Are we living longer and in better health? Evidence from Singapore and Japan

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Figure 1: Percentage of Population aged 65+

Figure 2: Percentage of Population aged 80+

Health Expectancy

• In 1997, WHO Health Report, DG Hiroshi Nakajima stated that increased longevity without quality of life is an empty prize. Health expectancy is more important than life expectancy (Lagiewka 2012).
What do we mean by health expectancy?

• Combine life expectancy and the concept of health (disability, self-reported health, chronic disease, social integration).

• Quality of life is as important as quantity of life
Measures of health expectancy

• Disability-free life expectancy (DFLE)
• Health Life Years (HLY) based on general activity limitation indicator + QOL indicator
• 2010 Global Burden of Disease (Healthy Life Expectancy, HALE),

http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)61690-0/abstract
Attention on HLY has increased

• Between 2010 and 2060 number of Europeans 65 +will double (88 → 153 million), number of 80+ will triple (24 → 62 million)

• European Innovation Partnership on Active and Healthy Aging aims to Increase HLY at birth on EU average by 2 years by 2020 (Lagiewka 2012)

• Currently the difference between LE and HLY in 2008 was nearly 15 years for men and 20 years for women

Source: Lagiewka Archives of Public Health 2012, 70:23
http://www.archivepublichealth.com/content/70/1/23
Experts debate how HLE will change in the future

- Changes in HLE depend on current prevalence rates and information on disability transitions and mortality
- Assumptions regarding the onset and trajectory of diseases, human capital within a population, advances in medical technology, health behaviors
- 3 main hypotheses drive projections:
  - Compression of morbidity hypothesis
  - Expansion of morbidity hypothesis
  - Dynamic equilibrium hypothesis
Data

• Projections are dependent on data availability

• Sullivan method requires prevalence of disease or disability and mortality at specific ages at the population level

• Individual-level Longitudinal data provides better estimation of disability and mortality transitions which can then be used for population level projections.
Compression of morbidity hypothesis

- Fries (1980) in a seminal work published in NEJM proposed that morbidity and disability will be gradually compressed into a shorter span in the life course. Hence the number of years spent with diseases or disability will decrease in human populations over time.
Expansion of morbidity hypothesis

- Gruenberg (1977) and Kramer (1980) hypothesized that due to decreased fatality of diseases, there would be a substantial increase in chronic morbidity and related disability of the life course.
Dynamic equilibrium hypothesis

• Intermediate hypothesis

• Manton (1982) the proportion of a life span lived with serious illness/disability will increase but the proportion of time spent with moderate disability or less severe illness increases.
Study aims:

- to examine gender differentials in disability transitions and active life expectancies among older adults in Japan
- to determine whether these gender differentials vary by age, socioeconomic characteristics, and disease profile
Gender differences

- Men tend to have higher prevalence of life-threatening diseases
- Women have higher prevalence of chronic conditions, live longer than men but to what extent are these extra years spent with a disability (?)
Significance

- Fewer years spent with a disability translates in lower health care costs for individuals, families, and government.
- Projecting expected health expenditure costs is greatly enhanced with accurate predictions of the number of years individuals spend with a disability.
Method

- Active life expectancy defined as living with and without disabilities using activities of daily living.
- Expected years of life and active life are examined by constructing multistate life-tables, which employ probabilities of health and mortality transitions derived from hazard models.
- We incorporate the dynamic nature of disability, combining both morbidity and mortality.
Data

- Nihon University Japanese Longitudinal Study of Aging
  - [http://www.usc.edu/dept/gero/CBPH/nuljsoa/index.htm](http://www.usc.edu/dept/gero/CBPH/nuljsoa/index.htm)


- 7% average mortality
Control variables

- Educational status
- Income
- Occupational type
- Presence of a chronic disease
Japan’s demographics

- 23% of the population is above age 65
- Fastest growing segment of the population is those aged 85 and above (Japan Statistics Bureau, 2010)
- In 2009, women lived on average 86 years, men 79 years
Figure 1: Life expectancy with and without disability for women
Figure 2: Life expectancy and active life expectancy without disability for men.
Figure 3: Percent of remaining life without disability by age and sex
Results

• Men are more likely to die whereas women are more likely to have disabilities.
• Women live longer than men and have more years spent with disability compared to men.
• However, increasing Japanese women’s access to higher education may delay their transition into disability.
Future research

• Examine the link between gender, cognitive functioning and mental health
• Self reported disabilities
• If women have poorer mental health and poorer self-rated health compared to men, controlling for these indicators may decrease gender differences in disability.
## Singapore (2011)

<table>
<thead>
<tr>
<th>Life expectancy</th>
<th>At birth</th>
<th>At age 65</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>82</td>
<td>20.2</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td>84.3</td>
<td>21.8</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td>79.6</td>
<td>18.3</td>
</tr>
</tbody>
</table>

Gender differences in health and health expectancies of older adults in Singapore (Yong, Saito and Chan 2011)

• We examined gender differences in health and health expectancies using a range of health dimensions – diseases, impairments, and disability for representative sample of older adults 55+ in Singapore.
Background

• Previous literature on prevalence shows women have higher debilitating conditions that do not typically result in death (arthritis, glaucoma, osteoporosis).

• Men generally have higher prevalence of life-threatening illnesses such as coronary heart diseases.

• These results remain after controlling for socioeconomic, health risk behaviors and social support variables.
Data and Methods

• 2005 National Survey of Senior Citizens

• Nationally representative survey of Singaporeans aged 55+

• 4,591 older adults completed the interview

• Published life tables for 2005 from Singapore Department of Statistics

• Sullivan method
Results (1)

- Heart disease and stroke more apparent among men than women, particular < 75 years.
- Women more likely to have hypertension compared to men.
- Largest gender difference for bone/joint problems.
- 34% of women have bone/joint problems compared to 18% of men.
Women have more disabilities

• Above 75 years, 17% of women report having one ADL compared to 10% of men.

• Women can expect to live 10% of their remaining years with disability after age 65, twice the percentage for men.
Health expectancies for diseases

• However, because women live longer at all ages they have more years of life without diseases for all diseases examined except:

  – At age 65:
    • Men can expect 7.6 years with hypertension, women 9.9 years
    • Women can expect to live 3.9 years longer with bone/joint problems, 1.5 years longer with eye/vision problems and 1.7 years longer with walking problems.
Health expectancies from disabilities

- Women suffer from more disabilities and impairments compared to men in Singapore and they will spend a larger proportion of remaining life with these health difficulties compared to men.

- Women have lower bone density, muscle mass → more mobility problems?
Why do women suffer more disability over their lifetimes?

- Post-menopausal hormonal deficiency – linked to cataracts among women
- Limitation: data based on self report. Disability easier to report, diseases need health screening, institutionalized persons not included
What next?

• Using longitudinal data to estimate gender differences in disability and mortality transitions for Singapore.
• What are the effects of education on these transitions?
• Can we expect a compression of morbidity as populations get more educated?
• Understanding the relationship between human capital and health.