

Gender and Educational Differences of Active Life Expectancy for the Elderly in Taiwan, 1989-1999

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Background Information

In the past 50 years, Taiwan has experienced the following demographic changes:

- Fertility and Mortality: High → Low
 - Fertility 46.6 (1952) → 11.02 (2003) /per thousand **(-76.4%)**
 - Mortality 9.9 (1952) → 5.7 (2003) /per thousand **(-42.4%)**
- Aging Population
 - Age 65 2.5% (1951) → 9.3% (2002) **(+272%)**
- Life Expectancy
 - Females 57 (1950) → **78.94** (2002) **(+21.94 years)**
 - Males 53 (1950) → **73.22** (2002) **(+20.22 years)**

Objectives of the Study

To address whether prolonging life will also extend longer years of active life expectancy for the elderly in Taiwan

- To estimate the probabilities of health transitions (PHT) from one to another states for the age 60 and over in Taiwan during 1989 -99
- To estimate life expectancy (LE) and active life expectancy (ALE) for the age 60 and over between 1989 to 1999 in Taiwan
- To examine whether there are differences of LE and ALE among gender and educational sub-groups of the elderly population

Previous Research in PHT and ALE by Gender

- Older females
 - Higher PHT in deteriorating to an unhealthy state and remaining in an unhealthy state
 - Lower PHT in mortality
(Crimmins & Hayward 1997; Rogers, Rogers, et al. 1992)
 - More years of LE and ALE, but lower percentages of ALE
(Robine, Mathers, et al., 1996; Crimmins & Hayward, 1997)

PHT: Probabilities of Health Transitions

Previous Research in PHT & ALE by Education

- Studies show large inequities by educational status in active life expectancy (ALE)
(Crimmins & Saito, 2001; van den Bos & van der Masas, 1993)
- Lower level of education
 - Higher mortality rates and prevalence of disability
(Crimmins & Saito, 2001; van den Bos & van der Masas, 1993)
 - Social class gradient is smaller for females than males in years of LE and ALE
 - Older females with lower level of education have twice mortality ratio compared to the higher level one, which results in a difference in 4-5 years of LE
(van den Bos & van der Maas, 1993, Amsterdam study)
- Higher levels of education results in a decreased incidence of functional limitation only for those originating in an active state, but not for those who originating in an inactive state
(Zimmer, Liu, Hermalin, & Chuang, 1998)

Methods - Source of Data & Survey Design

- **Source of data**

- **Surveys of Health and Living Status of the Middle Aged and Elderly in Taiwan (SHLSE)**

- **Survey design**

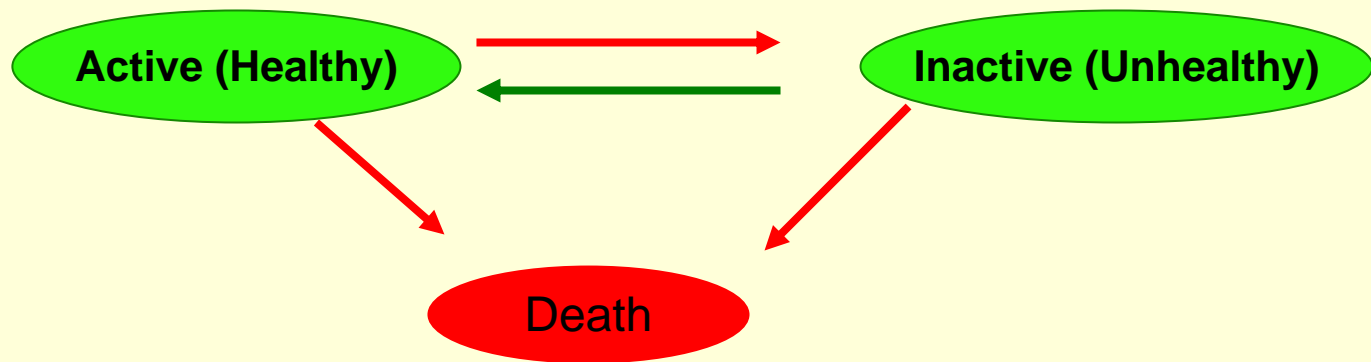
- Multi-stage national probability sampling method
- Population: Age 60 and over in 1989 in Taiwan
- Longitudinal national surveys – a panel study

Sampling and Response Rates

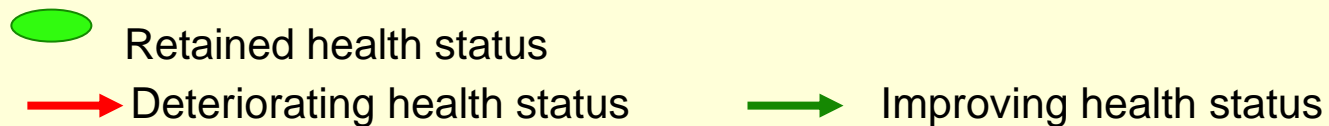
Content	1 st wave	2 nd wave	3 rd wave	4 th wave
Survey year	1989	1993	1996	1999
Interview months	4-11	4-12	4-12	4-12
No. or respondents (Age of respondents)	4049 (60+)	3154 (64+)	2669 (67+)	2310 (70+)
Deceased cases (Cumulate N.)	-	590	470 (1069)	426 (1488)
Response rates (%)	91.8%	91.2%	89.3%	90.8%

Conceptual Framework

Health Transitions: Multi-state life table method



Health transition stages:



Operational Definition

- Health index
 - Activity of daily living (Bathing)+Instrumental of daily living (5 IADLs items)
 - reasons for using this new composite health index
 - Limitation of the survey: Lack of completed ADL items in the first wave survey
 - Comparing to other health indices
- Active life expectancy (ALE) v.s. Inactive LE (IALE)
 - ALE means years of life that one is able to perform any of the activity in health index
 - IALE means years of life that one is unable to perform at least one activity in each health index



Comparisons with other health indices

Health Indices Year of survey		BATHING+5IADLs					
		1993		1996		1999	
Health indices		0	1	0	1	0	1
Total (N)		2040	1104	1824	838	1384	921
6ADLs+5IADLs	0	2040	0	1824	0	1384	0
	1	0	1104	0	838	0	921
Bathing	0	2040	958	1824	688	1384	721
	1	0	142	0	150	0	200
	Missing	4					
5IADLs	0	2039	1	1824	1	1384	2
	1	0	1103	0	837	0	919
	Missing	1					

- (Bathing+5IADLs) and other health index (6ALDs+5IADLs) in three wave surveys (1993, 1996, 1999) are identical.
- 5IADLs include shopping, managing money, making the phone call, taking the bus/train, and doing heavy house work



Method of Analysis

- The Interpolation Markov Chain (IMaCh) developed by Brouard & Lièvre based on multinomial logistic regression
- Advantages of IMaCh
 - Deal with many waves of data at once and different lengths of intervals between surveys
 - Calculate probability of Health transitions (PHT) for a single year of age by gender and other covariates (education)
 - Calculate active life expectancy (ALE) / Inactive ALE (IALE) for a single year age by gender
 - Manage LE/ALE/IALE by two covariates at the same time and consider interaction effects
 - Calculate ALE and provide us standard error

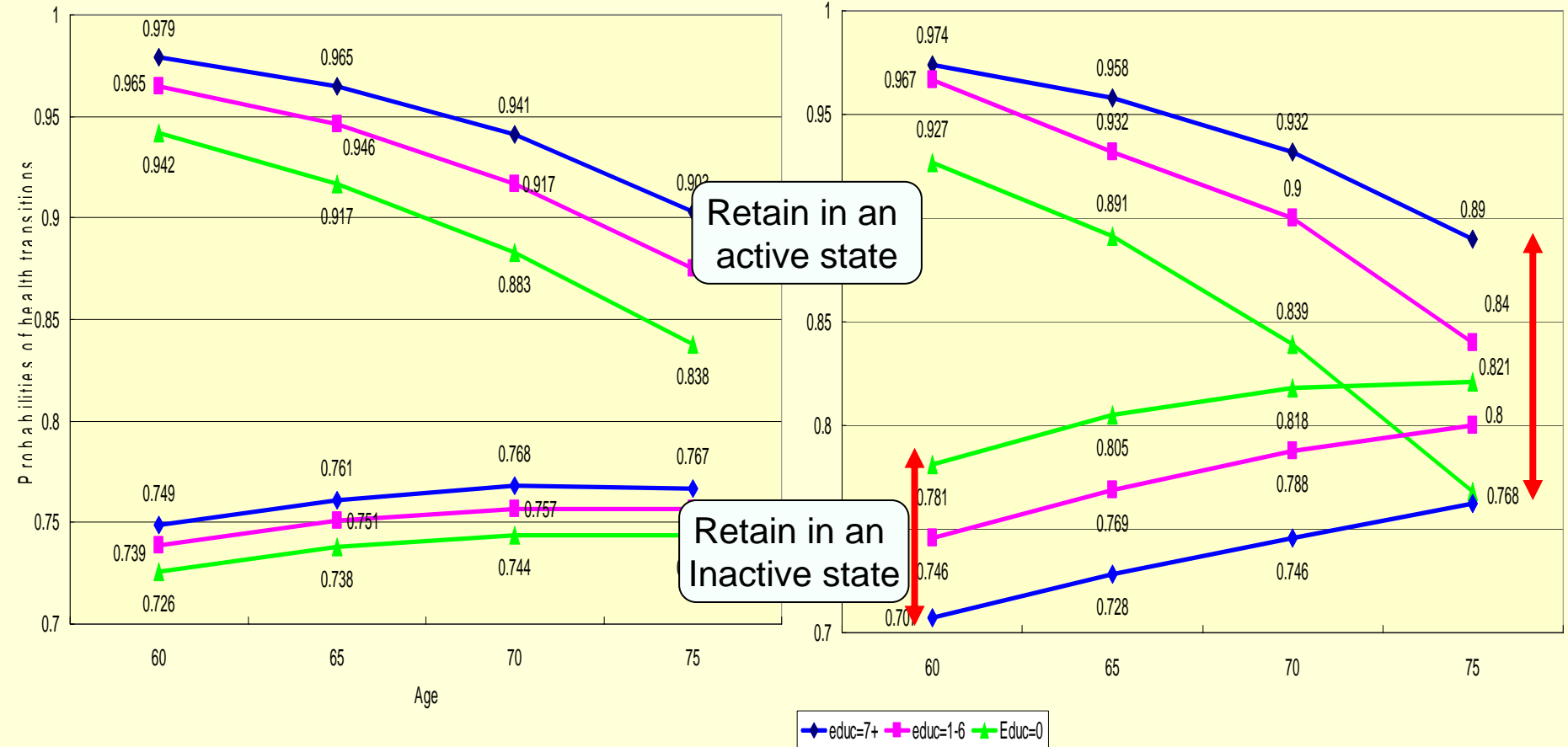
Results-Characteristics of the study

	Total	Males	Females
Total (N)	4038	2302	1736
(%)	100%	57.0%	43.0%
Age 60-63	1204	32.4%	26.4%
64-66	783	20.7%	17.6%
67-69	639	15.7%	16.0%
70-74	1162	16.6%	19.8%
75-79	250	9.4%	12.7%
80+	79	5.3%	7.4%
Years of education			
0	2025	32.5%	73.8%
1-6	1236	39.0%	19.6%
7+	768	28.5%	6.5%
Missing	9	5	4

PHTs for retaining in the same health state

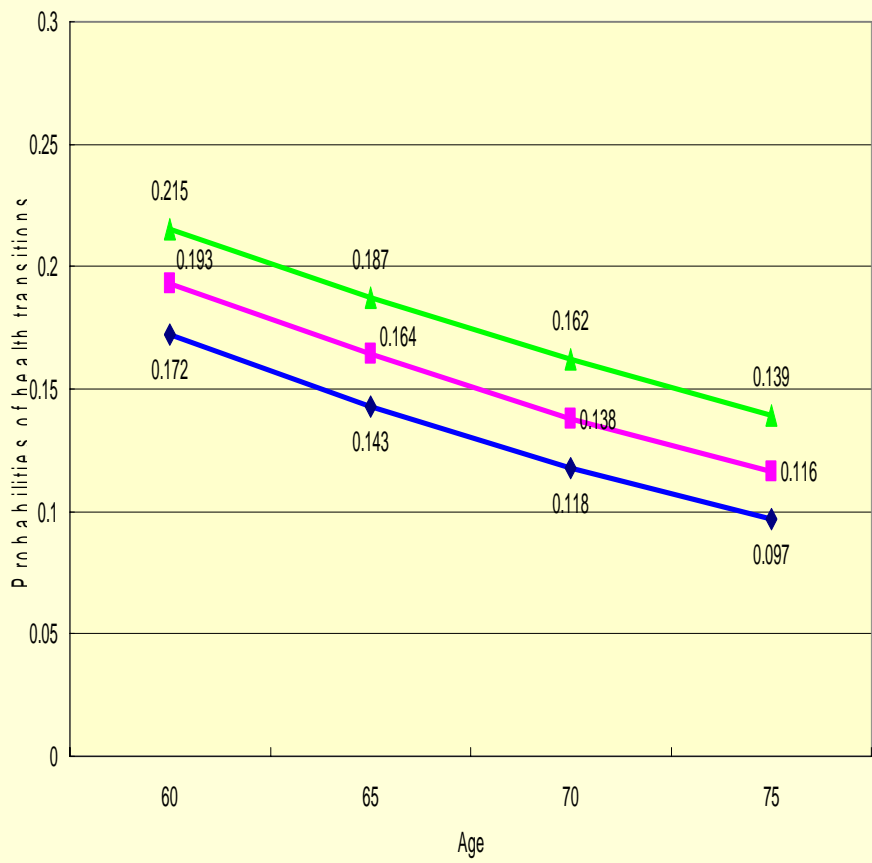
Older Males

Older Females

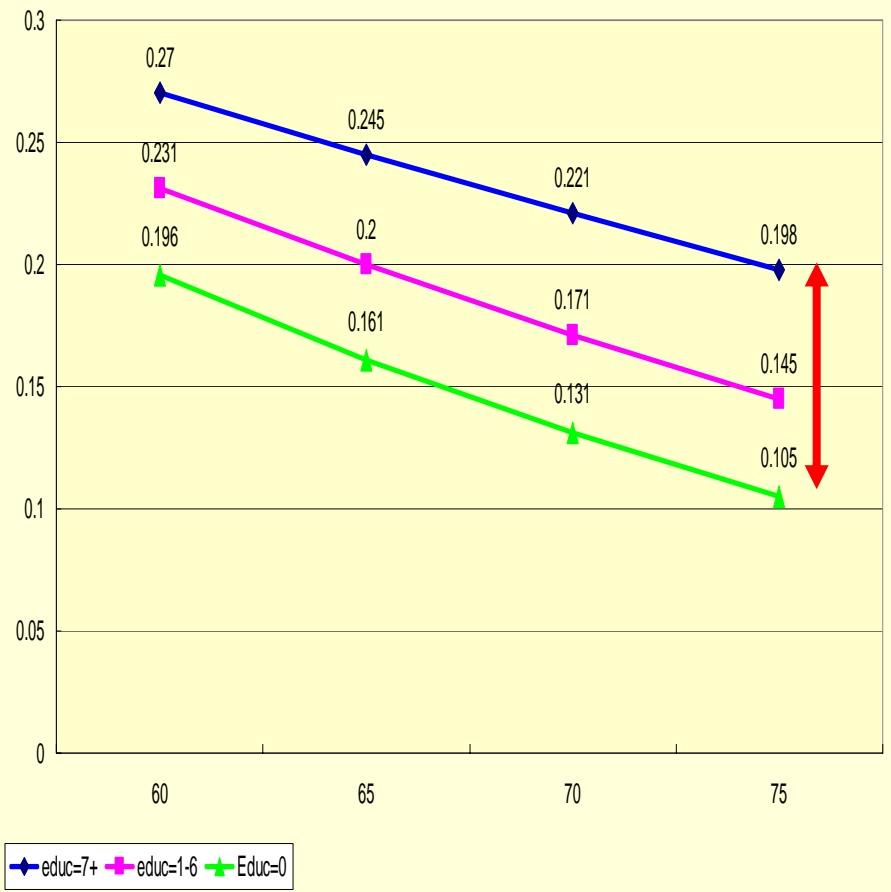


PHTs for improving to an active state

Older Males



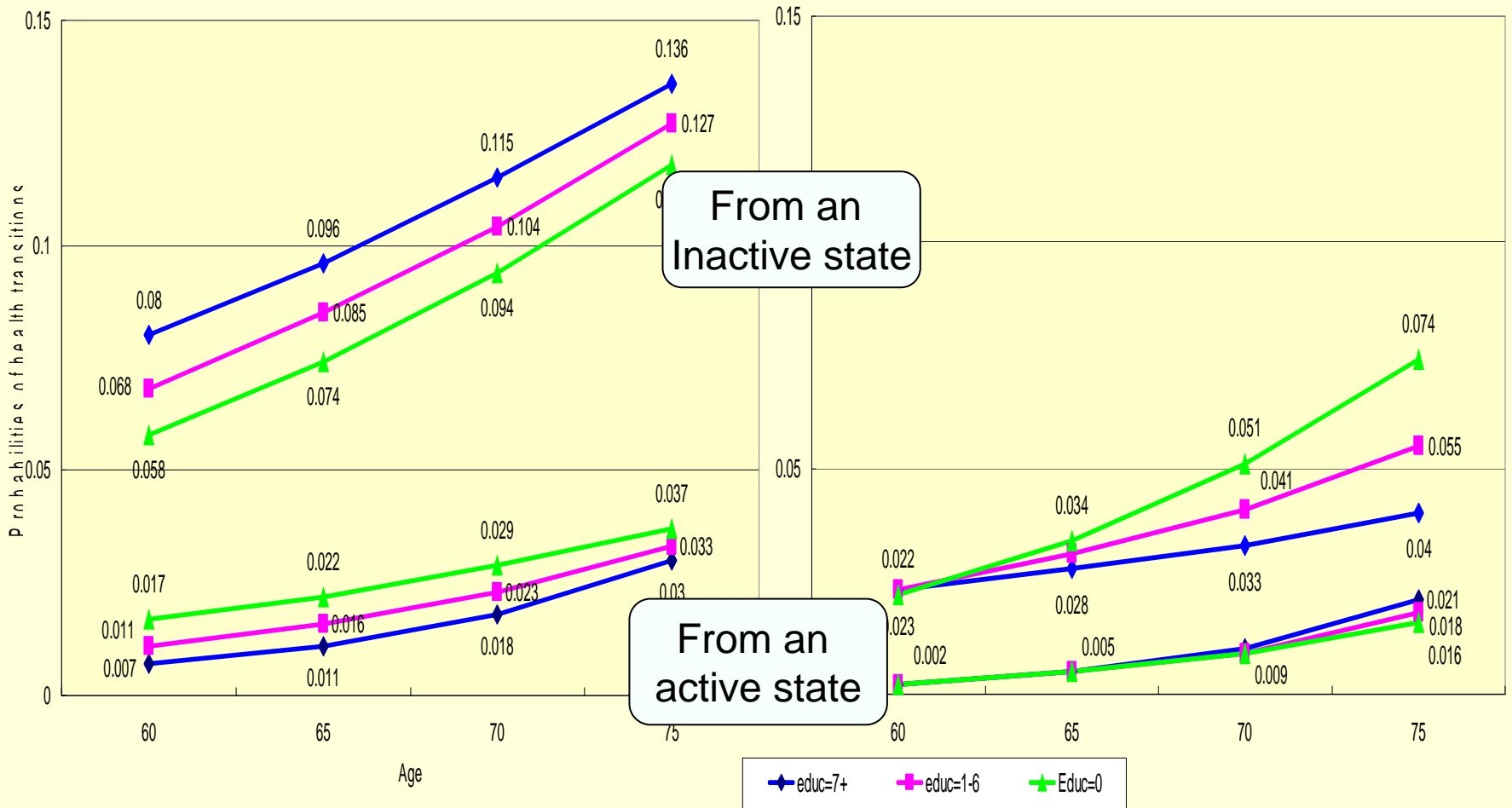
Older Females



Probabilities of Mortality

Older Males

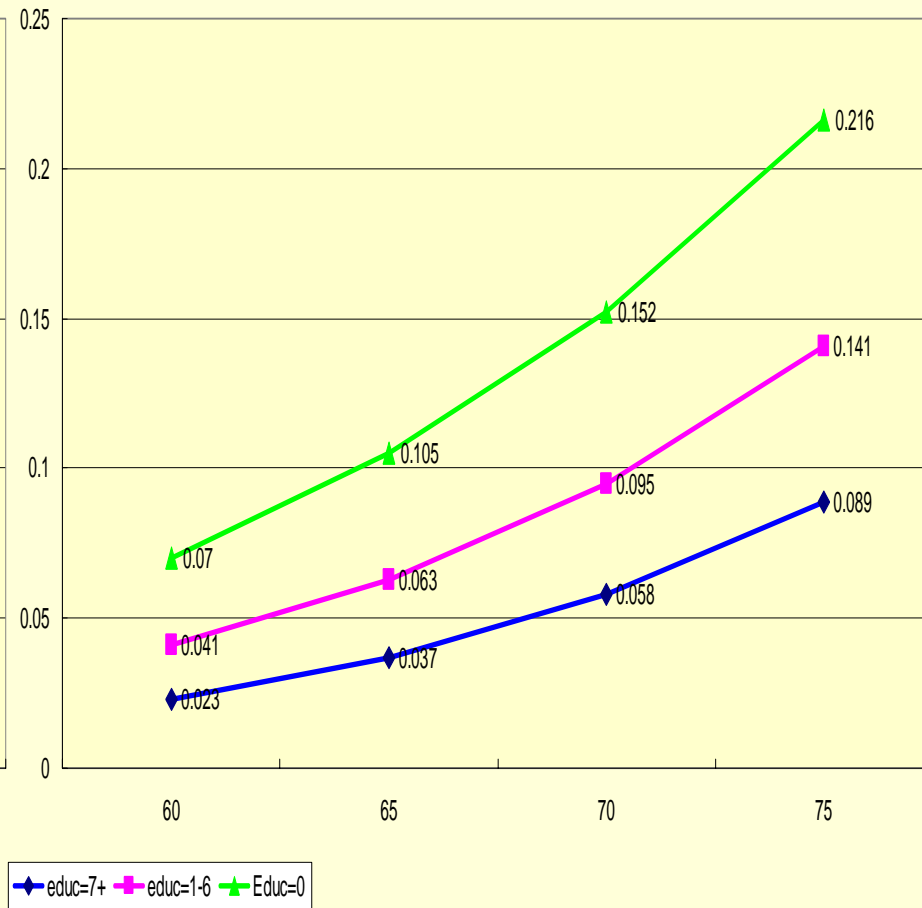
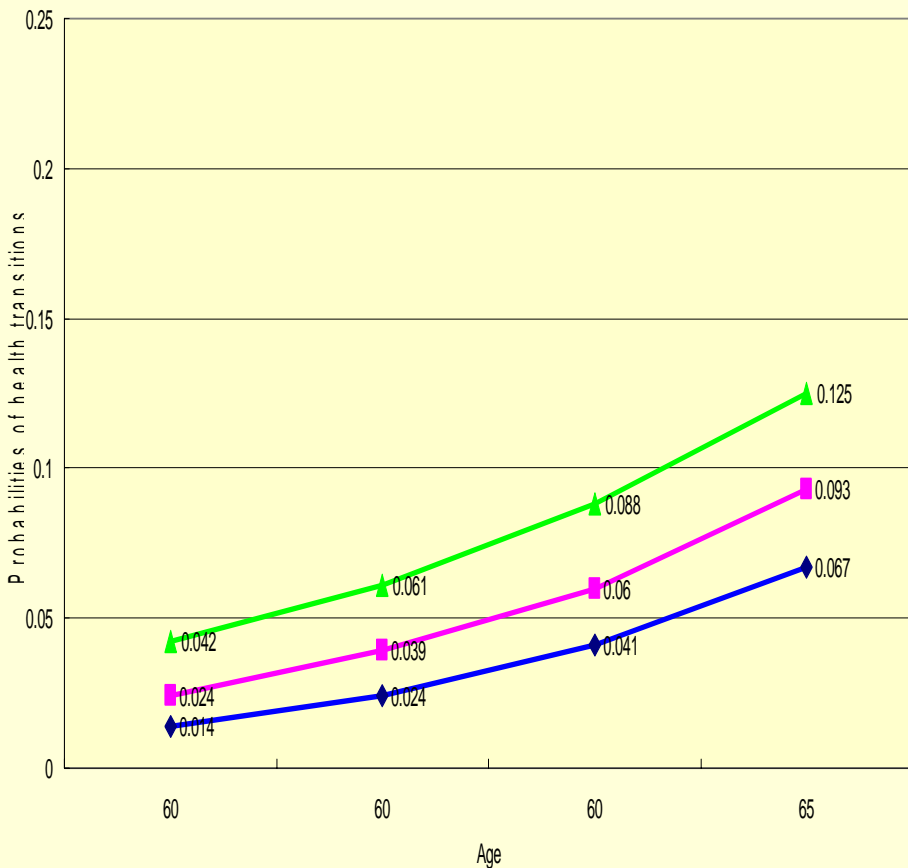
Older Females



PHTs for decreasing to an inactive state

Older Males

Older Females



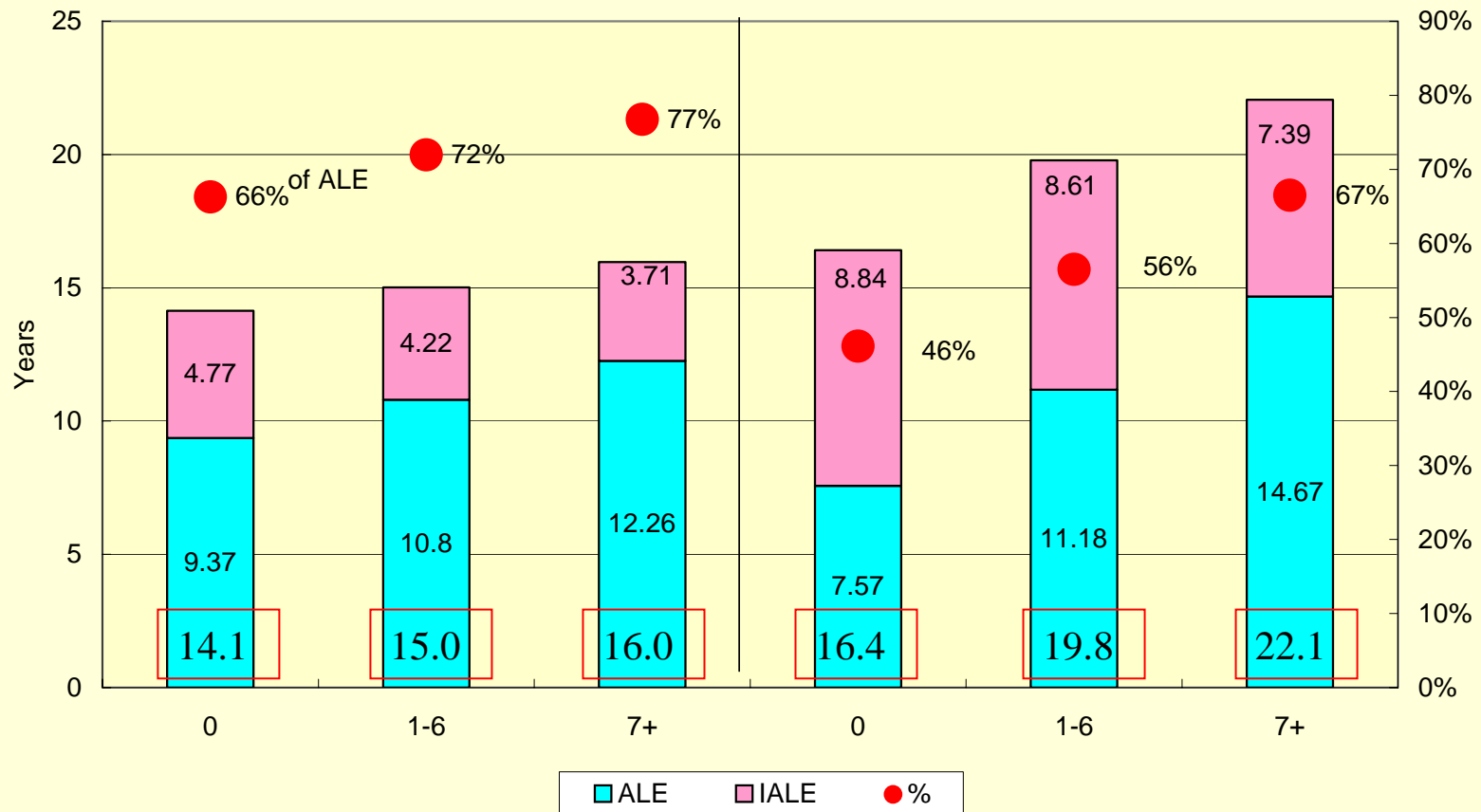
Discussions in PHTs

- Genders have different patterns of PHT
 - Males at age 60 and over
 - ➔ Higher Mortality, especially from inactive state
 - ➔ Higher PHT for decreasing to an inactive state
 - ➔ Lower PHT for improving to an active state
- Levels of education
 - Higher levels of education have consistently and positive impact on the PHTs for both genders cross ages
 - Higher level of education
 - ➔ Higher PHT for remaining in an active state & for improving to an active state (only for females)
 - ➔ Lower PHT for decreasing to an inactive state and mortality
- Exceptions for the older males who started with an inactive state

ALE at age 65 by gender and levels of education

Males age age 65

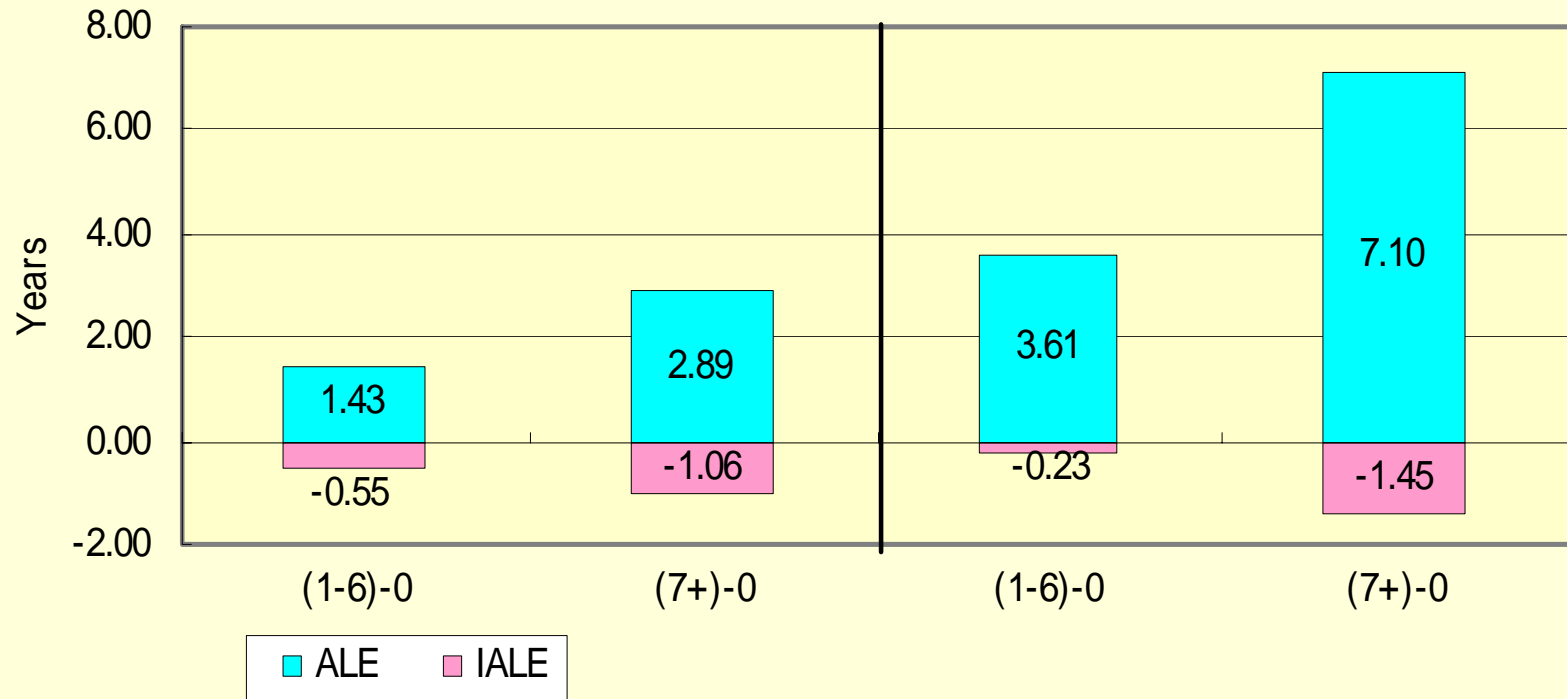
Females at age 65



Differences of ALE and IALE among levels of education

Males at age 65

Females at age 65



Conclusion – Significance of the Study

- This is the first study based on the panel survey data to estimate years of ALE for the elderly in Taiwan by using IMaCh program
- Gradient of inequities by educational status in ALE existed cross gender and age groups for the elderly in Taiwan
- Being females and with higher level of education have positive effects on the PHTs and ALE
- Years of differences in ALE among educational groups are greater for females (3.6-7years) than for males (1.4-3 years) at age 65
- Future research
 - Cohort effects on the ALE by gender and social economic status (SES)
 - How Risk factor of healthy life style, i.e. Obesity and exercise, related to ALE by gender and SES

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☺ Thank You ☺

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