What is the active life expectancy of elderly Japanese with and without stroke? An application of the SPACE program

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Introduction

- Stroke is a debilitating condition that can severely limit the ability of individuals to perform daily living activities and lead an active life

- Risk factors for stroke include: increasing age, hypertension, cardiovascular diseases, high cholesterol, diabetes, obesity, physical inactivity, heavy alcohol consumption, and cigarette smoking

Introduction (cont.)

- Worldwide, about 15 million people suffer strokes each year. Of these, 5 million die and another 5 million are left permanently disabled.
- In Japan,   troke is the 3rd leading cause of death.
- The Japanese diet which is relatively high in sodium increases the risk for hypertension, a major risk factor for stroke.

Objective

- To investigate and compare the total and active life expectancy of elderly Japanese men and women with and without stroke in order to determine the impact of stroke on disability and mortality

Data

- Nihon University Japanese Longitudinal Study of Aging (NUJLSOA)
- 5 waves of data in 1999, 2001, 2003, 2006, 2009.
- Nationally-representative of Japanese aged 65+ at baseline (N=4,997)
- Oversampled for age 75+
- Information on death obtained at follow-up from family members

Measures

- Stroke was measured using self-reports by subjects
- Disability was measured by self-reports of difficulty in performing at least one of 14 basic and instrumental activities of daily living.
  - 7 ADLs: bathing, dressing, eating, getting in/out of bed, walking, going outside, toileting
  - 7 IADLs: preparing for own meal, shopping, managing money, making phone calls, doing light housework, using transportation, taking medication
- **<u>Inactive</u>**: difficulty performing at least one of 14 ADLs/IADLs
- **<u>Active</u>**: otherwise

Methods

- Multi-state life table (MSLT)
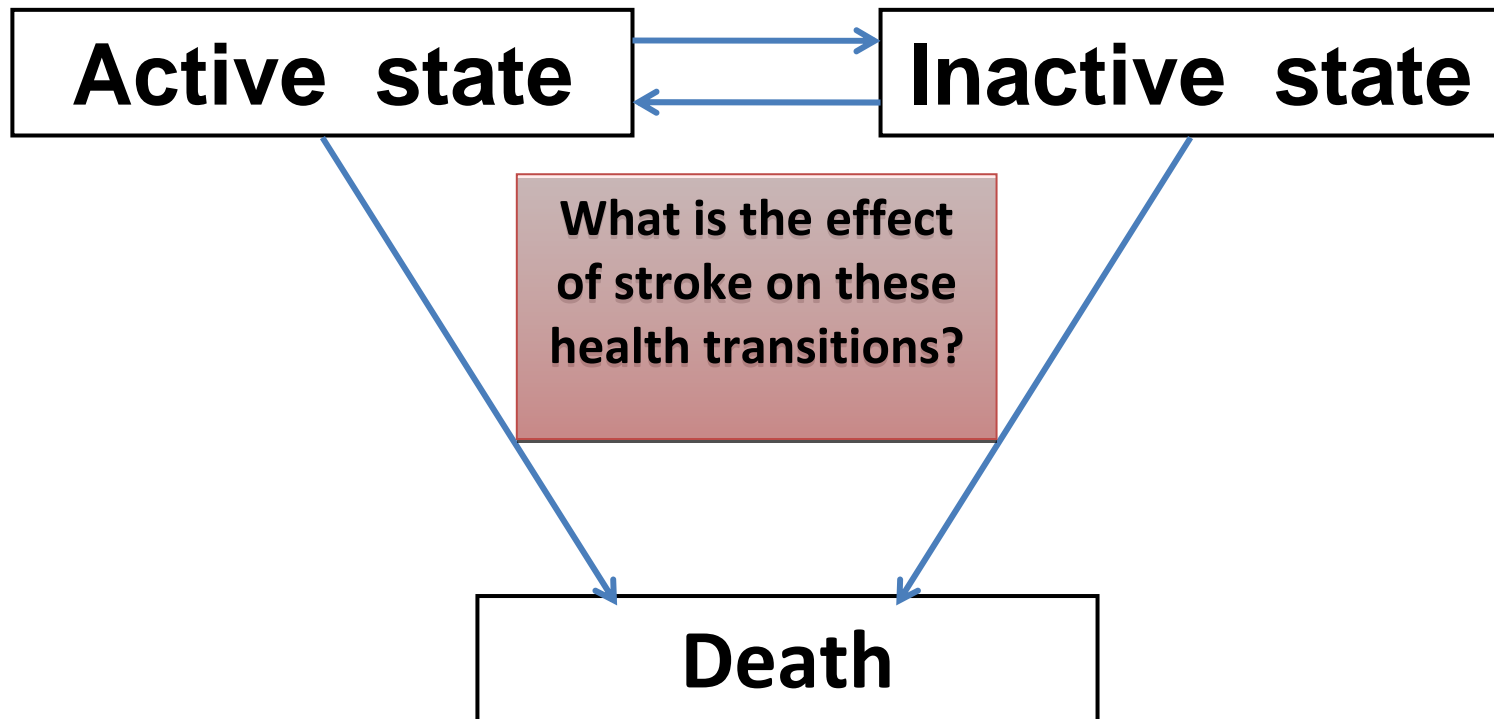
Methods (cont.)

- The SPACE program was used to estimate MSLT functions and their sampling variability.

- Simulation cohort N=100,000

- Bootstrap N=300

- An advantage of using the SPACE program is that standard errors can be estimated and the distribution of MSLT functions can be investigated. (see Cai et al. 2010 in *Demographic Research* for details)

SPACE: Stochastic Population Analysis for Complex Events

RESULTS

Population-based estimates at age 65

	TLE (95% CI)	ALE (95% CI)	IALE (95% CI)	ALE/TLE (%)
Total With stroke	**18.7** (17.83-19.66)	**12.1** (10.93-13.24)	**6.7** (5.63-7.69)	64.5
Total No stroke	**22.8** (22.36-23.15)	**17.2** (16.70-17.63)	**5.6** (5.18-5.99)	75.5
Men With stroke	**16.6** (15.43-17.77)	**11.1** (9.51-12.66)	**5.5** (4.27-6.76)	66.8
Men No stroke	**21.4** (20.82-21.88)	**17.4** (16.74-17.99)	**4.0** (3.54-4.43)	81.4
Women With stroke	**21.7** (20.29-23.02)	**13.5** (11.56-15.35)	**8.2** (6.72-9.69)	62.1
Women No stroke	**24.0** (23.34-24.57)	**17.3** (16.69-17.87)	**6.7** (6.12-7.22)	72.1

Status-based estimates, at age 65 (Initial state: Active)

	TLE (95% CI)	ALE (95% CI)	IALE (95% CI)	ALE/TLE (%)
Total With stroke	**19.2** (18.33-20.07)	**13.7** (12.74-14.71)	**5.5** (4.54-6.42)	71.5
Total No stroke	**22.8** (22.43-23.2)	**17.5** (17.05-17.87)	**5.4** (4.98-5.73)	76.6
Men With stroke	**17.0** (15.85-18.21)	**12.7** (11.23-14.14)	**4.3** (3.16-5.52)	74.5
Men No stroke	**21.4** (20.88-21.93)	**17.6** (17.05-18.18)	**3.8** (3.38-4.21)	82.3
Women With stroke	**22.2** (20.85-23.47)	**15.2** (13.54-16.91)	**6.9** (5.62-8.25)	68.7
Women No stroke	**24.0** (23.43-24.65)	**17.7** (17.13-18.18)	**6.4** (5.85-6.91)	73.5

Status-based estimates, at age 65 (Initial state: Inactive)

	TLE (95% CI)	ALE (95% CI)	IALE (95% CI)	ALE/TLE (%)
Total With stroke	**17.1** (15.98-18.29)	**6.3** (5.02-7.64)	**10.8** (9.56-12.05)	36.9
Total No stroke	**21.9** (21.29-22.50)	**12.8** (11.75-13.87)	**9.1** (8.29-9.89)	58.5
Men With stroke	**14.9** (13.52-16.18)	**4.5** (2.70-6.22)	**10.4** (8.85-11.91)	30.0
Men No stroke	**20.3** (19.43-21.09)	**12.6** (10.83-14.40)	**7.7** (6.39-8.91)	62.3
Women With stroke	**20.3** (18.71-21.89)	**8.7** (6.40-10.95)	**11.6** (9.70-13.55)	42.8
Women No stroke	**22.9** (22.12-23.72)	**12.7** (11.44-13.86)	**10.3** (9.29-11.24)	55.2

Summary

- TLE and ALE are significantly different (p<0.05) for elderly Japanese men and women with and without stroke for both population-based and status-based estimates; IALE is not.

- At age 65, Japanese men without stroke can expect to live 4.8 years longer and 6.3 more years of active life compared to Japanese men with stroke. The corresponding figures for Japanese women are 2.3 years and 3.8 years of active life, respectively.

Summary (cont.)

- Elderly Japanese without stroke can expect 11 percentage points more of active life, with the proportion greater for men than for women.

- Those with initial (baseline) active state can expect more years and proportion of active life compared to those with initial inactive state. The years and proportion are greater for those without stroke than with stroke.

Discussion

- Findings similar to Fang et al. (2009) study on elderly in Beijing, China which used hazard rate models

- Limitations of study

  - data are for community-dwelling elderly Japanese; excluded stroke patients residing institutions

  - Losses to follow-ups, although subjects who were institutionalized or hospitalized at later waves are followed up to the greatest extent possible

Discussion (cont.)

- The current study used baseline stroke status only. Further work is needed to take into consideration subjects who have had stroke(s) at later survey waves.

- Policy implications include providing better support to meet the needs of stroke survivors, who have fewer years of active life, and their caregivers.

Thank you!

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