Modelling old age trajectories - A Japanese – Swedish comparison

Marten Lagergren
Noriko Kurube
Yasuhiko Saito

Presentation at the REVES conference in Vienna June 8, 2016
Aging from systems level or from the perspective of the individual?

- Data from longitudinal studies are most often used for looking at aging and health from a systems perspective, but...
- ...aging and health could also be regarded from the perspective of the individual

- WHAT ´S THAT FOR ME???
Phases of aging

• Aging is a continuous process from birth and onwards
• Third age: Retirement with retained independency
• Fourth age: Dependent on others for daily life

In fourth age AGING PUTS IN A ”HIGHER GEAR”
Old age life chances - what’s that for me?

• Given present age and health status how are my life chances for the coming 5, 10, 15, 20 years?

• How are individual life chances influenced by health improvements on systems level?

• Are they different in Japan and Sweden?

• Longitudinal studies can provide an answer!
The LIFECHANCE – model metod and assumptions

Definition of initial state:

• age 77, 78 and 79
• gender
• functional limitations (independent, IADL-dependent, ADL-dependent)
• level of LTC (no LTC, home-related LTC, institution)
Data sources


- Sweden: Swedish National study on Aging and Care (SNAC), baseline and 3-year follow up, 2001/04 - 2004/07
Calculation method

- Initial state (functional limitation *LTC level) estimated from the data sources
- Initial age 78 year, separate calculations for men and women
- Distribution on future states calculated from initial state by successive multiplication of transition matrices using Markov assumption
Calculation method

- Transition matrices (death and functional limitation* LTC level) calculated by successive logistic regression analysis controlling for initial age, gender, degree of functional limitations and level of LTC
- Japan: 5-year time step
- Sweden: 3-year time step
- In total 15 years in both cases
Example of results
Japan: Distribution on level of functional limitations, men
- initial level: No limitations

After five years

After ten years

After 15 years

Legend:
- Dead
- No limitations
- IADL dependency
- ADL dependency
Japan: Distribution on level of functional limitations, men
- initial level: IADL-dependent

After five years

After ten years

After 15 years

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Dead
No limitations
IADL dependency
ADL dependency
Japan: Distribution on level of functional limitations, men
- initial level: ADL-dependent

- After five years
- After ten years
- After 15 years

Graph showing distribution of people with different levels of dependence after different time periods.

- Dead
- No limitations
- IADL dependency
- ADL dependency
Sweden: Distribution on level of functional limitations, men
- initial level: No limitations

After three years
After six years
After nine years
After twelve years
After fifteen years

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Dead
No limitations
IADL dependency
ADL dependency
Sweden: Distribution on level of functional limitations, men
- initial level: IADL-dependency
Sweden: Distribution on level of functional limitations, men - initial level: ADL-dependency

- After three years
- After six years
- After nine years
- After twelve years
- After fifteen years

Dead
No limitations
IADL dependency
ADL dependency
Japan: Distribution on level of LTC, women - initial level: No LTC

After five years
- Dead: 10%
- No LTC: 90%
- Home-related LTC: 0%
- Institution: 0%

After ten years
- Dead: 20%
- No LTC: 80%
- Home-related LTC: 0%
- Institution: 0%

After 15 years
- Dead: 25%
- No LTC: 75%
- Home-related LTC: 0%
- Institution: 0%
Japan: Distribution on level of LTC, women - initial level: Home-related LTC

- After five years
- After ten years
- After 15 years

Legend:
- Dead
- No LTC
- Home-related LTC
- Institution
Japan: Distribution on level of LTC, women - initial level: Institution

- After five years
- After ten years
- After 15 years

Legend:
- Dead
- No LTC
- Home-related LTC
- Institution
Sweden: Distribution on level of LTC, women - initial level: No LTC

After fifteen years
- Dead: 5%
- No LTC: 26%
- Home-related LTC: 14%
- Institution: 55%

After twelve years
- Dead: 10%
- No LTC: 40%
- Home-related LTC: 14%
- Institution: 46%

After nine years
- Dead: 20%
- No LTC: 36%
- Home-related LTC: 14%
- Institution: 30%

After six years
- Dead: 30%
- No LTC: 30%
- Home-related LTC: 14%
- Institution: 26%

After three years
- Dead: 50%
- No LTC: 15%
- Home-related LTC: 15%
- Institution: 20%
Sweden: Distribution on level of LTC, women - initial level: Home-related LTC

- After fifteen years
- After twelve years
- After nine years
- After six years
- After three years

Legend:
- Dead
- No LTC
- Home-related LTC
- Institution
Sweden: Distribution on level of LTC, women - initial level: Institution

After three years
After six years
After nine years
After twelve years
After fifteen years

Dead
No LTC
Home-related LTC
Institution
Conclusions – functional limitations

• The initial state has a profound impact on probability of death – especially in the short run, 5 -10 years – and also on transition to more severe levels of limitations

• Recovery is not uncommon – it seems that functional limitations sometimes are transitory

• Women have lower mortality and higher probability for disability increase

• The patterns in Japan and Sweden are similar
Conclusions – level of LTC

• As for functional limitations initial level of LTC has great influence on death and future levels of LTC – especially in the short run. A greater proportion of women than men end up in institutional care.

• Japan and Sweden differ when it comes to the permanence of level of LTC. This illustrates different ”care in end of life”-patterns. (Note that in our study ”no LTC” in Japan also covers hospital in-patient care, which explains why so many go from institution to ”no LTC”. Around 80 % of old Japanese die in hospital compared to around 10% in Sweden)
Limitations

• The Markov assumption may not hold, i.e. not only the present state, but previous states might influence transitions. This can be tested.

• The samples underlying the calculation of transition probabilities are fairly small. All controlling variables in the regression analysis are not significant.

• The applied technique allows only for a very limited number of state-variables. In this case two – functional limitation and level of LTC.

• In the Japanese data there is an uncertainty regarding to which extent ”no LTC ”might stand for long-term hospital in-patient care.
• Calculating life-chances implies a different perspective on aging and needs for LTC. Focus is shifted from the system to the individual.

• The method used is inspired by micro-simulation but much simpler. For further progress along these lines micro-simulation is recommended.
That’s all folks!

Thanks for your attention!!