PRELIMINARY DRAFT: PLEASE DO NOT QUOTE

Disability Prevalence and Disability Transitions among Older Singaporeans: Gender and Socioeconomic Differentials

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Introduction

Older females typically experience higher rates of disability compared to older males in both Western and Asian settings (Chan and Jatrana 2004; Fuller, Edwards, Sermsri et al. 1993; Li, Liang, Toler et al. 2004; Zimmer, Natividad, Ofstedal & Lin, 2001; Rahman, Strauss, Gertler, Ashley & Fox, 1994; Strauss, Gertler, Rahman & Fox, 1993; Zimmer Liu, Hermalin & Chuang, 1998; Zimmer, Martin, and Chang, 2002). Recently, there is evidence of a narrowing of gender differences over time in the United States. Crimmins and Saito (2000) show that in spite of an increase in the prevalence of disease and co-morbidity, that functioning and IADL disability improved among older women with chronic diseases. Men, however, experienced a greater increase in disease prevalence and co-morbidity, and no reduction in disability, during the period under study (1984-1994). Changes in disability prevalence rates are an outcome of individual-level disability transitions which have been less frequently studied until recently (Liu, Liang, Muramatsu, and Sugisawa 1995). If the determinants of these transitions differ for men and women it is important to document and understand them to allow us to learn more about specific interventions and behavioral changes that may underlie population-level trends trends (Freedman and Martin 1998). Understanding the determinants of gender differences in disability transitions will also allow more accurate forecasting of potential changes in population health levels over time.

Singapore provides a useful setting for studying gender differences in disability prevalence and disability transitions. It is useful for comparative purposes, as noted by Liu et al. (1995), testing the importance of variables determining disability prevalence rates and disability transitions in a non-Western setting allows us a better understanding of the relationships under study. Singapore provides an additional setting in which to examine whether prevalence rates of disability decrease over time with socioeconomic development and longer life expectancy. According to the compression of morbidity hypothesis (Fries 1975), longer life expectancy does not translate into more years with a disability, rather morbidity and disability are concentrated in the last few years of life, such as found in the United states since the 1990s (Freedman et a. 2004). Other authors note, however, that the initial mortality decline may be associated with increases in morbidity and disability prevalence rates as older cohorts at the time of the mortality decline have relatively lower education levels and poorer health behaviors over their life course.

Singapore is a developed country where life expectancy has reached 81 years for females, and 77 years for males (http://dos.org.sg). Currently 19% of the population is over the age of 60 and by 2030 this proportion will have increased to 30%. This translates into an increase in the old age dependency ratio from 1:10 in 2000 to 3:10 in 2030. The gender ratio among those aged 60-64 is 104: 100 (women to men) and rises to 117: 110 among those aged 85 and over (Department of Statistics, 2001). Singapore's multi-racial composition of Chinese, Malays, and Indians allows testing for gender differences for different cultures. Including cultural indicators, such as ethnicity, provides potential to understand underlying causal mechanisms that influence health status over and above demographic and socioeconomic variables.

Existing research on gender differences in disability prevalence rates shows that older women report more disability than older men in Asia. Women report more disability compared to men in Thailand (Sobieszczyk, Knodel, and Chayovan, 2002). Research on Bangladesh, Jamaica, and Malaysia reveals that women are more likely to report more problems with physical functioning and general health across the life cycle (Strauss, et al., 1993). These age-related gender differences remain even after controlling for education and location factors. Results from Taiwan suggest that reductions in mortality have been accompanied by increases in the probability of the onset of functional difficulty. However, there have also been improvements in rates of recovery for those who have functional difficulties (Zimmer and Lin 2000). Previous research on the relationship between gender and disability for Taiwan suggests gender differences in disability prevalence rates, however this was not specifically tested (Zimmer and Lin 2000).

Gender differences in disability transitions have been studied in China (Liang, Liu, and Gu 2001) and Japan (Liu et al. 1995). Older women in Japan are 4% less likely to die compared to older men, however, there are no gender differences in the transition into, or out of the disabled state. Interestingly, in China, Liang et al. (2001) find similar gender differences in the probability of dying, with no gender differences in the probability of becoming disabled over time. One possible explanation may lie in the different roles accorded to men and women in different societies that may translate into behavioral and psychological outcomes over the life course ultimately affecting health status at older ages. Even within Asia, cultural differences among ethnic groups within particular societies may result in different gender role expectations. Asian settings provide the opportunity to test existing theories regarding the association between gender roles and health.

The analysis begins by establishing whether there are gender differences in disability prevalence rates for Singapore after controlling for compositional variables. This is followed by an analysis of the determinants of disability transitions, taking into account mortality and attrition as potential outcomes. This analysis closely follows a model developed by Liu et al. 2001) which takes into account, among other things, the effects of demographic characteristics, clinical health (chronic disease, self-rated health), and social support. Unfortunately information on health behaviors was not available in the baseline survey for Singapore. Based on a review of the literature studying the determinants of disability transitions, the following categories of variables are hypothesized to have a significant effect on predicting disability at older ages.

Demographic characteristics. Older ages are hypothesized to be associated with higher disability prevalence rates, and an increased probability of transiting into the disabled state, and death (Liu et al. 1995; Zimmer et al. 1998; Manton and Soldo 1985). Older women are hypothesized to be less likely to die compared to older men but more likely to be disabled, and to become disabled over time (Liu et al. 1995; Manton 1990).

Socioeconomic characteristics. Education level, income, and work status, are included as indicators of socioeconomic characteristics. Higher education levels are hypothesized to be associated with lower levels of disability and mortality in developed countries (Adler

et al., 1993, 1994). Freedman and Martin (1999) find that lower educated individuals are twice as likely to report a functional limitation in late life. Existing research on China, Japan, the Philippines, Taiwan, Thailand, and Singapore does not show a uniform effect of socioeconomic status on health such that higher socioeconomic status is associated with better health, or a lower probability of transiting into an unhealthy state (Liang, McCarthy, Jain, Krause, Bennett, and Gu, 2000; Liang, Liu, and Gu, 2001, Liang, Bennett, Krause, Kobayashi, and Kim, 2002; Zimmer and Amornsirisomboon, 2001; Zimmer, Hermalin, and Chuang, 1998; Zimmer, Hermalin, and Lin, 2002a). Zimmer, Chayovan, Lin, and Natividad (2004) show that education is found to be associated with functional health in Taiwan but is a weaker predictor in Thailand and the Philippines. Even within a particular setting, the effects of education are mixed. For example, higher educated Taiwanese individuals are less likely to experience the onset of disability, however, education level has little influence on the transition out of having a disability (Zimmer, Liu, Hermalin et al., 1998). Limited effects of education have also been found for Japan (Li, Liang, Muramatsu, and Sugisawa, 1995). Controlling for education level is expected to reduce gender differences in disability transitions since the majority of Singaporean female elderly in these data have no education. Higher income is associated with lower disability rates in the United States (Stuck et al. 1999). Older males are more likely to have worked over their life course in Singapore and therefore have higher incomes in old age. Older females, on the other hand, are more likely to rely on children for financial support (Chan 1997). Controlling for income level and work status to test whether these items reduce gender differences in disability.

Social Support. Previous work has consistently shown social support to have a positive effect on the physical and mental health of older adults in developed countries (Stuck et al. 1999). Although social support can be defined in a variety of ways, in this analysis marital status and living with an adult child are used as proxies for the availability of social support. In the US, the correlations between marital status and functional status depend on gender, social environment and socioeconomic status (Arber and Ginn 1993; Goldman et al., 1995 and Stuck et al. 1999). Married males report much better health status compared to married females. I test whether there are gender differences in marital status and living arrangement effect on disability transitions.

Ethnicity. Finally, ethnicity is controlled in the analysis. Previous research in developed countries has shown that ethnicity plays a non-trivial role in differentiating groups by health status (Martin and Soldo, 1997). Existing research for Singapore suggests ethnic differences in several health measures at the population level. Thumboo, Fong, Machin, Chan, Soh, Leong, et al., (2003) found significant ethnic differences in health-related quality of life among the Chinese, Malays and Indians in Singapore. Ethnic differences in mortality associated with diabetes, probability of heart failure, and cancer risks, were also found for Singapore (Ma, Cutter, Tan, Chew and Tai, 2003; Ng and Niti, 2003; Wang, Seow, and Lee, 2004). Gender roles within each ethnic group are quite varied and may result in very different outcomes. For example, women in Malay communities have higher fertility. Older Malay men have rather high social status derived from their religious activities, a fact that may partially explain higher suicide rates among older

Chinese males (Seth 2001). I test whether gender interacts with ethnicity to influence disability transitions.

Data and Methods

Longitudinal data from the 1999 survey, *Transitions in Health, Wealth, and Welfare of Elderly Singaporeans: 1995-1999* are used. The data were collected as part of a follow-up to the 1995 *National Survey of Senior Citizens.* In 1995, a representative sample of 4,750 individuals aged 55 and above were interviewed concerning a variety of issues including demographic characteristics, work and retirement, living arrangements and intergenerational support, income and assets, health status and behaviors, and involvement in voluntary activities and organizations. In 1999, NUS researchers attempted to re-interview as many of the original respondents as possible.[7] Although the initial 1995 survey was not designed as a longitudinal study, taking into account the mortality rate for this age group (4% per year) and other losses to follow-up (including moves and severe health impairments impeding interview), we managed to re-contact 42% of the original respondents (n=1,977). In order to adjust for panel attrition we calculated a weight adjustment based on the estimated probability of non-response derived from a multivariate regression model including age, sex, ethnicity and marital status as the predictors of non-response. (Full details of the weighting procedure and model specification can be found in Ofstedal et al., *forthcoming*).

Disability refers to the social result of the interaction between disease, impairments, and functional limitations (Nagi 1965, in Spector and Fleishman, 1998). Freedman, Crimmins, Schoeni, Spillman, Ayakan, Kramarow et al., (2004) stress the social aspect of the concept of disability and point to the importance of a person's physical environment, psychological capacity, and the demands of a given social and environmental context, in determining whether or not one has a disability. In this study prevalence rates of actual disability, i.e., the presence of a disability [with help, if used], are examined (Verbrugge, 1990). The definition of disability is constrained to questions on disability that are comparable across waves. Information on the ability to perform the following activities was available for both waves of data:

- Activities of Daily Living (bathing/dressing, feeding, and toileting),
    - 1995: *Can you feed yourself/go to the toilet independently/groom yourself (includes bathing)?* [Respondent was asked about each item separately].
    - 1999: *Because of mental or physical health problem, do you have difficulty with bathing, feeding, or toileting?* [Items were combined into one question as indicated].
- Instrumental Activities of Daily Living (using transportation, shopping, preparing meals, and light housework)
    - 1995: *Are you able to perform the following tasks on your own? Clean the house/prepare meals/use public transport/shopping/marketing?* [Respondent was asked about each item separately].
    - 1999: *Because of mental or physical health problem, do you have any difficulty with preparing own meals/shopping for groceries/personal needs/doing light housework like cleaning*

dishes, straightening up, light cleaning/using public transport to places that are beyond walking distance? [Respondent was asked about each item separately].

Disability is defined as having difficulty performing any one or more ADL or IADL noted above.

Models of disability transitions

Health transition is based on a comparison of status at two points in time separated by four years, 1995 and 1999. The four categorical outcomes in the multinomial logit model are decline in functional status, same level of functional status, death, and lost to follow-up for individuals who began without any disability. For respondents who had a disability at Time 1, the four categorical outcomes are improvement in functional status, same level of functional status, death, and lost to follow-up. These are presented in Figure 1.

[Figure 1 about here]

Multinomial logistic regression is used to examine changes in functional status between Time 1 and Time 2. Models are estimated for individuals who began without any disability.

The equation for this set of analyses can be expressed as:

$$P_{ij} = exp(X_i B_j) / \sum_{K=1}^{J} exp(X_i B_k)$$

Where P_{ij} is the probability that individual *i* makes health transition *j* between Time 1 and Time 2, x_i represents the characteristics of individual *i* at time 1, B_j represents the corresponding parameter vectors, and J represents the number of health transition outcomes, in this case four.

Results

Disability prevalence

Table 1 shows the weighted percentages for the independent variables at baseline (1995). Table 2 shows the percent reporting ADL and IADL limitations at baseline and follow-up, separately and combined, by gender. The percent reporting functional limitations increased for both genders over time and females are more likely to report functional limitations compared to males.

Table 3 shows the odds ratios for the logistic regressions predicting disability (reporting at least one ADL or IADL) using data pooled across survey waves. In the bi-variate model, older males are significantly less likely to report a disability compared to older females. There are no significant gender differences in the multivariate model. Disability prevalence increases for the whole population increases 1.26 times between 1995 and 1999. Increased disability prevalence levels are associated with older ages, minority status, living arrangements at Time 1 and the presence of a chronic disease at Time 1.

Disability Transitions

Table 4 shows change in disability status between 1995 and 1999 among respondents who started out without any disability in 1995, by gender. Approximately 40% of males remained healthy, compared to 43% of females. Among healthy males, 5% became disabled by 1999, compared to 7% of females. Mortality was higher for men, 6% of males died compared to 5% of females. More males were loss to follow-up compared to females. The chi-square shows that the gender differences reported are significant.

Among respondents with a disability at baseline, 9% of males and 16% of females remained disabled at Time 2. Males were significantly more likely to recover, 29% compared to females, 17%, by Time 2. Mortality among the disabled was higher among females, 23%, compared to males, 19%. Among the disabled, 43% of males and 44% of females were lost to follow-up. The chi-square shows that the reported gender differences are significant.

[Table 4 about here]

Table 5 shows the results for the multinomial logistic regression predicting the onset of disability (and also death and lost to follow-up) for individuals who began without any disability. In the bi-variate model, older males are 0.8 times less likely to become disabled compared to older females. As shown in the multivariate model, married males are significantly less likely to become disabled compared to married females. Malay men and men who worked at baseline are significantly more likely to become disabled compared to Malay women and women who worked at baseline, respectively. There are no significant effects of living arrangements, presence of a chronic disease, and self rated health.

Older males are more likely to die compared to older females and this gender effect is not reduced when covariates are included in the model. In the multivariate model, males are 2.2 times more likely to die compared to females. Marriage, however, continues to benefit males. Married males are almost half as likely to die compared to married females. The effects of the other covariates are in the expected direction and there were no significant interactions with gender. Older ages are associated with a greater risk of dying. Minority status, higher education, and good self-rated health at baseline are associated with lower risks of dying.

[Table 5 about here]

Table 6 shows the results for the multinomial logistic regression predicting recovery from disability (and also death and lost to follow-up) for individuals who had a disability at T1. In the bivariate model, older males are significantly more likely to recover from a disability compared to older females. In the multivariate model this male advantage disappears. A higher probability of recovery is associated with having worked at baseline and reporting good self-rated health at baseline. Lower probability of recovery is associated with being aged 75 and above, Chinese, and reporting the presence of a

chronic disease at baseline. As for the sample that started out without any disability, males in the sample with a disability at baseline are significantly more likely to die compared to females with a disability at baseline. Gender differences in loss to follow-up do not occur once covariates are introduced to the model.

Discussion

Gender differences in disability prevalence rates and disability transitions have been found in both Asian and Western settings. This paper examines whether gender differences in prevalence rates and disability transitions exist in Singapore and the determinants of these gender differences.

There are no gender differences in disability prevalence rates in Singapore. Older respondents, minorities, and unemployed older adults, have higher disability prevalence. These results mirror those found in Western settings. What is unique about the Singaporean situation is that there are no significant effects for gender, individual income, or education level. Higher individual income and education are typically associated with lower disability rates in Western settings. Differences in health infrastructure may mediate gender, education, and income effects on disability prevalence rates in Asian settings. In addition, the pervasive role of the Singaporean family in managing the health of older adults (such as transmission/translation of health care knowledge, health care utilization, and health care financing) may lessen individual effects on disability prevalence rates.

Gender differences in disability transitions exist in Singapore. Few studies of disability in Asia take into account recovery from disability, death, and loss-to-follow-up, which are important transitions influencing gender differences in population health levels. As Liu et al. 1995) note, when attrition is not random, omitting sample attrition from the state space will lead to misspecifications and biased estimates of the competing risks and marginal effects. Among older adults who do not have a disability at baseline, married males are the least likely to become disabled, and to die, over time. This supports the idea that marriage has a protective effect for males as has been found in Western settings.

Interestingly, living arrangements are not a significant predictor of disability transitions. In Singapore, the government is extremely proactive in promoting co-residence of older adults with their adult children. For example, tax incentives and priority housing are provided to those adult children who live with their older parents. These efforts are carried out due to an entrenched notion that co-residence will benefit older adult well-being. It may be, however, that the measure of co-residence is too general and should be differentiated by gender of the adult child and nature of kin living in the household. If, however, co-residence does not have any effect on disability transitions, focusing policies to enable assisted living scenarios where older adults can maintain independence may be more productive.

Ethnicity is an important factor to consider in the Singapore context. Malay males are the most likely to become disabled in this sample. This is a result that needs to be further studied. The determinants of ethnic differences in overall disability prevalence rates, and individual disability transition probabilities, are not well-understood in Singapore. Ethnic differences are often attributed to "lifestyle" factors or genetics. A more in-depth understanding of why ethnic groups show such large differentials in disability prevalence rates and disability transition probabilities, despite controlling for social and economic characteristics, is needed. Since disability is a product of the social environment and individual health we need to understand the perception of disability and how disability is managed in particular cultural settings, and within families.

The family context is particularly important given that individual-level factors such as education and income have little impact on health transitions in Singapore and to a certain extent, elsewhere in Asia. Older adults with higher incomes and educations are no more or less likely to make a disability transition. This limited effect of education on disability transitions was also found for Taiwan (Zimmer et al., 1998) and Japan (liu et al., 1995). Liang et al. (2001) suggest that attention needs to be paid to the direct, indirect, and total effects of SES on old-age disability. This will allow us to identify the underlying mechanisms by which SES may influence disability. For example, Liang et al. (2001) show that in China the direct and indirect effects of education on functional changes tend to operate in opposite directions. The generally positive impacts of SES on functional changes are somewhat offset by SES indirect but negative effects through serious health conditions.

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Table 1. Weighted percentages for independent variables at baseline (1995)

Variables	Total sample (n=4,750)	Females (n=2,499)	Males (n=2,251)
Gender			
Male	47.36	-	-
Female	52.64	-	
Age			
55-64	52.74	50.46	55.29
65-69	17.09	16.71	17.51
70-74	13.02	13.44	12.54
75+	17.15	19.39	14.67
Ethnicity			
Chinese	79.55	83.50	75.16
Malay	11.52	10.73	12.40
Indian	7.73	4.45	11.38
Marital status			
Currently married	57.55	38.99	78.18
Widowed/ Divorced/ Separated/Never married	42.45	61.01	21.82
Highest education level achieved			
No education	61.53	76.97	44.47
Completed secondary and above	25.69	16.79	35.58
Completed primary	12.74	6.23	19.98
Work Status			
Currently working	27.43	12.14	44.43
Not working	72.57	87.86	55.57
Living arrangement			
With Children	85.87	88.31	83.15
Other living arrangements	14.13	11.69	16.85

Source: *Transitions in Health, Wealth, and Welfare of Elderly Singaporeans: 1995-1999* survey.
Note: Percentages are weighted to account for over-sampling of Indians and individuals aged 75+ in the original 1995 survey.

Table 2. Percent reporting ADL and IADL limitations at baseline and follow-up, separately and combined, by gender

Disability	Baseline(1995)		Follow-up (1999)	
	Male	Female	Male	Female
ADL: Bathing/dressing/Toileting/Eating	2.1	3.8	3.3	4.5
IADL:				
Using transportation/shopping/ preparing meals/light housework	14.7	15.6	14.2	19.7
Combined (ADL + IADL)	14.8	15.8	14.2	19.7
N	2251	2499	1039	938

Note: Data for 1995 are weighted to account for over-sampling of 75+. Data for 1999 are weighted to account for attrition in 1999.

Source: Transitions in Health, Wealth, and Welfare: 1995-1999 survey

Table 3. Odds ratios for logistic regression equations predicting disability using data pooled across survey waves, controlling for year and other covariates

Variable	Model without controls	Main effects model
Gender		
Male	0.78***	0.99
Female	-	
Year		
1999	-	1.26**
Age		
59-64	-	-
65-69	-	1.46**
70-74	-	2.63***
75+	-	6.81***
Ethnicity		
Chinese	-	-
Malay	-	1.74***
Indian	-	1.76***
Others	-	1.62
Marital Status at Time 1		
Married	-	0.89
Unmarried	-	-
Education level		
None	-	-
Primary	-	1.02
Secondary or more	-	1.16
Monthly individual income at Time 1		
<$500	-	0.94
$500 - $999	-	0.90
$1,000+	-	-
Work status at Time 1		
Working	-	0.63***
Not working	-	-
Living arrangement at Time 1		
Live with child	-	1.32**
Live alone or with others	-	-
Have a chronic disease		-
Yes	-	1.54***
No	-	-
Self-rated health		
Good (Very good, good)	-	0.25***
Poor (Fair, poor)	-	-

Source: *Transitions in Health, Wealth, and Welfare of Elderly Singaporeans: 1995-1999* survey.
Note: Data for 1995 are weighted to account for over-sampling of 75+. Data for 1999 are weighted to account for attrition in 1999.
Note: *** p<.001, ** p<.05, *p<.10

Table 4. Change in disability status between 1995 and 1999, by disability status at baseline

Change in status	Males	Females
Respondents without disability at baseline		
Remained non-disabled	40.07	42.65
Became disabled in 1999	4.98	6.94
Died	5.61	4.5
Loss to follow-up	49.34	46.90
N	1,917	2,104
Chi-Square: 10.74 ($p<0.01$)		
Respondents with a disability at baseline		
Remained disabled	8.59	16.01
Recovered (no disability in 1999)	28.54	16.88
Died	19.43	22.94
Loss to follow-up	43.44	44.18
N	332	396
Chi-Square: 20.05 ($p<0.000$)		

Source: *Transitions in Health, Wealth, and Welfare of Elderly Singaporeans: 1995-1999* survey.

Table 5. Odds ratio for multinomial logistic regression predicting various transitions in functional difficulty status between 1995 and 1999 among respondents who started out with no disability in 1995 (n=3635)

Reference group = individuals who did not have a disability at both waves.

Variable	Became disabled		Died		Loss to follow-up	
Gender	**Without controls**	**With controls**	**Without controls**	**With controls**	**Without controls**	**With controls**
Male	0.75**	0.78	1.29*	2.24**	1.09	1.32**
Female	-	-	-	-	-	-
Age						
59-64	-	-	-	-	-	-
65-69	-	1.82**	-	1.71**	-	1.14
70-74	-	3.35***	-	1.71**	-	1.19
75+	-	7.17***	-	8.08***	-	1.84***
Ethnicity						
Chinese	-	-	-	-	-	-
Malay	-	0.58***	-	0.59**	-	0.84**
Indian		0.34***	-	0.46**	-	0.50***
Marital Status at Time 1						
Married	-	0.89	-	0.84	-	0.72**
Unmarried	-	-	-	-	-	-
Education level						
None	-	-	-	-	-	-
Primary	-	1.40*	-	0.90	-	1.01
Secondary or more	-	0.93	-	0.25**	-	0.95
Work status at T1						
Working	-	0.27**	-	0.70	-	0.76*
Not working	-	-	-	-	-	-
Living arrangement at T1						
Live with child	-	0.88	-	1.42	-	1.03
Live alone or with others	-	-	-	-	-	-
Presence of a chronic disease						
Yes	-	1.11	-	1.17	-	0.87*
No	-	-	-	-	-	-
Self-rated health						
Good (very good, good)	-	0.91	-	0.53**	-	1.01
Poor (fair, poor)	-	-	-	-	-	
Interaction terms						
Married males	-	0.55*	-	0.54*	-	0.83
Malay males	-	3.63**	-	1.08	-	1.38
Indian males	-	0.52	-	0.55	-	0.59
Working males	-	3.13**	-	1.97		1.23

Source: *Transitions in Health, Wealth, and Welfare of Elderly Singaporeans: 1995-1999* survey.
Note: *** p<.001, ** p<.05, *p<.10

Table 6. Odds ratio for multinomial logistic regression predicting various transitions in functional difficulty status between 1995 and 1999 among respondents who started out with a disability in 1995 (n=1115)

Reference group = individuals who had a disability at both waves.

Variable	Recovery		Died		Loss to follow-up	
Gender	**Without controls**	**With controls**	**Without controls**	**With controls**	**Without controls**	**With controls**
Male	3.16***	1.67	1.56	1.86*	1.84**	1.49
Female	-	-	-	-	-	-
Age						
59-64	-	-	-	-	-	-
65-69	-	1.07	-	0.93	-	0.86
70-74	-	0.58	-	0.37**	-	0.48*
75+	-	0.28**	-	0.77	-	0.42**
Ethnicity						
Chinese	-	0.66**	-	1.06	-	1.00
Malay	-	-	-	-	-	-
Indian	-	-	-	-	-	-
Marital Status at Time 1						
Married	-	1.08	-	0.84	-	0.74
Unmarried	-	-	-	-	-	-
Work status at T1						
Working	-	3.35*	-	0.2	-	3.4*
Not working	-	-	-	-	-	-
Living arrangement at T1						
Live with child	-	0.58	-	1.16	-	0.69
Live alone or with others	-	-	-	-	-	-
Presence of a chronic disease						
Yes	-	0.54**	-	1.00	-	0.76
No	-	-	-	-	-	-
Self-rated health						
Good (very good, good)	-	2.69**	-	0.64	-	1.01
Poor (fair, poor)	-	-	-	-	-	

Source: *Transitions in Health, Wealth, and Welfare of Elderly Singaporeans: 1995-1999* survey.
Note: *** p<.001, ** p<.05, *p<.10

Figure 1. Two-Wave Model of Transitions in Disability among Older Singaporeans