Population Disability and Mortality Over 30 years: A Growing Gender Gap in the US

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Collaborators

- Brenda Spillman, Urban Institute
- Douglas Wolf, Syracuse University
Background

- The U.S. population has been aging steadily over the last few decades.
- During this time, women have lost ground in life expectancy relative to men in the U.S.
  - Gap between women and men in life expectancy at birth was about 8 years in 1975 and has steadily declined to under 5 years in 2010 (NCHS 2013).
  - Some of the narrowing has been attributed to shifts in smoking histories for women (Preston and Wang 2006).
Background

- Outstanding question: Has women’s disadvantage grown with respect to late-life disability and active life expectancy?
- Important because:
  - Women make up a substantial share (57%) of the 65-and-older population in the U.S
  - Women constitute an even larger share—68%—of those receiving assistance with daily tasks (Freedman and Spillman 2014a)
  - Women make up three-fourths of older adults in residential care settings (Freedman and Spillman 2014b)
Background

- Excess disability for older women linked to:
  - more debilitating non-fatal chronic conditions
    - Dementia, arthritis, depressive symptoms, fall-related fractures
  - lower muscle strength and bone density
  - higher rates sedentary behavior and obesity
  - smoking histories
  - less likely to have post-high school education
  - higher poverty rates

- Reason to think declines in cardiovascular-related mortality may have different implications for men and women
Competing Theories

- Gruenberg’s Failure of Success: medical advances (would lead to the increased survival of persons with chronic morbidity)
- Fries’ Compression of Morbidity: health promotion and disease prevention could increase the age at onset of disease and disability,
- Manton’s Dynamic Equilibrium: changes in the relative size of the morbid period prior to death are not pre-ordained
  - Could change in different ways for women and men
Operationalizing Theories with Survival Curves

- **Blue Line**: Prob of Surviving
- **Red Line**: Prob of Surviving without Disability
Few Studies Have Computed These Curves

- Because population-level changes in health and longevity tend to occur slowly, long-term data are best suited to investigate such shifts
Data

- **1982 National Long Term Care Survey (NLTCS)**
  - 20,000 respondents
  - 87% Response rate to screener
- **2004 National Long Term Care Survey**
  - 16,000 respondents
  - 81% Response rate to screener
- **2011 National Health and Aging Trends Study (NHATS)**
  - 8,245 respondents
  - 71%
Survey comparability

- Drawn from the same sampling frame
  - Medicare Enrollment File
- Both cover the entire elderly population, irrespective of setting
- Both include a set of identical disability questions
- Both have tracked mortality of participants
  - 82-84 and 11-13
- Individuals in institutions in 1982 and 2004 and in nursing homes in 2011 not asked questions (assume have limitation)
Growth of Residential Care

<table>
<thead>
<tr>
<th>Year</th>
<th>Community</th>
<th>Residential Care</th>
<th>Nursing Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>94.3</td>
<td>5.7</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>92.7</td>
<td>4.4</td>
<td>2.9</td>
</tr>
<tr>
<td>2011</td>
<td>91.8</td>
<td>5.29</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Legend:
- community
- residential care
- nursing home
Survey comparability

- NHATS sampled in October and fieldwork took place May-October
- NLTCS sampled in March/April and field work took place April-October
  - To address differential time between sampling and survey, we reweight 65 year olds in NHATS to represent all 65 year olds
Survey comparability

- NLTCS post-stratified to Census
- NHATS post-stratified to Medicare
- Main difference in the 65-69 year old group
- Estimates here either synthetic (life table) or standardized to Census
Age Distributions

- 65-69
- 70-74
- 75-79
- 80-84
- 85+

Data sources:
- 1982
- 2011
- Census 2010 (Men)
Survey differences / limitations

- NLTCS asked screen by phone and in person
- NHATS asked screen at end of interview in person
  - Investigated role of this difference and concluded unlikely to be driving findings
Measures: Activity Limitation

- **Any problem with** (or can’t do/doesn’t do):
  - eating without the help of another person or special equipment;
  - getting in or out of bed without help;
  - getting in or out of chairs without help;
  - walking around inside without help;
  - going outside without the help of another person or special equipment;
  - dressing without help;
  - bathing without help; and
  - getting to the bathroom or using the toilet.

- **Unable** because of a disability or health problem
  - prepare meals without help;
  - do laundry without help;
  - do light housework such as washing dishes;
  - shop for groceries without help;
  - manage money, such as keeping track of bills and handling cash;
  - take medicine without help; and
  - make telephone calls without help.
1-Year Mortality Rates from NLTCS/NHATS Match NCHS Estimates

- 1982 (NCHS)
- 2011 (NCHS)
- 1982 (NLTCS)
- 2011 (NHATS)
Methods

- Survival and disability curves (using life table and Sullivan method)
  - Examine shifts in curves by gender
- Mortality rates by gender, year, and disability status
  - For whom is mortality improving?
- Shifts in top causes of death by gender
  - Use algorithm to adjust for changes in ICD versions (Anderson et al. 2001)
- Age-adjusted disability prevalence and gap
- Years expected with and without disability and percentage of remaining life that is active
Conventions

**RED:** Disability

**BLUE:** Survival

**DASHED:** 1982

**SOLID:** 2011
Results: Survival Curves

1982 (dashed) and 2011 (solid)
Results: Mortality Rates

1982 (dashed) and 2011 (solid)
## Results: Top Causes of Death

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>CVD</strong></td>
<td>56%</td>
<td>34%</td>
<td>61%</td>
<td>34%</td>
</tr>
<tr>
<td><strong>Cancer</strong></td>
<td>21%</td>
<td>24%</td>
<td>17%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>COPD</strong></td>
<td>5%</td>
<td>6%</td>
<td>3%</td>
<td>7%</td>
</tr>
<tr>
<td>**Influenza/    **</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Pneumonia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
<td>2%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Alzheimer's</strong></td>
<td></td>
<td></td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td><strong>Disease</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Accidents</strong></td>
<td>2%</td>
<td></td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Age adjusted deaths per 100,000</strong></td>
<td>86%</td>
<td>71%</td>
<td>86%</td>
<td>70%</td>
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<tr>
<td></td>
<td>7236</td>
<td>5008</td>
<td>4615</td>
<td>3863</td>
</tr>
</tbody>
</table>
Results: Disability Prevalence

Age-adjusted to 2010 age distribution for men
Results: Active Life Expectancy

Men

Women

Years Without Disability

Years With Disability
Results: Male Advantage in Percentage of Life Expected to Be Active

- 0%
- 5%
- 10%
- 15%
- 20%
- 25%
- 30%

- 1982
- 2011

Bar chart showing the comparison of male life expectancy to be active between 1982 and 2011 across different age groups.
Conclusions

• Massive shift away from deaths due to CVD has resulted in different experience for men and women
• Findings of differential relative shift in disability and mortality curves support Manton’s theory of Dynamic Equilibrium
• Growing gender gap in the US in disability and in active life expectancy
  • Mortality declined among women in their 70s with limitations
Acknowledgments

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