

# 臺灣人口的老化對未來健康面的影響

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**目標：**針對經建會提出之臺灣未來人口推估，本研究嘗試了解未來人口結構轉變對健康方面可能的影響。**方法：**以現有癌症或失能率及健保醫療支出及未來人口結構，推估未來將癌症或失能的人數及健保醫療支出。**結果：**毫無疑問的，隨著臺灣人口老化，老年人口罹患慢性病如癌症及失能的絕對人數及相對比例將明顯增加，在醫療費用需求亦增加下，這些轉變將變成整個社會沉重的負擔。**結論：**相對於人口結構調整策略，運用健康促進來降低及預防疾病及失能應為一有效方法。(台灣衛誌 2003；22(3)：237-244)

關鍵字：老化、癌症、失能、醫療支出

## Population aging in Taiwan: future health implications

**Objectives:** As the projections of Taiwan's future population have recently been proposed, this analysis is aimed to understand the possible health impacts of the change in population structure. **Methods:** Based on the current age-specific cancer and disability rates, age- sex- specific total medical expenditure, and the future population structure, the numbers of people with cancer and disability and the total medical expenditure for older people are projected. **Results:** Not surprisingly, as Taiwan's population is aging, a substantial increase in the absolute numbers and the relative proportions of cancer and disability for older people can be seen. As a result of these adverse outcomes, future medical expenses needed for older people will create a huge burden for society. **Conclusions:** Rather than trying to change the future population, health promotion and disability and disease prevention will be a more effective way of coping with these problems. (*Taiwan J Public Health*. 2003;22(3):237-244)

**Key words:** Aging, cancer, disability, medical expenditure



## Introduction

Recently, Taiwan's population has been officially projected from the year 2002 to the year 2050 [1]. Using these projections we can further understand the possible social effect of population change, for example, the dependency ratio, education level, and the proportion of older people in the population. However, we still have no idea about how much effect the change in population structure will have on population health. More specifically, will this change mean an increase in the numbers of people with diseases and disabilities? It is necessary to have some projected figures to show numbers and proportions of people with different health conditions across different age groups in the future. In this exploratory article, I aim to discuss some possible implications of the population change, using some examples of health conditions.

## Materials & Methods

Data about age and sex specific population projections from 2002 to 2050 for the Taiwan area were obtained from the Council for Economic Planning and Development [1]. For this analysis, the middle-series projected numbers were used. To give some examples of the possible effect of the population changes and to calculate the projected figures, age-specific cancer and disability rates, and age and sex specific total medical expenditure were obtained from different sources and were applied, based on the future population structure, to estimate the future numbers with these conditions. For the cancer projections, the baseline age-specific cancer incidence and mortality rates were calculated from the 1997 and 2001 annual official statistics [2]. For projected numbers of older people with functional limitations, prevalence of mobility dis-

ability was mainly based on the results from the fourth wave (1999) of the Survey of Health and Living Status of the Elderly in Taiwan, a nationwide representative survey of adults aged 65 years and older [3]. In this survey, 'one limitation' is defined as individuals reporting at least difficulty with either one of the two mobility tasks: walking 200 to 300 meters and climbing two or three flights of stairs; 'both limitations' is at least difficulty with both tasks; and 'severe limitation' is with great difficulty or inability to do both tasks. In addition to the fourth wave of the survey, rates from two earlier series of the survey results (1993 and 1996) were also applied to estimate the future numbers and these different future trends were further compared. Total medical expenditure, which includes inpatient and outpatient medical expenses reported by the National Health Insurance (NHI) system from the 2001 official statistics, was taken as the baseline data [2]. Instead of rates, age and sex specific projected medical expenses were estimated from the relative change in the number of age and sex specific people.

## Results

### Population projections

Table 1 summarizes the increase in life expectancy and the change in the number of total and older population, starting from 1991 and projecting through 2050. The increase in life expectancy, as for most of the countries in the world, is mainly due to medical improvement and the decrease of deaths from some acute and chronic diseases, and will contribute greatly to the increase in the number and proportion of the older population. Life expectancy from the year 2000 will increase steadily by 2.39 years for males and 2.94 years for females in 2010, by 5.43 years for males and 6.08 years for females in 2030, and by 5.83 years for males and 7 years for females in 2050, with increasing differences in

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Table 1 Actual and Projected Life Expectancy and Growth of the Older Population in Taiwan

	Life expectancy (years)		Total population	65 +		85 +	
	Male	Female		Number	% of total	Number	% of 65 +
1991	71.83	77.15	20,454,904	1,302,536	6.4	50,743	3.9
2000	72.62	78.45	22,184,530	1,893,391	8.5	109,432	5.8
2010	75.01	81.39	23,447,996	2,425,518	10.3	211,858	8.7
2030	78.05	85.03	24,441,661	5,376,162	22.0	484,508	9.0
2050	78.95	85.95	22,104,412	6,579,290	29.8	1,154,473	17.5

life expectancy between males and females. As a result of the decrease in marriage and fertility rates, the total population will be increasing slowly to the year 2027 and will then be gradually decreasing [1]. In contrast, the older population at the same time is rising dramatically. Thus, the proportion of the population aged 65 and over is accelerating. In 2050, it is estimated that older people will make up nearly one-third of the total population. Remarkably, the oldest old (usually defined as people aged 85 and over) is the fastest growing segment in the older population. There

will be twice as many as now in 2010, nearly five times in 2030, and over ten times in 2050.

The speed of aging transition is not exactly the same for different countries throughout the world. Figure 1 presents the number of years that were taken or will be taken for some selected countries to increase the older population as a percentage of the total population from 7% to 14%. Obviously, the aging speed for the developed countries is relatively slow compared with the developing countries and they have a longer time to adapt to this change. However, there will

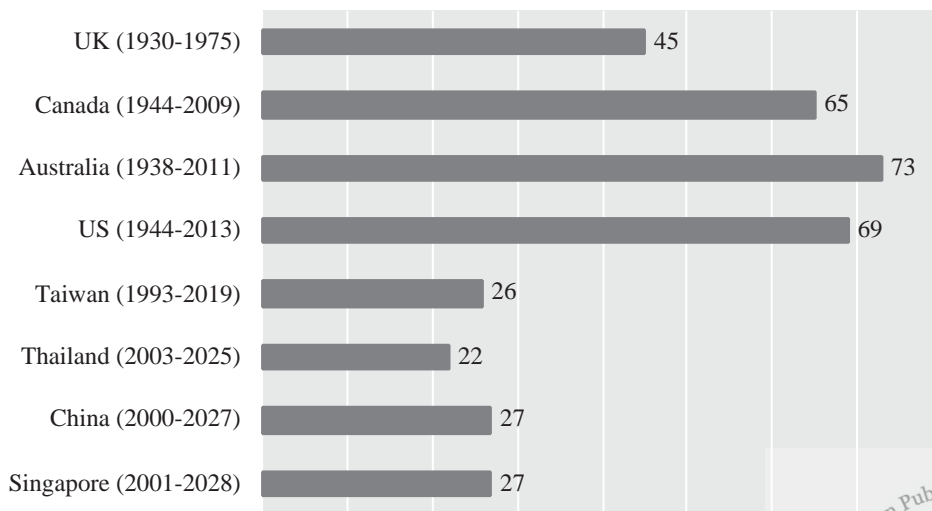


Figure 1 Number of Years and Time Period in which Percent of Age 65 and over Doubles from 7% to 14% for Some Selected Countries (Source for other countries: Kinsella and Velkoff (2001) [4])

be a very short time for the developing countries to prepare for this transition and this big population change will have a larger health and social impact. Taiwan is facing this transition and will have less time than other developing countries to prepare for it.

### Cancer projections

In order to illustrate what the future trend of chronic disease for older people will look like, the projected number of older people with cancer was chosen, as cancer is the most influential disease and the leading cause of death in Taiwan. As can be seen in Figure 2, with the population aging, the numbers of older people with cancer will increase rapidly. There are around 20,000 cancer incidence or deaths per year currently, and the figure will be nearly four times in 2050 (over 70,000 incidents or deaths per year).

### Disability projections

In addition to chronic diseases, geriatric problems emerge as an important issue for older people. Decreased functioning in different do-

main has a great negative effect on their lives. Undoubtedly, disability is recognized as having the most impact on both health and policy because its consequences include dependency, institutionalization, and formal and informal healthcare needs and utilization. Measurement of mobility disability, although is not directly correlated with health care utilization, has been thought to be relatively less influenced by environmental and social changes that have a heavy impact on other domains of disability measurement such as activities of daily living and instrumental activities of daily living, and is suitable for longitudinal estimation and comparison. In this analysis, I attempted to use nationwide mobility disability rates to extrapolate the future disability trend. In Figure 3, based on the 1999 estimates, the number of older people who have one, two or severe limitation will rise from about 0.73, 0.50, and 0.27 million, respectively, in 2002 to 2.71, 1.90, and 1.10 million in 2050. This means that there will be nearly four times the number of older people with different levels of mobility difficulties in 2050.

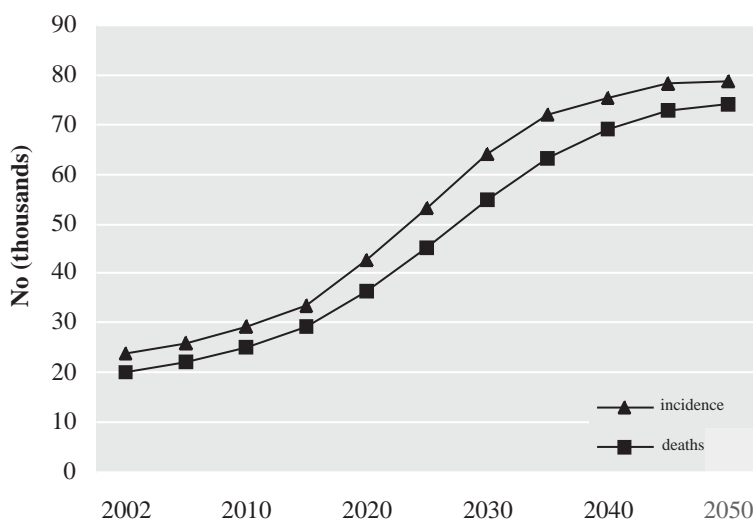


Figure 2 Projected Incidence and Deaths of People Aged 65 and over with Cancer in Taiwan

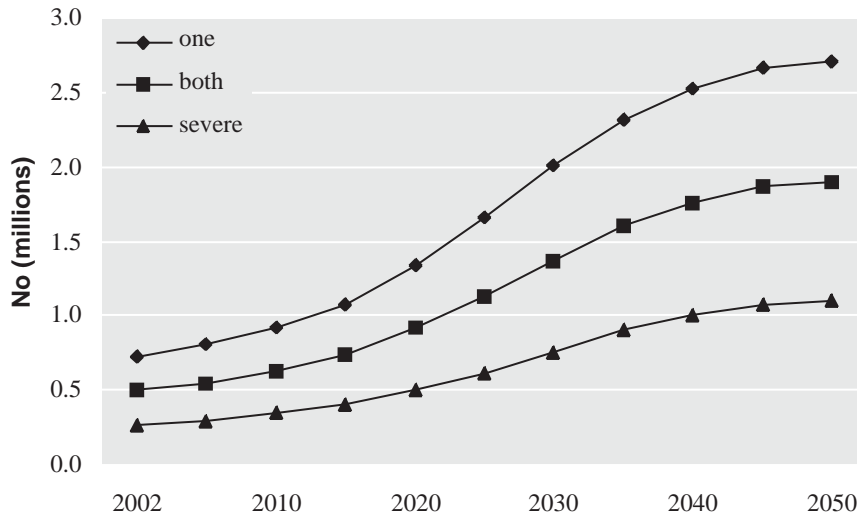


Figure 3 Estimated Numbers of People Aged 65 and over with Different Levels of Disability in Taiwan, Based on Rates in 1999

Figure 4 further shows, based on the same estimates, the projected numbers of older people with severe mobility limitation for different age groups. These people have relatively high risk of dependency and needing help. The rise in numbers can be seen across the different age groups. However, the greatest rise, either in absolute numbers or in the proportion, is in the 80 and over age group, which is projected to increase by over six times from 100 thousand in 2002 to nearly 0.7 million in 2050.

Based on different years' prevalence estimates, different trends for the projected numbers of older people with one functional limitation can be seen in Figure 5. It shows an obvious rise in the future number of such people, when more recent figures are applied.

### Implications of aging on medical expenditure

Figure 6 shows the projected trends in medical costs for the total population and for different age groups. The total medical expenditure paid by the NHI will gradually increase from 340

billion in 2001 to 592 billion in 2045 and then drop to 583 billion in 2050. This figure also shows the substantial financial effect of the change in the population structure. Currently, the major proportion of total medical expenses is for people aged 15 to 64. However, as the population ages, there will be a crossover around year 2025 and people aged 65 and over will consume the highest proportion of medical expenses. At 2050, the proportion of medical expenses for age group 65 and over will reach 62% compared with 29% in 2001. The increase in age group 65 and over reflects on not only the proportion but also the absolute expense. The medical expenses needed for people aged 65 and over will steadily increase to 361 billion dollars in 2050, which is nearly the same as the 'current' medical expenses for the total population.

Figure 7 further shows the projected trends for different age groups in the older population. All older people in different age groups will consume more medical expenses. The oldest old will have the biggest rise in the absolute value (9.4 times higher in 2050 than in 2001 compared

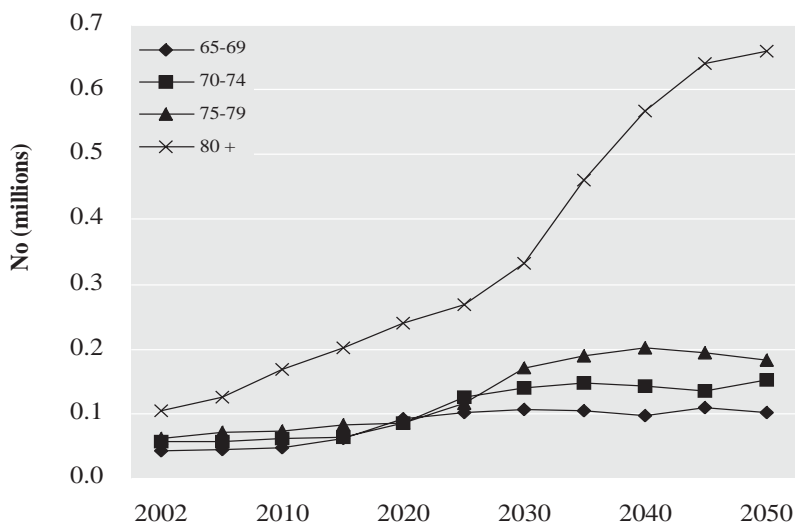


Figure 4 Estimated Numbers of Older People with Severe Mobility Limitation in Taiwan, Based on Rates in 1999

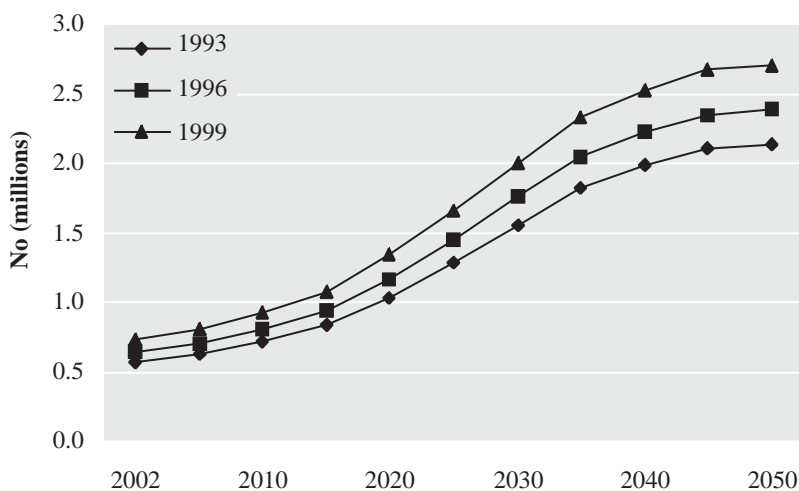


Figure 5 Estimated Number of People Aged 65 and over with One Mobility Limitation in Taiwan, Based on Rates in 1993, 1996, and 1999

with 2.6 times for 65 to 74 age group and 3.7 times for 75 to 84 age group) and in the relative proportion of medical expenses (rising from 10.3 % in 2001 to 26.7 % in 2050).

### Discussion

Like other countries in the world, Taiwan's

population is aging. Results from this analysis have raised concern about the speed of aging and its huge implications on the population's health. There will be less time left for the aging transition compared with other developing countries and alongside this will be an increase in the numbers of chronic diseases (such as cancer) and disability, as well as higher medical expenses.

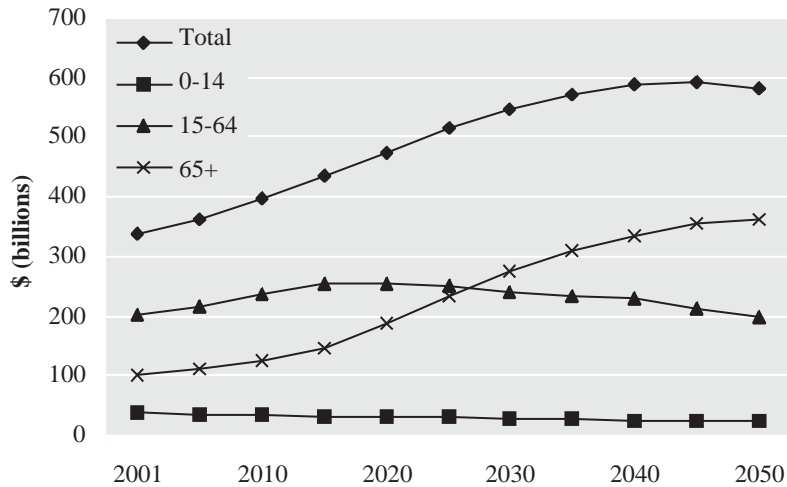


Figure 6 Actual (2001) and Projected Medical Expenditure for Different Age Groups in Taiwan

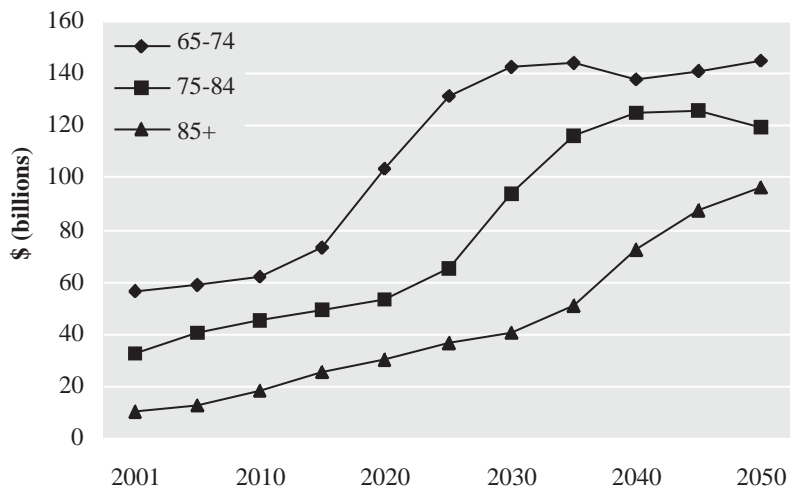


Figure 7 Actual (2001) and Projected Medical Expenditure for Older Age Groups in Taiwan

Especially, the oldest old, which will be the fastest growing segment of the older population, will have a relatively large impact on society.

Of course, no one can precisely predict future trends. All the projections made in this analysis are based only on the changes in population structure, and it is possible that future trends could be changed by other factors and will

go in totally different directions. For example, both disability rates and numbers for older people will decrease if the scenario of compression in morbidity happens in Taiwan, although evidence from recent surveys suggests that the increase in recent disability rates reflects the expansion of morbidity, which is probably due to the implementation of the new NHI system [5].

Similarly, if the extra years gained in life expectancy represent longer healthy life, the medical expenditure will not increase dramatically.

Finally, the importance of these projections is that we have to think of alternatives that we can use to cope with the possible effects of aging. Instead of trying to change the unavoidable population aging, understanding the risk factors that cause unwanted diseases and disability in older people's life and having more health prevention and intervention is a relatively effective way for population aging [6]. If this can be done, population aging will merely reflect the increase in numbers of older people, not in numbers of chronic diseases, disabilities or even in medical expenditure.

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