Disability Rises Gradually in an Elderly Cohort: Gender Comparisons

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Purpose

For a cohort of elderly people: What happens to disability over time as members acquire functional problems, and some die? Do cohort disability levels rise sharply or gradually, or do they stay steady, or even decline over time?

We describe changes in ADL, IADL, and PLIM disability over time for a single cohort of U.S. adults ages 70 and older.
Three Perspectives

Living cohort: cohort members alive at each interview wave

Decedent groups: cohort members who die between one interview wave and the next

Survivor groups: cohort members who manage to live up to a given interview wave
Hypotheses

H1: Disability rises over time for the living cohort.
H2: Disability rises over time for all decedent groups, but less rapidly for later decedents than earlier ones.
H3: Earlier decedent groups have more baseline disability than later decedent groups at every wave.
H4: Disability rises over time for all survivor groups, but less rapidly for later (longer) survivors than earlier (shorter) ones.
H5: Earlier (shorter) survivor groups have more baseline disability than later (longer) survivor groups at every wave.
H6: Women have higher disability levels than men, but both groups have similar disability changes over time as the total cohort.
H7: The older elderly have higher disability levels than the younger elderly, but both groups have similar disability changes over time as the total cohort.
Data and Measures

Data

Disability
Personal care (activities of daily living, ADL, range 0-5)
Household management (instrumental activities of daily living, IADL, range 0-5)
Physical limitations (PLIM, range 0-9)

Strata
Gender
Baseline age (70-79, 80+)
Methods

Plots of mean disability levels for the living cohort, decedent groups, and survivor groups over time (total sample, gender, and baseline age).

Analyses are weighted -- and include both community-dwelling and nursing home respondents. We prepared non-zero weights for nursing home residents.
Figure 1. Disability for AHEAD Living Cohort, 1993-2010

- Mean Number of ADLs, IADLs, and PLIMs

- Interview Wave

Lines represent:
- ADL (Mean) in blue
- IADL (Mean) in red
- PLIM (Mean) in green

Wave progression from left to right: Wave 2, Wave 3, Wave 4, Wave 5, Wave 6, Wave 7, Wave 8, Wave 9, Wave 10.
Figure 3A. ADL Disability Over Time for AHEAD Survivor Groups, 1993-2010
Key Results

- Disability rises gradually for the living cohort over time.
- Decedent groups have much higher disability than the living cohort.
- Earlier decedent groups have higher disability than later ones, but disability rises sharply for everyone near death.
- Longer survivor groups have less disability, and slower disability increases, than shorter survivor groups.
Living cohort: gender
Figure 4. Disability for AHEAD Men and Women, 1993-2010

- Mean Number of ADLs, IADLs, and PLIMs

Legend:
- Women: ADL (Mean)
- Men: ADL (Mean)
- Women: IADL (Mean)
- Men: IADL (Mean)
- Women: PLIM (Mean)
- Men: PLIM (Mean)
Decedent groups: gender
Figure S1B. IADL Disability Over Time for AHEAD Decedent Groups (Women), 1993-2010

Mean IADL Disability vs. Interview Waves Prior to Death

- Died w2-3
- Died w3-4
- Died w4-5
- Died w5-6
- Died w6-7
- Died w7-8
- Died w8-9
- Died w9-10
- Overall
Figure S1C. PLIM Disability Over Time for AHEAD Decedent Groups (Women), 1993-2010
Figure S1F. PLIM Disability Over Time for AHEAD Decedent Groups (Men), 1993-2010
Survivor groups: gender
Figure S2B. IADL Disability Over Time for AHEAD Survivor Groups (Women), 1993-2010
Figure S2E. IADL Disability Over Time for AHEAD Survivor Groups (Men), 1993-2010

Mean Number of IADLs vs Interview Wave

- Alive Wave 2
- Alive Waves 2-3
- Alive Waves 2-4
- Alive Waves 2-5
- Alive Waves 2-6
- Alive Waves 2-7
- Alive Waves 2-8
- Alive Waves 2-9
- Alive Waves 2-10
- Overall

Wave 2 to Wave 10
Figure S2C. PLIM Disability Over Time for AHEAD Survivor Groups (Women), 1993-2010
Figure S2F. PLIM Disability Over Time for AHEAD Survivor Groups (Men), 1993-2010
Key Results: Gender

Women have higher disability levels than men at all time points, but disability patterns over time are the same for women and men.
Comparison

Only one other analysis has a similar approach to describe disability changes over time (Christensen et al. 2008). Data are for a Danish cohort age 92 at baseline for 8 years (4 waves). Despite differences in sample sizes, ages, and observation length, results are similar in the US and Danish studies.

Conclusions

• Commonplace assumption that disability rises sharply with age in populations is not true from a cohort perspective.
• Disability levels increase only gradually as the cohort ages, even when cohort members are in their 80's and 90's.
• The continuity in results across gender (and also age strata) implies that the disability changes we observe are general and will exist in other cohorts.
• There is some intrinsic fitness (biological, behavioral, psychological) among longevous people.
• Efforts to slow disablement in late life will not result in a very ill and frail population, but instead in one with just moderate levels of disability.
Figure S1A. ADL Disability Over Time for AHEAD Decedent Groups (Women), 1993-2010
Figure S1D. ADL Disability Over Time for AHEAD Decedent Groups (Men), 1993-2010

- Died w2-3
- Died w3-4
- Died w4-5
- Died w5-6
- Died w6-7
- Died w7-8
- Died w8-9
- Died w9-10
- Overall

Mean ADL Disability

Interview Waves Prior to Death
Figure S2D. ADL Disability Over Time for AHEAD Survivor Groups (Men), 1993-2010
Baseline Age

Disability patterns for younger (70-79) and older elderly (80+) groups are similar to those for the total cohort
Both studies find:

- Small rises in disability for the living cohort over time.
- Larger rises in disability among survivor groups and decedent/stop groups than the living cohort (except early waves for AHEAD survivors).
- Monotonic differences across groups at every wave, with higher disability among shorter survivor groups and earlier decedent/stop groups.
- Sharper rises in disability over time for shorter survivor groups (vs. longer ones) and earlier decedent/stop groups (vs. later ones).