Alzheimer’s Association: Public Health Perspectives & Initiatives

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Disclosures:
Full time employee of the Alzheimer’s Association

OUR VISION:
A world without Alzheimer’s disease®.

OUR MISSION: To eliminate Alzheimer's disease through the advancement of research; to provide and enhance care and support for all affected; and to reduce the risk of dementia through the promotion of brain health.
Outline

• Prevalence vs Incidence
• Changing demographics
• Overview of studies used for prevalence
• Public health implications
• Opportunity to diversify funding strategies
• Future – where do we go from here
Prevalence vs. Incidence

- Key measures for public health
- Incidence = # new cases for a given period of time
- Prevalence = # total cases at time measured
- Prevalence **Number** vs Prevalence **Rate** are defined:
  - Prevalence number = # people with the disease
  - Prevalence rate = \( \frac{\text{# people with the disease}}{\text{# total population}} \)
Decreasing Prevalence Rates with Increasing Prevalence Numbers

As the Baby Boomer generation ages, it is paradoxically leading to a decrease in AD prevalence rates, even as the prevalence number increases.

- Baby Boomers first enter the 65-74 age range, in which new cases of AD are more rare than in older ages.
- In other words, the relatively healthy young-old population is currently ballooning.
- As the Boomers continue to age, they will enter the 75-84 age range, then the 85+ age range, in which AD becomes more and more common.

<table>
<thead>
<tr>
<th>Age</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-74</td>
<td>53</td>
<td>59</td>
<td>54</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>75-84</td>
<td>32</td>
<td>29</td>
<td>34</td>
<td>37</td>
<td>33</td>
</tr>
<tr>
<td>85+</td>
<td>14</td>
<td>12</td>
<td>12</td>
<td>17</td>
<td>22</td>
</tr>
</tbody>
</table>

Percent of Population Age 65+ in Each Age Range

Data based on 2010 US Census
## Dementia vs. Alzheimer’s

<table>
<thead>
<tr>
<th>Study</th>
<th>Dementia</th>
<th>Alzheimer’s disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHAP</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>ADAMS</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Framingham Heart Study (FHS)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Health Retirement Study</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Colombia</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Sub-Sahara Africa</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Alzheimer’s Disease International (10/66)</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
HRS Reported Decrease in Dementia Prevalence Rate

Table 2. Cognitive Function, at Age 65 Years or Older, in the 2000 and 2012 Cohorts

<table>
<thead>
<tr>
<th>Cognitive Function</th>
<th>2000 (n = 10 546)</th>
<th>2012 (n = 10 511)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%) [95% CI]</td>
<td>No. (%) [95% CI]</td>
</tr>
<tr>
<td>Normal</td>
<td>6966 (67.2) [65.8-68.6]</td>
<td>7114 (72.4) [71.1-73.6]</td>
</tr>
<tr>
<td>CIND</td>
<td>2293 (21.2) [20.1-22.3]</td>
<td>2224 (18.8) [17.8-19.9]</td>
</tr>
<tr>
<td>Dementia</td>
<td>1287 (11.6) [10.7-12.7]</td>
<td>1173 (8.8) [8.2-9.4]</td>
</tr>
</tbody>
</table>

Abbreviation: CIND, cognitive impairment—no dementia.

a Values in parentheses are weighted percentages (95% CIs) derived using the HRS sampling weights to adjust for the complex design of the Health and Retirement Study.  

b P < .001 for difference between 2000 and 2012.  
c The age- and sex-standardized weighted percentages, after direct standardization of the 2012 cohort to the 2000 cohort.

- Reported decrease rate from 11.6% in 2000 to 8.8% in 2012, even in presence of hypertension, diabetes and obesity
- Population had education levels, higher net worth, late life overweight or obesity
- Reported prevalence rates
ADAMS Estimates Dementia & Alzheimer’s Prevalence Number & Rate in US

• Prevalence number is 2.3 million living with Alzheimer’s; 4.97 million living with all-cause dementia
• Prevalence rate is 13.67% of 71 years + with all cause dementia and 9.5% with Alzheimer’s disease
• Alzheimer’s accounted for 69.9% of all cases of dementia

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>All dementia</th>
<th>Alzheimer’s disease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Combined</td>
<td>Men</td>
</tr>
<tr>
<td>71–79</td>
<td>4.97 (2.61–7.32)</td>
<td>5.25 (1.25–9.25)</td>
</tr>
<tr>
<td>90+</td>
<td>37.20 (25.36–49.03)</td>
<td>44.59 (21.70–67.47)</td>
</tr>
</tbody>
</table>

Table 3
National prevalence of dementia and Alzheimer’s disease, by age categories

Weighted percentages and (95% confidence interval).

Brookmeyer et al. 2011
Alzheimer’s & Dementia
Framingham Reported Trends in Decreased Incidence of Dementia

- Decreasing age-specific incidence in Framingham over time
- Similar reports from Sweden, Netherlands, Germany & UK
Estimates of Prevalence
Number and Rate of Alzheimer’s disease

• Based on CHAP
• 65+ estimates 5.2 million Americans living with Alzheimer's disease
  – ADAMS 71+

<table>
<thead>
<tr>
<th>Year</th>
<th>Aged 65-74 years</th>
<th>Aged 75-84 years</th>
<th>Aged 85 years or older</th>
<th>Total no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Percent</td>
<td>No.</td>
<td>Percent</td>
</tr>
<tr>
<td>2010</td>
<td>0.7</td>
<td>3.0</td>
<td>2.3</td>
<td>17.6</td>
</tr>
<tr>
<td>2011</td>
<td>0.7</td>
<td>3.0</td>
<td>2.3</td>
<td>17.5</td>
</tr>
<tr>
<td>2012</td>
<td>0.7</td>
<td>2.9</td>
<td>2.3</td>
<td>17.4</td>
</tr>
<tr>
<td>2013</td>
<td>0.7</td>
<td>2.9</td>
<td>2.3</td>
<td>17.3</td>
</tr>
<tr>
<td>2014</td>
<td>0.8</td>
<td>2.9</td>
<td>2.3</td>
<td>17.2</td>
</tr>
<tr>
<td>2015</td>
<td>0.8</td>
<td>2.9</td>
<td>2.3</td>
<td>17.1</td>
</tr>
<tr>
<td><strong>2016</strong></td>
<td><strong>0.8</strong></td>
<td><strong>3.0</strong></td>
<td><strong>2.4</strong></td>
<td><strong>17.0</strong></td>
</tr>
<tr>
<td>2017</td>
<td>0.9</td>
<td>3.0</td>
<td>2.4</td>
<td>16.9</td>
</tr>
<tr>
<td>2018</td>
<td>0.9</td>
<td>3.0</td>
<td>2.5</td>
<td>16.7</td>
</tr>
<tr>
<td>2019</td>
<td>0.9</td>
<td>3.1</td>
<td>2.6</td>
<td>16.7</td>
</tr>
<tr>
<td>2020</td>
<td>1.0</td>
<td>3.1</td>
<td>2.7</td>
<td>16.7</td>
</tr>
<tr>
<td>2030</td>
<td>1.3</td>
<td>3.3</td>
<td>4.2</td>
<td>17.2</td>
</tr>
<tr>
<td>2040</td>
<td>1.3</td>
<td>3.4</td>
<td>5.4</td>
<td>18.0</td>
</tr>
<tr>
<td>2050</td>
<td>1.3</td>
<td>3.3</td>
<td>5.4</td>
<td>18.5</td>
</tr>
</tbody>
</table>

Hebert et al. 2013 Neurology
2016 Facts & Figures

5.4 million Americans of ALL ages will have Alzheimer’s in 2016

<table>
<thead>
<tr>
<th></th>
<th>Rate (65+)</th>
<th>Number (65+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>11.3%</td>
<td>5.0 Million</td>
</tr>
<tr>
<td>2016</td>
<td>10.5%</td>
<td>5.2 Million</td>
</tr>
</tbody>
</table>
Other Countries Report Increasing Prevalence of Dementia

- China
  - ADI estimates dementia prevalence rate increased from 5% to 7%

- Sub-Saharan Africa
  - ADI estimates dementia prevalence rate increased from ~3% to 4.76%

- Colombia
  - Estimate approximately 260,000 people with Alzheimer’s by 2020 (prevalence number)
  - Current estimates may be off by 50%
Increasing Global Prevalence Number of Dementia (2010-2050)

What to Make of All This?

• Dementia incidence and prevalence rates appear to be declining in some countries and populations.

• This is welcome news, and points to the importance of public health strategies to prevent many cases of dementia.

• However, experts agree that the prevalence number, both within countries and globally, will continue to skyrocket.

• Dementia is the public health crisis of our time!
Initiatives, Future Directions & Opportunity
IDEAS Study

- IDEAS study is modeled after the largest successful coverage with evidence development (CED) study in oncology
- Powered sufficiently to demonstrate changes in health outcomes & patient care management as result of amyloid PET scan

http://www.ideas-study.org/
IDEAS Steering Committee

Steering Committee Chair
Maria Carrillo
Alzheimer’s Association

Study Chair
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University of California, San Francisco

Study Co-Chairs
Bruce Hillner
Virginia Commonwealth University

Barry Siegel
Washington University

Rachel Whitmer
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American College of Radiology

Rosemarie Hakim & Daniel Cano
Senior Research Advisors, Centers for Medicare & Medicaid Services

William Abbott
Piramal

Meridith Johnson
GE Healthcare

Mark Mintun
Avid Radiopharmaceuticals

IDEAS-Study.org
IDEAS Progress

Launch:
Feb. 2016

6,557 Volunteers Consented
5,128 PET Scans Completed
96.1% Consented to Archive Images
Add-on Studies (BHR, Genetics, Caregiver Survey)

18,488 PET Scans in 24-36 months

- 725 Dementia Experts from 428 Clinics Activated
- 286 PET Centers Activated
- 62.3% MCI / 37.7% Dementia

Amyloid Status:
- β-amyloid (+): MCI = 54.5% Dementia = 69.2%

IDEAS-Study.org
How Does This Impact NIA-AA Diagnostic Guidelines?

Cliff Jack to present revision process and update of NIA-AA Guidelines, Friday at 2pm
Why Revisit the Guidelines Now?

• Increased understanding of the disease & progression
• Advances in biomarkers – new tools, technologies
• Learnings from recent clinical trials
• Need more evidence of biomarker behavior in aging and in disease
# Current Landscape of Clinical Trials In Alzheimer’s

<table>
<thead>
<tr>
<th>Phase of Trial</th>
<th>Type of Clinical Trial*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>52 = 41 experimental medications, 1 medical device, 10 diagnostic trials</td>
</tr>
<tr>
<td>Phase 2</td>
<td>84 = 74 experimental medications, 4 medical devices, 6 diagnostic trials</td>
</tr>
<tr>
<td>Phase 3</td>
<td>33 = 16 registration trials, 5 for agitation/ sleep, 5 in academic sites, 4 medical devices, 3 diagnostic trials</td>
</tr>
</tbody>
</table>

*As of October 1, 2016

Based on data from clinicaltrials.gov & alz.org/TrialMatch
Alzheimer’s Association Making Strategic Investments to Diversify Portfolio

• Understanding sex biology contributions to underlying biology of disease – funded 9 projects in 2017
• Emphasis on vascular contributions to Alzheimer’s & dementia, basic science and clinical add on amyloid/ tau imaging to vascular dysfunction program project
• Add on tau imaging to clinical trials – LEARN, A4, DIAN-TU, DIAN-TU NexGen, API Generation Study
• Advanced nearly 20 clinical trials in last 3 years through PTC – diverse targets in inflammation, neuronal growth factors, tau, alternative energy sources, and repurposed agents (cancer, hypertension)
CTAD presentations on diverse targets include:

- amyloid (BACE, gamma secretase, monoclonal Abs, active vaccines, kinase inhibitors)
- tau aggregation
- inflammation
- neuroprotection
- allopregnanolone (hormone)
- transcranial magnetic stimulation w/cognitive training
- lifestyle & diet/metabolic
- gut microbiota
“Leave no stone unturned ... In our search for an effective treatment for Alzheimer’s”

- Euripides
THE END OF ALZHEIMER’S STARTS WITH YOU

alzheimer’s association

alz.org