Demography and Trends in Aging and Disability

Eileen M. Crimmins
University of Southern California

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Aging –
Our great success of the 20\textsuperscript{th} Century

Disability –
Our challenge for the 21\textsuperscript{st} Century
Number of people age 65 and over, by age group, selected years 1900-2000 and projected 2010-2050

- 3 million
- 4.2 million
- 21 million
- 35 million
- 70 million

Note: Data for 2010-2050 are projections of the population. Reference population: These data refer to the resident population. Source: U.S. Census Bureau, Decennial Census and Projections.

Source of Slide: Alpeter, M. Aging of the U.S. Population: Trends and Implications
Aging matters when characteristics are “age-related”: The Disability “Pyramid”: The Percent with Any Disability by Age
Number of People with a Disability

Trends in Disability

- Depend on how defined
- Depend on age studied
- Depend on time period
ICF Model

Health Condition (disorder/disease)

Body function & structure (Impairment) → Activities (Limitation) ← Participation (Restriction)

Environmental Factors

Personal Factors
Figure 1: The process of population health change

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- Risk Factors
- Diseases Conditions Impairments
- Functioning Loss
- Disability
- Death

Environment and Personal Characteristics
Figure 1: Medical Care/Intervention

- Risk Factors
- Diseases and Conditions
- Impairments
- Functioning Loss
- Disability
- Environment and Personal Characteristics
- Death
Trends in Disability, Functioning
Figure 1. Trends in Limitation of Activity due to Chronic Conditions for U.S. Children, 1960–2009, with Major Programmatic Initiatives in Health, Education, and Public Assistance

Source: National Health Interview Survey.

c. Individuals with Disabilities Education Act Amendment of 1997.

Percent with difficulty performing ADLs, Medicare beneficiaries, 65+, 1992-1998

Source: National Center for Health Statistics
Increase in Difficulty performing Activities of Daily Living (ADL disability) among 60-69

Source: Seeman et al., 2010. AJPH.
Estimated Probability of Needing Help with ADLs and IADLs, ages 50-69: 1997 - 2006

Reynolds and Crimmins, 2010, Retraite & Society
Figure 2. Prevalence of any ADL or IADL limitation, 2000-2008: Community-based population ages 55 to 64

Freedman et al. Forthcoming in Demography.
Estimated Probability of Being Unable to Work ages 62-69

Reynolds and Crimmins,
FIGURE 1—Percentage of the population 70 years of age and older with ADL, IADL-only, and any disability, 1982–2002.

Source: Schoeni et al. (2005).

Note. IADL = instrumental activity of daily living; ADL = activity of daily living.
Figure 1. Prevalence of any ADL or IADL limitation, 2000-2008: Community-based population ages 65 and older

Freedman et al. Forthcoming in Demography.
Trends have been better among those with higher income

FIGURE 2—Percentage of the population 70 years of age and older with any disability among highest and lowest income quartiles, 1982–2002.

Source: Schoeni et al. (2005).
Explanations for change

• Education among old large part of improvement
• Technology or less physically challenging jobs may also play a role
• Weight among middle aged is an explanation for deterioration
The Dimensions of Changing Health and Understanding the Process of Change
Survival from Mortality, Morbidity, and Disability

- Mortality
- Morbidity
- Disability

The graph illustrates the percentage survival from mortality, morbidity, and disability across different ages. The curves show the decline in survival with age.
Disability-free life Expectancy

• A method of combining mortality and morbidity into one index –

• Total life = Disability-free + disabled

• Based on life tables which can provide estimates of average life spans and number of years disabled in population
### Years of Potential Life Lost and Years of Disabled and Disability-free Life Lived at Age 30 in 1990: for Sex-Race Groups with 13+ and 0-8 Years of Schooling

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<th>13+ Years of School</th>
<th>0-8 Years of School</th>
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#### 13+ Years of School
- **Women**
  - Black: 12.9, Healthy: 40.2
  - White: 11.8, Healthy: 40.3
- **Men**
  - Black: 8.1, Healthy: 36.0
  - White: 5.2, Healthy: 37.9

#### 0-8 Years of School
- **Women**
  - Black: 10.5, Healthy: 24.2
  - White: 4.8, Healthy: 30.8
- **Men**
  - Black: 19.9, Healthy: 18.4
  - White: 11.9, Healthy: 13.4
Potential Health Changes for Individuals

Diseases Conditions Impairments ➞ Functioning Loss ➞ Disability ➞ Death

Diseases Conditions Impairments ➞ Functioning Loss ➞ Disability ➞ Death

Diseases Conditions Impairments ➞ Functioning Loss ➞ Disability ➞ Death
Probability of Becoming ADL Disabled by Age: LSOAI and LSOAII

Recovery: From ADL disability to no disability
Death Rates by Age for the ADL and IADL Disabled and the Non-Disabled
Models show that the best way to reduce disability in the population is to reduce the age-specific incidence, or delay onset.

Decreasing mortality without reducing incidence leads to increasing disability.
Future Trends in Health

• Delay of many diseases is just beginning with basic biological knowledge

• ability to prevent progression - cure will be story of next decade
USC OPTT- RERC
Rehabilitation Engineering Research Center for Technologies for Successful Aging with Disability (Optimizing Participation Through Technology)

• NIDRR Rehabilitation Engineering Research Centers conduct technical or engineering research to solve rehabilitation problems and remove environmental barriers.

• OPTT - development and delivery of technology for identification and rehabilitation of motor processes that facilitate or impede functional performance, employment, and community participation among those aging with and into disability.

• **Design serious games** that employ immersive technologies such as virtual reality (VR) for individuals aging with or into disability to prevent loss of ability and participation and promote rehabilitation.
People Aging with a Disability have a Relatively Rapid Rate of Deterioration in Ability to Perform

1) Activities of Daily Living and

2) Instrumental Activities of Daily Living
Increasing ADL Inability with Age among Persons with Chronic Conditions Relative to the U.S. Population of the Same age
Increasing ADL Inability with Age among Persons with Chronic Conditions Relative to the U.S. Population of the Same age
Increasing IADL Inability with Age among Persons with Chronic Conditions Relative to the U.S. Population of the Same Age
Sources


Support

• NIA P30 AG017265 and R01AG11235

• NIDRR H133E080024
Percentage of 70+ Receiving ADL Help

Freedman et al. 2004, *Demography*