Dementia and Long-Term Care

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Dementia
(NIA - Alz Assoc Criteria, 2011)

• Impairment in at least two of: memory, reasoning, visuospatial abilities, language; or changes in personality / behavior, AND

• The impairments “interfere with the ability to function at work or at usual activities”; are a decline from previous levels of functioning; AND

• Not explained by delirium or psychiatric disorder
Causes of Dementia

• Alzheimer’s Disease (~ 60 - 70% of cases)
• Vascular Dementia (~ 20 - 30% of cases)
• Other (~10% of cases)
  – Parkinson’s Disease
  – Frontotemporal Dementia
  – Dementia with Lewy Bodies
  – Reversible Causes
• Mixed Dementia
  – Overlapping AD and vascular pathology is likely most common, especially in aged 80+

Overlap / Interaction of Cardiovascular disease and AD

• Anatomy / Physiology
  – Brain is 2% of body mass, but gets 20% of blood flow and uses 20% of the body’s oxygen

• Risk Factors
  – Hypertension, Diabetes, Hyperlipidemia, Obesity, Physical inactivity, Smoking, Alcohol, Inflammation, Apo E e4 genotype
  – More vascular risk factors in mid-life is associated with more amyloid protein in the brain in later life

• Clinical
  – For a given level of AD pathology, the more cerebrovascular lesions, the greater the likelihood of CI / dementia

Sources: Snowdon et al, JAMA, 1997; Langa et al, JAMA, 2004; Schneider and Bennett, Stroke, 2010; Zlokovic, Nature Rev Neuro, 2011; Snyder, Alz and Dem, 2015; Gottesman et al, JAMA, 2017
Dementia Annual Cost Per Case
United States, 2010

- Informal Care: 49%
- Nursing Homes: 25%
- Out of Pocket: 11%
- Home Care: 10%
- Medicare: 5%

Total: $50,000 per case; $200 billion nationwide

Dementia and Nursing Home Use

- Risk of nursing home entry increases with dementia severity: ~ 10% for mild, and ~ 50% for severe

- Risk influenced by both patient and caregiver characteristics:
  - Living situation (alone vs. married)
  - Race / ethnicity (Black and Hispanic elders at lower risk)
  - Neuropsychiatric symptoms (e.g., depression, delusions)

- Yearly median NH cost is ~$90,000 / year (2016), and accounts for about 45% of direct costs of dementia care

- ~50% of NH residents have dementia, although recent trend toward substitution to assisted living, etc

Living Arrangements of Adults 65+ with Dementia
HRS 2012

Source: Langa and Weir, HRS 2012, unpublished data.
Genetic and Biomarker Indicators of AD

• Apolipoprotein E (ApoE)
  – Gene that codes for a cholesterol-transport protein
  – Comes in three flavors (e2, e3, e4), and the e4 version is associated with increased AD risk
  – ApoE status now available from 23andMe ($199)

• Amyloid / Tau / Neurodegeneration
  – A:  + Amyloid PET; low CSF AB-42
  – T:  + Tau PET; high CSF phosphorylated tau
  – N:  Brain atrophy (MRI); hypometabolism (FDG-PET)

Amyloid PET Scan

ApoE Testing, Amyloid Scans and Information Asymmetry

• ApoE genotype now available from 23andMe
  – Knowing ApoE e4 positive status increased likelihood of LTCi purchase (OR = 2.3; 24% changed)

• Amyloid PET imaging not yet widely available in clinical practice
  – Medicare reimbursement for research use only
  – Current NIA-funded study examining impact on medical, psychological, and LTCi purchase outcomes

Sources: Taylor et al, Health Affairs, 2010; CMS, PET in Dementia Decision Memo, 2014.
*Likelihood of dementia, conditional on given level of biomarker / pathology, varies significantly across individuals, perhaps related to “Cognitive Reserve”.

Clinical / Behavioral Markers for AD

- Cognitive testing
  - Repeat testing to identify within-individual trajectory most useful

- Informant assessments

- Changes in financial decision-making

- Changes in gait, speech, living space
  - GPS, home video monitoring being investigated as ways to identify early signs of AD / dementia

HRS: Dementia Prevalence, by Age

Conclusions and Key Issues

• Dementia is a primary driver of LTC demand and costs

• Will increasing dependency ratio for informal care lead to greater demand for institutional care?

• Future of diagnostic markers for dementia risk?
  – Accuracy, availability, impact on information asymmetry and LTCi market?

• Future of dementia incidence and treatments?
  – Trends in CRFs (obesity, diabetes, hypertension)?
  – New drugs for prevention (solanezumab)?