


Aging and Health in Asia (AHA) Meeting

Trends of Active Life Expectancy for the Elderly in Taiwan 1989-1999

- *An Application of the IMaCh Approach*



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Contents of the Study

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Background Information

- In the past 50 years, demographic changed in Taiwan
 - Decreasing fertility by 75% and mortality 42.5%
 - Fertility 46.6 in 1952 and 11.7 in 2001
 - Mortality 9.9 in 1952 and 5.7 in 2001
 - Leading causes of death shifted from infectious to chronic diseases
 - Increasing life expectancy



Increasing the aged population



Study Question and Assumption - I

- **General Question -**

Do the elderly live longer and healthier in Taiwan?

- **Study Questions 1 -**

1. Health Transition (HT)

- What are patterns and trends of HT among the elderly ?
by gender?

Assumptions

HT: The older groups have lower rates of improving HT and higher rates of deteriorating HT

HT by Gender

The female elderly have higher rates of deteriorating HT and retention HT in unhealthy state.



Study Questions and Assumptions - I

2. Active Life Expectancy (ALE)

- What are patterns and trends of ALE for the elderly in Taiwan? By gender? By the initial health states?

Assumptions

ALE and inactive LE of the elderly increased as the LE did.

ALE by Gender: The female elderly have longer LE and ALE, but lower percentages of ALE.

ALE by the initial health states

The one who started with an active state will have a longer ALE compared to the one who started with an inactive state.



Method - Data and Survey Design

■ **Source of data**

- **Surveys of Health and Living Status of the Elderly in Taiwan (SHLSE)** Conducted jointly by the Bureau of Health Promotion (Taiwan) and the Population Studies Center and Institute of Gerontology at University of Michigan (U.S.)

■ **Survey design**

- Multiple stage sampling method
- Population: Age 60 and over in 1989 in Taiwan

Sampling and Response Rates

Content	1 st wave	2 nd wave	3 rd wave	4 th wave
Survey year	1989	1993	1996	1999
Interview mon.	4-11	4-12	4-12	4-12
No. and Age of respondents	4049 (60+)	3154 (64+)	2669 (67+)	2310 (70+)
Deceased c. (Cumulate c.)	-	590	470 (1069)	426 (1488)
Mortality rates	-	18.4%	17.4%	19.0%
Response rates	91.8%	91.2%	89.3%	90.8%
Proxy cases (%)	126 (3.1%)	203 (6.4%)	251 (9.4%)	241 (10.4%)



Question and Definition

- **Survey Question**

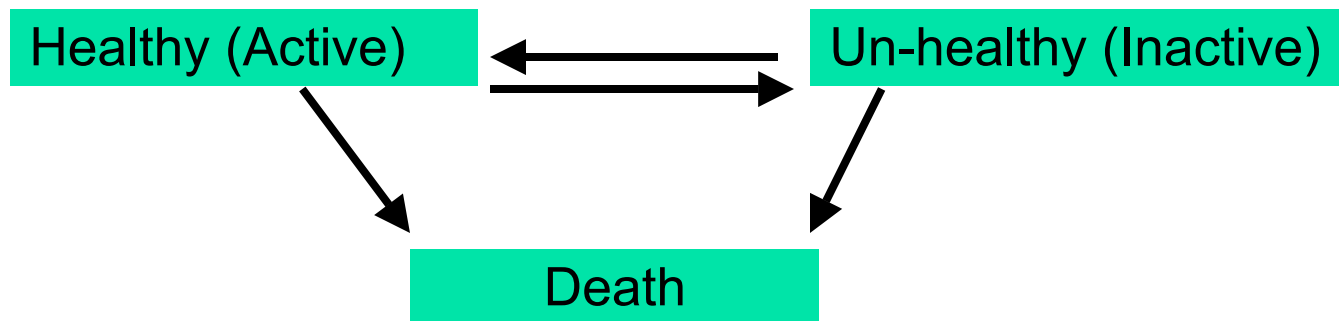
- Do you have any difficulty performing any of the following activities by yourself because of a health or physical problem?
 - Bathing, managing money, using the telephone, and shopping

- **Definition of an Active / Inactive states**

- Active state (Healthy state)
 - Without any problem performing any of the activities
- Inactive state (Unhealthy state)
 - Having at least one problem performing any of the activities

Research Design

- **Multi-state life table concept**



- **IMaCh program**

- The Interpolation Markov Chain (developed by Brouard & Lièvre)



Results of Frequencies and LE

↻ Frequencies

↻ Life Expectancy

Result 1 -Frequencies of Basic Variables

Survey year (SA) Variables (%)	1989 (60+)	1993 (64+)	1996 (67+)	1999 (70+)
Age (mean)	68.11	71.34	73.77	76.27
60-64 (%)	36.60	6.12	----	----
65-69	28.45	40.74	25.78	----
70-74	17.91	27.14	37.32	45.45
75-79	10.82	15.00	20.79	31.60
80-84	4.22	8.02	11.24	14.59
85+	2.00	2.98	4.87	8.35
Gender				
Male	57.08	56.44	55.90	55.02
Female	42.92	43.56	44.10	44.98
Total N	4049	3154	2669	2310
%	100	100	100	100

SA: Age of sample

Result 2 -Frequencies of ADL and IADLs

Survey year (N) Variables (%)	1989 (age 60+)	1993 (64+)	1996 (67+)	1999 (70+)
ADL – Bathing				
No Problem	94.04	93.71	91.72	87.23
With problem	5.96	6.27	8.28	12.77
Missing (N)	7	6	0	0
IADL - shopping				
No Problem	89.95	87.08	84.30	81.16
With Problem	10.05	12.92	15.70	18.84
Missing (N)	70	3	0	1
IADL - managing money				
No Problem	91.94	90.44	86.73	84.89
With problem	8.06	9.56	13.27	15.11
Missing (N)	53	4	2	0
IADL - using telephone				
No Problem	84.33	81.77	81.93	79.23
With Problem	15.67	18.23	18.07	20.27
Missing (N)	297	11	13	9
Sum of Activity limitation				
No problem	80.8	76.4	75.3	71.2
With problem	19.2	23.6	24.7	28.8
Missing (N)	4	2	0	0
Total N	4049	3154	2669	2310
%	100	100	100	100

Comparisons of Life Expectancy at Age 60

- **Official report***

	Male	Female
■ 1989 age 60	17.9	20.3
■ 1993 age 64	15.2	18.0
■ 1996 age 67	13.6	15.9
■ 1999 age 70	11.9	13.8

- **SHLSEs (survey data)**

■ 1989-93 age 64	15.0	16.4
■ 1993-96 age 67	13.0	15.3
■ 1996-99 age 70	13.6	14.3
■ 1989-99 age 70	12.2	13.1

Difference		
Male	Female	/(year)
0.2	1.6	/1993
0.6	0.6	/1996
-1.7	-0.5	/1999

Source: [REDACTED], 2002



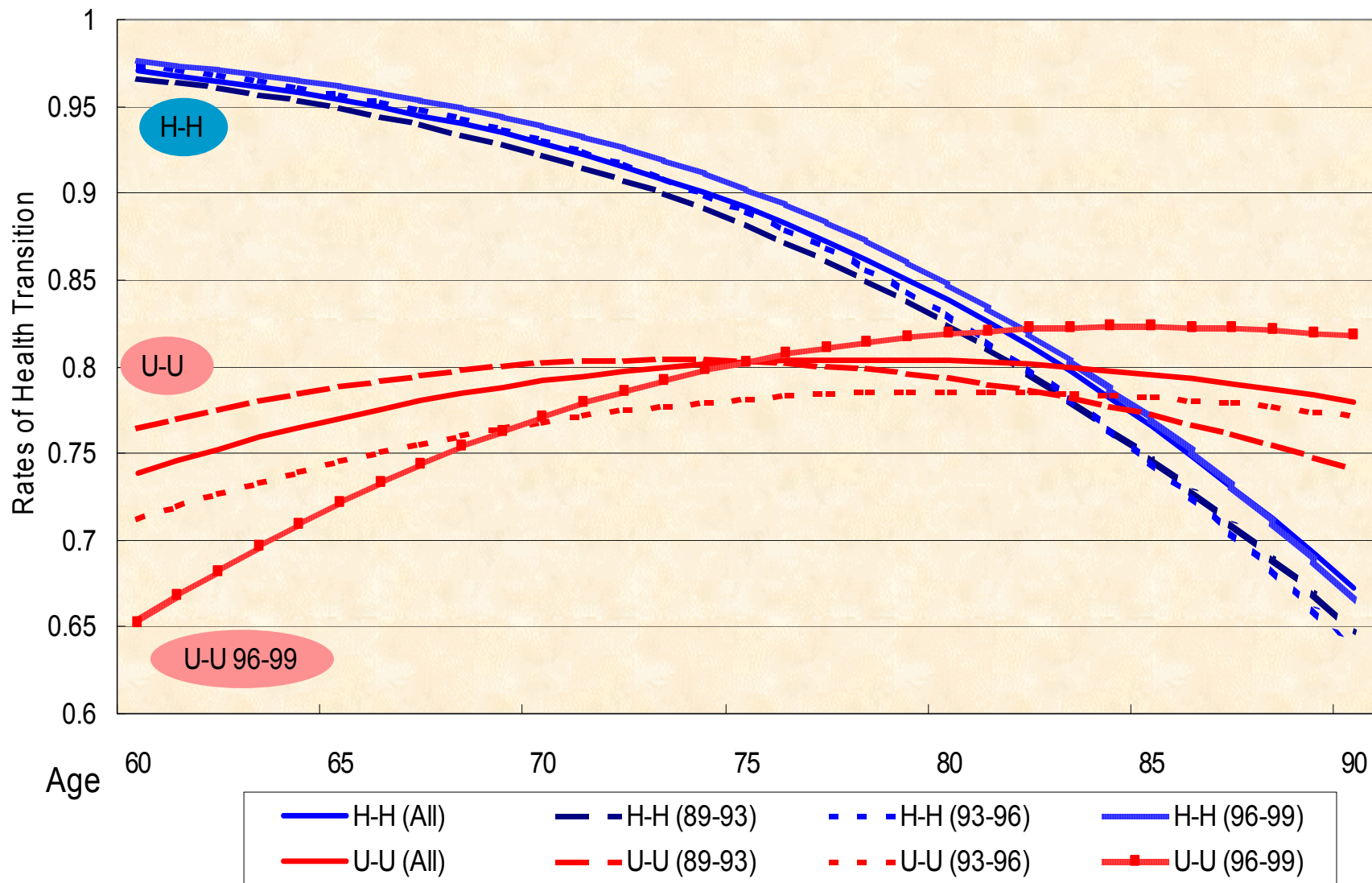
Results for Assumption I

Health Transition

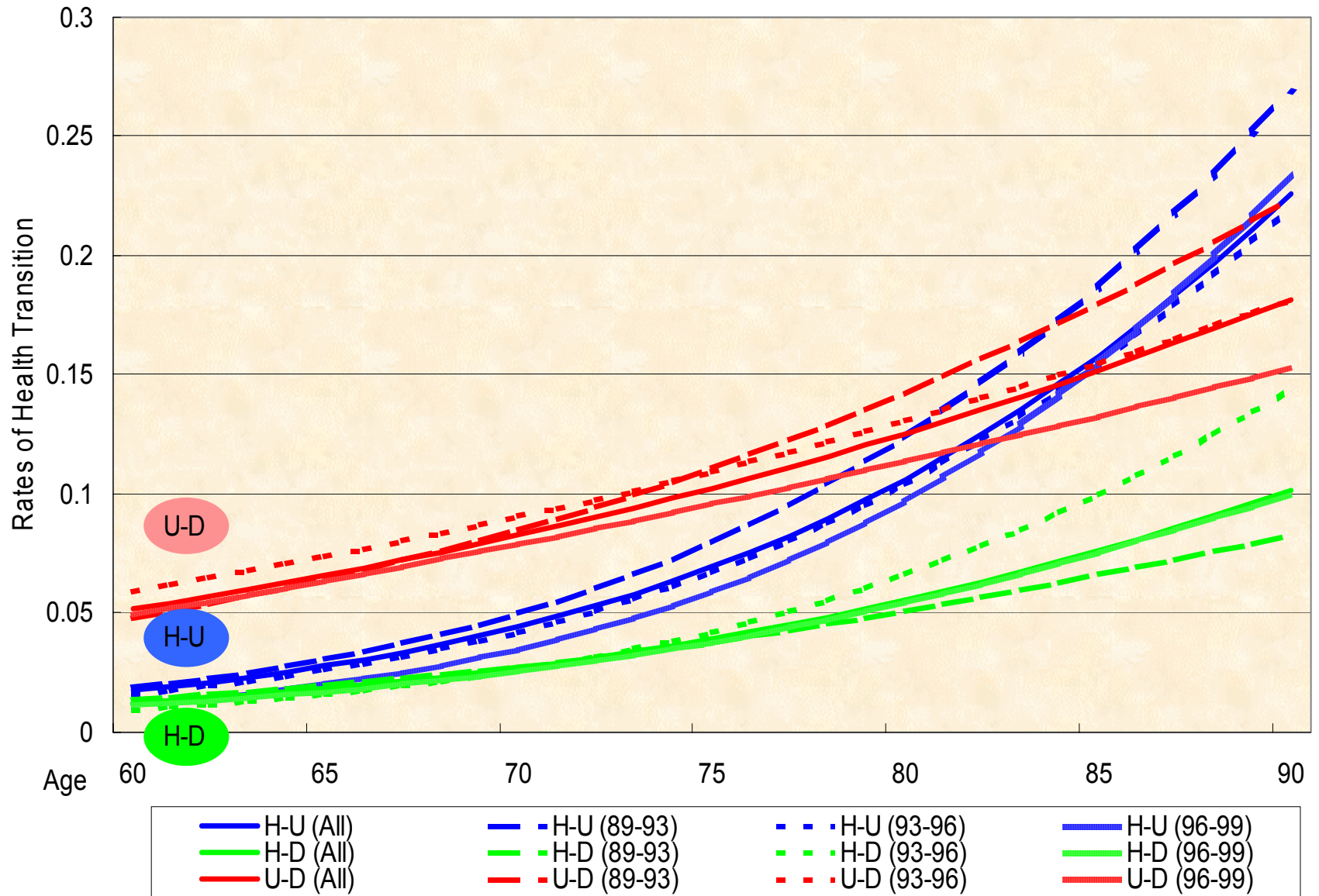
↻ General Patterns and Trends

↻ By Gender

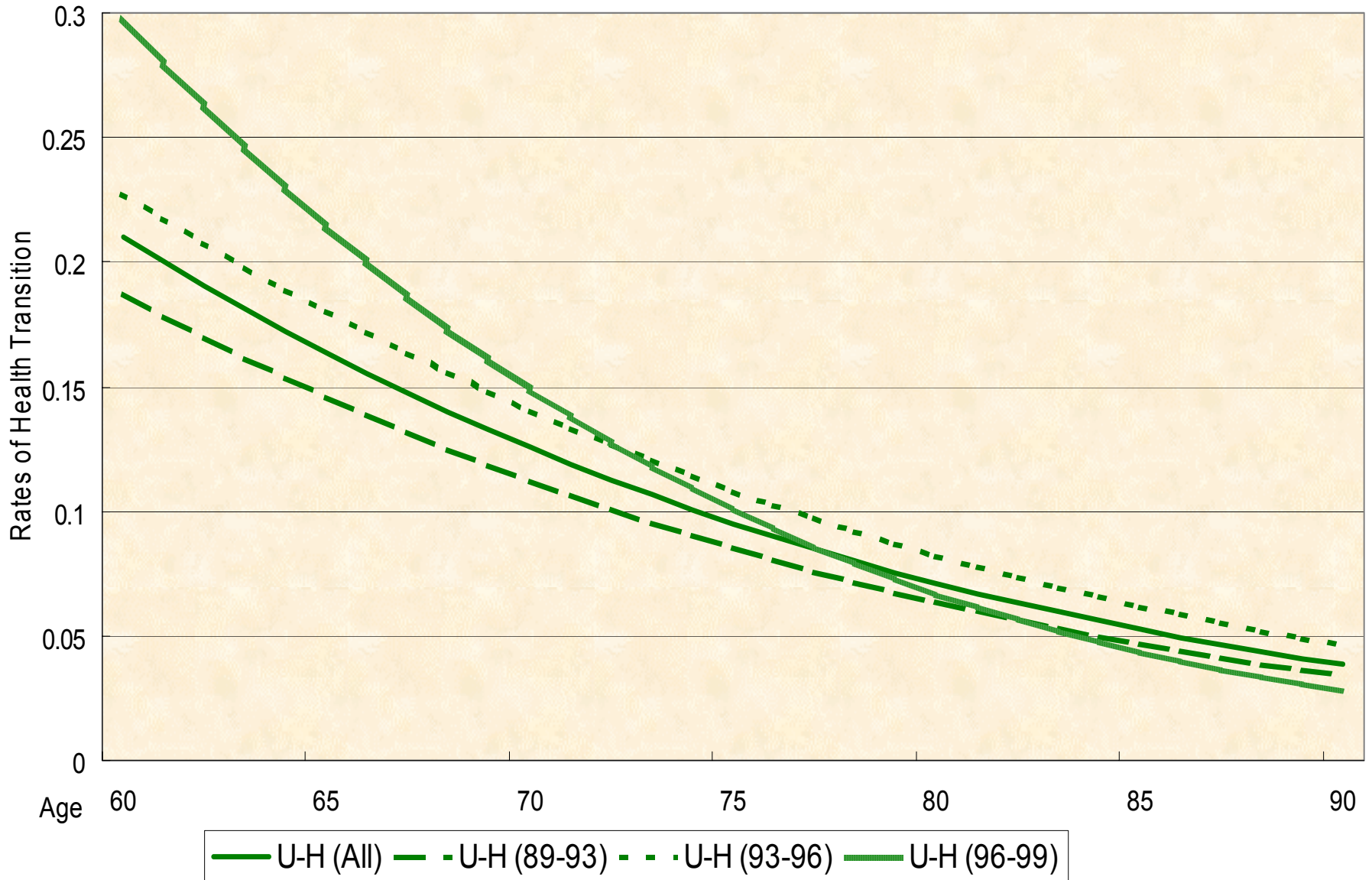
Probability of HT for the Elderly- Retention Health (1989-1999)



Probability of HT for the Elderly- Deteriorating Health (1989-1999)



Probability of HT for the Eldelry - Improving Health (1989-1999)





Health Transition by Gender

- The female elderly compared to the male elderly
 - Retention health state
 - Higher rates of HT staying in an inactive state
 - Lower rates of HT staying in an active state
 - Deteriorating health state
 - Higher rates of HT entering to an inactive states
 - Lower mortality rates, especially from an inactive state
 - Improving health state
 - Lower rates of HT improving to an active state, esp. after age 75.



Results for Assumption II

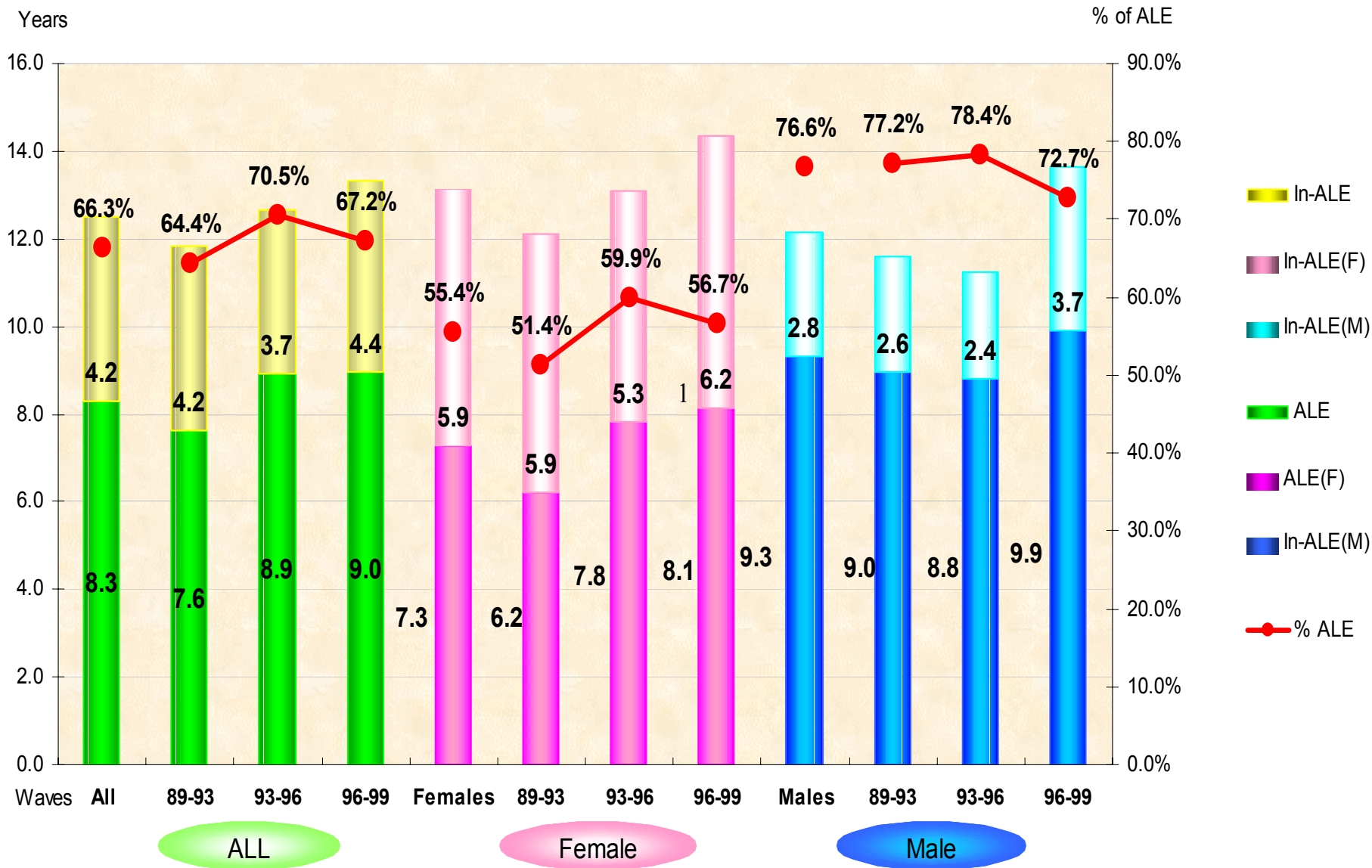
Active Life Expectancy

- ↻ General Patterns and Trends

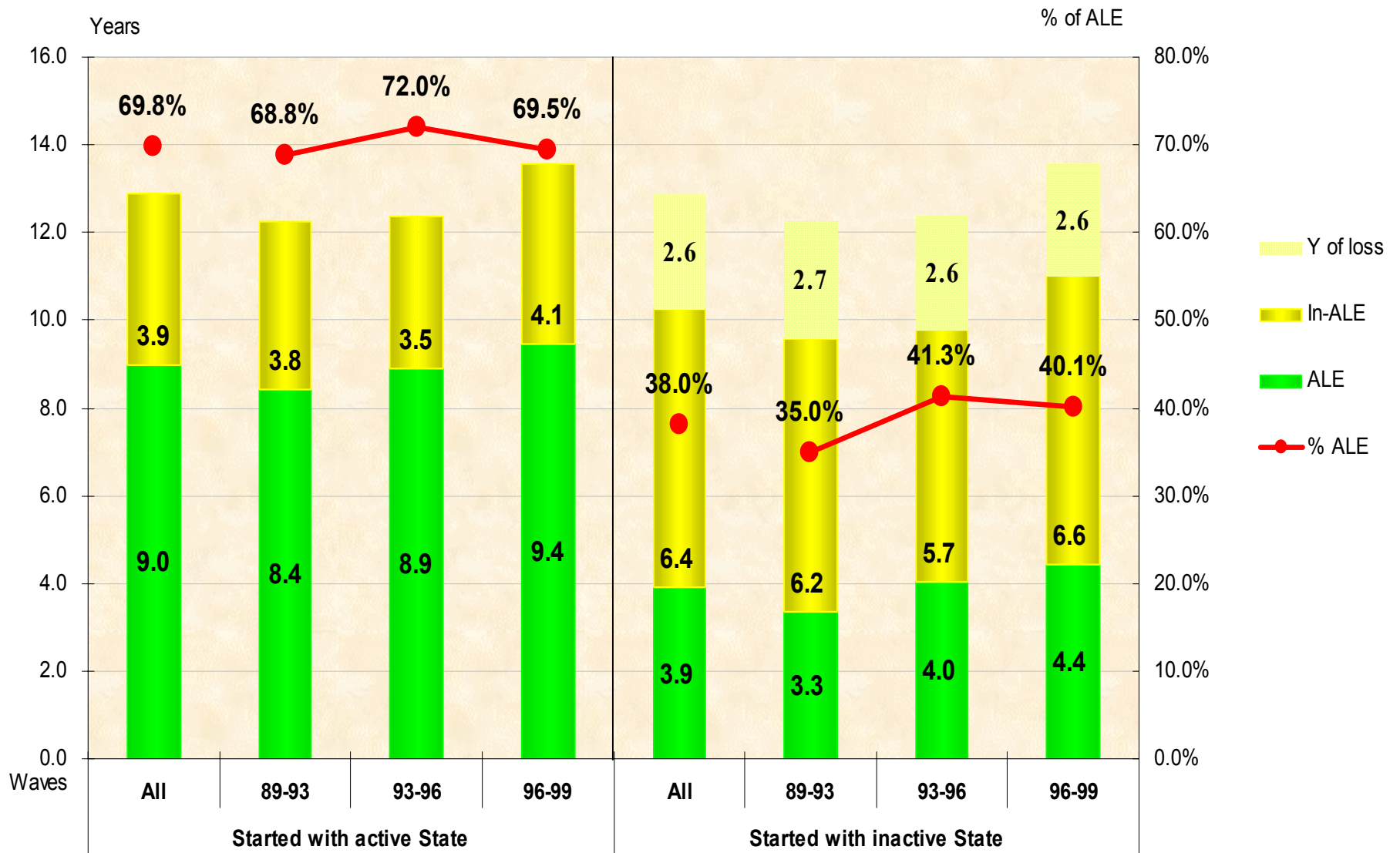
 - ↻ By Gender

 - ↻ By Initial Health Status

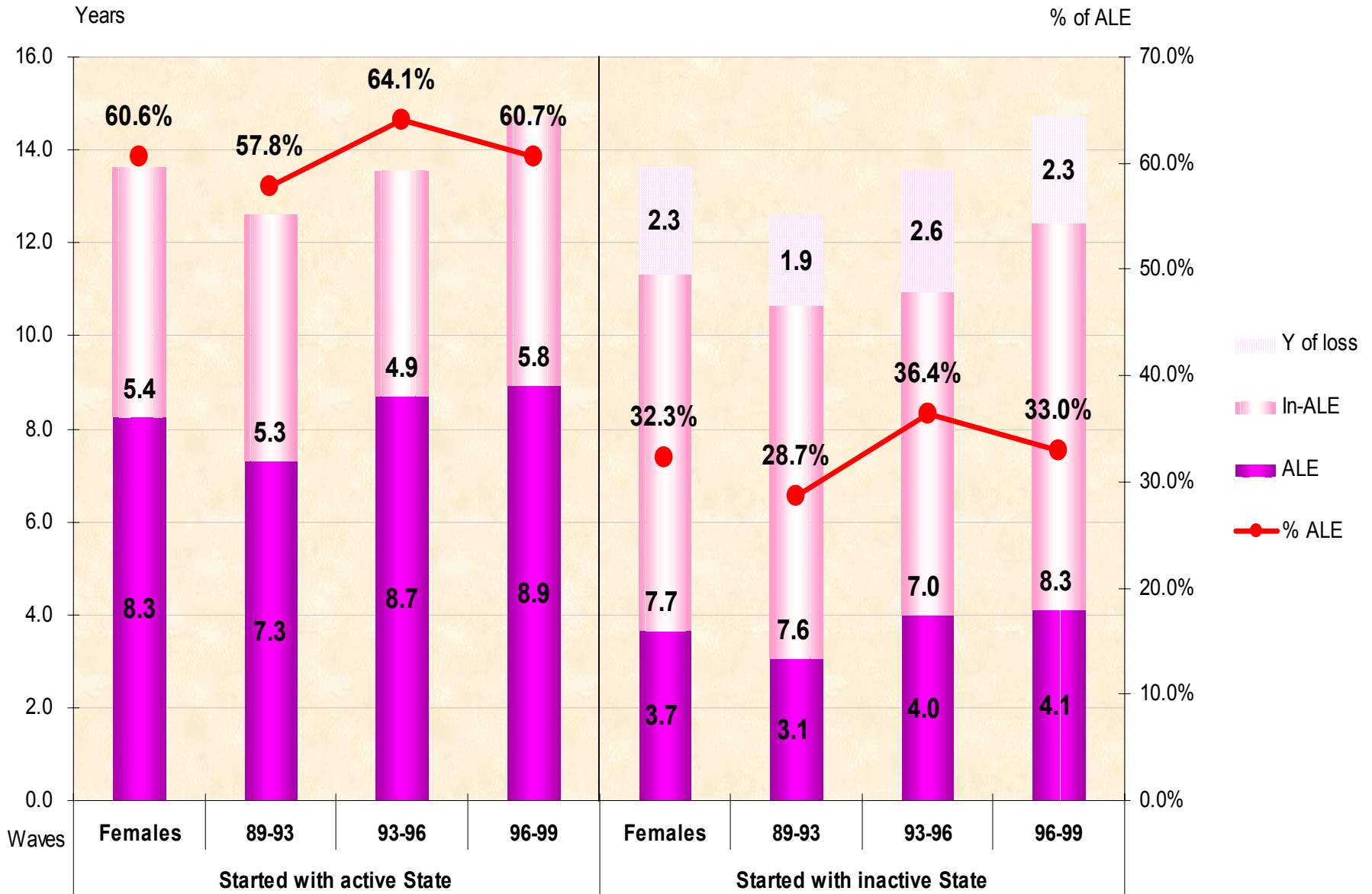
ALE Between Each Two Waves at Age 70- by Gender (1989-99)



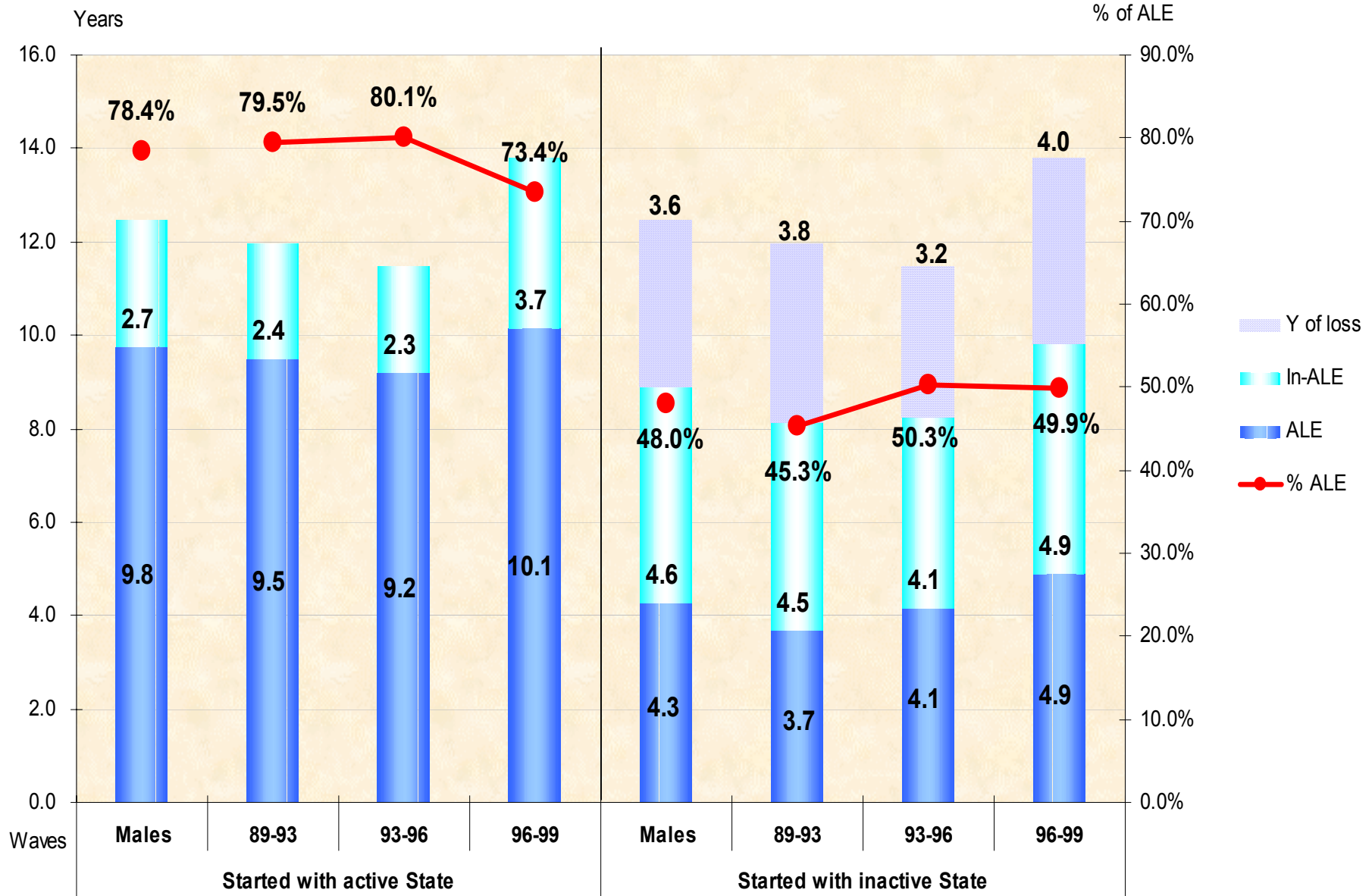
Comparison of ALE by Initial Health Status at Age 70 (1989-1999)



Comparison of ALE by Initial Health Status at Age 70 (Female 1989-99)



Comparison of ALE by the Initial Health Status at Age 70 (Male 1989-99)





Summary - Health Transition

- **General trends**

- Decrease rates of retention and improving HT for staying or entering an active state by age
- Increase rates of deteriorating HT for entering an inactive state or death by age

- **The female elderly**

- Higher rates of retention HT for staying in an inactive state
- Higher rates of deteriorating HT for entering an inactive state
- Lower mortality rates either from an active or an inactive state

- **The male elderly**

- Much higher mortality rates, especially for those who started with an inactive state



Summary - Active Life Expectancy

- **General patterns (age 70)**
 - LE increased during 1989-1999
 - ALE increased during 1989-96, but kept stable during 1996-99
 - Inactive LE increase during the first-two and third-forth waves
- **The female elderly – the results are similar to previous literatures**
 - At age 70 --**
 - 0.5-1.9 years longer of LE
 - 2.5-3.3 years longer of inactive LE
 - 16.0%-25.8% lower ALE%
- **Different pattern**
 - 1.0-2.8 years *shorter of ALE*



ALE by Initial Health State

- General patterns - at age 70
 - The ***healthy elderly*** are expected to live around ***5 years longer*** in an active life
 - The ***unhealthy elderly*** are expected to live ***2.2-2.5 years longer*** in an inactive life, and are likely to live 2.6 years shorter in general

Differences of LE/ALE by Initial Health Status & Gender

Age 70	All waves	W1-W2	W2-W3	W3-W4
All				
LE	2.6	2.7	2.6	2.6
ALE	5.1	5.1	4.9	5.0
In-ALE	-2.5	-2.5	-2.2	-2.5
Female				
LE	2.3	1.9	2.6	2.3
ALE	4.6	4.2	4.7	4.8
In-ALE	-2.3	-2.3	-2.1	-2.5
Male				
LE	3.6	3.8	3.2	4.0
ALE	5.5	4.8	5.1	5.2
In-ALE	-1.9	-2.1	-1.8	-1.2

Difference= Who started with an an active state – Who started with an inactive state



Limitation

- Changing patterns of questions and categories of answers
 - Increase missing values
- Simplifying disablement process
 - Only consider age and gender in the study
 - Other risk factors should be considered in future study such as education, life style,.. etc.

Limitation and Problem

1989

- 1.No problem performing
- 2.Have some difficulty performing
- 3.Have difficulty performing
- 4.Can not perform

5.Do not know

6.Never perform the task



1993, 1996, 1999

- 1.No problem performing
- 2.Have some difficulty performing
- 3.Have difficulty performing
- 4.Can not perform



Recoded as missing value



Conclusion and Policy Implication I

High risk groups

- Higher deteriorating HT
- Higher retention HT in an inactive state
- Longer inactive LE
- Higher mortality rates

- 
- 
- Older age group, esp. 75+
 - Female elderly

- Unhealthy male elderly

Policy implication

☞ Those are target groups who need more long-term care

☞ Projection of the needs of LTC in the future



Conclusion and Policy Implication II

■ ALE

- The female elderly have a longer life, but with a longer inactive LE
- The healthy elderly are expected to live 5 years longer in an active life
- The unhealthy elderly are expected to live 2.6 (male 3.6, female 2.3) years shorter and spend 2.5 (male 1.9, female 2.3) more years in an inactive life

Policy Implication

- ☞ Health promotion to keep the elderly as active as possible, esp. for middle and old age of the female
- ☞ Research on risk factors of unhealthy status for the elderly



Future Research Plans

- Include other covariates
- Age-cohort differences in disability prevalence
 - Need to add new sample in 1996 (age 50-66) into analysis
- Risk factors of health status for the elderly



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Thank You

Comments are Welcome