Michael V. Vitiello, PhD
Professor of Psychiatry & Behavioral Sciences,
Gerontology & Geriatric Medicine, and Biobehavioral Nursing
Co-Director, Northwest Geriatrics Workforce Enhancement Center
Editor-in-Chief (for the Americas), Sleep Medicine Reviews
University of Washington, Seattle WA
Presentation Objectives

• Discuss the growing proportion national populations represented by older adults.

• Outline the causes of disturbed sleep in older adults.

• Examine the associations between sleep problems and chronic illnesses in older adults with attention to GERD.

• Describe a number of important research questions in the area of GERD, sleep and aging.

• Note the potential role of GERD in dementia.
Estimated Percents of National Populations 65 Years of Age or Older
Causes of Sleep Disturbance in Aging

- Age-related sleep change
  - Changes in homeostatic sleep drive and circadian rhythm for wakefulness

- Co-morbid medical and psychiatric illnesses
  - E.g.; Pain, Depression, Nocturia, GERD, etc.

- Primary sleep disorders
  - Insomnia, OSA, RLS, RBD, CRDs, etc.

- Poor sleep hygiene
  - Learned behaviors, environmental factors, etc.

- Any combination of the above

# Prevalence of Sleep Complaints


<table>
<thead>
<tr>
<th></th>
<th>SOD</th>
<th>SMD</th>
<th>EMA</th>
<th>NRS</th>
<th>EDS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>17.6</td>
<td>33.1</td>
<td>26.6</td>
<td>26.0</td>
<td>13.3</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td>13.7</td>
<td>27.8</td>
<td>26.6</td>
<td>23.7</td>
<td>13.1</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td>21.2*</td>
<td>37.9*</td>
<td>26.6</td>
<td>28.1*</td>
<td>13.4</td>
</tr>
</tbody>
</table>

*Note: SOD = Sleep Onset Delay, SMD = Sleep Maintenance Difficulty, EMA = Early Morning Awakening, NRS = Night Time Restless Symptoms, EDS = Episodic Daytime Sleepiness.*
Prevalence of Chronic Illnesses in Older Adults

- Chronic pain/OA 48.4
- Indigestion/GERD 21.4
- BPH* 16.8
- Depression 16.7
- Headache/Migraine 15.5
- Cancer 14.5
- CAD 9.2

- Diabetes 7.0
- Rheumatoid A. 3.9
- COPD 3.7
- Stroke 2.5
- Heart Failure 1.8
- Kidney Disease 1.0
- Cirrhosis/Liver Dis. 0.5

Vitiello et al. Sleep 2004
Associations of Chronic Illnesses and Sleep Complaints

• Most illnesses were associated with both nighttime (ORs of 1.0 - 1.7) and daytime sleep-related complaints (ORs of 1.1 - 2.8).
  – Depression (ORs of 1.7 - 2.8) had the strongest associations.
  – Chronic Pain/OA (ORs of 1.6 - 1.9) had the second strongest associations.
  – Similar patterns were observed for medical burden and were comparable for men and women.

Vitiello et al. *Sleep* 2004
Associations of GERD and Sleep Complaints

- GERD associated with nighttime sleep-related complaints (OR = 1.37, CI:1.32-1.42, p<.000).
- GERD associated with daytime sleep-related complaints (OR = 1.71, CI:1.64-1.79, p<.000).
- GERD associated with insomnia classification (OR = 1.66, CI:1.59-1.74, p<.000).

Adjusted for age, sex, education and other medical conditions.

Vitiello et al. *Sleep* 2004
GERD and Sleep: Unanswered Questions

- Does prevalence of GERD increase with age?
- Does chronicity and severity of GERD increase with age?
- What are the relationships between GERD and sleep and obstructive sleep apnea?
  - And are they affected by age?
- What are the health implications of GERD-based nighttime awakenings in older adults?
  - Possible direct and indirect paths to dementia?
GERD: Pathway to Dementia

• **Directly:** Through GERD’s impact on sleep, as a significant cause of diminished and fragmented sleep over time, which may increase beta-amyloid lead to dementia.

• **Indirectly:** Through treatment with proton pump inhibitors, which may increase brain beta-amyloid and lead to dementia.
Sleep and Cognitive Decline

> Abnormalities in sleep architecture reported in mild cognitive impairment (MCI)

> Elevated levels of cerebrospinal fluid beta-amyloid (βA) in preclinical Alzheimer disease associated with lower sleep quality.

> Role of sleep in AD? : While the brain sleeps, it clears out harmful waste proteins, including beta-amyloid via actions of the glymphatic system.

> Poor sleep compromises glymphatic system function.
Sleep-Related Pathways to Alzheimer’s

Studies suggest a bidirectional relationship between sleep and Alzheimer’s disease:

- Circadian dysregulation
- Poor sleep
- Inflammation
- Aβ deposition
- AD pathogenesis

“By God, for a minute there it suddenly all made sense!”
Dog Face to Face with the Second Step