

# 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+**

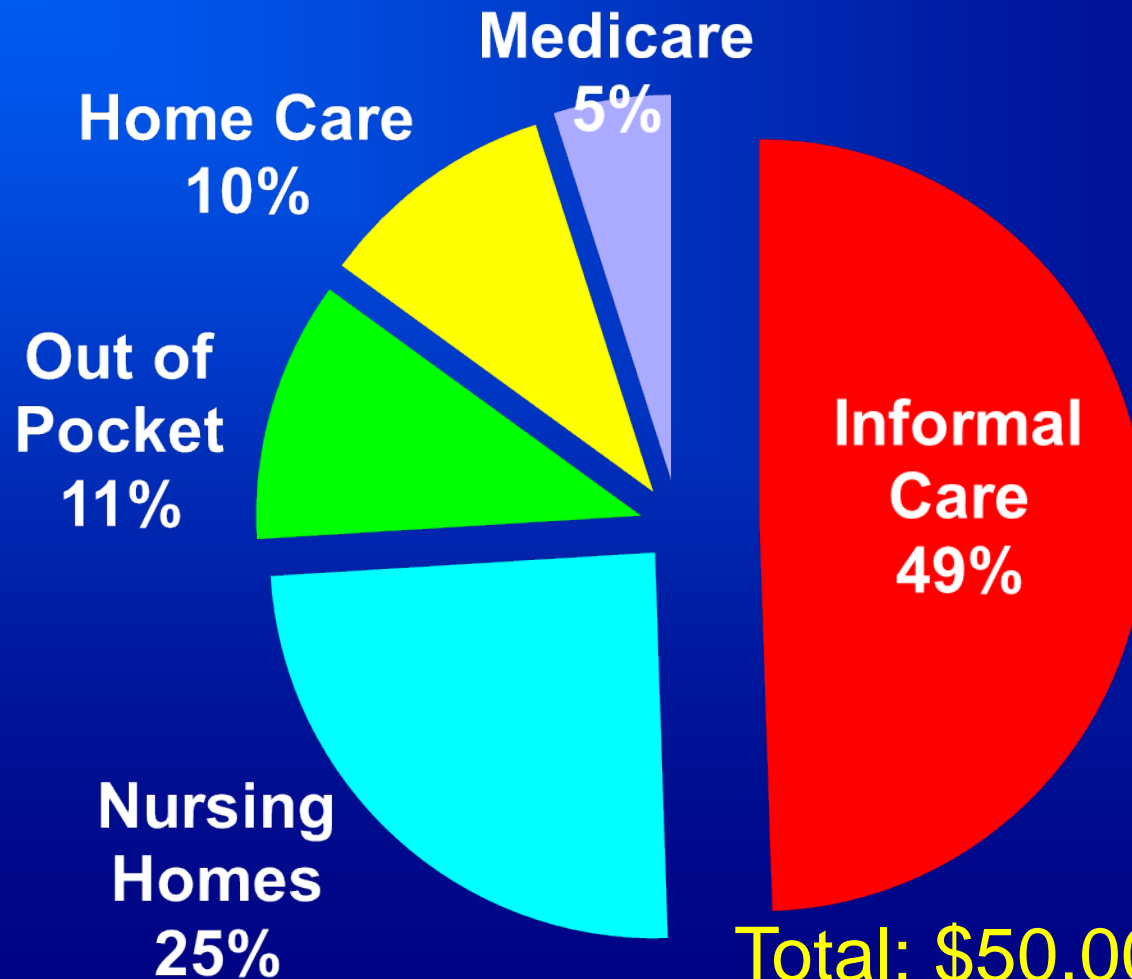


# Overlap / Interaction of Cardiovascular disease and AD

- 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

# Dementia Annual Cost Per Case

## United States, 2010



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

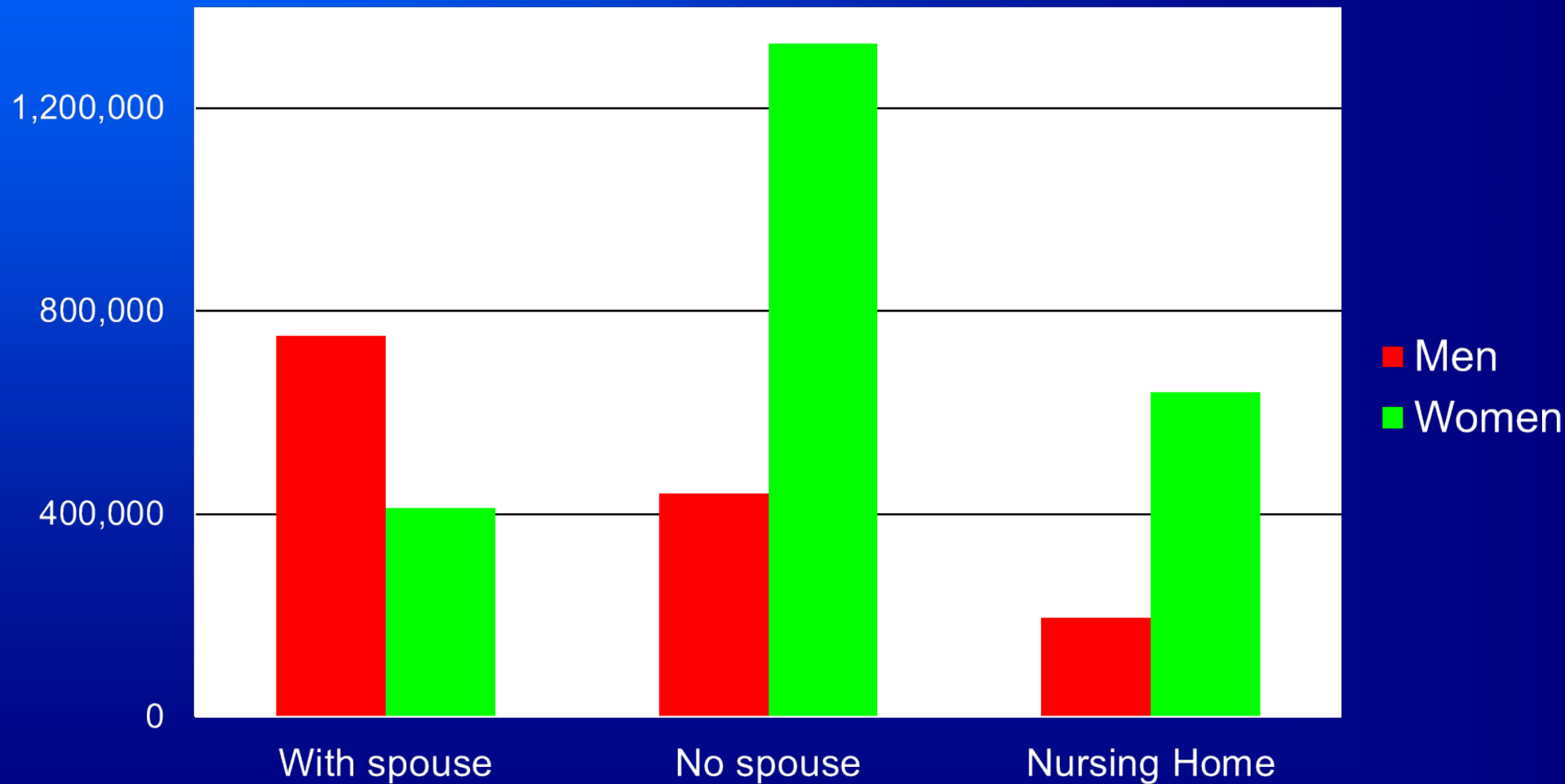


# Dementia and Nursing Home Use

- 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



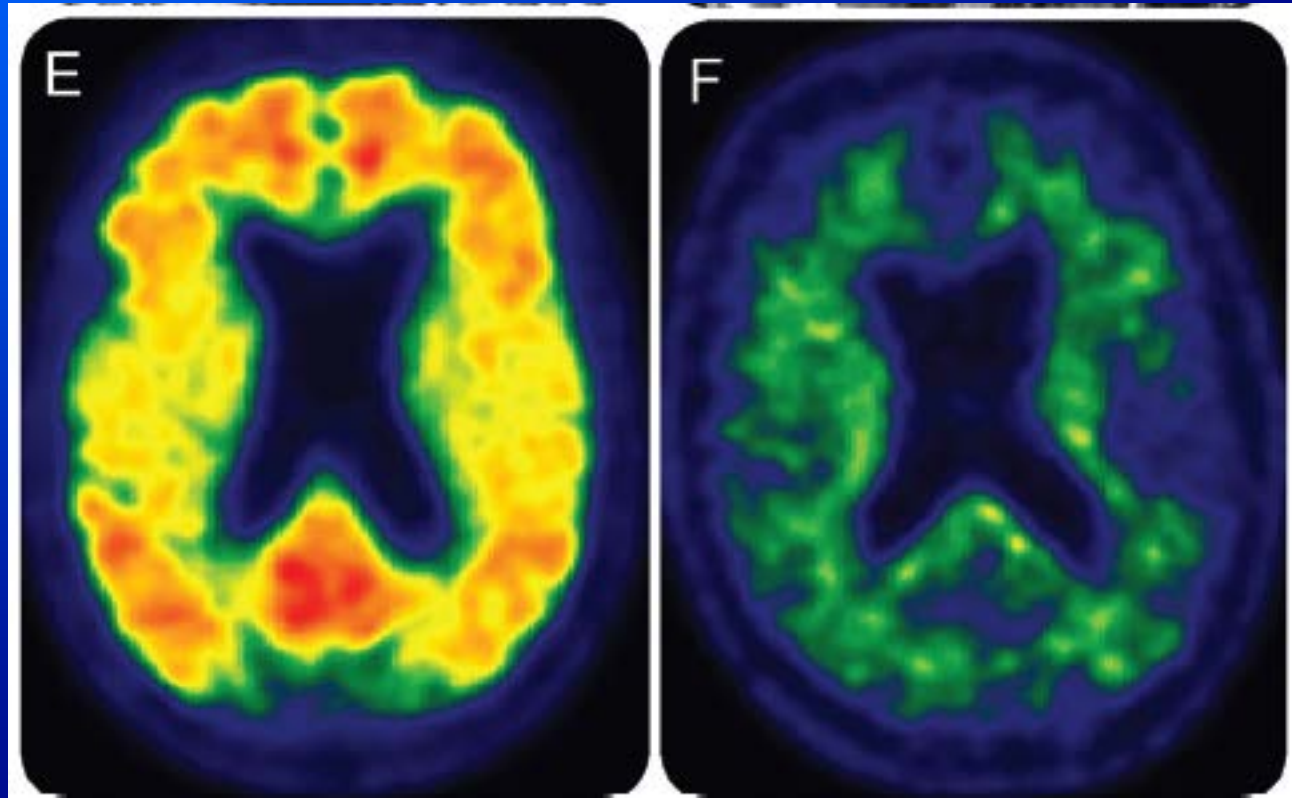
Source: Langa and Weir, HRS 2012, unpublished data.

# 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



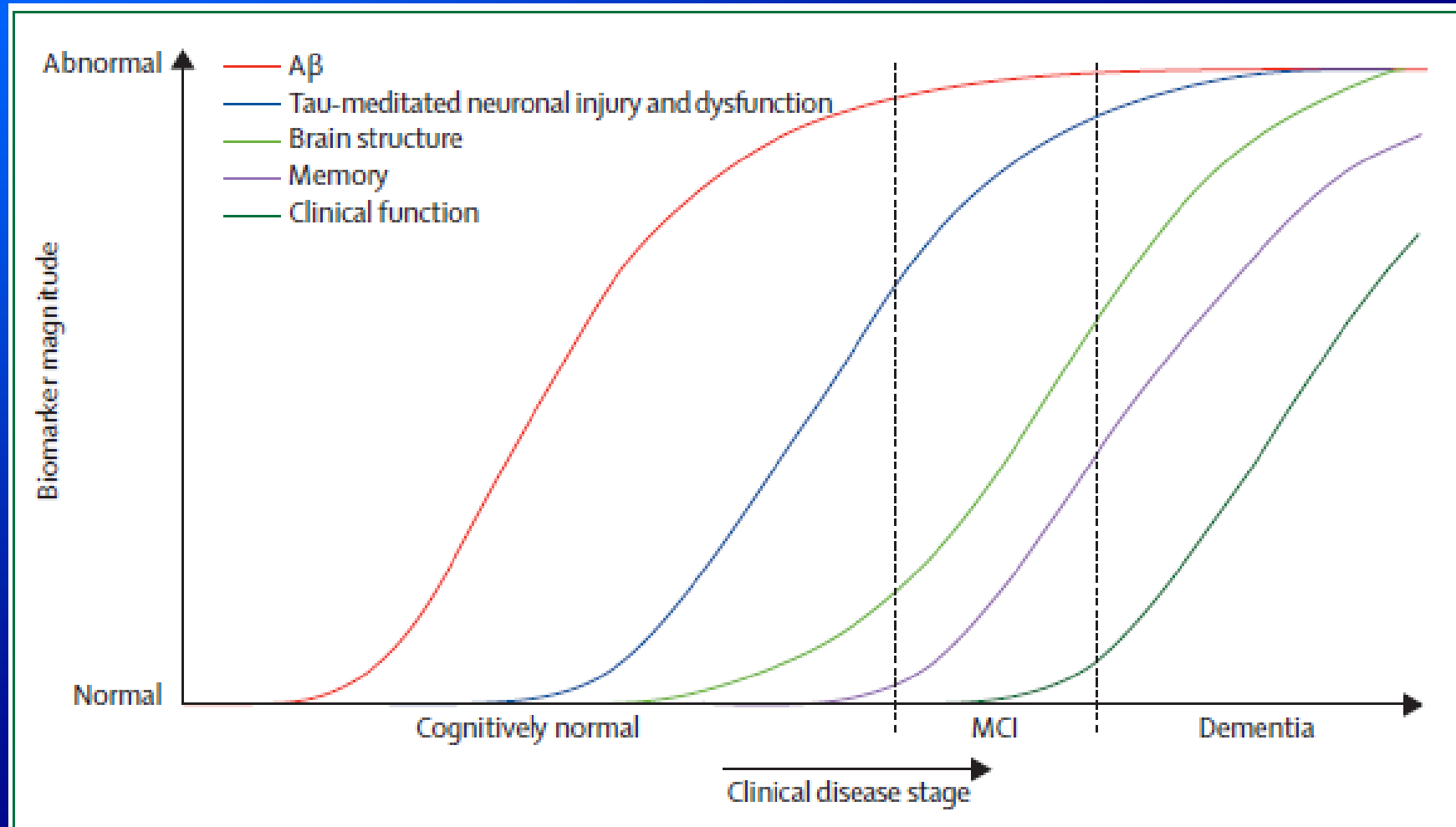
AD

Normal

# 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

# Model of AD Biomarker Dynamics



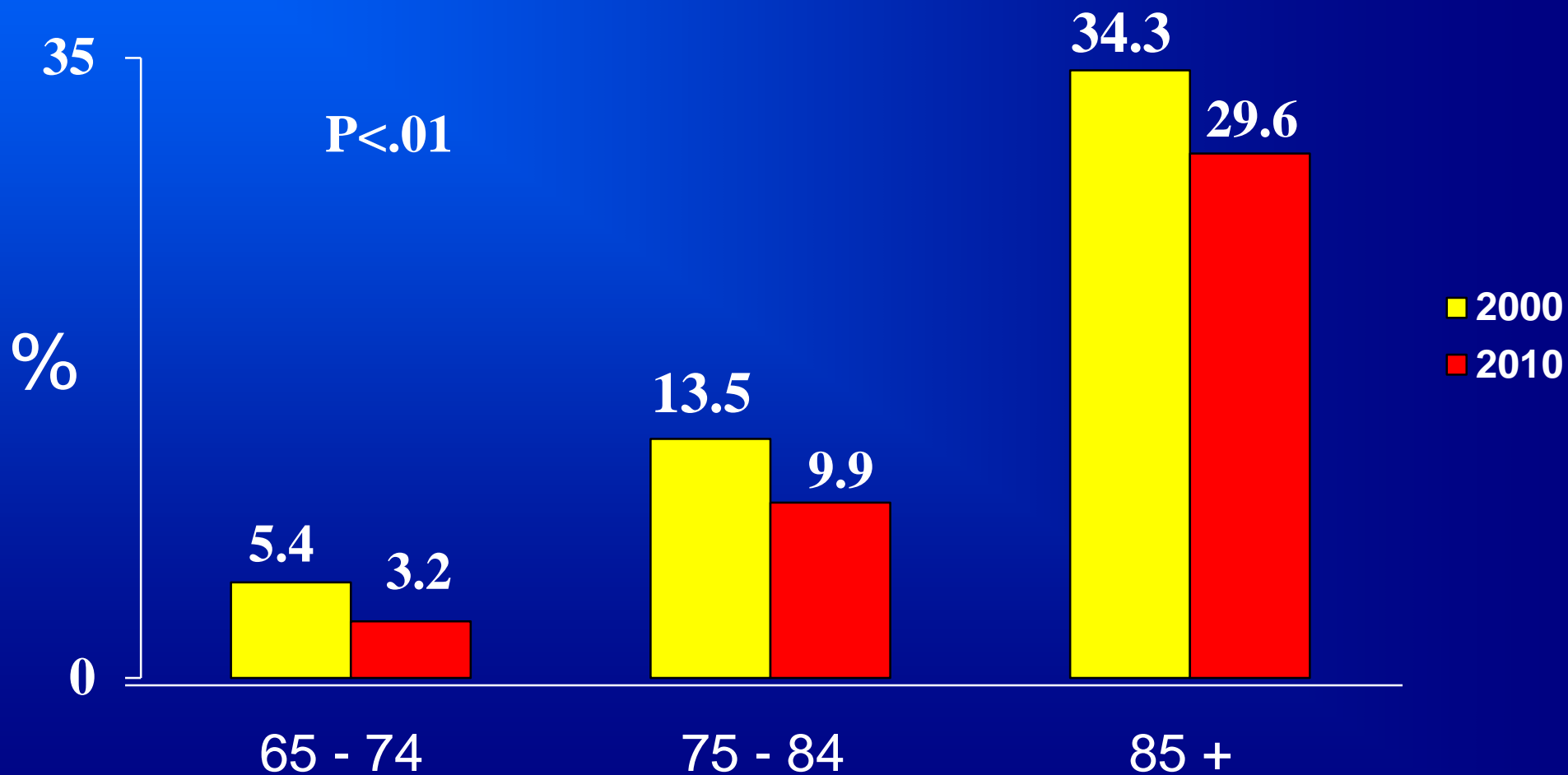
\*Likelihood of dementia, conditional on given level of biomarker / pathology, varies significantly across individuals, perhaps related to "Cognitive Reserve".



# 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



Source: Langa et al. *JAMA Internal Medicine*, 2017.

# 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)?