ 2 Investigators. Donanemab in Early Symptomatic Alzheimer Disease: The TRAILBLAZER-ALZ 2 Randomized Clinical Trial. JAMA. 2023 Aug 8;330(6):512-527. doi: 10.1001

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Appropriate Use Recommendations (AUR)

- Confirm + amyloid status
- Anticoagulants-Avoid in patients on anticoagulants/DOACs
- APoE4/4: Not recommended

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Biomarkers

News | Alzheimer's Disease Blood Test Health And Medicine

New Alzheimer's Test Approved by FDA—What to Know

Published May 17, 2025 at 2:07 PM EDT

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Biomarkers for Alzheimer's Disease

- AD presents clinically as declining multiple cognitive domains impacting daily function
- AD presents pathologically with beta amyloid plaques and Tau tangles
- Biomarkers are advancing our ability to detect pathologic hallmarks of AD
  - MRI, PET, CSF, blood based biomarker

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Biomarkers

- Amyloid
  - Imaging: **Amyloid PET**
  - CSF: **$A\beta_{42}$, CSF $ptau_{181}/A\beta_{42}$**, $A\beta_{42/40}$
  - Plasma: **$A\beta_{42/40}$, p-tau_{217}**
- Tau
  - Imaging: **Tau PET**
  - CSF: **p-tau_{181}, total tau,** other tau isoforms
  - Plasma: **p-tau_{217}**

FDA approved test Insurance coverage

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Biomarkers

- Neurodegeneration
  - Imaging: **Structural MRI and FDG PET reads**
  - CSF/Plasma: Neurofilament Light (NfL)
- Vascular
  - Imaging: **MRI with FLAIR & SWI or GRE**
- Synuclein
  - CSF: **seeding amplification assays**
  - Skin biopsy: Syn-One

FDA approved test Insurance coverage

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Dementia - Blood Test for AD

Research

JAMA | Original Investigation

Blood Biomarkers to Detect Alzheimer Disease in Primary Care and Secondary Care

Sebastian Palmqvist, MD, PhD; Pontus Tideman, MSc; Niklas Mattsson-Carlgren, MD, PhD; Suzanne E. Schindler, MD, PhD; Ruben Smith, MD, PhD; Rik Ossenkoppele, PhD; Susanna Calling, MD, PhD; Tim West, PhD; Mark Monane, MD, MBA; Philip B. Verghese, PhD; Joel B. Braunstein, MD, MBA; Kaj Blennow, MD, PhD; Shorena Janelidze, PhD; Erik Stomrud, MD, PhD; Gemma Salvadó, PhD; Oskar Hansson, MD, PhD

IMPORTANCE An accurate blood test for Alzheimer disease (AD) could streamline the diagnostic workup and treatment of AD.

OBJECTIVE To prospectively evaluate a clinically available AD blood test in primary care and secondary care using predefined biomarker cutoff values.

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Dementia - Blood Test for AD

- Study conducted in Sweden
- Involved ≈500 primary care patients and ≈700 patients from a specialized memory clinic
- Participants were tested for blood levels of amyloid-β and phosphorylated tau, and results were converted to an “amyloid probability score”

Palmqvist et al. Blood Biomarkers to Detect Alzheimer Disease in Primary Care and Secondary Care. JAMA. 2024 Oct 15;332(15):1245-1257. doi: 10.1001

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Dementia - Blood Test for AD

- Accuracy: 92%
- Positive predictive Value: 92%
- Negative Predictive Value: 92%
- Sensitivity: 92%
- Specificity: 90%

Palmqvist et al. Blood Biomarkers to Detect Alzheimer Disease in Primary Care and Secondary Care. JAMA. 2024 Oct 15;332(15):1245-1257. doi: 10.1001

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Dementia - Blood Test for AD

- Prediction of CSF AD Biomarkers
  - Dementia Specialist accuracy: 71%
  - Primary Care Provider Accuracy: 58%
  - Biomarker Accuracy: 92%
- Blood biomarker clearly does better than clinicians at predicting where there is brain pathology of AD
- This study tells us NOTHING about whether blood biomarker are good for patients
  - Changes in management
  - Changes outcomes

Palmqvist et al. Blood Biomarkers to Detect Alzheimer Disease in Primary Care and Secondary Care. JAMA. 2024 Oct 15;332(15):1245-1257. doi: 10.1001

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When to Consider Use of Biomarkers

- Moderate or Severe Dementia
  - No: for anti-amyloid
  - +/- for diagnostic clarity
- MCI or Mild Dementia
  - Yes: for anti-amyloid candidates
  - +/- for diagnostic clarity
- Normal Cognitive Function
  - No

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Delirium

RESEARCH

OPEN ACCESS

Delirium and incident dementia in hospital patients in New South Wales, Australia: retrospective cohort study

Emily H Gordon, David D Ward, Hao Xiong, Shlomo Berkovsky, Ruth E Hubbard

ABSTRACT

OBJECTIVES

To determine the strength and nature of the association between delirium and incident dementia in a population of older adult patients without dementia at baseline.

DESIGN

Retrospective cohort study using large scale hospital administrative data.

SETTING

Public and private hospitals in New South Wales, Australia between July 2001 and March 2020.

PARTICIPANTS

Data were extracted for 650 590 hospital patients aged ≥65 years. Diagnoses of dementia and delirium were identified from ICD-10 (International classification of diseases, 10th revision) codes. Patients with dementia at baseline were excluded. Delirium-no delirium pairs were identified by matching personal and clinical characteristics, and were followed for more than five years.

MAIN OUTCOME MEASURES

Cox proportional hazards models and Fine-Gray hazard models were used to estimate the associations of delirium with death and incident dementia, respectively. Delirium-outcome dose-response associations were quantified, all analyses were performed in men and women separately, and sensitivity analyses were conducted.

RESULTS

The study included 51 211 matched pairs (48% men, mean age 83.4 years, standard deviation 6.5 years). Collectively, 58% (n=63 929) of patients died and 17% (n=19 117) had a newly reported dementia diagnosis during 5.25 years of follow-up. Patients with delirium had 59% higher risk of death (hazard ratio 1.39, 95% confidence interval 1.37 to 1.41) and three times higher risk of incident dementia (subdistribution hazard ratio 3.00, 95% confidence interval 2.91 to 3.10) than patients without delirium. The association with dementia was stronger in men (P=0.004). Each additional episode of delirium was associated with a 20% increased risk of dementia (subdistribution hazard ratio 1.20, 95% confidence interval 1.18 to 1.23).

CONCLUSIONS

The study findings suggest delirium was a strong risk factor for death and incident dementia among older adult patients. The data support a causal interpretation of the association between delirium and dementia. The clinical implications of delirium as a potentially modifiable risk factor for dementia are substantial.

WHAT IS ALREADY KNOWN ON THIS TOPIC

An association might exist between delirium and subsequent dementia; however, the strength and nature of this association are unclear because of limitations in existing observational studies

As the global burden of dementia increases, it is important to confirm the extent to which delirium is a potentially modifiable risk factor

WHAT THIS STUDY ADDS

Among patients without dementia at baseline with at least one episode of delirium, the risk of a new dementia diagnosis was about three times higher than for patients without delirium; each additional episode of delirium increased the risk by 20%

The association between delirium and incident dementia seems to be stronger in men than in women

Delirium prevention and treatment could reduce the burden of dementia globally

Introduction

Delirium is characterised by inattention and disturbance of awareness that represents a change from baseline cognitive function, and is precipitated by acute events such as illness and surgery. Delirium is a prevalent condition in hospital, with an estimated occurrence of 23% in patients with acute medical conditions[1] and up to 45% in patients aged 90 years and older.[2] Delirium is associated with adverse outcomes, including death in hospital or in the short to medium term post discharge, prolonged hospital stay, and new admission to a residential institution.[3] In 2020, Goldberg and colleagues[4] found that delirium was also associated with long term cognitive decline (ie, decrease in objective cognitive scores or new clinical diagnosis of dementia) in their meta-analysis of 26 studies including 10 919 patients. This association persisted in their subgroup analysis of 19 studies examining patients without cognitive impairment at baseline. An association between delirium and incident dementia in patients without dementia at baseline has been reported in a subsequent systematic review and meta-analysis.[5] However, included studies were relatively modest in size (between 78 and 329 patients) and variably adjusted for important confounders. Furthermore, studies did not account for the competing risk of death, which is particularly high in this vulnerable population and might contribute to biased risk estimates of incident dementia in relation to delirium.[6]

Mechanisms linking delirium with incident dementia are under debate. Delirium might be an epiphenomenon, it might uncover unrecognised (preexisting or preclinical) dementia, or it might cause dementia by accelerating underlying neuropathological processes or de novo mechanisms.[7] Observational studies are limited in their capacity to validate causality; however, the association between delirium and dementia is not

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Delirium

- 55,000 patients (age, ≥65) with no history of dementia who had at least one episode of inpatient delirium during a 6-year index period in Australia were retrospectively reviewed
- Case patients were matched with 55,000 similar patients who were hospitalized during the same period but had no delirium

Gordon et al. Delirium and incident dementia in hospital patients in New South Wales, Australia: retrospective cohort study. BMJ. 2024 Mar 27;384:e077634. doi: 10.1136.

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Delirium

- Mortality and incident dementia were more common in the delirium group than in the no-delirium group (relative risks, 1.4 and 3.4, respectively)
- Mortality and incident dementia also rose in conjunction with the number of delirium episodes in the first 12 months of follow-up (by 10% and 20% per episode of delirium, respectively)
- Evidence for causality is not conclusive, but this data suggest that **aggressive efforts to prevent delirium might help reduce the rising burden of dementia** as the population ages

Gordon et al. Delirium and incident dementia in hospital patients in New South Wales, Australia: retrospective cohort study. BMJ. 2024 Mar 27;384:e077634. doi: 10.1136.

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Delirium Prevention

- Previous studies have shown that about 30-40% of delirium is preventable
- Recommend nonpharmacologic interventions that manage modifiable risk factors

Siddiqi et al. Occurrence and outcome of delirium in medical in-patients: a systematic literature review. Age Ageing. 2006;35:350–364.
Hshieh et al. Hospital Elder Life Program: Systematic Review and Meta-analysis of Effectiveness. Am J Geriatr Psychiatry. 2018;26(10):1015-1033.

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Delirium Prevention

- Interventions designed to mitigate risk factors
  - Orientation protocols
  - Optimize sleep
  - Early mobilization/avoid restraints
  - Use of visual and hearing aids
  - Avoiding and/or monitoring the use of problematic medications
    - Benzodiazepines, opioids, anticholinergics, and antihistamines
  - Manage medical conditions known to cause or aggravate delirium
    - Dehydration, constipation, withdrawal, urinary retention, electrolyte abnormalities, hypoxemia, and infections
  - Managing pain

Reston et al. In-facility delirium prevention programs as a patient safety strategy: a systematic review. Ann Intern Med 2013; 158:375.
Hshieh et al. Effectiveness of multicomponent nonpharmacological delirium interventions: a meta-analysis. JAMA Intern Med 2015; 175:512.

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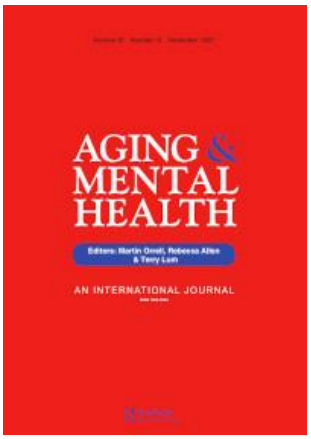
Depression



Physical and Mental Health

Depression as a determinant of frailty in late life

Marcus K. Borges, Ivan Aprahamian, Carla V. Romanini, Fabiana M. Oliveira, Silvana V. B. Mingardi, Natália A. Lima,

...show all

Pages 2279-2285 | Received 23 May 2020, Accepted 22 Nov 2020, Published online: 11 Dec 2020

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Depression

- Cohort study, 315 outpatients
  - Mean age 72.1 years, 68.3% female sex
- Major and subthreshold depression
  - Measured with psychiatric diagnostic interview according to DSM-5 criteria (SCID-5) and (GDS-15 and PHQ-9)
- Frailty Index (FI-36 items) or FRAIL-BR Questionnaire

Borges et al. Depression as a determinant of frailty in late life. Aging Ment Health. 2021 Dec;25(12):2279-2285. doi: 10.1080.

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Depression

- Multiple logistic and linear regression were performed to assess the association between depression (independent variable) and frailty (dependent variable) adjusted for confounders

Borges et al. Depression as a determinant of frailty in late life. Aging Ment Health. 2021 Dec;25(12):2279-2285. doi: 10.1080.

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Depression

Late life depression and frailty are associated in a dose-dependent manner, irrespective of the used definitions

	No Depressive Disorder	Subthreshold Depression	MDD
FRAIL-BR Questionnaire	14.4%	46.5%	65.1%
FI-36 Index	10.2%	20.9 %	30.2%

Borges et al. Depression as a determinant of frailty in late life. Aging Ment Health. 2021 Dec;25(12):2279-2285. doi: 10.1080.

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Frailty

- Frailty is clinically observed to be a chronic, progressive condition, with a spectrum of severity
- Increases vulnerability to adverse health outcomes
- Earlier phases may be responsive to treatment
- The most severely frail older adults appear to be in an irreversible, pre-death phase with high mortality over 6–12 months

Martinchek et al. Frailty. Geriatrics Review Syllabus: A Core Curriculum in Geriatric Medicine. 11th edition.2022 pg 230-235

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Frailty

- Two conceptual frameworks
  - Frailty Phenotype (Fried)
    - Slow gait, weakness (grip strength), low physical activity, fatigue, unintentional weight loss
  - Deficit accumulation model frailty (Rockwood)
    - Accumulation of a number of diseases, impairments, and other health conditions in an individual

Rodríguez-Mañaset et al. Searching for an operational definition of frailty: a Delphi method based consensus statement: the frailty operative definition-consensus conference project. J Gerontol A Biol Sci Med Sci. 2013 Jan;68(1):62-7. Epub 2012 Apr 16.

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Clinical Presentation of Frailty

- Decreased muscle mass, or sarcopenia, with resulting loss of strength
- Slowed motor performance (such as walking speed)
- Decreased physical activity
- Worsened exercise tolerance (or low energy or fatigue or exhaustion)
- Inadequate nutritional intake (even when physical activity is low)

Martinchek et al. Frailty. Geriatrics Review Syllabus: A Core Curriculum in Geriatric Medicine. 11th edition.2022 pg 230-235

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Screening

F	Fatigue: Are you fatigued?
R	Resistance: Can you walk up one flight of stairs?
A	Aerobic: Can you walk one block?
I	Illness: Do you have more than 5 illnesses?
L	Loss of weight: More than 5% in last 6 months

Gleason et al. FRAIL Questionnaire Screening Tool and Short-Term Outcomes in Geriatric Fracture Patients. JAMADA. Volume 18, Issue 12, 1082 - 1086

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Frailty

- Stressors such as hospitalization, surgery, illness, or environmental extremes are less tolerated by frail older adults
- Frail older adults are more likely to:
  - Have delayed recovery from illness and/or to fall
  - Develop greater functional impairment, including becoming disabled or dependent
  - Be hospitalized, with worse outcomes once hospitalized, including dependency
  - Die

Martinchek et al. Frailty. Geriatrics Review Syllabus: A Core Curriculum in Geriatric Medicine. 11th edition.2022 pg 230-235

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Mobility

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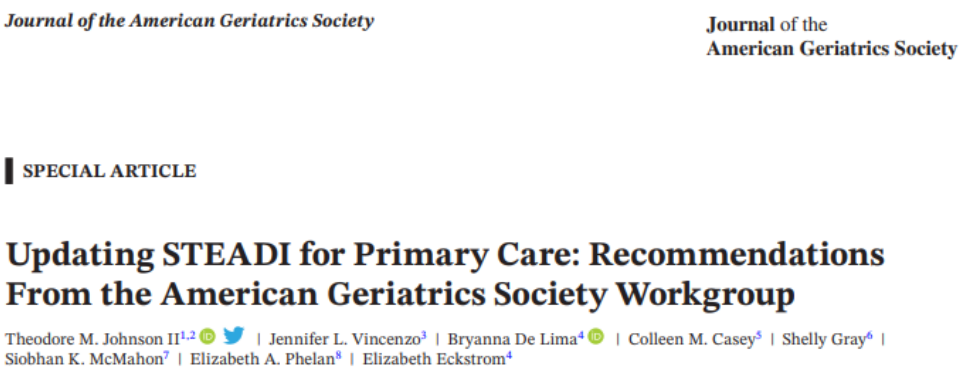
Mobility



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Mobility

- CDC released STEADI (stopping elderly accidents, deaths, and injuries) toolkit based on AGS fall prevention guidelines
- Updated in 2024 based on 448 stakeholders and work groups
  - Screen
  - Assess
  - Intervene

Johnson et al. Updating STEADI for Primary Care: Recommendations From the American Geriatrics Society Workgroup. J Am Geriatr Soc. 2025 Jan 29. doi: 10.1111/jgs.19378.

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Mobility

- Screen
  - Screen with three key questions:
    - Have you fallen in the past year?
    - Are you concerned* about falling? -*avoid fear/worry
    - Do you feel unsteady standing or walking?

Johnson et al. Updating STEADI for Primary Care: Recommendations From the American Geriatrics Society Workgroup. J Am Geriatr Soc. 2025 Jan 29. doi: 10.1111/jgs.19378.

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Mobility

- Assess
  - If screen is positive, then should lead to an intervention
  - Ask remaining STEADI-12 questionnaire
  - Check orthostatic vital signs
  - Hearing and cognitive screen

Johnson et al. Updating STEADI for Primary Care: Recommendations From the American Geriatrics Society Workgroup. J Am Geriatr Soc. 2025 Jan 29. doi: 10.1111/jgs.19378.

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Mobility

- Intervene
  - Review medications for FRIDs (fall risk increasing drugs)
  - Address urinary symptoms, especially nighttime
    - For bladder issues recommend behavioral interventions or pelvic PT
  - Recommend 1000 to 2000 IU vitamin D3
  - Recommend single distance glasses outside the home/ refer to ophthalmology if they have not seen in greater than one year
  - Address home safety concerns/ footwear, osteoporosis status, and recommend physical therapy or home exercises that focus on gait, balance, and strength
  - Give out: "Check for safety" and "what you can do to prevent falls"

Johnson et al. Updating STEADI for Primary Care: Recommendations From the American Geriatrics Society Workgroup. J Am Geriatr Soc. 2025 Jan 29. doi: 10.1111/jgs.19378.

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Fall Prevention

JAMA | US Preventive Services Task Force | EVIDENCE REPORT

Interventions to Prevent Falls in Older Adults
Updated Evidence Report and Systematic Review for the US Preventive Services Task Force

Janelle M. Guirguis-Blake, MD; Leslie A. Perdue, MPH; Erin L. Coppola, MPH; Sarah I. Bean, MPH

IMPORTANCE Falls are the most common cause of injury-related morbidity and mortality in older adults.

OBJECTIVE To systematically review evidence on the effectiveness and harms of fall prevention interventions in community-dwelling older adults.

DATA SOURCES MEDLINE, Cumulative Index for Nursing and Allied Health Literature, and Cochrane Central Register of Controlled Clinical Trials for relevant English-language literature published between January 1, 2016, and May 8, 2023, with ongoing surveillance through March 22, 2024.

STUDY SELECTION Randomized clinical trials of interventions to prevent falls in community-dwelling adults 65 years or older.

DATA EXTRACTION AND SYNTHESIS Critical appraisal and data abstraction by 2 independent reviewers. Random-effects meta-analyses with Knapp-Hartung adjustment.

MAIN OUTCOMES AND MEASURES Falls, injurious falls, fall-related fractures, hospitalizations or emergency department visits, people with 1 or more falls, people with injurious falls, people with fall-related fractures, and harms.

RESULTS Eighty-three fair- to good-quality randomized clinical trials (n = 48 839) examined the effectiveness of 6 fall prevention interventions in older adults. This article focuses on the 2 most studied intervention types: multifactorial (28 studies; n = 27 784) and exercise (37 studies; n = 16 117) interventions. Multifactorial interventions were associated with a statistically significant reduction in falls (incidence rate ratio [IRR], 0.84 [95% CI, 0.74-0.95]) but not a statistically significant reduction in individual risk of 1 or more falls (relative risk [RR], 0.96 [95% CI, 0.91-1.02]), injurious falls (IRR, 0.92 [95% CI, 0.84-1.01]), fall-related fractures (IRR, 1.01 [95% CI, 0.81-1.26]), individual risk of injurious falls (RR, 0.92 [95% CI, 0.83-1.02]), or individual risk of fall-related fractures (RR, 0.86 [95% CI, 0.60-1.24]). Exercise interventions were associated with statistically significant reductions in falls (IRR, 0.85 [95% CI, 0.75-0.96]), individual risk of 1 or more falls (RR, 0.92 [95% CI, 0.87-0.98]), and injurious falls (IRR, 0.84 [95% CI, 0.74-0.95]) but not individual risk of injurious falls (RR, 0.90 [95% CI, 0.79-1.02]). Harms associated with multifactorial and exercise interventions were not well reported and were generally rare, minor musculoskeletal symptoms associated with exercise.

CONCLUSIONS AND RELEVANCE Multifactorial and exercise interventions were associated with reduced falls in multiple good-quality trials. Exercise demonstrated the most consistent statistically significant benefit across multiple fall-related outcomes.

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Multimedia
Related article page 51 and JAMA Patient Page page 84
Supplemental content
CME at jamacmelookup.com

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Corresponding Author: Janelle M.

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Fall Prevention

- Systematic review of 83 fair to good randomized controlled trials that considered either
  - Multifactorial interventions
    - PT, environmental interventions, specific physician recommendations, medication management, fall prevention education, fall detection devices
  - Exercise

Guirguis-Blake et al. Interventions to Prevent Falls in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA. 2024 Jul 2;332(1):58-69..

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Fall Prevention

- Multifactorial and exercise interventions were associated with reduced falls in multiple good-quality trials
- Exercise demonstrated the most consistent statistically significant benefit across multiple fall-related outcomes, including injurious falls

Guirguis-Blake et al. Interventions to Prevent Falls in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA. 2024 Jul 2;332(1):58-69..

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Medications

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You Are Treating a 70 y/o Male Without Known h/o CAD.
He Asks If He Should Be Taking Aspirin to
Prevent Future Heart Attacks.

How Do You Respond?

A. Start Aspirin 81 mg daily
B. Start Aspirin 81 mg every other day
C. Start Aspirin 325 mg daily
D. Do not start Aspirin

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Medications

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Beers Criteria

- The intention of the AGS Beers Criteria® is to: (1) reduce older adults' exposure to potentially inappropriate medications (PIMs) by improving medication selection; (2) educate clinicians and patients; and (3) serve as a tool for evaluating the quality of care, cost, and patterns of drug use in older adult
- The criteria are intended to be applied to adults 65 years old and older in all ambulatory, acute, and institutionalized settings of care, except hospice and end-of-life care settings.

AGS. Expert Panel. American Geriatrics Society 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults. July 2023. JAGS 71; 7. 2052-2081

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Noteworthy Changes

- Aspirin:
  - No longer recommended for primary prevention of cardiovascular disease

Guirguis-Blake et al. Interventions to Prevent Falls in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA. 2024 Jul 2;332(1):58-69..

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Noteworthy Changes

- Anticoagulation:
  - Warfarin: Avoid starting warfarin as initial therapy for the treatment of venous thromboembolism (VTE) or nonvalvular atrial fibrillation unless alternative options (e.g., DOACs) are contraindicated
  - Xarelto (Rivaroxaban): Avoid rivaroxaban for long-term treatment of nonvalvular atrial fibrillation or VTE in favor of safer anticoagulant alternatives.
  - Pradaxa (Dabigatran): Use caution in selecting dabigatran over other DOACs (e.g., Eliquis/apixaban) for long-term treatment of nonvalvular atrial fibrillation or VTE.

Guirguis-Blake et al. Interventions to Prevent Falls in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA. 2024 Jul 2;332(1):58-69..

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Noteworthy Changes

- Estrogen
  - The initiation of oral and transdermal estrogen is to be avoided in older women; topical vaginal estrogen remains appropriate for its major indications of symptomatic vaginal atrophy or urinary tract infection prophylaxis. Deprescribing should be considered for older women already using nonvaginal estrogen replacement
- Sulfonylureas
  - Avoid all sulfonylureas as first- or second-line monotherapy or add on-therapy in recognition of their association with a higher risk of cardiovascular events, all-cause mortality, and hypoglycemia

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Noteworthy Changes

- PIMs exacerbating Specific Diseases
  - Heart failure:
    - Avoid dextromethorphan/quinidine (Nuedexta)
  - Delirium:
    - Opioids and steroids added as meds that can exacerbate
    - Avoid H2 receptor antagonists like Famotidine
  - Falls:
    - Antidepressants have been lowered to moderate in patients with history of falls

Guirguis-Blake et al. Interventions to Prevent Falls in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA. 2024 Jul 2;332(1):58-69..

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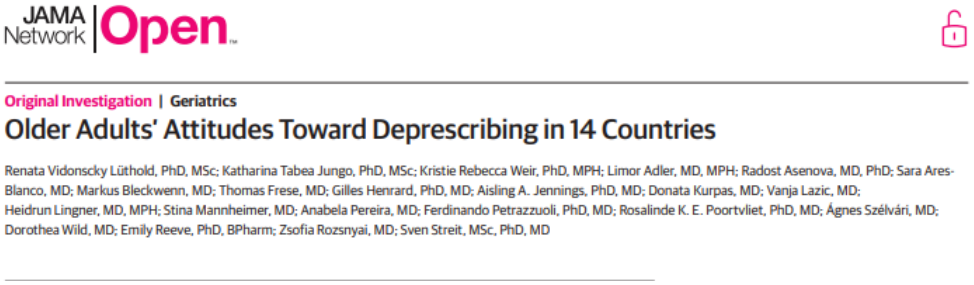
Deprescribing



JAMA Network Open

Original Investigation | Geriatrics

Older Adults' Attitudes Toward Deprescribing in 14 Countries

Renata Vidonscky Lüthold, PhD, MSc; Katharina Tabea Jungo, PhD, MSc; Kristie Rebecca Weir, PhD, MPH; Limor Adler, MD, MPH; Radost Asenova, MD, PhD; Sara Ares-Blanco, MD; Markus Bleckwenn, MD; Thomas Frese, MD; Gilles Henrard, PhD, MD; Aisling A. Jennings, PhD, MD; Donata Kurpas, MD; Vanja Lazic, MD; Heidrun Lingner, MD, MPH; Stina Mannheimer, MD; Anabela Pereira, MD; Ferdinando Petrazzuoli, PhD, MD; Rosalinde K. E. Poortvliet, PhD, MD; Ágnes Szélvári, MD; Dorothea Wild, MD; Emily Reeve, PhD, BPharm; Zsofia Rozsnyai, MD; Sven Streit, MSc, PhD, MD

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One of the first duties of the physician is to educate the masses not to take medicine.

~Sir William Osler,

the "Father of Modern Medicine"

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Deprescribing

- Conducted from May 2022 to December 2023 in primary care settings in 14 countries.
- Patients aged 65 years or older taking 5 or more medications were consecutively recruited by their general practitioner (GP) and completed the questionnaire

Vidonscky et al. Older Adults' Attitudes Toward Deprescribing in 14 Countries. JAMA Netw Open. 2025 Feb 3;8(2):e2457498. doi: 10.1001/jamanetworkopen.2024.57498.

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Deprescribing

- Primary outcomes:
  - Patient attitudes toward deprescribing specific medications, as measured by responses to the question, "Thinking about your current medication list, are there any medications that you would like to stop taking or reduce the dose of?"
- Multilevel multivariable logistic regression analysis was used, adjusted for clustering effect at the country level, to investigate the association between patient characteristics and interest in deprescribing

Vidonscky et al. Older Adults' Attitudes Toward Deprescribing in 14 Countries. JAMA Netw Open. 2025 Feb 3;8(2):e2457498. doi: 10.1001/jamanetworkopen.2024.57498.

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Deprescribing

- 1340 patients
- Patients expressed interest in deprescribing specific medications at varying levels
  - 79% (86 of 109 patients) in Poland to 23% (21 of 96 patients) in Bulgaria.
- The 3 most reported medications patients would like to have deprescribed were:
  - diuretics (111 of 1002 medications [11%])
  - lipid-modifying agents (109 of 1002 medications [11%])
  - agents acting on the renin-angiotensin system (83 of 1002 medications [8%])

Vidonscky et al. Older Adults' Attitudes Toward Deprescribing in 14 Countries. JAMA Netw Open. 2025 Feb 3;8(2):e2457498. doi: 10.1001/jamanetworkopen.2024.57498.

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Matters Most

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A 90-year Nursing Home Resident with 10-year History of AD Has Had Coughing After Meals for 6 Months. He Has Profound Memory Deficits, No Longer Recognizing Family, Is Bedbound, Is Only Able to Mumble a Couple Of Words, and Is Unable to Perform Any ADLs/IADLs. He Is Losing Weight.

How Should He Be Evaluated/Treated?

A. Refer to GI for feeding tube
B. Start Megace
C. Start Marinol
D. Refer to hospice

CONTINUING EDUCATION COMPANY

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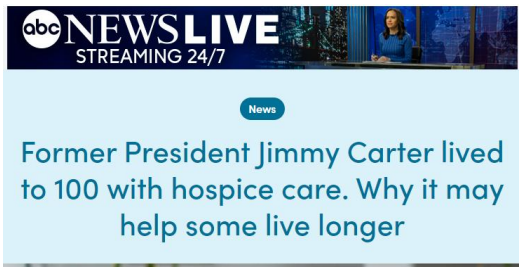
What Matters Most



Original Investigation

February 27, 2023

Association of Hospice Profit Status With Family Caregivers' Reported Care Experiences

Rebecca Anhang Price, PhD[1]; Layla Parast, PhD[2]; Marc N. Elliott, PhD[3]; et al

Author Affiliations

JAMA Intern Med. 2023;183(4):311-318. doi:10.1001/jamainternmed.2022.7076

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Hospice

- Cross-sectional study
- 653,208 caregiver respondents, reflecting care received from 3107 hospices
- A score of 8 measures of hospice care experience
  - Communication, timely care, symptom management, and emotional/religious support

Anhang et al. Association of Hospice Profit Status With Family Caregivers' Reported Care Experiences. JAMA Intern Med. 2023 Apr 1;183(4):311-318.

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Hospice

- Family caregivers reported worse care experiences at for-profit hospices compared with not-for-profit hospices

Anhang et al. Association of Hospice Profit Status With Family Caregivers' Reported Care Experiences. JAMA Intern Med. 2023 Apr 1;183(4):311-318.

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Hospice

- Limitations:
  - CG not patient surveyed
  - Low response rate (32%)
  - Lots of variability hospice performance
  - New/small for profit hospices largely not included
- Take home: not all for profit are bad and not all non-profit are good

Anhang et al. Association of Hospice Profit Status With Family Caregivers' Reported Care Experiences. JAMA Intern Med. 2023 Apr 1;183(4):311-318.

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Hospice

- Introducing Hospice earlier offers several advantages
  - Better symptom management
  - Reduced Emergency room visits/ICU admissions/decreased readmissions
  - More time for planning/emotional support

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Hospice Criteria for Dementia

- **FAST stage 7 or beyond**
- Unintentional weight loss >10% over 6 months
- Comorbid condition within the past 12 months (aspiration pneumonia, pyelonephritis, sepsis, multiple stage ¾ ulcers, fever after antibiotics)

Hospice Alzheimer's Disease & Related Disorders. Center for Medicare & Medicaid Services .https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?LCDId=34567 Accessed 12/27/24.

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Stage	Stage Name	Characteristic
1	Normal Aging	No Deficits
2	Possible MCI	Subjective Deficits
3	MCI	Objective Deficits, still Independent ADLs/IADLs
4	Mild Dementia	Needs help with bills, cooking, driving, medicine
5	Moderate Dementia	Needs help picking proper clothes
6a	Moderately Severe Dementia	Needs help putting on clothes
6b	Moderately Severe Dementia	Needs help bathing
6c	Moderately Severe Dementia	Needs help toileting
6d	Moderately Severe Dementia	UI
6e	Moderately Severe Dementia	FI
7a	Severe Dementia	Speaks only 5-6 words
7b	Severe Dementia	Speaks 1 word
7c	Severe Dementia	Can not walk
7d	Severe Dementia	Can not sit up
7e	Severe Dementia	Can not smile
7f	Severe Dementia	Can not hold up head

Adapted from: Reisberg B, Ferris SH, Franssen E. An ordinal functional assessment tool for Alzheimer's-type dementia. Hosp Community Psychiatry. 1985 Jun;36(6):593-5. doi: 10.1176/ps.36.6.593. PMID: 4007814.

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Take Home Points

- Avoid high risk medications based on AGS Beers Criteria in older adults.
- Prescribe exercise and multifactorial interventions to reduce falls in older adults.
- Introduce hospice eligibility earlier in disease progression for patients with dementia.

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