

Draft paper

Changes of Type-Severity-Specific Disability-Free Life Expectancies of Chinese Elderly, 1987-2006

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Abstract

The objective of this paper is to explore the disability-free life expectancies changed over the time period from 1987 to 2006. The first national disability survey in China was conducted in 1987. The sampling rate for this survey is 1.5% of the total population, which are 1.58 million people sampled in China. Nineteen years later, China conducted the second national disability survey in 2006. The sampling rate is 1.93% of the national population, which covered 2.53 million people in China. The proportions of disabled increased from 4.9 percent in 1987 to 6.4 percent in 2006 following the aging of the population. Using Sullivan Method, we calculate the disability-free life expectancies by type and severity of the disability of the elderly, and discuss their trends.

Introduction

By the end of 2005 China's population had reached 1.3 billion. Even though restricted family planning policy led to the pace of the population increase slowed down, however, the total number of elderly population is increasing rapidly and the speed of aging are accelerated. The elderly aged 60 and over in China numbered 145 million, and those aged 65 and over numbered 101 million in 2005 (Qiao, 2005), accounting for 7.7 percent of the China's total population and over 20 percent of the world's population of those ages. As the transition of the population structure, the health issues, especially the disability, in terms of the increased elderly are more obvious. The large number of elderly will present serious problems early in the century, because of a lack of governmental and societal support for the elderly, especially the lack of support from their children owing to the prevalence of one-child families. However, health is the key to settling the issues of aging. Evaluating the health status of China's elderly could be the first step toward a solution.

The most serious problem for the elderly could be caused by the extent of disability. The National Sampling Survey of the Disability, approved by the State Council of China in 1987, was the first survey concerning the disabled in China. This work was undertaken chiefly by the Ministry of Civil Administration, the State Statistics Bureau, the Ministry of Health, and other Ministries. This was the only survey relating to health proposed by State Council, rather than by one section of the national government. International experts from the World Health Organization served as consultants regarding the technical design and implementation. National and international publications reveal few published papers that review the survey, and those analyses are very general because they use only tabulated data published by the office of the survey. According to the REVES Bibliography Series and related country reports (REVES 1994), Frab Grab, and Dowd Michel (1991) were the first researchers to use the data of the National Sample Survey of the Disability to estimate, referring to the 1982 census life table, the disability-free life expectancy in China. Mei Wang conducted systematic study on health expectancies in China in her 1993 dissertation (Wang, 1993). Using 1990's life table, she computed disability-free life expectancies of the elderly by gender and urban and rural areas. X. Qiao presented a paper at the tenth International meeting on Health Expectancy held at Tokyo in 1997 that estimated disability-free life expectancies in China by the exact ages 0, 65, and 80, using the adjusted life table of 1987(Qiao, 1997). Having taken advantage of the data from the 1987 sampling survey of disability, X. Qiao calculated the type-severity-specific disability free life expectancy and presented the paper at the annual meeting of REVES in 2000 (Qiao, 2000). As the micro data of the 1987 survey have never been published and few Chinese scholars focused on the disability related field at that time, the data analysis for the 1987 survey data of disability were not sufficient in respect to scientific research.

However, as the Chinese government is very much focusing on the settlement of the problems faced by disabled people, the government decided to conduct the Second National Sampling Survey on Disability in 2006. Due to the similar definition and classification of the disability between the two surveys, we can use both data from 1987 and 2006 surveys to explore the changes of disabled people, especially the changes of the disability free life expectancy between 1987 and 2006. The purpose of this paper is to calculate the disability free life expectancy, to decompose the disability life expectancy by types and degrees of disability for both surveys, and to compare the changes of type-severity-specific disability life expectancies between 1987 and 2006 in order to test if the morbidity of the elderly is compressed or expanded. It should be noted that comparative duration from 1987 to 2006 might be too long, from which it is unable to show the fluctuations within the period, to reflect the stable

situation. As the restriction of the time of the survey, this analysis can just reflect general situation and trend of the disability free life expectancy between the two points of time.

Data and Method

Data of the two surveys are nationally representative. The 1987 and 2006 surveys covered 424 and 743 counties, respectively, in all mainland China. About 369,816 households for 1987 and 771,797 household for 2006 (persons living in institutions were not included), and 1,579,314 individuals for 1987 and 2,526,145 individuals for 2006 were initially interviewed. The interviewers found 11.4 percent of suspicious disabled in 1987 and 15.7 percent in 2006. Following the process in “Screening Regulation of the Disability”, the persons who were initially identified as disabled underwent medical examinations to determine if they are disabled and test the specific nature of the disability from mild to severe disabilities for both surveys. The disability was divided into six categories, such as vision, hearing and speech¹, intellectual, physical, mental, and multiple disabilities in 1987 survey, and seven categories separating hearing and speech into individual category in 2006.

The definitions of the disability and each type of the disability for the two surveys were similar, which can be compared directly in disability and within the same type of the disability. The proportions of confirmed disabled finally were 4.9 percent for 1987 and 6.4 percent for 2006. The proportions of individual categories within the disabled population were 14.61 percent for vision, 34.2 percent for hearing and speech, 14.66 percent for physical, 19.70 percent for intellectual, 3.76 percent for mental, and 13.03 percent for multiple disability for 1987 survey. The proportion changed to 14.86 percent for vision, 24.16 percent for hearing, 1.53 percent for speech, 29.07 percent for physical disability, 6.68 percent for intellectual, 7.40 percent for mental, and 16.30 percent for multiple disability in 2006 survey. It was inferred that there were about 51.64 million and 82.96 million disabled persons lived in Mainland China in 1987 and 2006, respectively. We can see that the proportion of the disabled population was increasing from 4.9% in 1987 to 6.4% in 2006. Among the disabled, the structures of the type of disability were also changing. The proportions of hearing and speech, intellectual, and multiple disabilities decreased; while the proportions of physical and mental increased between the 19 years.

For each survey, the types of disability - vision, hearing, speech, intellectual, physical, and mental disabilities - were classified into four degrees from severe to mild. The first degree is

¹ We separate hearing and speech into two categories at following calculations based on the tabulated data published.

the most severe, and the fourth is the mildest. The multiple disabilities were not classified by degree in 1987 survey.

We use Sullivan method (Sullivan 1971) to calculate the disability-free life expectancies so as to decompose the disability life expectancies into different types and degrees of disability². The method requires both prevalence rates of various disabilities and life tables around the time of the surveys. The data of those two surveys provide the age-type-severity-specific prevalence rates of the disabled populations. We can get the life tables from 1987 and 2005 one percent national population surveys. The age-specific death rates were directly calculated from published data, without any adjustment.

As the sample sizes for both surveys are so huge, we do not need to calculate the standard error of the disability free life expectancy, which means that the confidence interval with a certain probability of confidence for the estimated results would be very small.

In regard to the data sources, we obtained the 1987 data from CHINA DATA OF 1987 SAMPLING SURVEY OF THE HANDICAPPED published by The Office of National Sampling Survey of the Handicapped in 1989. The tabulations of the 2006 data were processed from the original data provided by the Office of National Sampling Survey of the Disability. When dealing with the sources of following tables of the two surveys in this paper, we will not list the sources again and again.

Changes of Disability-free Life Expectancy

In 1987 the life expectancies of China's population at birth were 69.7 years for males and 72.2 years for females, over 2.5 years longer for females than for males (see table 1). However, the healthy life expectancy at birth was 64.4 years for males and 65.7 years for females, 1.3 years longer for females than for males. The differences between life expectancy and healthy life expectancy were significant. A male could expect to be healthy with 92.4 percent of his life and a female could expect to be healthy with 91.1 percent of hers. This general result, a higher percentage of healthy years for males than for females, has appeared in almost all the countries of the world (REVES 1993).

In regard to the elderly in 1987, life expectancy at age 65 was 13.6 years for males and 16.2 years for females, 2.6 years longer for females than for males. However, for the same age, disability-free life expectancy was 9.6 years for males and 11.1 years for females, 1.5 years

² Thanks for Ms Yuan Zhang, a master student at Institute of Population Research, Peking University, who helped me to conduct the calculations for this paper.

longer for females than for males. However, the proportions of healthy duration among the remaining life at age 65 were 70.4 percent for males and 68.2 percent for females, 2.2 percentage point higher for males than for females. We can also see that following the age increased, the proportions of healthy life were decreasing for both males and females. After age 80 as oldest old, men and women can expect less than 50 percent of life without disabilities, which means that over half of the remaining years of life of the people over age 80 might be living with disabilities. This problem was more serious for females than for males.

Table 1 Disability-free Life Expectancy by Exact Age, 1987

Age	Male				Female			
	LE	DLE	DFLE	DFLE/LE	LE	DLE	DFLE	DFLE/LE
0	69.70	5.27	64.43	92.44	72.15	6.43	65.72	91.08
60	16.95	4.17	12.78	75.38	19.95	5.38	14.58	73.05
65	13.60	4.02	9.58	70.44	16.21	5.15	11.06	68.24
70	10.63	3.82	6.82	64.11	12.80	4.83	7.97	62.24
75	8.23	3.58	4.65	56.47	9.90	4.44	5.46	55.15
80	6.28	3.19	3.08	49.12	7.46	3.85	3.61	48.38
85	4.87	2.75	2.12	43.52	5.48	3.12	2.36	43.11

Note: LE = life expectancy; DLE = disability life expectancy; DFLE = disability free life expectancy; DFLE/LE = the proportion of the DFLE among the LE. Here, LE = DLE + DFLE

Nearly 20 years later, in 2006, the life expectancies at birth reached 73.4 years for males and 78.1 years for females. The difference of life expectancy at birth between males and females increased from 2.5 years in 1987 to 4.7 years in 2006. It showed that the higher the life expectancy, the higher the difference of life expectancies between men and women. The disability free life expectancies at birth increased from 64.4% in 1987 to 67.0% for males and from 65.7% to 71% for females, while the proportions of the duration of disability free life expectancy at birth among the LE decreased from 92.4% in 1987 to 91.3% in 2006 for males and from 91.1% in 1987 to 90.9% in 2006. This means that the proportional durations for healthy life were decreasing for both male and female, the morbidity is “expanded.”

Life expectancies at age 65 reached 15.6 years for males and 18.2 years for females in 2006. At the same time, the disability free life expectancies at age 65 were 11.0 years for males and 12.7 for females. The life expectancies at age 65 increased 2.04 years for males and 1.96 years for females, while the disability free life expectancies at age 65 increased 1.39 years for males and 1.60 years for females from year 1987 to 2006. Because of the different gain between the life expectancies and disability free life expectancies, the proportion of the

healthy period in remaining life at age 65 showed very small decrease, that is, 0.29 percentage point, for males and increased by 1.40 percentage point for females from year 1987 to 2006. If this is true, that is, the differences were statistically significant, it would show that the morbidity are little “expanded” for males and “compressed” for females. It means that the health status are worsening for males and improving for females from year 1987 to 2006.

However, for higher ages, such as at age 80, the proportions of disability free life expectancy increased dramatically from 49.1% in 1987 to 57.6% in 2006 for males and from 48.4% in 1987 to 58.7% for females. This has showed that the higher the ages, the more compressed the morbidity.

Table 2 Disability-free Life Expectancy by Exact Age, 2006

Age	Male				Female			
	LE	DLE	DFLE	DFLE/LE	LE	DLE	DFLE	DFLE/LE
0	73.40	6.39	67.02	91.30	78.10	7.10	71.00	90.91
60	19.39	4.97	14.43	74.39	22.27	5.86	16.41	73.70
65	15.64	4.67	10.97	70.15	18.17	5.52	12.66	69.64
70	12.30	4.27	8.03	65.25	14.41	5.04	9.36	64.99
75	9.43	3.73	5.70	60.42	11.07	4.34	6.72	60.76
80	7.02	2.97	4.05	57.64	8.26	3.41	4.85	58.73
85	5.06	1.89	3.16	62.54	5.95	2.10	3.86	64.77

Changes of Type Specific Disability Life Expectancy

We compared the differences of disability-free life expectancy between the year 1987 and 2006 above. Now, in order to decompose the health expectancy by types of disability, we use disability life expectancy, the opposite part of the disability-free life expectancy, as the total duration in disability within remaining years of life.

Decomposing the remaining years of life with disabilities yields the expected remaining years of life for each types of disability (see table 3 and 5). Let us take look at the disability life expectancy at age 65 for both males and females and for the year 1987 and 2006. We can see that the total numbers of remaining years of life with disability were 4.02 years for males and 5.15 years for females in 1987, and were 4.67 years for males and 5.52 years for females in 2006. It seemed that as the increase of the life expectancies, the durations with disability were also increasing. We are trying to decompose the total duration in the duration with different

types of disability and to see which type of disability hold the higher level of disability in duration. Table 3 gives the number of the duration and the table 4 gives the proportion of the duration by types of disability in 1987.

Table 3 Disability Life Expectancy by Exact Age and Type of Disability by Gender, 1987

Male								
age	Total	Vision	Hearing	Speech	Intellectual	Physical	Mental	Multiple
60	4.174	0.703	2.170	0.014	0.047	0.465	0.038	0.738
65	4.021	0.675	2.114	0.013	0.037	0.396	0.029	0.757
70	3.816	0.632	2.008	0.010	0.030	0.318	0.021	0.797
75	3.584	0.576	1.868	0.007	0.026	0.244	0.016	0.848
80	3.193	0.502	1.619	0.008	0.020	0.178	0.011	0.855
85	2.752	0.392	1.363	0.014	0.023	0.134	0.000	0.826
Female								
	Total	Vision	Hearing	Speech	Intellectual	Physical	Mental	Multiple
60	5.378	1.354	2.165	0.011	0.076	0.420	0.060	1.287
65	5.149	1.268	2.073	0.008	0.065	0.366	0.045	1.319
70	4.834	1.141	1.942	0.007	0.054	0.304	0.032	1.349
75	4.441	0.976	1.741	0.004	0.043	0.245	0.025	1.403
80	3.852	0.761	1.420	0.002	0.035	0.185	0.014	1.427
85	3.117	0.549	1.071	0.002	0.018	0.123	0.009	1.333

For both males and females at age 65 in 1987, the longest period of disability was associated with hearing disability. Males could expect hearing disabilities for 2.11 years of their 4.02 disability years at exact age 65, and females could expect 2.07 years of hearing disabilities during their 5.15 disability years. Hearing disability affected around half of the disability years, 52.6 percent for males and 44.3 percent for females. Comparing disabilities between males and females, the impairment of hearing was a bit of more serious for males than for females in absolute result and was much more serious for males than for females in proportion, due to longer duration of disability. Of the total number of years with disability at age 65, the durations of vision and multiple disabilities accounted for just over 0.70 years respectively for males and accounted for about 1.3 years for females respectively, which means that the durations of vision and multiple disability were higher for females than for males in both absolute and relative results. Vision and multiple disabilities together accounted for around 35% of the duration of the disability for males, while accounted for .over 50% for females in 1987.

Even though the absolute numbers and proportions of remaining years in each type of disability were decreasing, except for the multiple disabilities, due to the decrease of total number of disability life expectancy, the multiple disabilities were increasing in both absolute and relative results, as the age increased for both males and females. The increases of the multiple disabilities were more serious for females than for males in 1987.

Table 4 Proportions by Type of Disability 1987

	Vision	Hearing	Speech	Intellectual	Physical	Mental	Multiple
Age	Male						
60	16.8	52.0	0.3	1.1	11.1	0.9	17.7
65	16.8	52.6	0.3	0.9	9.9	0.7	18.8
70	16.6	52.6	0.3	0.8	8.3	0.5	20.9
75	16.1	52.1	0.2	0.7	6.8	0.5	23.7
80	15.7	50.7	0.3	0.6	5.6	0.3	26.8
85	14.2	49.5	0.5	0.8	4.9	0.0	30.0
	Female						
60	25.2	40.3	0.2	1.4	7.8	1.1	23.9
65	24.6	40.3	0.2	1.3	7.1	0.9	25.6
70	23.6	40.2	0.1	1.1	6.3	0.7	27.9
75	22.0	39.2	0.1	1.0	5.5	0.6	31.6
80	19.8	36.9	0.1	0.9	4.8	0.4	37.0
85	17.6	34.4	0.1	0.6	3.9	0.3	42.8

In regarding to the disability in 2006, the longest period and the highest proportion of disability was associated with the hearing disability (see table 5) for both males and females. Vision and mental problems and multiple disabilities were more serious for females than for males for all exact ages. At age 65, among 4.67 years with disabilities, males could expect to spend 0.68 of their remaining years with vision disability, 1.99 years with hearing disability, 0.03 years with speech, 1.21 years with intellectual problems, 0.05 years with physical disability, 0.07 years with mental disorder, and 0.78 years with multiple disabilities, while females, among 5.52 years with disability, could expect to spend 1.26 years with vision problem, 1.72 years with hearing disability, 0.02 years with speech disability, 1.22 years with intellectual disability, 0.05 years with physical problems, 0.13 years with mental disorder, and 1.12 years with multiple disabilities. When taking look of the proportions, we can see that vision, mental, and multiple disabilities were more serious for females than for males. In

contrast, the hearing, speech, intellectual, and physical disabilities were more serious for males than for females.

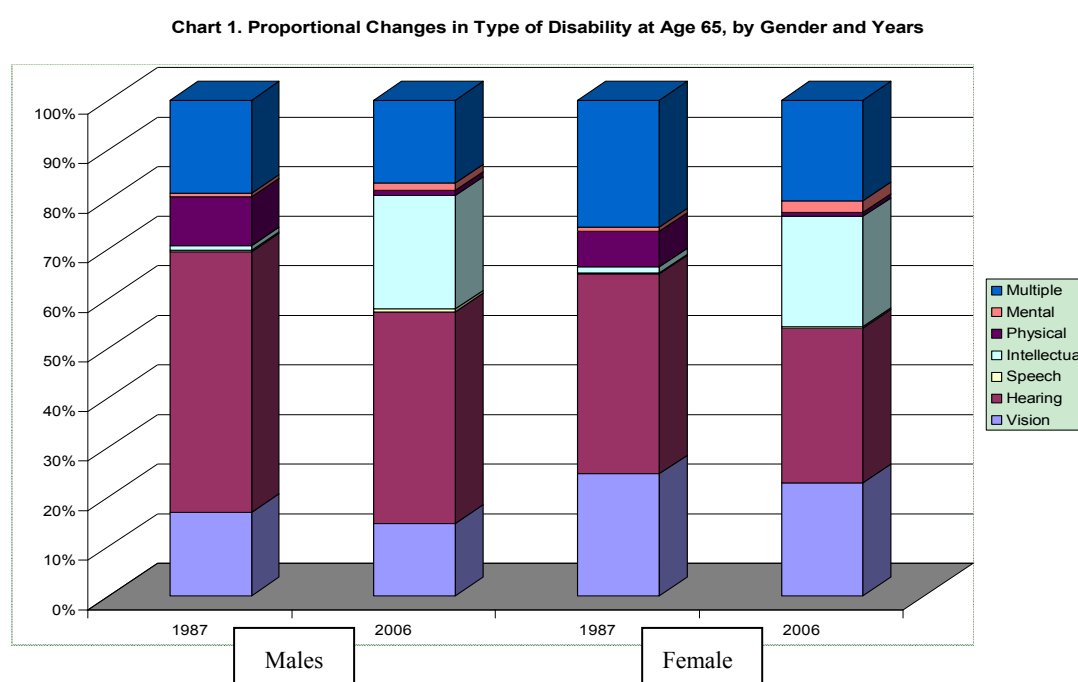
Table 5 Disability Life Expectancy by Exact Age and Type of Disability, 2006

Male								
Age	Total	Vision	Hearing	Speech	Intellectual	Physical	Mental	Multiple
60	4.967	0.729	2.044	0.035	1.207	0.062	0.092	0.799
65	4.670	0.682	1.994	0.027	1.068	0.047	0.071	0.780
70	4.275	0.618	1.883	0.020	0.900	0.037	0.054	0.763
75	3.732	0.526	1.662	0.014	0.717	0.033	0.038	0.742
80	2.974	0.411	1.325	0.008	0.522	0.023	0.023	0.662
85	1.894	0.238	0.836	0.003	0.290	0.015	0.014	0.497
Female								
Age	Total	Vision	Hearing	Speech	Intellectual	Physical	Mental	Multiple
60	5.856	1.336	1.771	0.022	1.360	0.065	0.167	1.135
65	5.517	1.259	1.721	0.017	1.224	0.051	0.125	1.120
70	5.043	1.144	1.608	0.012	1.041	0.044	0.096	1.098
75	4.342	0.949	1.401	0.008	0.825	0.037	0.070	1.052
80	3.407	0.673	1.110	0.005	0.590	0.030	0.045	0.954
85	2.097	0.367	0.666	0.002	0.322	0.018	0.024	0.699

Table 6 Proportions by Type of Disability, 2006

Age	Vision	Hearing	Speech	Intellectual	Physical	Mental	Multiple
Male							
60	14.7	41.1	0.7	24.3	1.2	1.8	16.1
65	14.6	42.7	0.6	22.9	1.0	1.5	16.7
70	14.5	44.0	0.5	21.1	0.9	1.3	17.8
75	14.1	44.5	0.4	19.2	0.9	1.0	19.9
80	13.8	44.6	0.3	17.6	0.8	0.8	22.2
85	12.6	44.1	0.2	15.3	0.8	0.8	26.3
Female							
60	22.8	30.3	0.4	23.2	1.1	2.8	19.4
65	22.8	31.2	0.3	22.2	0.9	2.3	20.3
70	22.7	31.9	0.2	20.6	0.9	1.9	21.8
75	21.9	32.3	0.2	19.0	0.8	1.6	24.2
80	19.7	32.6	0.1	17.3	0.9	1.3	28.0
85	17.5	31.7	0.1	15.4	0.9	1.1	33.3

When comparing the change of the disability in quantity and in structure, we can see that the duration number with disability increased from 1987 to 2006 for both males and females. However, the composition of the type specific disability were changed obviously which can be seen from the comparison of the two disabilities of the two years (see Chart 1). Even though there were some differences in the composition between males and females, the huge differences in the composition of the disabilities appeared between the year 1987 and 2006. Most significant change was the intellectual disability, as well as the multiple disabilities.

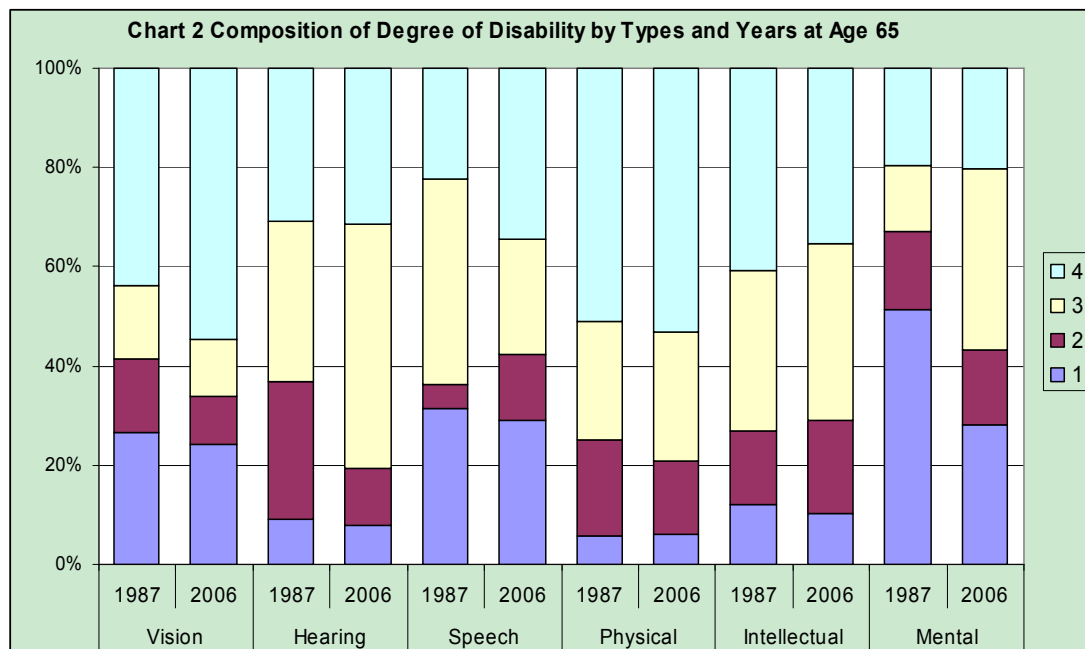


Changes of Type-Degree Specific Disability Life Expectancy

We decomposed the disability life expectancy by type above. Further, we can decompose the duration of each type of the disability life expectancy by its degree with mild (degree 4) to severe (degree 1). In order to see the structural changes by degree, the proportions in degrees of disability by types, age, gender, and time were calculated (see Table 7 and 8).

Now, taking the proportions at age 65 as an example, we can compare both the differences of the composition of the degree among the types of disability in same year and the changes of the composition of the degree of disability between 1987 and 2006 (see Table 9 and Chart 2).

Table 9 also gives the mean score of the degree of disability in each type, which reflects the general level of the severity of the disability, the smaller the score, the severer the disability.



Based on the table 7, 8, and 9, as well as chart 2, we can find that 1) following the age increases, the mean scores of the degree for all types were decreasing, which means that the health status of the elderly is worsening as getting old, especially for the 2006 data in table 8. 2) There were a little difference in mean score between males and females, which mean that the severity of disability seemed very small between male and female elderly, except for speaking. That is, the ability in speaking is better for male than for female elderly. 3) The highest mean score, the mildest status, appeared in physical disability for both males and females and for two surveys; whereas the lowest mean score, the severest status, appeared in mental disability for all classifications. 4) Comparing between the year 1987 and 2006, we can see from Chart 3 and Chart 4 that the scores for almost all types of disability, except for the intellectual disability, were increasing, which means that the disability status were improving from 1987 to 2006 for both males and females. Such improvement was more significant for females than for males.

Table 7 Proportions in Degrees of Disability by Age, Gender, and Type, 1987

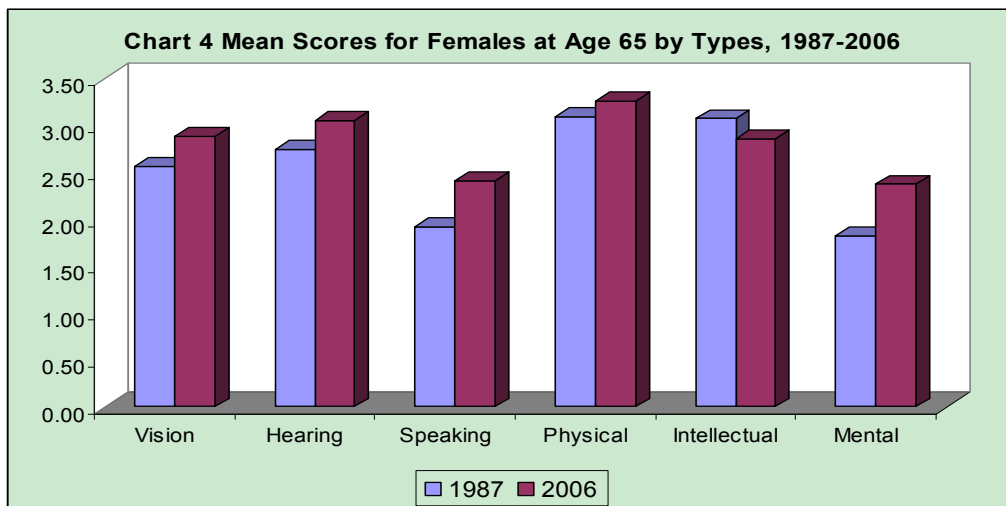
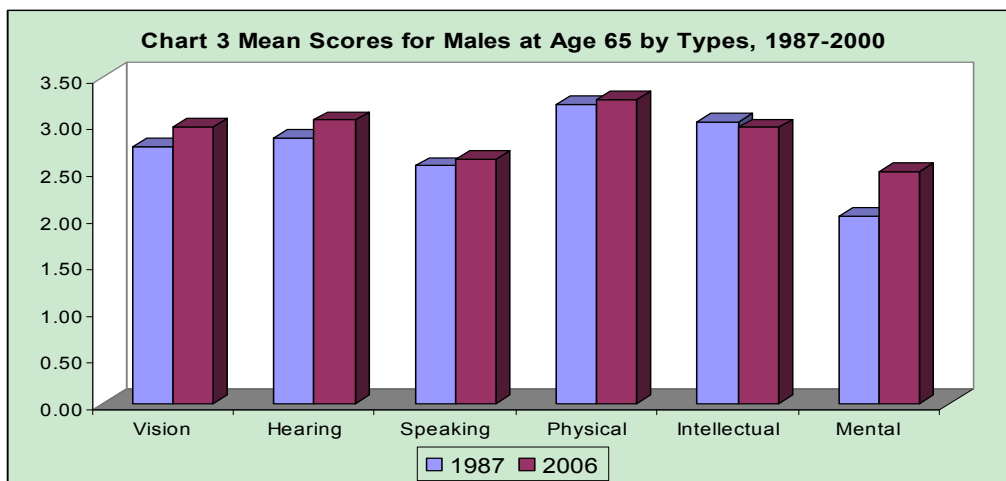
Type\Degree	Age	Male					Female				
		1	2	3	4	Mean	1	2	3	4	Mean
Vision	60	26.7	14.5	14.9	43.9	2.76	31.5	15.5	14.2	38.8	2.60
	65	26.6	14.8	14.8	43.7	2.75	32.7	15.5	14.2	37.6	2.57
	70	27.4	14.9	14.6	43.1	2.73	34.0	15.9	14.1	35.9	2.52
	75	29.0	14.5	13.9	42.7	2.71	36.2	15.6	13.8	34.4	2.46
	80	30.4	15.0	15.0	39.6	2.64	38.2	16.8	13.7	31.3	2.38
	85	32.9	15.3	17.1	34.7	2.54	39.8	17.1	14.9	28.2	2.32
Hearing	60	8.8	26.5	32.7	32.0	2.88	8.9	32.3	30.2	28.6	2.79
	65	9.1	27.7	32.4	30.8	2.85	8.9	33.9	30.2	27.0	2.75
	70	9.4	29.6	33.0	28.0	2.80	9.3	36.7	29.9	24.1	2.69
	75	10.8	32.2	32.7	24.3	2.71	9.9	41.4	28.5	20.2	2.59
	80	13.5	35.0	31.9	19.5	2.57	11.2	49.1	25.0	14.6	2.43
	85	15.0	38.2	32.3	14.6	2.47	12.4	55.6	22.3	9.7	2.29
Speaking	60	35.1	4.6	39.1	21.1	2.46	50.7	3.1	41.4	4.7	2.00
	65	31.3	5.0	41.3	22.4	2.55	55.3	1.4	38.5	4.8	1.93
	70	33.1	2.6	32.2	32.1	2.63	56.7	2.0	34.6	6.7	1.91
	75	24.0	2.3	6.9	66.8	3.17	65.3	0.0	24.0	10.7	1.80
	80	13.7	0.0	0.0	86.3	3.59	74.3	0.0	25.7	0.0	1.51
	85	0.0	0.0	0.0	100.0	4.00	100.0	0.0	0.0	0.0	1.00
Physical	60	5.4	18.7	24.3	51.5	3.22	8.7	19.2	24.3	47.8	3.11
	65	5.6	19.6	23.7	51.1	3.20	9.0	19.5	24.5	47.1	3.10
	70	4.8	19.8	23.5	51.8	3.22	9.6	19.3	26.2	44.9	3.06
	75	4.7	19.5	23.8	52.0	3.23	10.0	19.1	26.6	44.3	3.05
	80	5.1	19.5	21.1	54.3	3.25	9.1	18.3	27.8	44.9	3.09
	85	1.9	22.9	20.8	54.5	3.28	9.1	23.8	28.0	39.0	2.97
Intellectual	60	9.8	13.7	32.5	44.1	3.11	9.5	14.0	30.0	46.5	3.14
	65	12.0	14.8	32.5	40.7	3.02	10.4	15.8	29.8	44.1	3.08
	70	13.0	14.7	35.1	37.1	2.96	11.3	15.9	28.7	44.0	3.05
	75	14.8	15.1	33.0	37.2	2.93	14.3	17.7	28.1	39.8	2.93
	80	18.4	12.8	35.1	33.6	2.84	15.3	19.3	24.2	41.2	2.91
	85	25.0	12.5	33.3	29.2	2.67	18.4	18.4	30.6	32.7	2.78
Mental	60	52.4	14.8	12.4	20.4	2.01	56.5	12.5	12.2	18.8	1.93
	65	51.3	15.8	13.2	19.6	2.01	60.6	12.0	11.6	15.8	1.83
	70	57.6	12.2	13.8	16.4	1.89	61.0	13.5	11.5	14.0	1.79
	75	45.2	13.8	20.0	21.0	2.17	65.1	12.2	9.8	12.9	1.71
	80	38.9	22.2	16.7	22.2	2.22	77.0	7.4	6.5	9.1	1.48
	85					0.00	75.7	10.4	3.5	10.4	1.49

Table 8 Proportions in Degree of Disability by Age, Gender, and Type, 2006

Type\Degree	Age	Male					Female				
		1	2	3	4	Mean	1	2	3	4	Mean
Vision	60	23.9	9.4	11.6	55.1	2.98	25.9	10.1	11.1	52.9	2.91
	65	24.3	9.4	11.7	54.6	2.97	26.7	10.2	10.9	52.2	2.89
	70	25.2	9.3	11.8	53.7	2.94	27.9	10.2	11.1	50.8	2.85
	75	27.9	9.5	11.5	51.1	2.86	30.6	10.3	11.2	47.9	2.76
	80	32.3	9.5	12.0	46.3	2.73	36.3	10.3	10.6	42.8	2.60
Hearing	60	37.2	9.1	11.4	42.3	2.59	43.1	10.4	10.3	36.2	2.40
	65	8.1	11.1	48.5	32.3	3.05	8.5	10.5	46.2	34.8	3.07
	65	8.0	11.3	49.4	31.3	3.04	8.6	10.6	46.9	33.9	3.06
	70	8.2	11.6	50.6	29.6	3.02	8.9	10.8	48.2	32.1	3.04
	75	8.8	12.5	52.2	26.4	2.96	9.8	11.3	50.3	28.6	2.98
Speaking	80	9.9	14.3	54.0	21.7	2.87	11.4	12.7	52.2	23.8	2.89
	85	11.4	17.0	54.1	17.5	2.78	14.6	14.7	53.1	17.6	2.74
	60	27.3	12.2	23.3	37.1	2.70	37.5	13.1	25.7	23.7	2.36
	65	29.1	13.3	23.2	34.3	2.63	36.5	11.6	26.1	25.8	2.41
	70	29.7	13.3	23.3	33.8	2.61	38.7	9.5	26.2	25.7	2.39
Physical	75	29.1	15.6	20.1	35.2	2.61	40.1	2.7	32.3	24.9	2.42
	80	32.7	15.7	20.3	31.3	2.50	43.9	6.1	31.1	18.9	2.25
	85	0.0	25.0	25.0	50.0	3.25	50.0	0.0	25.0	25.0	2.25
	60	5.5	14.3	25.6	54.6	3.29	5.8	15.0	23.5	55.7	3.29
	65	5.9	14.9	26.1	53.1	3.26	6.2	15.5	23.8	54.5	3.27
Intellectual	70	6.4	15.9	26.3	51.4	3.23	6.8	16.1	24.6	52.5	3.23
	75	7.3	16.4	26.7	49.6	3.19	7.8	16.7	25.6	50.0	3.18
	80	8.0	16.9	27.8	47.3	3.14	8.6	18.7	26.4	46.3	3.10
	85	8.5	21.2	28.8	41.5	3.03	9.5	19.7	26.4	44.5	3.06
	60	9.2	18.2	36.2	36.3	2.99	10.8	20.3	37.0	31.9	2.90
Mental	65	10.4	18.6	35.7	35.3	2.96	11.7	20.6	37.3	30.4	2.86
	70	11.4	19.6	38.1	30.9	2.89	12.7	21.7	38.9	26.7	2.80
	75	12.4	22.6	39.7	25.2	2.78	12.7	25.4	38.1	23.8	2.73
	80	13.0	29.5	37.3	20.2	2.65	15.3	23.9	41.4	19.3	2.65
	85	21.1	31.6	31.6	15.8	2.42	25.0	27.5	37.5	10.0	2.33
Multiple	60	26.5	14.1	38.5	20.9	2.54	33.7	15.3	15.4	35.6	2.53
	65	28.2	14.9	36.6	20.3	2.49	38.4	16.0	15.1	30.6	2.38
	70	30.9	14.3	35.2	19.6	2.44	43.2	17.1	14.5	25.2	2.22
	75	32.5	13.2	31.2	23.0	2.45	49.6	17.4	13.9	19.1	2.03
	80	40.2	10.6	24.5	24.8	2.34	55.1	18.6	13.8	12.4	1.83
Multiple	85	37.5	8.3	20.8	33.4	2.50	69.8	18.9	7.5	3.8	1.45
	60	35.5	18.0	32.1	14.4	2.25	38.2	17.1	28.7	15.9	2.22
	65	34.2	18.2	32.9	14.7	2.28	37.8	17.2	29.1	15.9	2.23
	70	33.3	18.6	33.7	14.3	2.29	37.7	17.3	29.5	15.6	2.23
	75	33.4	19.2	34.2	13.2	2.27	38.8	17.2	30.0	14.0	2.19
Multiple	80	34.4	19.9	33.9	11.8	2.23	40.5	18.1	29.9	11.5	2.12
	85	37.6	21.9	30.5	10.0	2.13	44.8	19.3	28.8	7.1	1.98

Table 9 Proportions and Mean Score in Degree of Disability by Age, Gender, Type, and Year

		Males					Females				
		1	2	3	4	Mean	1	2	3	4	Mean
1987	Vision	26.60	14.80	14.80	43.70	2.75	32.70	15.50	14.20	37.60	2.57
	Hearing	9.10	27.70	32.40	30.80	2.85	8.90	33.90	30.20	27.00	2.75
	Speaking	31.30	5.00	41.30	22.40	2.55	55.30	1.40	38.50	4.80	1.93
	Physical	5.60	19.60	23.70	51.10	3.20	9.00	19.50	24.50	47.10	3.10
	Intellectual	12.00	14.80	32.50	40.70	3.02	10.40	15.80	29.80	44.10	3.08
	Mental	51.30	15.80	13.20	19.60	2.01	60.60	12.00	11.60	15.80	1.83
2006	Vision	24.30	9.40	11.70	54.60	2.97	26.70	10.20	10.90	52.20	2.89
	Hearing	8.00	11.30	49.40	31.30	3.04	8.60	10.60	46.90	33.90	3.06
	Speaking	29.10	13.30	23.20	34.30	2.63	36.50	11.60	26.10	25.80	2.41
	Physical	5.90	14.90	26.10	53.10	3.26	6.20	15.50	23.80	54.50	3.27
	Intellectual	10.40	18.60	35.70	35.30	2.96	11.70	20.60	37.30	30.40	2.86
	Mental	28.20	14.90	36.60	20.30	2.49	38.40	16.00	15.10	30.60	2.38



Conclusions

We have compared the disability free life expectancies, disability life expectancies by type, and disability life expectancies by type and degree between year 1987 and 2006. We found that even though the morbidity for the whole population appeared to be expanded, the morbidity for the elderly population appeared to be compressed. Furthermore, the higher the ages, the more expressed the morbidity. Hearing disability accounted for the largest proportion of the duration of the disability for both males and females, and it accounted for higher for males than for females. Such prominent proportions decreased from 1987 to 2006. The most significant change appeared in intellectual disability, such that the proportion of intellectual disability increased from 0.9% to 22.9% for males and from 1.3% to 22.2% for female at age 65. The severity of disability was improving from 1987 to 2006 for both males and females. Such improvement was more significant for females than for males.
