Vascular Dementia: An Important Supporting Actor in the Story of Dementia

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Administration for Community Living

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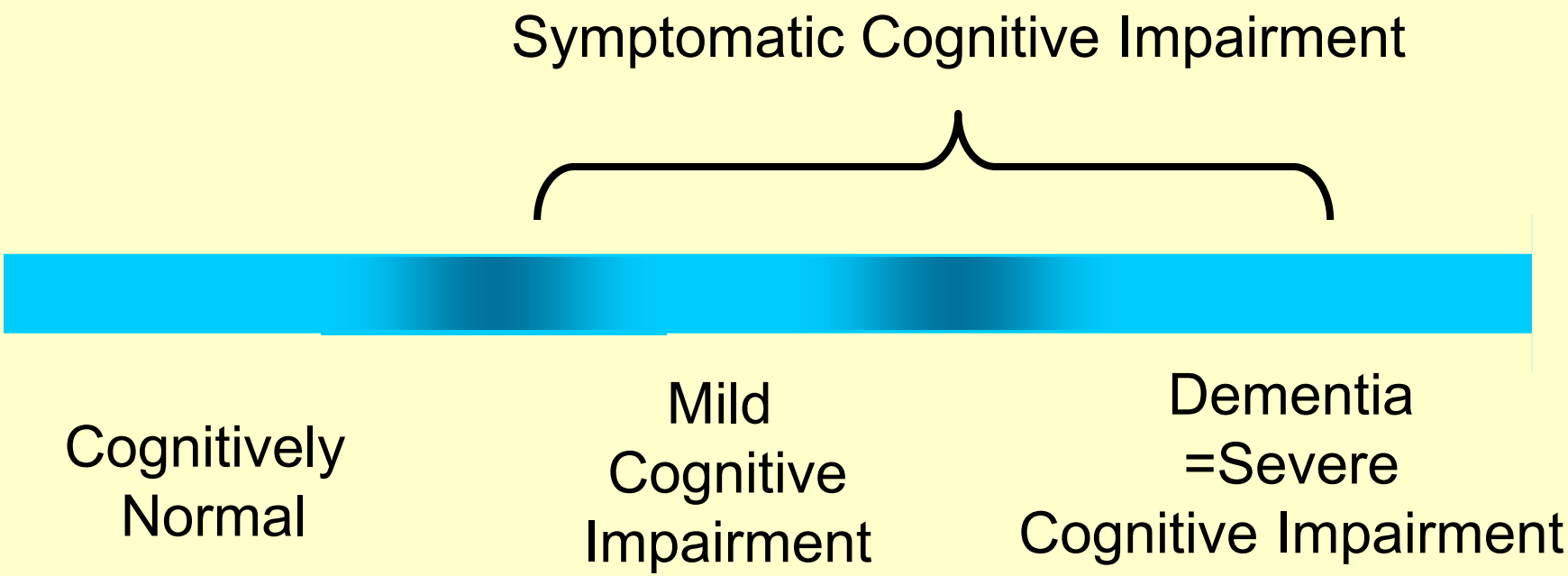
What is Vascular Dementia?

- Vascular dementia is a disorder of thinking, memory and behavior = a cognitive-behavioral disorder
  - **Vascular cognitive impairment** is the preferred name
- It is caused by cerebrovascular disease, = blood vessel disease of the brain, of which “strokes” are a common consequence

What is cognitive impairment? The spectrum of cognition from normal to severe impairment



Nature of Cognitive & Behavioral deficits in Vascular Cognitive Impairment

- Impaired psychomotor speed may be most common
- Memory, visuospatial, language deficits occur
- The cognitive deficits of cerebrovascular disease are diverse
- Behavioral & neuropsychiatric profile is also varied, apathy is often present

→ Cognitive & behavioral profile does not differentiate cognitive impairment due to cerebrovascular disease from other causes of dementia

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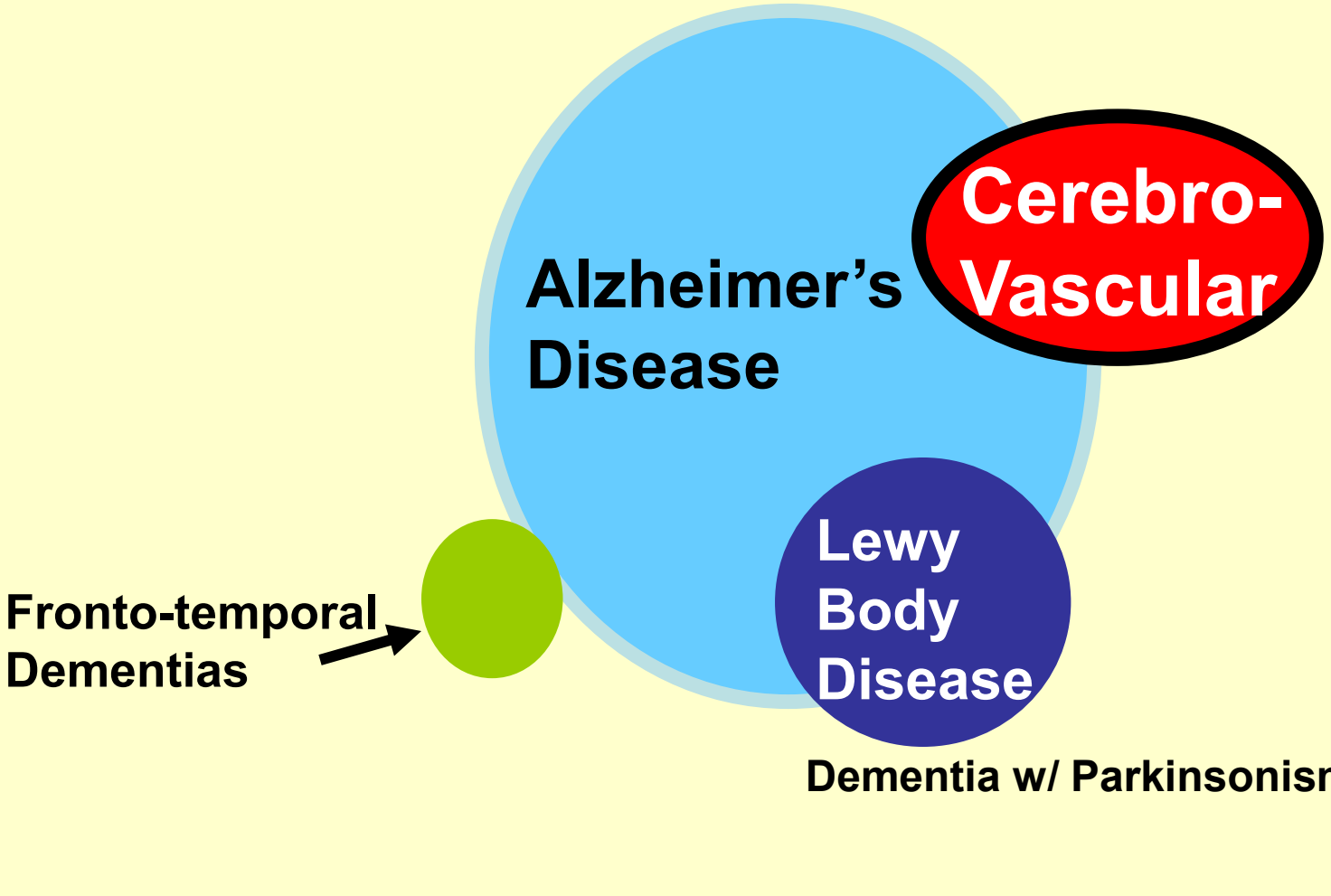
Pathological Bases of Late Life Cognitive Impairment



Traditional view of “vascular dementia”

- Where *overt* cerebrovascular disease is assumed to be the primary pathological cause of the cognitive impairment
- Clinical Definition
  - History of stroke
  - Brain imaging evidence of infarction
  - Neurological signs typical of stroke such as one-sided weakness
- This definition is specific but very insensitive
- Misses most multi-etiology dementia with CVD

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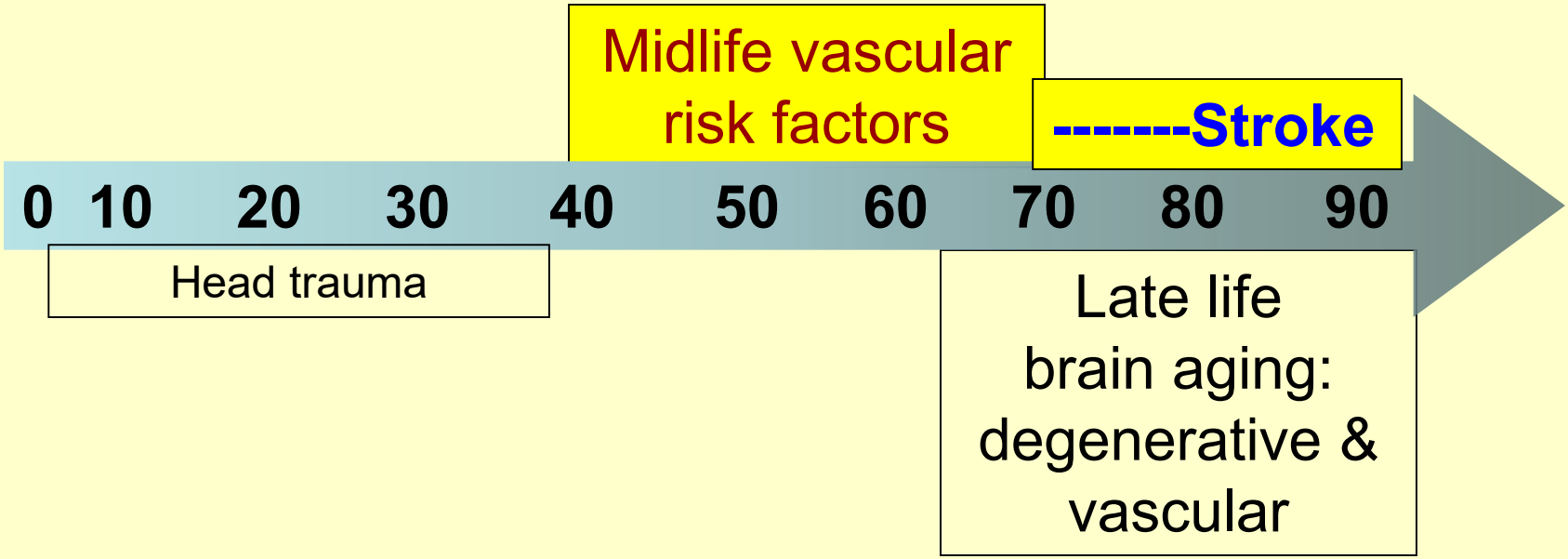
Replacing “vascular dementia” with a more realistic model

- Vascular (*contribution to)* cognitive impairment better expresses the variable and incremental role of cerebrovascular disease in the presence of AD
- Cerebrovascular disease (overt strokes and other changes to brain and brain blood vessels)
  - Is age-related and usually occurs with other diseases (such as Alzheimer’s disease)
  - heterogeneous in its clinical presentations
  - not inevitably or always clinically important

The overlap of cerebrovascular and cardiovascular disease

- Share common risk factors that may begin in midlife
  - Diabetes
  - Hypertension
  - Cigarette smoking
  - Hyperlipidemia
- Some heart diseases predispose to stroke
  - Atrial fibrillation
  - Acute myocardial infarctions
  - Prosthetic heart valves

How vascular risk factors for dementia fit into the life course



Vascular risk factors and future cognitive impairment

- Diabetes and hypertension are best studied
  - Diabetes = 20-25% of elderly
  - Hypertension =>70% of elderly
  - Midlife hyperlipidemia
  - Cigarette smoking …kills people early
- Both if present in middle age, increase risk for:
  - Cognitive decline & dementia
  - Brain imaging changes
    - Diabetes: reduced brain volume
    - Hypertension: increased burden of white matter lesions
    - Both: small strokes (“lacunar infarcts”)

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New Research from January 2019 on prevention of Vascular Cognitive Impairment

JAMA | Original Investigation

Effect of Intensive vs Standard Blood Pressure Control on Probable Dementia

A Randomized Clinical Trial

The SPRINT MIND Investigators for the SPRINT Research Group

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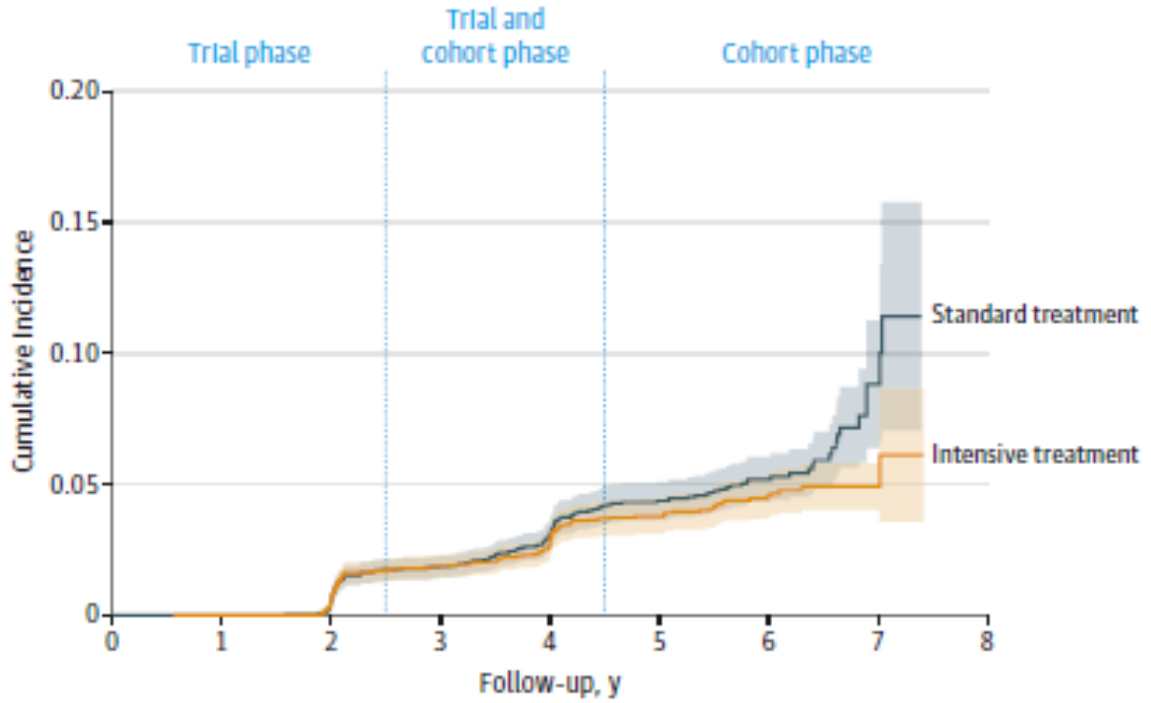
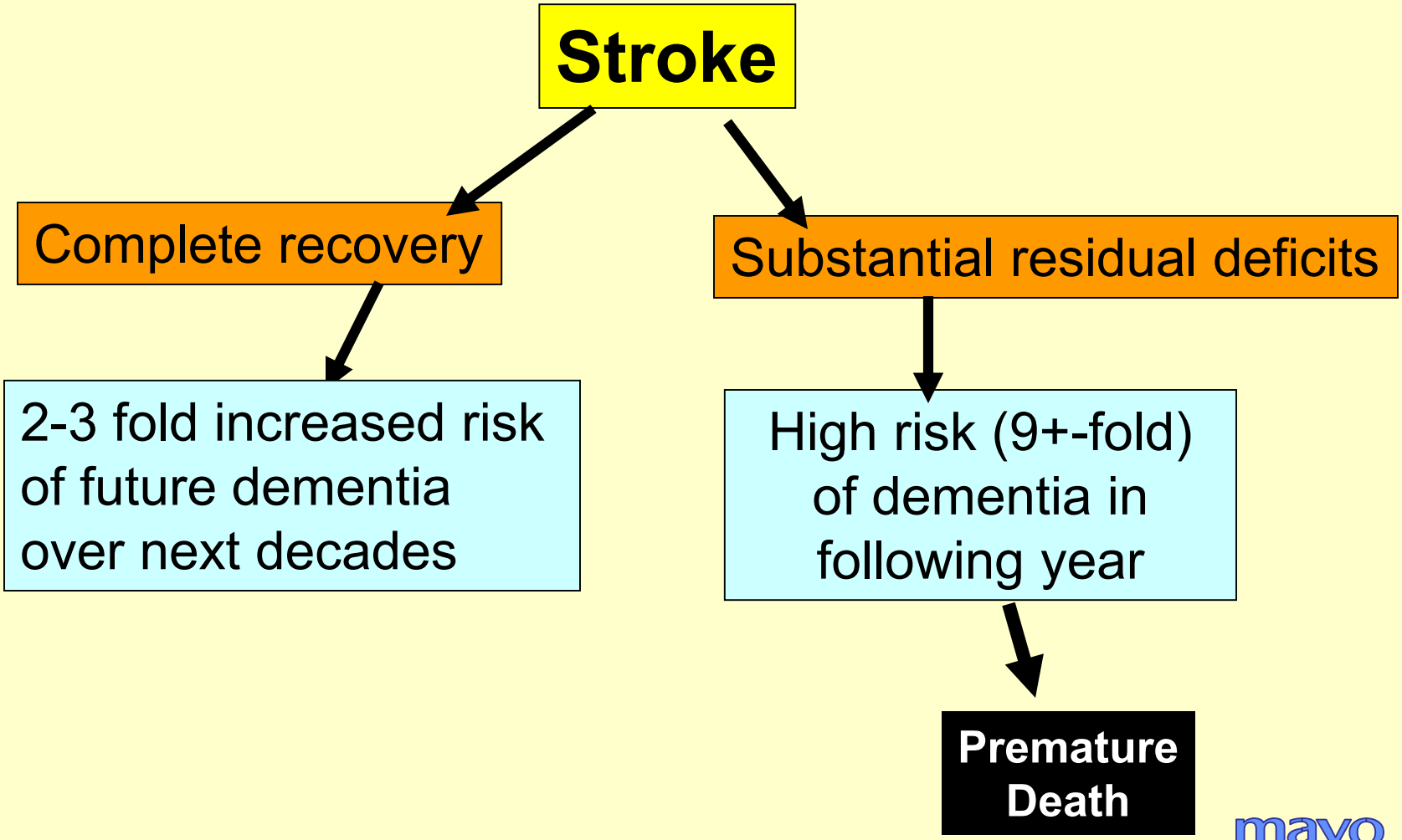
Figure 2. Probable Dementia by Treatment Group



No. at risk									
Standard treatment	4285	4282	4168	3886	2829	2107	989	87	0
Intensive treatment	4278	4277	4171	3917	2893	2189	1027	93	0

Overt strokes & risk for future Vascular Cognitive Impairment



Strokes and Vascular Cognitive Impairment

- Ischemic strokes - Due to aging of
  - larger brain blood vessels = “atherosclerosis” → large strokes
  - small brain blood vessels = arteriolosclerosis → lacunar strokes and micro-infarcts
- Hemorrhagic strokes
  - Due to aging of small blood vessels
  - Due to accumulation of abnormal protein (β-amyloid) in blood vessels = amyloid angiopathy
- Other changes
  - Disease of the white matter (brain region interconnections) due to blood vessel disease = white matter hyperintensities

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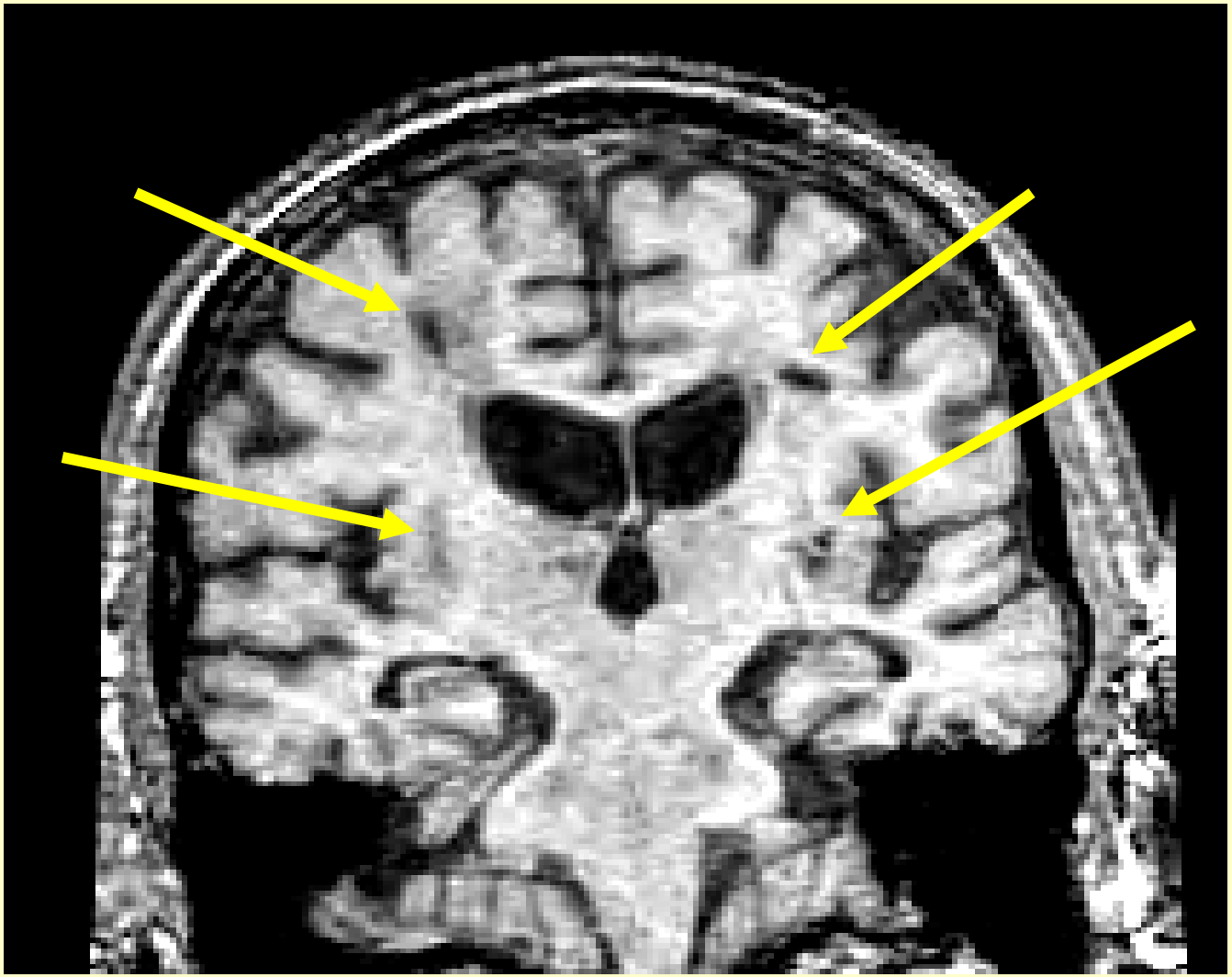
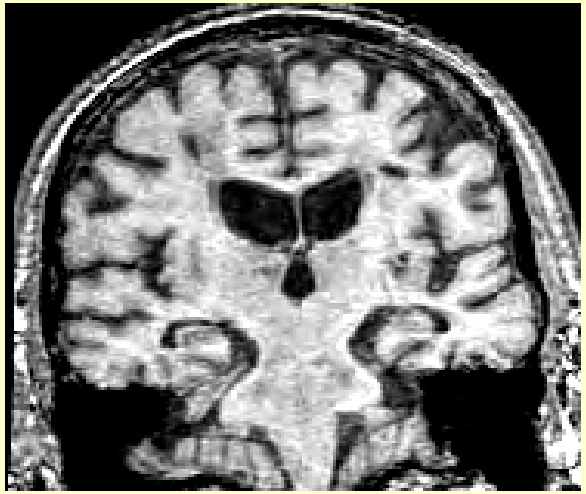
The MR of a 70 yo man with 1 year history of cognitive impairment and no history of stroke



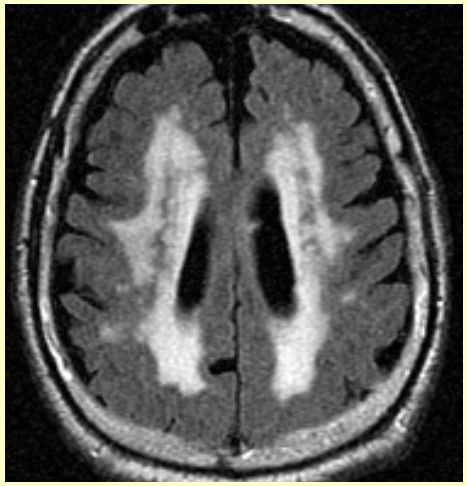
Cerebrovascular Imaging changes relevant to cognition

Multiple lacunes Extensive

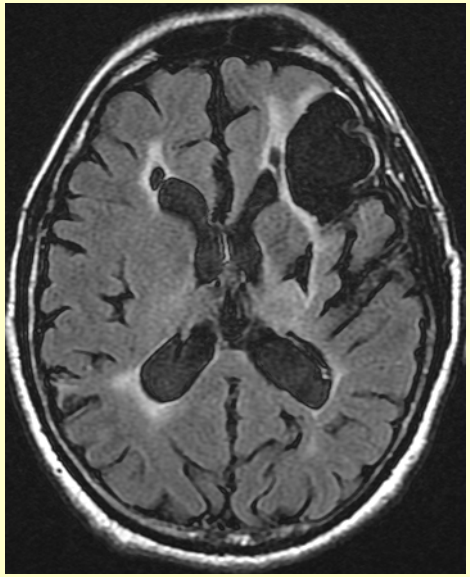


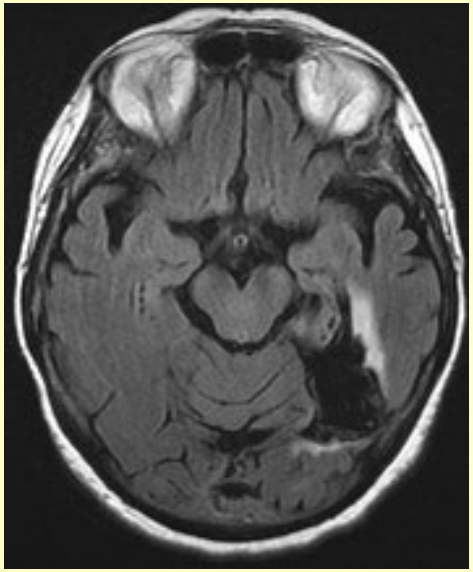
Microhemorrhage

White matter hyperintensities

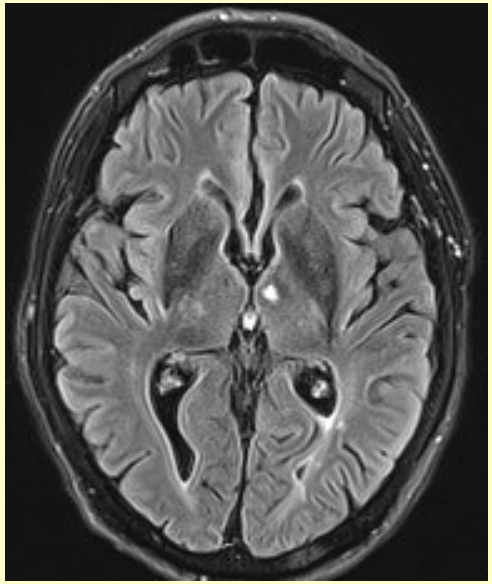


Large vessel infarctions

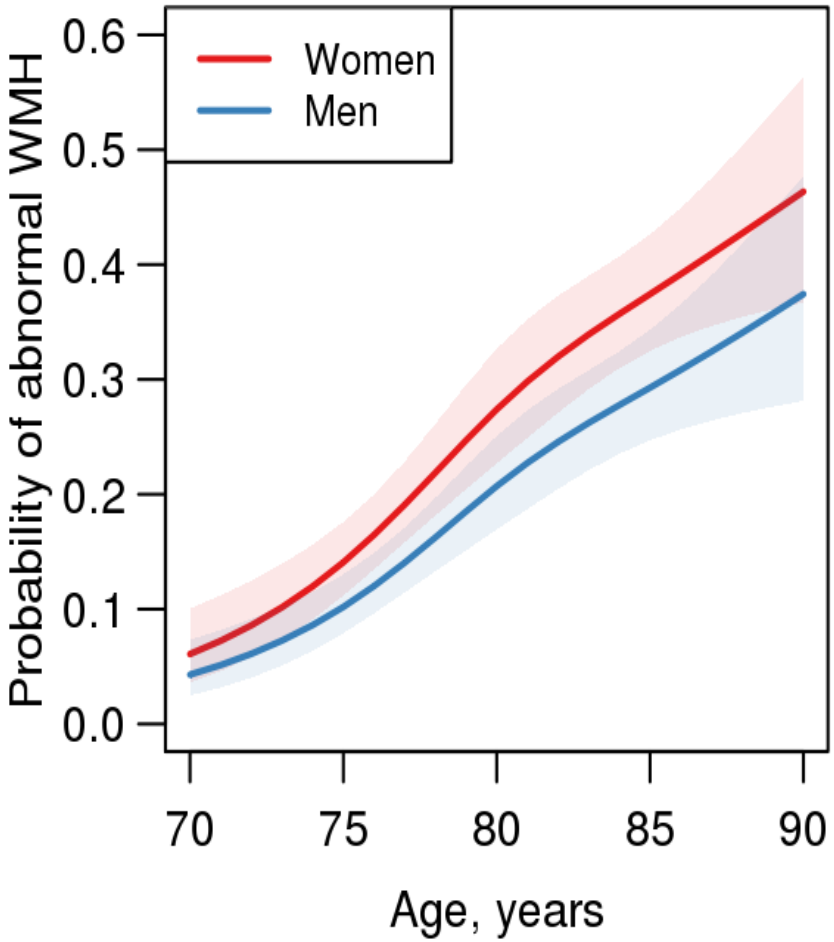


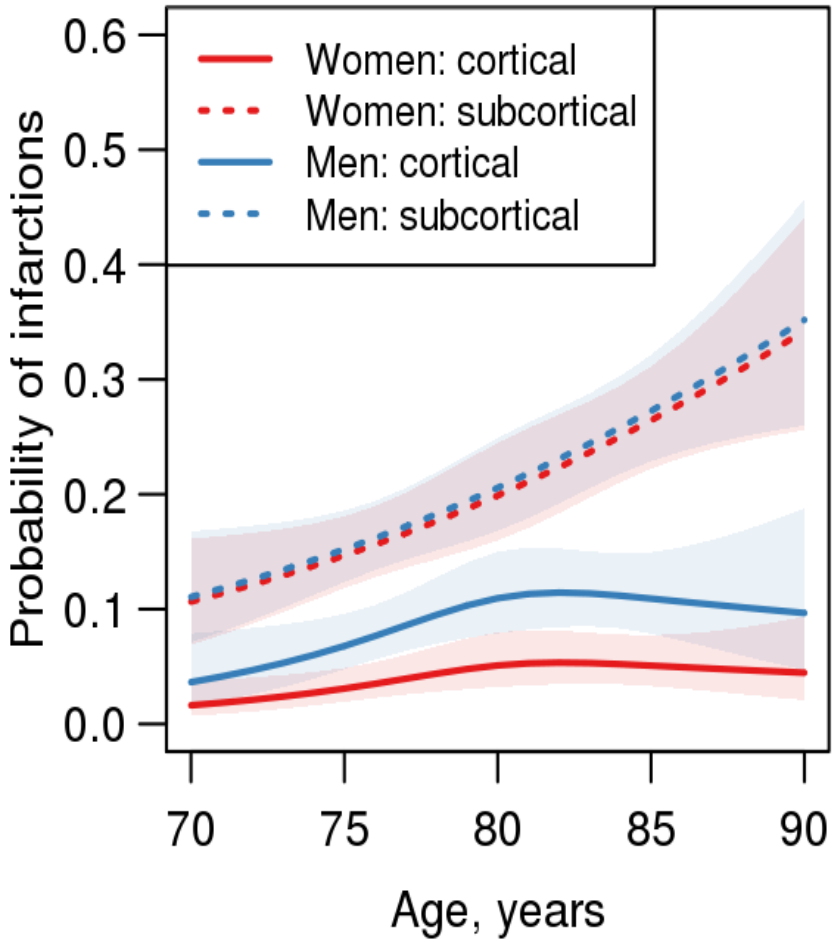


Thalamic infarct



Cerebrovascular MRI changes increase with advancing age





White matter hyperintensities

Brain Infarcts (strokes on MRI)

From Fatemi and Vemuri, Nov 11, 2016

Management of Vascular Cognitive Impairment

- Therapeutic Interventions
  - There are no approved therapeutics for people with existing vascular dementia
  - Medications approved for Alzheimer disease are ineffective in persons with vascular cognitive impairment
- Prevention is feasible but is far better to begin in midlife

Management of patients with Vascular Cognitive Impairment

- Symptom & nonpharmacologic management are the same as in any person with cognitive impairment
  - Treat vascular risk factors
  - Support greatest independence possible with activities of daily living
  - Be mindful of safety issues
  - Manage gait or balance problems
  - Manage behavioral changes as in any person with dementia
    - Depression
    - Agitation

The Simple 7: avoiding vascular disease beginning in young adulthood

- Exercise
- Reasonable diet
- Avoid obesity
- Avoid or treat hypertension
- Avoid or treat diabetes
- Don’t smoke!
- Avoid or treat hyperlipidemia

Summary: Cerebrovascular disease and cognitive impairment in the elderly

- Cerebrovascular disease is a common contributor to cognitive impairment, though a solo contributor rarely
- ➢ Clinical diagnosis of vascular dementia (even with imaging) is still challenging but should be suspected with stroke history or major vascular findings on MRI
- ➢ Cerebrovascular disease prevention beginning in midlife is very important from public health perspective

Thank you