The Social Impact of Recent and Prospective Mortality Decline among Older New Zealanders

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There is an urgent need to plan for the transfer of necessary resources to the community in order for it to cope with the increasing burden of caring for the elderly

New Zealand is experiencing a maturing population characteristic of most economically developed countries. Advances in medicine, health and social welfare have combined to extend the expectation of life of the whole population. Recent mortality declines among the older New Zealand population are significant. Longer life for the older population has affected and will continue to affect society in a number of ways. Projected growth of the age segment of the population has become the object of increasing concern among scholars and those responsible for public policy. In fact, the demography of ageing has become an almost obligatory preface to the scholarly presentation on nearly all aspects of ageing.

This article attempts to demonstrate the extent of mortality decline experienced by the total and older population and discusses its effects on population composition and family relationships. The extent of morbidity and the impact of ageing on future health care facilities is also discussed.

Recent mortality decline

Since 1950, life expectancy for both males and females has increased by 4.22 and 4.50 years, respectively. This trend is likely to continue in the future. The projected expectation of life in 2031 is likely to be 77.6 and 83.1 years, respectively, for males and females. The overall improvement in New Zealand's mortality situation has resulted in this increase in expectation of life at advanced ages. The resulting increase in life expectancies at age 60 and 80 are presented in table 1. This table includes both actual experience from 1955-1957 and the future projected experience based on recent Department of Statistics projections.

Table 1: Actual and projected expectation of life at ages 60 and 80 by sex

Year	Age 60		Age 80	
	Males	Females	Males	Females
1955-1957	16.19	19.16	5.70	6.46
1960-1962	16.09	19.39	5.50	6.43
1965-1967	15.82	19.68	5.61	6.70
1970-1972	15.82	19.91	5.52	6.75
1975-1977	16.17	20.55	5.66	7.26
1980-1982	16.74	21.17	5.89	7.70
1985-1987	17.15	21.34	6.13	7.85
1990-1992	18.20	22.25	6.78	8.42
Projected				
2001	19.52	23.35	7.04	8.50
2016	20.50	24.46	7.71	8.90
2031	21.29	25.30	8.00	9.85

Source: Demographic Trends 1992, Department of Statistics, New Zealand.

In the decades since the 1950s, life expectancy at age 60 has increased by nearly 2.11 and 3.09 years, respectively, for males and females. Similarly, there also has been an increase in the expectation of life at age 80. Current projections are for continued substantial improvement in old-age mortality. In the next four decades, men can expect to add another 3.09 years and women 3.05 years to their life expectancy at the age of 60. This means that by 2031 men and women at age 60 can expect to live for another 21.29 years and 25.30 years, respectively. The improvements in expectation of life at age 80 are also noticeable. Men and women at age 80 will be expected to live for another 8.00 years and 9.85 years, respectively.

The full impact of the mortality decline, however, is not fully suggested by these changes in life expectancy alone. These changes are fully understood by having some indication of the proportion of population surviving to certain ages – in this case, to age 60 and age 80. This is very important in order to understand the social impact of the mortality decline, particularly in a society where medical care and full retirement benefits are provided after age 60. The number of people in the life table population who survive to certain ages (1x) enables us to judge the proportion of people who are likely to survive to that age (1x). Of course, this does not describe the actual experience of any population; what it demonstrates is the effect of mortality on a synthetic cohort of 100,000 people exposed from the time of birth to death occurring at the age-specific mortality rates of a given calendar year. If this synthetic experience is generated under the mortality conditions of 1955-1957, then only 76 per cent of the males born during that period would have reached age 60 and nearly 82 per cent of the females would have reached age 60. If the projected increase in mortality is achieved, then continued increases may be expected in these percentages. In 2031, survival to age 60 and older will be about 90 per cent and 95 per cent, respectively, for males and females. Table 2 also shows the increase in survival to age 80 for both males and females. If these life table values hold, almost 57 per cent of the males born in 2031 should live to age 80 and 71 per cent of the females should live to this age. In the case of females, the rise is more significant. This has raised greater concern among scholars and planners about the ability of families and societies in the future to provide support networks for the elderly members of this society.

Table 2: Numbers surviving to specified ages out of 100 born in specified time periods

Time period	Males		Females	
	60+	80	60+	80+
1950-1952	76	26	82	37
1960-1962	79	27	86	42
1970-1972	79	25	87	45
1980-1982	82	30	88	50
1990-1992	84	36	90	56
Projected				
2001	89	48	93	62
2011	89	52	94	66
2031	90	57	95	71

Source: Same as table 1.

The remainder of this article deals with some social implications of these past and projected improvements in old-age mortality. This significant improvement in mortality coupled with a dramatic decline in fertility has led to changes in the absolute and relative size of the older population as well as its composition. It has also created relatively uneven generations in size through time. This situation is bound to affect intergenerational family relationships. In addition, it has altered both the demand for and the ability to supply social, economic and health services provided by families and larger institutional structures.

Implications of declining old-age mortality for the size and composition of the older population
The demographic changes that have occurred in New Zealand since the 1930s have resulted in an increase in both the absolute and relative size of the older population. The percentage of the population comprising those 60 years of age and older has increased from about 9 per cent in the 1930s to 15.4 per cent in 1991. Table 3 show that both the absolute and relative size of the older population are projected to increase through 2031.

Table 3: Population aged 60 and older: projected number and percentage of total under two mortality assumptions, 1991-2031

Year	Population aged 60-79 to population aged 40-59	Population aged 60-79 and 80+ to females aged 40-59		Population aged 60-79 and 80+ to non-working females aged 40-59	
		60-79	80+	60-79	80+
1991	61	123	22	387	67
1996 *	56	111	23	382	80
2001	53	104	24	371	86
2006	52	102	25	360	91
2011	57	111	27	390	96
2016	62	122	28	420	96

2021	72	141	31	477	106
2026	80	160	37	536	124
2031	85	168	46	568	153

Source: Based on the official Population Projections supplied by the Department of Statistics, New Zealand.

In addition, the older population itself is ageing, as indicated by the proportion of this population older than 80 (table 4). The ageing of the older population is also expected to continue. Demographic theory shows that population ageing results from the demographic transition and that declining fertility, more than declining mortality, is primarily responsible (Coale, 1956; United Nations, 1954). In discussing the ageing of the New Zealand population, Zodgekar (1990) emphasized the fact that fertility changes have been the major factor in the ageing process. Although some of the past and present ageing of the New Zealand population is due to mortality decline, it is not the major explanatory factor. The increase in the absolute and relative size of the older New Zealand population expected after 2010 is not due primarily to expected mortality declines but to the ageing of the "baby boom" cohort (Koopman-Boyden and Brown, 1991). However, the impact of mortality decline on the increase in the number of people surviving to old age and during old age cannot be ignored. Myers (1981) showed that, with low levels of fertility and levels of life expectancy at birth above 70 years, the proportion of the population 65 and older in a stable population will increase steeply as life expectancy increases.

Table 4: Characteristics of New Zealand's ageing population

Year	Index of ageing 60+/0-14[a]	Population size 80+ (thousands)	Percentage 80+/total	Percentage 80+/60+	Percentage of two-generation geriatric families 80+/60-64	Sex ratio[b]	
						60+	80+
1991	66.76	78.1	2.27	14.8	55	796	493
1996	66.59	97.3	2.68	17.3	72	806	518
2001	67.80	114.8	3.00	18.9	75	817	531
2006	74.29	134.5	3.38	20.1	76	835	568
2011	89.54	150.7	3.65	19.8	68	836	601
2016	106.40	158.5	3.74	18.5	69	836	619
2021	121.93	175.2	4.01	18.1	69	836	628
2026	132.14	201.5	4.49	18.8	76	821	638
2031	139.97	246.2	5.37	21.2	92	816	643

Source: Data from 1996 onward are based on Projections.
Notes: a = 60+/0-14 x 100; and
b = Males/females x 1,000.

The range of life expectancies for males and females used in recent Department of Statistics projections and the resulting range in both absolute and relative size of the future older population are presented in table 3.

The difference in the number of people at age 60 and older in 2031 under the two assumptions of mortality is significant. A difference of nearly 2.5 years in the expectation of life at birth would result in approximately 64,000 more people in the old-age group at that time. This means a one-percentage point increase in the percentage of the population aged 60 and older. This outcome clearly demonstrates that at the higher levels of expectation of life, mortality changes will have had a significant impact on the ageing of the population.

The index of ageing presented in table 4 is a reflection of the interaction between fertility changes and mortality changes. The expected increase in this index is not only a reflection of fertility decline in the future but also a larger proportion of cohorts surviving to advanced ages owing to the past and future expected declines in mortality, particularly old-age mortality. The information contained in this index of age composition is crucial for forecasting fundamental changes in the country's institutional structures. It may also mean that a considerable re-allocation of financial resources will be necessary to accommodate this population group.

The distribution of the population within the elderly age group is also going to alter significantly as a result of improvements in overall mortality, particularly in old-age groups. The number of people aged 80 years and older is going to increase in size three-fold between 1991 and 2031, whereas the elderly aged 60 years and older are going to increase in size

only two-fold. This will result in an increase in the proportion of the population aged 80 and older in New Zealand. Projections indicate that by 2031 the country will have nearly 5.4 per cent of its population in the age category of 80 and older, or over one-fifth of the elderly population. This means that during the period 1991-2031 the absolute number of those aged 80 and older is likely to increase from 78,100 to 246,200 (table 4), which is likely to have significant implications for the financing, organization and utilization of health care resources (Koopman-Boyden, 1986).

The differential decline in mortality experienced by the male and female population at younger as well as older ages has resulted in a remarkable change in the composition of the older population. Improvements in female mortality rates to date have consistently exceeded male mortality rates across the entire age range. This has resulted in a change in the sex ratio in older age groups, which means that there will be a disproportionate number of women in these groups. According to the 1991 census, the sex ratio of those aged 60+ is 796; for those aged 80+, it is 493. On the basis of the future population projection to the year 2031, these ratios are likely to change to 816 and 643, respectively. The sex ratio remains considerably in favour of women and is likely to remain so as long as the existing mortality differences between males and females continue to favour females. In particular, there are likely to be disproportionately more "old old" women in the age group 80+.

The impact of these changes in old-age mortality has been an increase in the number of elderly surviving to old age and an increase in the number of people living longer in old age. This trend demonstrates that a society composed increasingly of older people is one that is becoming a society of older women, which implies greater burdens of social dependency for individual families and society as a whole.

Effect of mortality decline on family relationships

The concept of the effects of mortality decline on family relationships is difficult to measure, but vital to understanding patterns of social support and dependency. In addressing the human support dimension of social consequences of population ageing, it is necessary first to understand the relationship between population ageing and the evolving pattern of the distribution of the ageing population over alternative primary potential support group structures (Stone, 1993:30). In order to study this relationship, ideally long time-series of data need to be analyzed. However, in the absence of such data, aggregate demographic composition data have to be used. In this article, an attempt is made at addressing the social support network issue by designating people with certain demographic characteristics and labelling their particular stage in the life-cycle as a potential source of support in the network.

Professional demographers in New Zealand have recognized that the onset of a rapid shift in the levels and patterns of fertility has been concomitant with social and demographic change within the family with regard to its size and structure (Pool, 1991). Also, the number of living generations in families has been undergoing a gradual change, with families of today having more living generations than previously. Past mortality decline is one of the factors causing this increase in the number of generations, and anticipated mortality decline in the future is expected to result in a continuation of this trend. The increased life expectancy and increase in the numbers of elderly in the family has resulted and will continue to result in "two-generation geriatric families" (table 4). By 2031 it is expected that, while their parents are still alive, nearly 92 per cent of their children will enter the old-age group, 60-64 years. The emergence of two generations of older people per family will cause significant changes in the mutual support network among family members (Zodgekar, 1990:300). Although the elderly constituting those 60-64 years of age are not as dependent as their parents on outside support, their capacity to cope with this type of dependency diminishes with age, which implies that it has to be transferred elsewhere.

Today the support functions of the family and society generally do not overlap: the former may provide social and emotional support, and the latter economic support for retirement and health care. The potential of the family to act as a support network for its elderly members is related, not only to the number of generations in the family but also to the number of people within each generation. In most societies older people traditionally turn to family members for support. With the demographic changes experienced in the past as well as current and anticipated ones, the ability of successive generations to supply that support is going to come under greater pressure. This is best understood by integrating the changes at the two ends of the family life-cycle, which will enable an assessment of the interaction between changing family dynamics and the ageing population in New Zealand. This assessment will be addressed by an indication of the implications this interaction will have on the social dependency burden of the elderly. The dependency links between successive generations is the key to understanding the social dependency burden of the elderly.

The changes occurring at the two ends of the family life-cycle are best shown in the data presented in table 5. The ratio of the population 60 to 79 years of age to those 40 to 59 years is used as the relative number of elderly parents and their children. Of course, this type of ratio does not indicate the generational composition of individual families but represents the average relative size of generations. The relative size of generations turns out to have almost doubled since the 1930s; it has temporarily peaked and will not increase until the ageing of the "baby-boom" generation begins in 2016. The relative size of the two generations is, of course, affected by both mortality and fertility, but recent sharp and future improvements in old-age mortality will intensify the effect of low and declining fertility in raising the ratio of elderly parents to their adult children.

Table 5: Familial old-age dependency ratios (per 100)

Age group	Public hospitals			Private hospitals			All hospitals		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
60-64	10	10	10	5	8	6.3	8.8	9.5	9.1
65-69	12	12	12	10	17	13.2	11.6	13.0	12.2
70-74	12	16	14	27	41	33.7	14.5	20.3	17.2
75-79	14	19	17	52	97	76.0	19.5	31.0	25.4
80-84	17	26	22	75	155	120.8	24.8	44.0	35.7
85+	21	34	30	155	306	257.7	39.4	78.0	64.3
60+	13.4	19.5	16.5	36.8	87.8	63.8	17.0	31.6	24.3
80+	18.6	29.0	25.4	107.1	232.8	185.5	30.6	60.3	48.5

(caption: Mean number of days of hospital stay)

* Note: Data for 1996 onwards based on projected population and labour force.

The above analysis of the familial old-age dependency burden is based on the population as a whole but, as has been established, women are the primary care-givers within the family and so any consideration of the capacity of the family to provide that support should incorporate this factor, which is depicted in the familial dependency ratios presented in table 5. It is very difficult to measure the exact number of dependents and the caring work force. However, it is possible to consider, firstly, the number of dependents as being people aged 60-79 and 80+, and, secondly, the care-giving workforce as being those women in the population aged 40-59. Examination of the data given in table 5 reveals that the demands of the community, by way of its dependents on the traditional group of voluntary care-givers, will increase considerably.

In fact, this situation further deteriorates as women from this care-giving age group, 40-59 years, increasingly participate in the paid labour force. This aspect effectively reduces the pool of women available to undertake the care-giving role within the family and even within the voluntary sector where females are the prominent source of workers. The familial old-age dependency ratios expose an increasing dependency burden based on the availability of women according to work status in the age group 40-59. The increases are three to four times higher compared with all women aged 40-59. This situation may increase the caring role of women in this society as they attempt to juggle the demands of paid work and family life.

Table 6: Ratio of survival years of males and females aged 60+ to children and to daughters

Birth cohort	Year becoming 60	$e°_{60}$ Males	$e°_{60}$ Females	TFR[a]	Survival[b] (Children) Males	Survival[b] (Children) Females	GRR[c]	Survival[d] (Daughters) Males	Survival[d] (Daughters) Females
1921	1981	16.74	21.17	3.18	5.26	6.65	1.56	10.73	13.57
1961	2021	20.75	24.75	2.20	9.43	11.25	1.08	19.21	22.92
1971	2031	21.29	25.30	2.00	10.64	12.65	0.98	21.72	25.82

Notes: [a] = Total fertility rate (proxy for family size);

[b] = $e°_{60}$/TFR;

[c] = Gross reproduction rate (number of daughters per woman); and

[d] = $e°_{60}$/GRR.

Another dimension of the growing social dependency is studied by constructing an indicator showing the length of possible dependency which the elderly will place on their care-givers. The measures presented in table 6 provide a good indication of the growing duration of possible dependency. For example, daughters whose mothers turned 60 in 1981 could expect to live at least another 21 years. These mothers on average are expected to have a little over 1.5 daughters, which means that the duration of the possible dependency burden per daughter is going to be around 13.6 years. This will change substantially for those women born in the 1960s and 1970s. For these cohorts, each daughter could expect to provide nearly 23 and 26 years of support, respectively. While mortality change certainly has had a substantial effect on the duration of the dependency burden, it must not be forgotten that the relative number of parents and children, so important in the older person's support network, is largely determined by previous fertility. Even though declining mortality will result in an increase in the number of generations in the family, the elderly will have a smaller number of living children and grandchildren because of the

long-term decline in fertility. The social and economic transformation accompanying an ageing society has particular significance for women owing to their greater expectation of life and their traditional care-giving role within the family.

These demographic changes are going to reduce considerably the family's and the community's ability and capacity to keep on providing the necessary support currently being provided in caring for the elderly. This social dependency burden is likely to intensify further as the emphasis of public policy shifts from institutional care to community care. Therefore, there is an urgent need in New Zealand to plan for the transfer of necessary resources to the community in order for it to cope with this increasing burden. Without such a transfer, a family's resources will come under considerable pressure.

Old age, morbidity and health care

The number of elderly in New Zealand is growing rapidly in absolute terms and relative to other age groups. The elderly are also living longer. The distribution of the population within the old age group is also going to alter significantly. People aged 60 and older are more likely to experience serious illness and functional disability than those at younger ages. All these factors suggest that important questions should be raised regarding the magnitude of this demographic change for the country's health services.

Data on the prevalence rate of hospitalization and mean number of days spent in public and private hospitals for those aged 60 and older are presented in tables 7 and 8.

Table 7: Public and private hospital usage rates, 1991

Age group	Public		Private	
	Males	Females	Males	Females
60-64	15.25	11.71	4.64	3.72
65-69	21.03	15.14	5.00	3.91
70-74	27.95	19.46	5.66	3.98
75-79	32.70	26.37	5.51	4.78
80-84	45.72	33.22	7.11	5.39
85+	56.04	40.63	8.93	7.77

Table 8: Public and private hospital discharge and hospital stays for patients aged 60+, 1991

Age group	Mean number of days of hospital stay								
	Public hospitals			Private hospitals			All hospitals		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
60-64	10	10	10	5	8	6.3	8.8	9.5	9.1
65-69	12	12	12	10	17	13.2	11.6	13.0	12.2
70-74	12	16	14	27	41	33.7	14.5	20.3	17.2
75-79	14	19	17	52	97	76.0	19.5	31.0	25.4
80-84	17	26	22	75	155	120.8	24.8	44.0	35.7
85+	21	34	30	155	306	257.7	39.4	78.0	64.3
60+	13.4	19.5	16.5	36.8	87.8	63.8	17.0	31.6	24.3
80+	18.6	29.0	25.4	107.1	232.8	185.5	30.6	60.3	48.5

Source: Same as table 7.

The average number of days spent in the hospital for males and females over age 60 during 1991 is 17 and 31.6, respectively. The length of hospital stay increases dramatically for those who are aged 80 and older. This has great significance in terms of the number of beds occupied in the hospital, since the elderly population in the future is going to have a much larger proportion of elderly in the 80 and older age group than is currently the case. The mean number of days per hospital admission for acute care indicates that the demand for hospital space will increase dramatically in the future, since older people already form the majority of public hospital admissions and hospital stays.

Such admissions are largely for treatment of degenerative conditions. In 1991, on the basis of age-specific use rates, the number of beds required for geriatric care (for people aged 60 and older) per hospital stay is set out in table 9. The number

of beds occupied in 1991 in both public and private hospitals totalled 9,772. If it is assumed that the age-specific use rates remain constant and if the analysis is extended by applying the rates to the projected elderly population in 2031, the number of public and private hospital beds required for geriatric care will increase by nearly 162 per cent, even though the elderly population will increase by only 120 per cent. One could question the assumption of constant age-specific use rates, which are clearly arbitrary assumptions that have been made to show the effects of changing mortality rates and population composition of the elderly on the likely increase in the demand for hospital beds required for geriatric care.

Table 9: Provision of hospital beds for patients aged 60+ in public and private hospitals, 1991 and 2031 *

| Age group | Number of hospital beds required | | | | | |
| | 1991 | | | 2031 | | |
	Public	Private	Total	Public	Private	Total
60-64	525	103	628	986	196	1,182
65-69	758	207	965	1,489	407	1,896
70-74	890	439	1,329	1,959	962	2,921
75-79	1,056	848	1,904	2,260	1,808	4,068
80-84	1,074	938	2,012	2,903	2,488	5,391
85+	1,140	1,794	2,934	3,849	6,315	10,164
Total 60+	5,443	4,329	9,772	13,446	12,176	25,622

* Notes: Data for 2031 projected on the basis of prevalence of hospitalisations and mean number of days stayed in the hospital in 1991.

The key issue is whether mortality declines will result in a reduction in utilization rates. Improvements in mortality rates in New Zealand during this century have not been accompanied by equivalent improvements in mortality (Koopman-Boyden, 1986). A recent study based on data from a number of countries suggests that the ratio between healthy life expectancy and total life expectancy was diminishing (Robine and Ritchie, 1991). Malcolm (1991) argues that, although life expectancy may be increasing for the elderly, there has been little or no expansion of life free of disability and morbidity. Thus, the debate should centre around a possible increase in the morbidity level and the possibility that longer life may be accompanied by a prolonged period of chronic disease, illness and disability. To further assess the effects of an ageing population on the demand for support services, it is necessary to give some indication of the number of elderly disabled people in the population. Green (1993) presents various estimates for the elderly population aged 65 and older based on some survey data. For every category, the number of disabled elderly in 2031 is at least 2.5 times higher than that for 1986. Thus, the likely effect of the ageing of the population is an increase of 100,000 in the total number of elderly people requiring help by the year 2031 (Green, 1993:155). The majority of the disabled elderly population in New Zealand live in the community, which implies a need for expanding community care facilities. Thus, the increase in the number of disabled elderly is going to create further pressures on familial dependency ratios.

Conclusion

Significant improvements in mortality coupled with a dramatic decline in fertility have led to changes in the absolute and relative size of the older population of New Zealand. The distribution of the population within the older age groups is also going to alter significantly as a result of improvements in overall mortality and particularly mortality in old age. The main impacts of the changes in old-age mortality have been an increase in the number of elderly surviving to old age and an increase in the number of people living longer in old age. This has resulted and will continue to result in "two-generation geriatric families". In addition, declining fertility will mean that successive generations will certainly contain fewer people. This will have a considerable effect on the familial support network, and this effect is likely to intensify further as the emphasis of public policy shifts from institutional care to community care for the elderly. There is an urgent need in New Zealand to plan for the transfer of necessary resources to the community in order for it to cope with this increasing burden. Without such a transfer, a family's resources will come under considerable pressure. Increases in the proportion of the elderly population will also create increased demands for geriatric hospital and community care, since a number of studies have shown that the improvements in mortality during this century have not been accompanied by equivalent improvements in morbidity.

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