Active Life Expectancy by Sex and SES in Singapore

Yasuhiko Saito,[1] Angelique Chan, [2,3] Rahul Malhotra,[3] and David Matchar,[3]

[1] Advanced Research Institute for the Sciences and Humanities, Nihon University

[2] National University of Singapore

[3] Duke-NUS Graduate Medical School

Introduction

- Few studies on health expectancy for older adults in Singapore based on prevalence based method
  - Yong, Saito, Chan (2011), JCCG
  - Yong, Chan, Saito (2010), JAG
- No incidence based estimates of health expectancy

Objectives of the Study

- To examine health transitions among elderly in Singapore by sex and SES between 2009 and 2011
- To compute active life expectancy by sex and SES

Data sources

- Social Isolation, Health and Lifestyles Survey (SIHLS) : Conducted in 2009 (Jly-Dec), commissioned by the Ministry of Community Development, Youth and Sports, Singapore, designed as a baseline for longitudinal survey
- Nationally representative of Singaporeans (citizens and permanent residents) aged 60+ (N=5,000), aged 75+, Malays and Indians were oversampled by factor of 2 (response:69.4%)
- Follow-up survey was conducted in 2011

Sample Size

	2009	
2011	Males	Females
alive	1646	2007
dead	110	97
missing	501	639
total	2257	2743

Definition of Health Status

- Health status was defined by 7 ADLs (bathing, dressing, eating, walking, transfer, going outside, and toileting) and 7 IADLs (preparing own meal, shopping, managing money, make phone call, light house work, taking public transportation, medication).
- Inactive: those who have at least one difficulty performing ADLs and IADLs
- Active: otherwise

Methods

- maximum likelihood computer program using Interpolation of Markov Chains (IMaCh) developed by Brouard and colleagues
  - Lievre, Brouard and Heathcote (2003) in Mathematical Population Studies
- Estimating transition probabilities using logistic regression
- Weights were applied for analyses

RESULTS

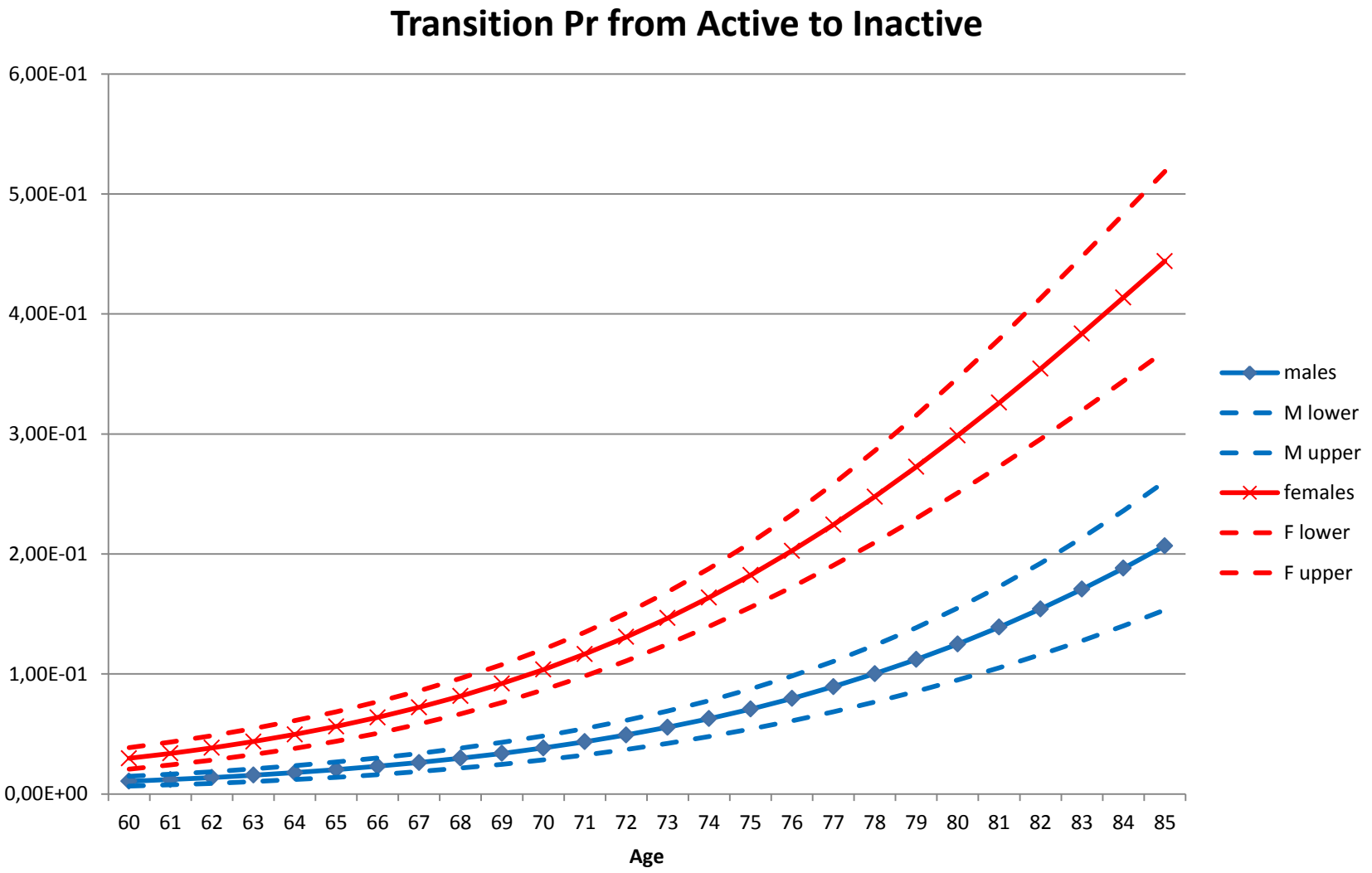
Overview of sample at baseline

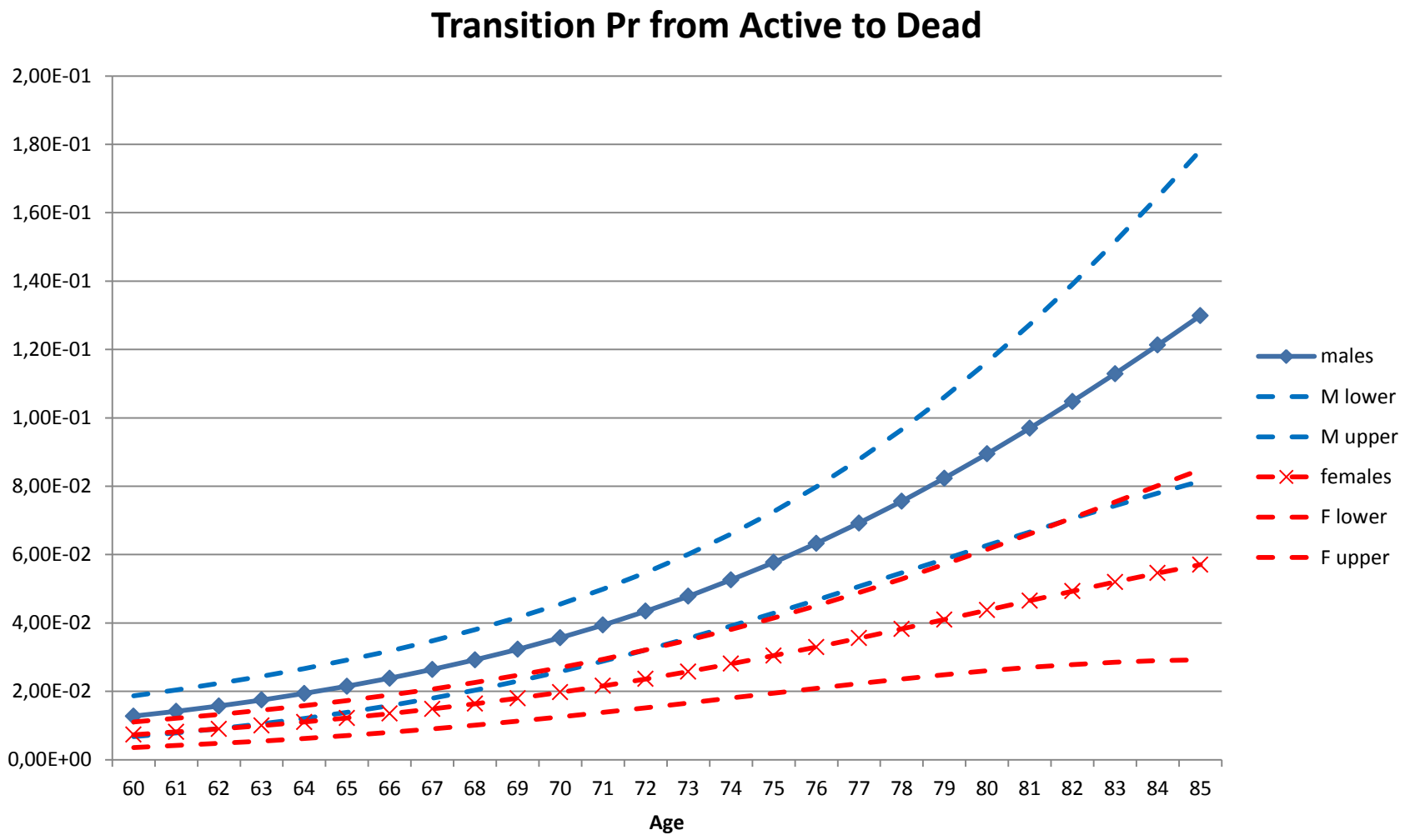
	Males	**Females**
Mean age (SD)	69.2 (7.3)	70.6 (8.0)
Female	45.8%	54.2%
Less than primary education	56.3%	76.9%
No formal education	13.7%	45.5%
Adequate income	76.6%	88.2%

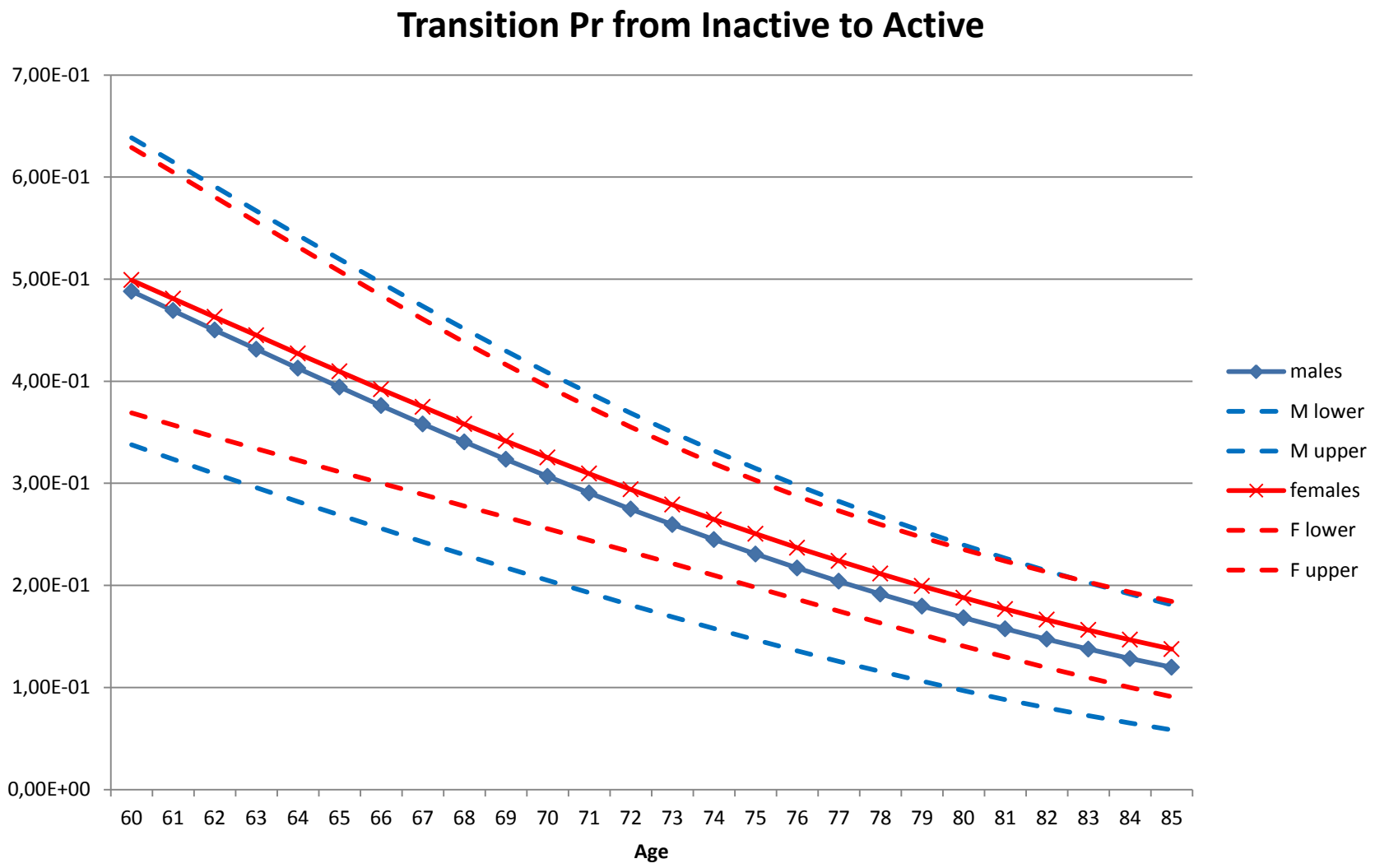
Overview of health transitions

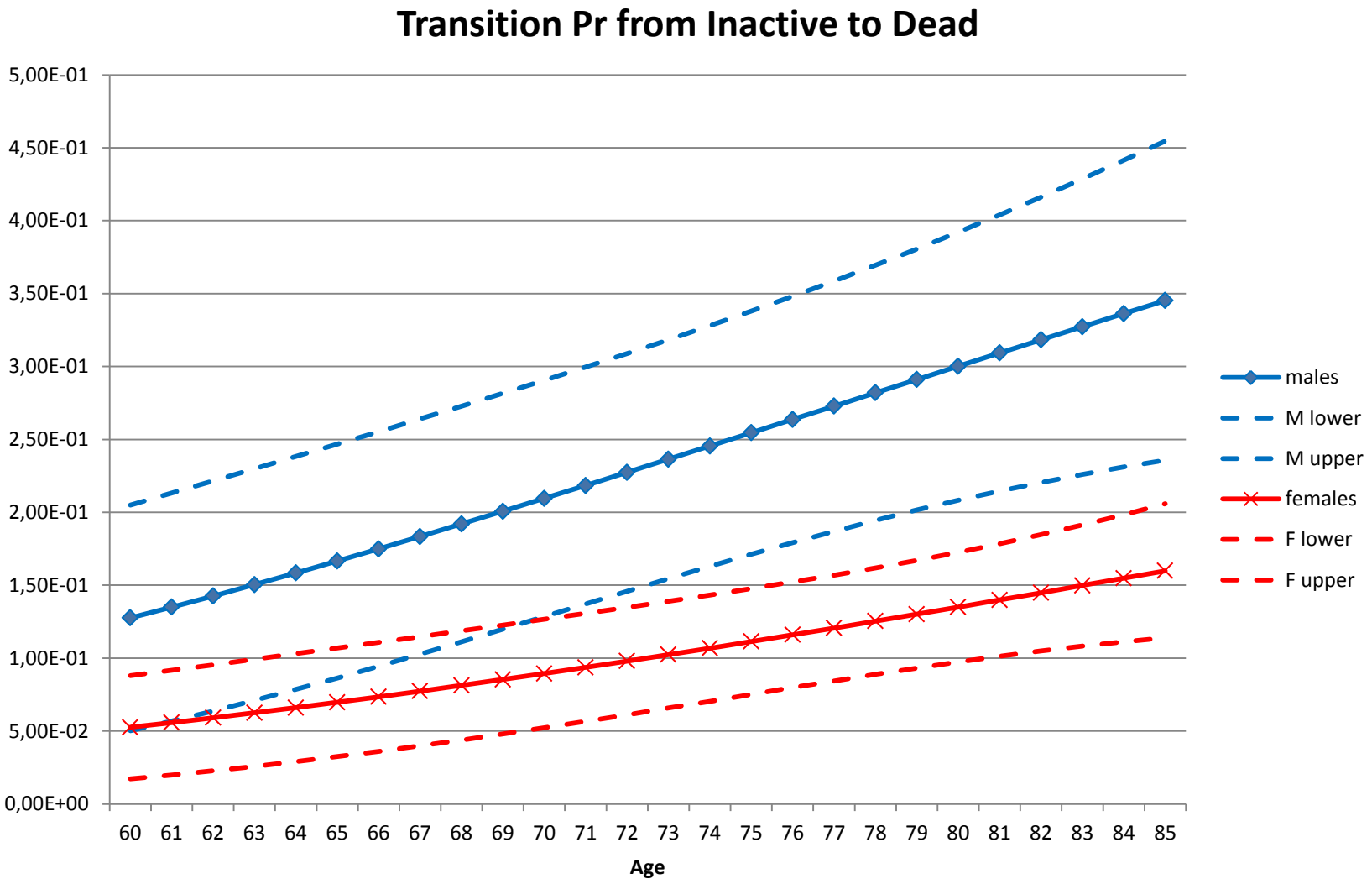
	2009	
2011	Active	Inactive
Active	2127	112
Inactive	307	353
Dead	99	106

Transition Probability by Sex


Transition Pr from Active to Inactive
6,00E-01
5,00E-01
4,00E-01
3,00E-01
2,00E-01
1,00E-01
0,00E+00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
Age
males
M lower
M upper
females
F lower
F upper


Transition Pr from Active to Dead
2,00E-01
1,80E-01
1,60E-01
1,40E-01
1,20E-01
1,00E-01
8,00E-02
6,00E-02
4,00E-02
2,00E-02
0,00E+00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
Age
males
M lower
M upper
females
F lower
F upper


Transition Pr from Inactive to Active
7,00E-01
6,00E-01
5,00E-01
4,00E-01
3,00E-01
2,00E-01
1,00E-01
0,00E+00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
Age
males
M lower
M upper
females
F lower
F upper

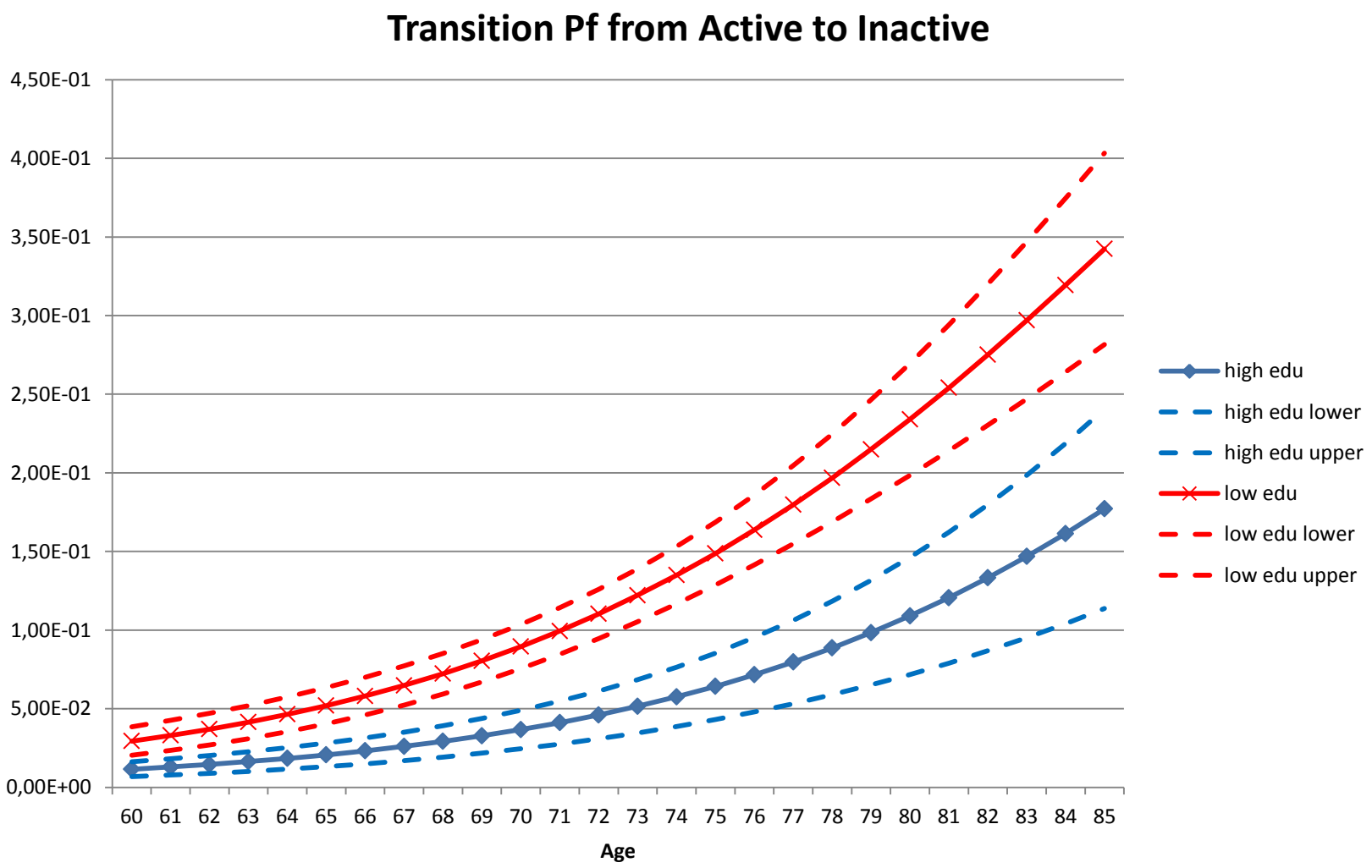

Transition Pr from Inactive to Dead
5,00E-01
4,50E-01
4,00E-01
3,50E-01
3,00E-01
2,50E-01
2,00E-01
1,50E-01
1,00E-01
5,00E-02
0,00E+00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
Age
males
M lower
M upper
females
F lower
F upper

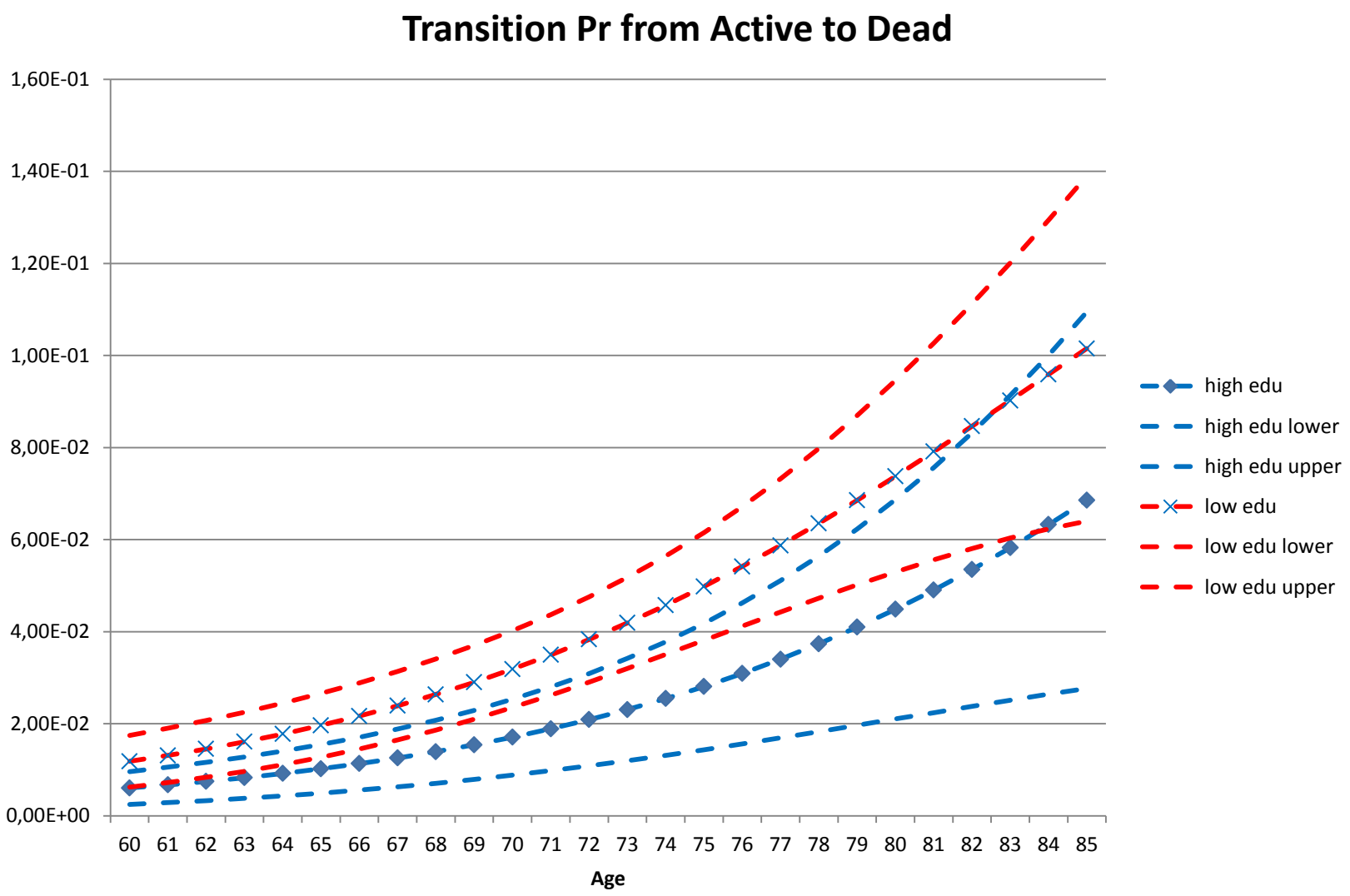
Transition Probability by Education Lower (primary or lower) / Higher

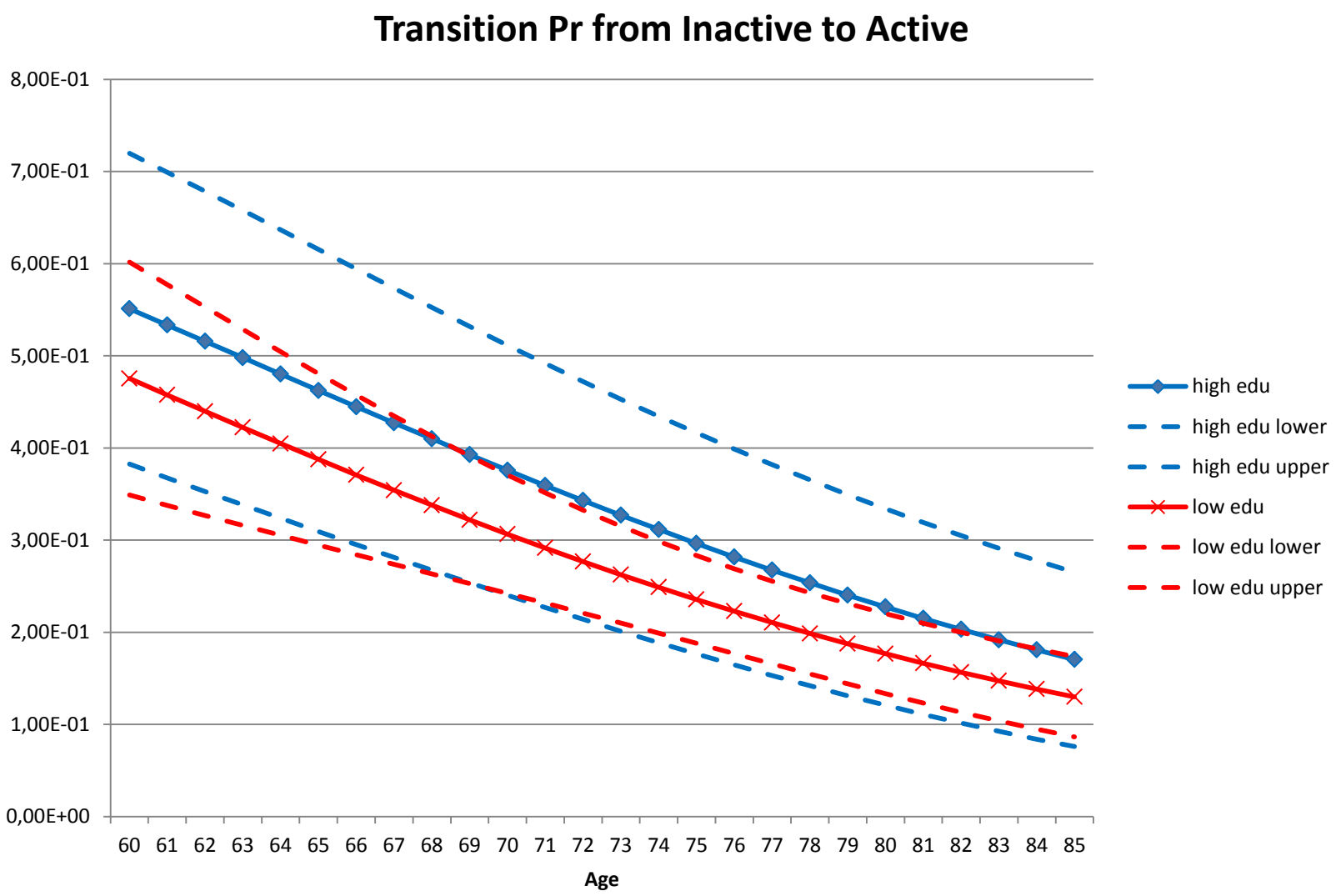
Asian Studies

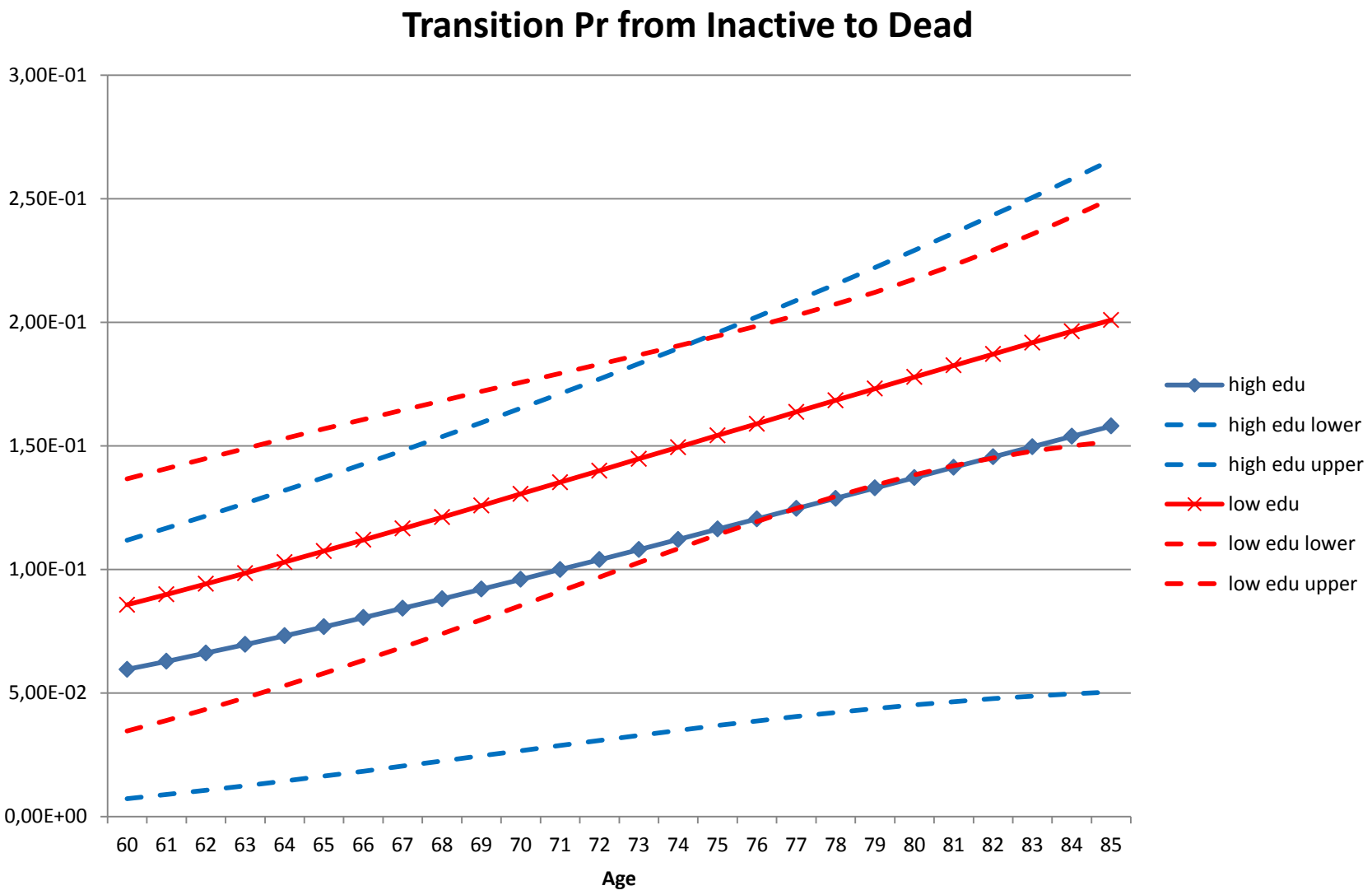
Educational effects on transition from:	Active-Inactive	Active-Dead	Inactive-Active	Inactive-Dead
Japan	*	*	ns	ns
Taiwan	*	ns	ns	ns
China	ns	ns	*/ns	ns
Indonesia	*/ns	*/ns	ns	ns
Philippines	ns	ns	ns	ns
Singapore	?	?	?	?

* significantly different
ns not significantly different


Transition Pf from Active to Inactive
4,50E-01
4,00E-01
3,50E-01
3,00E-01
2,50E-01
2,00E-01
1,50E-01
1,00E-01
5,00E-02
0,00E+00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
Age
high edu
high edu lower
high edu upper
low edu
low edu lower
low edu upper


Transition Pr from Active to Dead
1,60E-01
1,40E-01
1,20E-01
1,00E-01
8,00E-02
6,00E-02
4,00E-02
2,00E-02
0,00E+00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
Age
high edu
high edu lower
high edu upper
low edu
low edu lower
low edu upper


Transition Pr from Inactive to Active
8,00E-01
7,00E-01
6,00E-01
5,00E-01
4,00E-01
3,00E-01
2,00E-01
1,00E-01
0,00E+00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
Age
high edu
high edu lower
high edu upper
low edu
low edu lower
low edu upper


Transition Pr from Inactive to Dead
3,00E-01
2,50E-01
2,00E-01
1,50E-01
1,00E-01
5,00E-02
0,00E+00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
Age
high edu
high edu lower
high edu upper
low edu
low edu lower
low edu upper

Asian Studies

Educational effects on transition from:	Active-Inactive	Active-Dead	Inactive-Active	Inactive-Dead
Japan	*	*	ns	ns
Taiwan	*	ns	ns	ns
China	ns	ns	*/ns	ns
Indonesia	*/ns	*/ns	ns	ns
Philippines	ns	ns	ns	ns
Singapore	*	ns	ns	ns

* significantly different
ns not significantly different

Estimated Life Expectancy

	2009-2011		2010 Published	
Age	M	F	M	F
60	22.4	27.3	22.0	25.8
80	8.5	12.7	8.4	10.3

Active Life Expectancy by Sex

		60	80
Male	Total LE	22.4	8.5
	Active LE	19.5	5.4
	Inactive LE	2.9	3.2
Females	Total LE	27.3*	12.7
	Active LE	18.1	3.8
	Inactive LE	9.3*	8.8*

Proportion of Active Life Expectancy

		60	80
Male	Total LE	100.0	100.0
	Active LE	87.0	65.1
	Inactive LE	13.0	34.9
Females	Total LE	100.0	100.0
	Active LE	66.1	30.2
	Inactive LE	33.9	69.8

Active Life Expectancy by Education

		60	80
High Edu	Total LE	30.1	14.5
	Active LE	23.7	7.7
	Inactive LE	6.4	6.7
Low Edu	Total LE	23.9	10.7
	Active LE	17.4*	4.1*
	Inactive LE	6.4	6.6

Proportion of Active Life Expectancy

		60	80
High Edu	Total LE	100.0	100.0
	Active LE	78.6	53.5
	Inactive LE	21.4	46.5
Low Edu	Total LE	100.0	100.0
	Active LE	73.0	38.1
	Inactive LE	27.0	61.9

Concluding remarks

- Health transition by sex: Active to inactive (Significant), Active to Dead and Inactive to Dead (Almost)
- Health transition by education: Active to inactive
- Higher active life expectancy for males and higher proportion of active life (??)

Acknowledgements

- Baseline survey was commissioned by MCYS, Singapore and the follow-up survey was supported by the program in Health Services and Systems Research, Duke-NUS Medical Graduate School and the NUS-Tsao Ageing Research Initiative, National University of Singapore.