MAORI STANDARDS OF HEALTH

A STUDY OF THE 20 YEAR PERIOD 1955–75

A report prepared for the
Medical Research Council of New Zealand

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PREFACE

Despite general improvements in health standards over the past two decades there can be no doubt that statistics still favour those of non-Maori birth. Tables which have been prepared by the National Health Statistics Centre continue to show that members of the Maori race are exposed to increased risk of morbidity and mortality from a wide range of causes.

This fact has concerned the Medical Research Council and its Forward Planning Committee, which commissioned a study of available information on Maori health status. This report is the outcome of the study, and Council is indebted to Dr Pomare for his careful analysis of the relevant data.

The report gives no cause for complacency. The health of the New Zealand Maori population falls behind that of non-Maoris in most areas for which figures are available and the differences are not confined to any particular age group. Rheumatic heart disease, high blood pressure, cancer of the cervix and stomach, respiratory disease, motor vehicle accidents, gallstones, glomerulonephritis, diabetes mellitus and many infections are each responsible for at least three times the death rate in Maoris under the age of 65, compared with the remaining population. In some instances the cause of the difference is clear without the need for further research, even though the means whereby improvement can be achieved is often much less obvious. In other cases there is no obvious cause for the health disadvantage and more basic research is needed.

It is the hope of the Council and the Forward Planning Committee that this report will be widely read and discussed and that it will form the basis of more specific recommendations for future research in this important field. In particular, it is hoped that the Maori people themselves will consider these findings and provide the leadership which will be needed to enable the occurrence of many of these common diseases to fall in the Maori population.

If successful, by the beginning of the 21st century it may no longer be necessary or desirable to separate Maori and non-Maori in most health statistics. This would indeed be a praiseworthy goal for all health workers and for the Maori people in New Zealand.

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CONTENTS

TABLES

FIGURES

INTRODUCTION

This report is principally an assessment of the mortality experience in both Maoris and non-Maoris over the 20 year period 1955–1975. The reports of R.J. Rose in both 1960[31] and 1972[30] have been used extensively for comparison with latest available mortality statistics (1975).

In this report mortality rates have served as the principal guide to the incidence of diseases in the community, and for comparisons to be made between Maoris and non-Maoris. Field studies, however, are necessary to measure the true incidence of diseases but these have been few with regard to the Maori population and have come largely from epidemiological studies by Dr I. Prior and his group in Wellington over the past 20 years.

Although there has been a steady improvement in Maori health this century, with quite dramatic reductions in deaths due to infectious diseases within the past 20 years, Maori age specific death rates at all ages are still significantly higher than for non-Maoris.

In terms of the expectation of life at birth, the Maori fares worse than his non-Maori counterpart. According to the 1972 Life Tables, the Maori expectation of life at birth was 61 years for males and 65 years for females, compared with 69 years for non-Maori males and 75 years for non-Maori females. It is encouraging to note that the Maori expectation of life from birth has increased considerably since the 1950–52 period (by 7 years for males and 9 years for females) but there is still considerable room for improvement *(Table 1)*.

One of the most outstanding demographic characteristics of the Maori population is its youthfulness. In 1971 approximately half the Maori population was under 15 years of age, compared with less than a third for that of the non-Maori population. At the other end of the scale only 1 Maori in every 100 was 70 years of age or older compared with 6 non-Maoris.

TABLE 1: **MAORI AND NON-MAORI LIFE EXPECTANCY (YEARS) 1950–52 TO 1970–72**

NEW ZEALAND LIFE TABLES	EXACT AGE (Years)	LIFE EXPECTANCY (Years)			
		MAORI		NON-MAORI	
		Male	Female	Male	Female
1950 - 52)	0	54	56	68	72
1960 - 62)		59	61	69	75
1970 - 72)		61	65	69	75
1950 - 52)	20	42	43	51	55
1960 - 62)		44	45	52	56
1970 - 72)		44	48	51	57
1950 - 52)	40	26	27	33	36
1960 - 62)		27	27	33	37
1970 - 72)		27	29	32	38
1950 - 52)	60	13	14	16	19
1960 - 62)		13	14	16	19
1970 - 72)		13	15	16	20

The aim of the present report is to outline trends which have occurred in Maori health patterns over the past 20 years and to highlight specific health problems which may be worthy of further study.

DEMOGRAPHIC PATTERNS

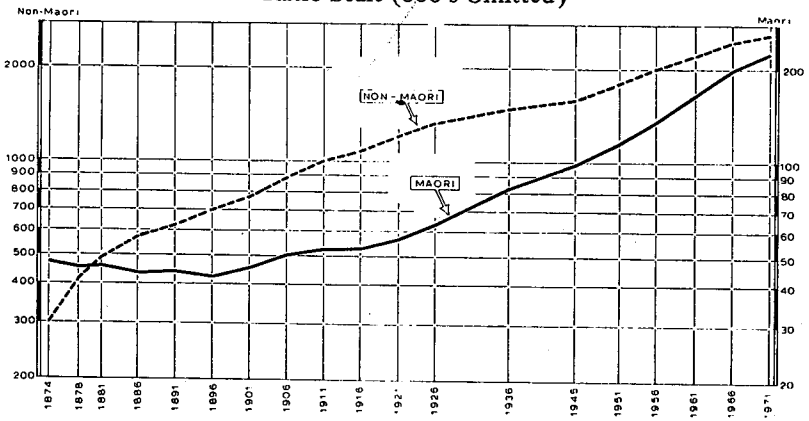
1. Population Growth

Since the 1857–58 population census (in which Maoris were included for the first time), New Zealand's population has grown steadily. At 31 March 1975 the population was estimated to total over 3.1 million. Although the trend has been for an increase in the population at about a rate of 2 percent per year, the past year has seen a decrease in the total population, due principally to emigration.

At the Census of Population and Dwellings held on 23 March 1971, the New Zealand population included 227,414 persons of half or more Maori origin. This was an increase of 26,255 (13.1 percent) on the total at the 1966 census and represented an average annual increase in the Maori population of 2.5 percent. This was the lowest growth rate since the Second World War *(Figure 1)*.

FIGURE 1:

MAORI AND NON-MAORI POPULATION GROWTH
Ratio Scale (000's Omitted)



2. Geographical Location

Historically, Maoris have lived predominantly in the North Island. At the 1971 census 213,577 (93.9 percent) lived in the North Island and only 13,837 in the South Island. However, this represented a 30.1 percent gain since 1966 in the South Island Maori population, compared with only a 12.1 percent increase in the North Island. The urban area of Christchurch recorded the largest concentration of Maori population in the South Island (4,440) though Southland also has recorded substantial percentage

increases since the 1966 census. The increase in the Maori population in the South Island is largely due to the migration of young Maori working males (and to a lesser extent females) from the North Island. In spite of the growth of the Maori population in the South Island, 68 percent of the Maori population is still located in the four statistical areas of Northland, Central Auckland, South Auckland/Bay of Plenty, and the East Coast. Thus, not only do the great majority of Maoris live in the North Island, but almost 7 out of every 10 live in the northern half of the North Island.

It is of note that three statistical areas showed a loss of Maori population at the 1971 census, the result of migration to areas with larger centres. Notably, these were the same three areas that had experienced a loss of Maori population in the intercensal period 1961–66: they were Northland, East Coast, and Taranaki.

3. Urban Areas

Coupled with normal population increases, migration from rural to urban areas has resulted in an accelerated growth in urban areas. The drift to the urban areas is probably largely the result of new opportunities of employment. Whilst in the period 1926–36 approximately 10 percent of the Maori population resided in urban areas, by 1971 this was more than 50 percent. It is also noteworthy that almost 50 percent of the total Maori population residing in urban areas is under 15 years of age.

4. Proportion of Maoris in Population

The 1971 population ratio of 8.6 Maoris to every 100 non-Maoris was the highest since the census of 1881. The County of Waiapu, on the East Coast peninsula, recorded the highest percentage of Maoris (69.3 percent) in the population during that year, whilst Hokianga, in Northland, had the next largest (62.1 percent). Other geographic counties with a third or more Maori inhabitants were Waikohu (45.2 percent) on the East Coast peninsula, Wairoa (41.7 percent), Opotiki (41.6 percent), Whangaroa (36.5 percent), Bay of Islands (35.9 percent), and Whakatane (33.9 percent). With the exception of Hokianga, which showed a slight increase, all these geographic counties recorded a drop in the proportion of Maoris in their population.

5. Composition of Maori Population

At the 1971 census those declaring themselves as full Maori totalled 56.3 percent, three-quarter Maori 10.8 percent, and one-half Maori 31 percent. At the 1961 census there were 62.2 percent full Maori, 14.4 percent three-quarter Maori, and 21.8 percent one-half Maori.

6. Maori Population by Sex

A ratio of 97.8 females to every 100 males in the Maori population in 1971 compares with 100.3 females to every 100 males in the non-Maori population.

7. Age Distribution

The youthfulness of the Maori population is one of its outstanding demographic characteristics. As already mentioned, at the 1971 census approximately half the Maori population was under 15 years of age, compared with less than a third of the non-Maori population. At the other end of the scale only 1 Maori in every 100 was 70 years of age or older compared with 6 non-Maoris.

MORTALITY DATA

1. Racial Definition

The term "Maori" is applied to that portion of the population which has 50 percent or more of Maori ancestry and the term "non-Maori" to the rest of the population. Accordingly, a very large proportion of the people classed as Maori possess some European ancestry and, conversely, the non-Maori population contains all those people of less than half Maori ancestry, whether they be Chinese, Indian, or Pacific Islanders.

2. Maori/Non-Maori Comparisons

The Maori population, with its high birth rate and high death rate in infancy and childhood over a long period of time, has a population structure in which the proportion of old to young is very different from that of the non-Maori population. As a result of this, Maori crude death rates cannot validly be compared with non-Maori crude death rates. Therefore, age specific death rates by race and sex are used and are shown in Table 2 for the periods 1954–58, 1964–68, and 1973–75.

One of the most notable changes in the past 20 years has been the reduced mortality rate of Maori infants and preschool children. In the 1954–58 period the mortality rate in this age group was over 3 times greater for Maoris than non-Maoris and this gap has steadily narrowed. The 1973–75 ratio was 1.3. The reduction in the Maori mortality rate (less than 5 years) has been 39 percent in this 20 year period and almost all of this occurred in the decade prior to 1975 *(Table 2)*.

In the school age group (5 to 14 years) there has also been a substantial reduction in Maori mortality rates in the 20 year period under review. For Maori males this has been 59 percent, whilst that for Maori females 64 percent. The greater part of these reductions occurred in the 10 year period 1954–1964. The ratio of Maori to non-Maori deaths has halved in the 20 year period but the Maori rate is still 1.6 times greater than that for non-Maoris *(Table 3)*.

If the mortality rates in the 5 to 9 year age group *(Table 4)* are studied in the 10 year period prior to 1975, the mortality rate for the Maori male has dropped appreciably, whilst that for the Maori female has stayed constant. If the mortality rates for the age group 10 to 14 years *(Table 5)* are studied, an appreciable reduction for Maori females in the 10 year period prior to 1975 is noted, whilst an increase of 17 percent has taken place for Maori males.

TABLE 2:

AGE–SPECIFIC DEATH RATES BY AGE AND SEX : RATES, 1954–75

Rates per 10,000 Population

PERIOD	RACE	< 5 YRS	5 - 14 YRS	15 - 24 YRS	25 - 44 YRS	45 - 64 YRS	> 65 YRS
1954 - 58		Male					
	Maori	189	17	30	56	251	1,173
	Non-Maori	60	5.1	15	20	126	843
	Ratio Maori/Non-Maori	3.1	3.3	2.0	2.8	2.0	1.4
		Female					
	Maori	158	14	21	47	249	1,074
	Non-Maori	46	3.8	5.2	13	78	646
	Ratio M/N-M	3.4	3.7	4.0	3.6	3.2	1.7
1964 - 68		Male*					
	Maori	199	7.9	22	43	234	1,215
	Non-Maori	106	4.6	13	20	137	924
	Ratio M/N-M	1.9	1.7	1.7	2.1	1.7	1.3
		Female*					
	Maori	138	4.9	11	33	171	1,007
	Non-Maori	80	2.8	4.8	12	74	650
	Ratio M/N-M	1.7	1.8	2.3	2.8	2.3	1.6
1973 - 75		Male					
	Maori	126	7	24	43	258	1,118
	Non-Maori	92	4.5	16	19	134	903
	Ratio M/N-M	1.4	1.6	1.5	2.3	1.9	1.2
		Female					
	Maori	87	5	9	32	197	868
	Non-Maori	65	3	6	12	71	627
	Ratio M/N-M	1.3	1.7	1.5	2.6	2.8	1.4

* Figures for 1963 - 65 are used

TABLE 3:

MORTALITY AGES 5–14 YEARS : RATES, 1954–75

Rates per 10,000 Population

PERIOD	MALE		RATIO MAORI TO NON-MAORI	FEMALE		RATIO MAORI TO NON-MAORI
	Maori	Non-Maori		Maori	Non-Maori	
1954 - 58	17	5.1	3.3	14	3.8	3.7
1964 - 68	7.9	4.6	1.7	4.9	2.8	1.8
% Change	-54	-10		-65	-26	
1973 - 75	7.0	4.5	1.6	5.0	3.0	1.7
% Change	-11	-2		+2	+7	

TABLE 4:

MORTALITY AGES 5–9 YEARS : RATES, 1963–75

Rates per 10,000 Population

PERIOD	MALE		RATIO MAORI TO NON-MAORI	FEMALE		RATIO MAORI TO NON-MAORI
	Maori	Non-Maori		Maori	Non-Maori	
1963 - 65	10	4	2.5	6	3	2.0
1973 - 75	7	5	1.4	6	3	2.0
% Change	-30	+25		-	-	

TABLE 5:

MORTALITY AGES 10–14 YEARS : RATES 1963–75

Rates per 10,000 Population

PERIOD	MALE		RATIO MAORI TO NON-MAORI	FEMALE		RATIO MAORI TO NON-MAORI
	Maori	Non-Maori		Maori	Non-Maori	
1963 - 65	6	5	1.2	5	3	1.7
1973 - 75	7	4	1.8	4	3	1.3
% Change	+17	-20		-20	-	

In the 15 to 24 year age group the Maori/non-Maori mortality ratio for females has dropped sharply from 4 to 1.5 in the 20 year period under review. A much smaller drop (2 to 1.5) has been noted with respect to the Maori male. Although there has been a 20 percent reduction in the mortality rate for Maori males during the 20 years, in the 10 years prior to 1975 there has been a small increase of 10 percent *(Table 6)*.

TABLE 6:

MORTALITY AGES 15–24 YEARS : RATES, 1954–75

Rates per 10,000 Population

PERIOD	MALE		RATIO MAORI TO NON-MAORI	FEMALE		RATIO MAORI TO NON-MAORI
	Maori	Non-Maori		Maori	Non-Maori	
1954 - 58	30	15	2.0	21	5.2	4.0
1964 - 68	22	13	1.7	11	4.8	2.3
% Change	-27	-13		-48	-8	
1973 - 75	24	16	1.5	9	6	1.5
% Change	+9	+23		-18	+25	

In the 25 to 44 year age group Maori mortality rates still remain appreciably higher (2.5 times) than non-Maori rates. Also it is noted that this difference is somewhat greater for Maori females than males. For Maori males a 23 percent reduction in mortality occurred in the 10 year period prior to 1964 whilst, in the 10 year period following this, mortality rates have been stationary. A similar picture is noted for Maori females *(Table 7)*. Within the 25 to 44 year age group there has been a small increase in the mortality rate for Maori males aged 25 to 34 years in the past 10 year period *(Table 8)*. Within the 35 to 44 year age group mortality rates for both Maori males and females in the last decade have remained stationary *(Table 9)*.

In the 45 to 64 year age group the Maori mortality rate is almost 2.5 times greater than that for non-Maoris and this difference is noticeably more for Maori females. In the 20 year period under review there has been a small increase (3 percent) in the Maori male mortality rate, whilst for Maori females there has been a 16 percent increase in mortality in the past decade *(Table 10)*.

TABLE 7:

MORTALITY AGES 25–44 YEARS : RATES, 1954–75

Rates per 10,000 Population

PERIOD	MALE		RATIO MAORI TO NON-MAORI	FEMALE		RATIO MAORI TO NON-MAORI
	Maori	Non-Maori		Maori	Non-Maori	
1954 - 58	56	20	2.8	47	13	3.6
1964 - 68	43	20	2.1	33	12	2.8
% Change	-23	-		-29	-8	
1973 - 75	43	19	2.3	32	12	2.6
% Change	-	-5		-6	-	

TABLE 8:

MORTALITY AGES 25–34 YEARS : RATES, 1954–75

Rates per 10,000 Population

PERIOD	MALE		RATIO MAORI TO NON-MAORI	FEMALE		RATIO MAORI TO NON-MAORI
	Maori	Non-Maori		Maori	Non-Maori	
1954 - 58	42	15	2.8	30	8	3.8
1964 - 68	28	14	2.0	20	7	2.9
% Change	-33	-7		-33	-13	
1973 - 75	29	13	2.2	18	7	2.6
% Change	+4	-7		-10	-	

TABLE 9:

MORTALITY AGES 35–44 YEARS : RATES, 1954–75

Rates per 10,000 Population

PERIOD	MALE		RATIO MAORI TO NON-MAORI	FEMALE		RATIO MAORI TO NON-MAORI
	Maori	Non-Maori		Maori	Non-Maori	
1954 - 58	70	24	2.9	64	18	3.6
1964 - 68	57	26	2.2	47	17	2.8
% Change	-19	+8		-27	-6	
1973 - 75	57	24	2.4	45	17	2.6
% Change	-	-8		-4	-	

TABLE 10:

MORTALITY AGES 45–64 YEARS : RATES, 1954–75

Rates per 10,000 Population

PERIOD	MALE		RATIO MAORI TO NON-MAORI	FEMALE		RATIO MAORI TO NON-MAORI
	Maori	Non-Maori		Maori	Non-Maori	
1954 - 58	251	126	2.0	249	78	3.2
1964 - 68	234	137	1.7	171	74	2.3
% Change	-7	+9		-31	-5	
1973 - 75	258	134	1.9	197	71	2.8
% Change	+10	-2		+16	-4	

In the over 65 year age group *(Table 11)* there have been small improvements in Maori mortality rates in the past 20 years. In this age group, in contrast to other age groups, mortality rates approximate each other much more closely. Indeed, in the 80 to 84 year age group, the Maori mortality rate is less than that for the non-Maori (1973–1975).

TABLE 11:

MORTALITY AGES > 65 YEARS : RATES, 1954–75

Rates per 10,000 Population

PERIOD	MALE		RATIO MAORI TO NON-MAORI	FEMALE		RATIO MAORI TO NON-MAORI
	Maori	Non-Maori		Maori	Non-Maori	
1954 - 58	1,173	843	1.4	1,074	646	1.7
1964 - 68	1,215	924	1.3	1,007	650	1.6
% Change	+4	+10		-6	+1	
1973 - 75	1,118	903	1.2	868	627	1.4
% Change	-8	-2		-4	-4	

3. Child Health Statistics

(i) Infant Mortality (rates per 1000 livebirths)

Since the 1954–58 period, the Maori rate has fallen by more than half and in 1975 stood at the level of the total population during the late 1950s. In 1975 the infant death rate for the total population was 16, whilst that for Maoris was 21. These compare with rates of 20 and 57 for the two populations in the 1954–58 period *(Table 12)*.

Significantly greater infant mortality rates for Maoris were noted in the following health districts: Whangarei (2.8 times), South Auckland (1.6), Rotorua (1.7), Napier (1.8), Palmerston North (2.6), and Wellington (2.2). In Gisborne the Maori infant mortality rate of 24 was high, but so was the non-Maori rate of 20. By and large, the health districts listed are those with higher Maori population densities.

TABLE 12:

INFANT MORTALITY : RATES, 1954–75

Rates per 1000 Live Births

PERIOD	INFANTS (< 1 YR)			NEONATES (< 28 days)			POST NEONATES (> 28 days < 1 YR)		
	Maori (M)	Non-Maori (NM)	Ratio M/NM	M	NM	Ratio M/NM	M	NM	Ratio M/NM
1954 - 58	57	20	2.9	20	14	1.5	37	5.9	6.3
1964 - 68	30	17	1.7	13	11	1.2	17	5.4	3.1
% Change	-47	-14		-35	-23		-55	-9	
1974 - 75	21	14	1.5	12	7.6	1.6	9.6	3.1	3.1
% Change	-27	-7		-1	-18		-43	-43	

(ii) Total Live Births (rates per 1000 mean population)

There have been sharp drops in the birth rates for both Maoris and non-Maoris in the past 15 years. In 1975 the Maori birth rate was 27, whilst that for the total population was 19. In the 15 years prior to 1975 the Maori rate has fallen by 43 percent, whilst for the total population the 1975 figure of 19 was 30 percent less than 15 years previously. The sharpest drop in numbers of births has occurred since 1971.

(iii) Late Fetal Deaths (rates per 1000 total births)

Since 1960 there have been sharp drops in both the Maori and non-Maori rates for late fetal deaths. In 1975 the Maori rate of 7 was 35 percent less than in 1960, whilst the rate of 9.4 for non-Maoris was 45 percent less than the 1960 rate. It is of note that the non-Maori rate in 1975 was 1.3 times greater than the Maori rate.

(iv) Early Neonatal Deaths (rates per 1000 live births)

In 1975 the Maori rate of 9.3 was 38 percent less than the 1960 figure of 15. For non-Maoris the 1975 figure was 7.3 which was 35 percent less than the 1960 figure of 11.2. In 1975 the Maori rate was 1.3 times greater than the non-Maori rate.

(v) Perinatal Deaths (rates per 1000 total births)

Appreciable reductions have occurred for both Maoris and non-Maoris in perinatal deaths and have been of a similar degree for both groups. The 1975 rate for Maoris was 16 compared with 15 for non-Maoris.

(vi) Neonatal Deaths (rates per 1000 births)

A big fall in the neonatal death rate for Maoris was noted in the 10 year period prior to 1964 but since that time there has been only a marginal improvement. The 1974–75 neonatal rate for Maoris was 12 compared with 7.6 for non-Maoris. The Maori rate was 1.6 times greater than that for non-Maoris.

(vii) Post Neonatal Deaths (rates per 1000 live births)

The Maori mortality rate in this group is still disproportionately high compared with the non-Maori in spite of a 74 percent reduction in the 20 year period under review. The difference between Maori and non-Maori rates has narrowed considerably but is still 3 times greater for Maoris.

The major contribution to total infant mortality in New Zealand occurs in the post neonatal period and is much greater for Maoris than non-Maoris. In 1974 40 percent of New Zealand's infant deaths were aged between 1 and 11 months. New Zealand's total population post neonatal mortality rate of 6.2 was 2 to 3 times greater than that recorded in Sweden, Norway, Denmark,and the Netherlands.

The commonest cause of infant mortality is respiratory infection (influenza, pneumonia,and bronchitis) and these, as previously, remain important causes of death amongst Maori infants.

It is to be noted that there has been an increase in the number of reported cases of "cot deaths". Increased rates may simply represent a growing use of the term rather than an actual increase in incidence, but it is noteworthy that the Maori rate is 2 to 3 times that of non-Maoris. Necropsy studies have shown that the majority are due to respiratory conditions (71 percent) and that the greatest number of these deaths occur in the 1 to 6 month age group (83 percent).

(viii) Mortality Ages 1–4 Years – the pre-school child (rates per 10,000 population)

Maori mortality rates have reduced substantially in the 20 years prior to 1975, the reduction being approximately 75 percent *(Table 13)*. The Maori rates for males and females of 14 and 11 respectively are still 1.5 times greater than that for non-Maoris, although this gap has narrowed from 4 times greater over 20 years.

TABLE 13:

MORTALITY AGES 1–4 YEARS : RATES, 1954–75

Rates per 10,000 Population

PERIOD	MALE		RATIO	FEMALE		RATIO
	Maori (M)	Non-Maori (NM)	M/NM	M	NM	M/NM
1954 - 58	48	13	3.7	49	11	4.3
1964 - 68	24	10	2.3	20	8.7	2.3
% Change	-50	-20		-59	-22	
1973 - 75	14	9	1.6	11	8	1.4
% Change	-41	-13		-45	-8	

The principal cause of death for both Maoris and non-Maoris was accidents. The Maori rate in 1975 of 9.7 was 3 times greater than that for non-Maoris. An important cause of accidental death in the Maori group was accidental falls and this was 8 times more common in Maoris than non-Maoris. Respiratory deaths were also 4 times more common in Maoris than non-Maoris and the major cause here was pneumonia. Although in most other categories the mortality rate for Maoris is much greater, numbers are too small for valid comparison *(Table 14)*.

TABLE 14:

CAUSES OF DEATH : AGES 1–4 YEARS
Rates per 10,000 Population 1975

	Maori	Rating	Non-Maori	Rating	Ratio Maori to Non-Maori
ALL DEATHS	17		7		2.4
INFECTIVE & PARASITIC	0.8		0.6		1.3
NEOPLASTIC	1.2	3=	0.6	3=	2.0
CIRCULATORY	0.4		0.1		4.0
RESPIRATORY	2.4	2	0.6	3=	4.0
DIGESTIVE	0.4		0.1		4.0
CONGENITAL	1.2	3=	1.5	2	0.8
ACCIDENTS	9.7	1	3.0	1	3.2
Motor vehicle Falls	3.2 2.4		0.9 0.3		3.3 8.0

Comparing these trends with those reported in the 1968–69 period, there has been a slight increase in the number of accidental deaths compared with quite a marked decrease in deaths due to respiratory disease.

(ix) Mortality Ages 5–14 Years – the school years (rates per 10,000 population)

Accidents are again the most common cause of death in the 5 to 14 year age group *(Table 15)*. The Maori rate of 3.8 is over twice that for non-Maoris (1.7). Deaths due to accidents have increased for both Maoris and for non-Maoris since the 1968–69 period, respective figures then being 3.2 and 1.4.

TABLE 15:

CAUSES OF DEATH : AGES 5–14 YEARS
Rates per 10,000 Population 1975

	Maori	Rating	Non-Maori	Rating	Ratio Maori to Non-Maori
ALL DEATHS	6.0		3.8		1.6
ACCIDENTS	3.8	1	1.7	1	2.2
Motor vehicle Homicide	2.1 0.39		0.86 -		2.4 -
NEOPLASTIC	0.65	2	0.73	2	0.89
RESPIRATORY	0.52	3	0.24	3	2.2
CIRCULATORY	0.39	4	0.22	4	1.8

Motor vehicle accidents are the commonest cause of death in both groups, and are 2 to 3 times more common with Maoris. Three homicides were recorded, all associated with the Maori group.

4. Adult Health Statistics

(i) Mortality Ages 15–24 Years (rates per 10,000 population)

The principal cause of death in this age group is again accidents, the rate for Maoris being 8.4 compared with 6.3 for non-Maoris. In 1968–69 the overall mortality rate for Maoris decreased from 16.2 to 14, whilst that for non-Maoris increased from 9.4 to 10.5 *(Table 16)*.

Motor vehicle accidents are the single most common cause of death, the Maori rate being 5.4 compared with 5.1 for non-Maoris. In 1968–69 the respective figures for Maori and non-Maori were 6.7 and 3.7. Death due to poisoning was over 5 times more common in the Maori group (0.78), whilst seven deaths were recorded in the non-Maori group in the water transport category. Death due to respiratory disease was also notably higher in the Maori group (0.97) than the non-Maori group (0.23). The majority of these deaths were due to asthma, the Maori rate being 4.8 times greater than that for non-Maoris.

Comparing causes of death in the 1968–69 period with those of 1975, there has been an appreciable reduction in deaths due to diseases of the circulatory system and diseases due to infection and parasites. Although suicide was less commonly seen in the Maori in 1968–69, death rates for 1975 are similar to the non-Maori rate (0.97).

TABLE 16:

CAUSES OF DEATH : AGES 15–24 YEARS

Rates per 10,000 Population 1975

	Maori	Rating	Non-Maori	Rating	Ratio Maori to Non-Maori
ALL DEATHS	14		10.5		1.3
ACCIDENTS	8.4	1	6.3	1	1.3
Motor vehicle Drugs/Poisons Suicide Homicide Falls Drowning	5.4 0.78 0.97 0.19 0.19 -		5.1 0.14 0.96 0.14 0.20 0.16		1.1 5.6 1.0 1.4 0.95 -
CIRCULATORY	0.58	4	0.41	3	1.4
RESPIRATORY	0.97	3	0.23	4	4.2
Asthma	0.58		0.12		4.8
NEOPLASTIC	1.1	2	0.76	2	1.4

(ii) Mortality Ages 25–44 Years (rates per 10,000 population)

The death rates from all causes in this group were 34 for Maoris and 15 for non-Maoris *(Table 17)*. There has been a slight reduction in both rates since 1968–69, the respective figures then being 39 and 16.

Again the biggest single cause of death in both Maoris and non-Maoris was accidents. The rate for Maoris for all accidents was 10 compared with 4.7 for non-Maoris. The Maori rate is marginally less than that in 1968–69, whilst the non-Maori rate is slightly more. Motor vehicle accidents are the principal cause of death, the Maori rate of 5.0 being 3.3 times greater than the non-Maori rate. A trend in a different direction is that for suicides, in which the non-Maori rate of 1.2 was over 50 percent greater than that for Maoris. The homicide rate was 5 times greater in the Maori group.

TABLE 17:

CAUSES OF DEATH : AGES 25–44 YEARS

Rates per 10,000 Population 1975

	Maori	Rating	Non-Maori	Rating	Ratio Maori to Non-Maori
ALL DEATHS	34		15		2.3
INFECTIVE & PARASITIC	1.8		0.25		7.2
Tuberculosis	0.90	8	0.04		23
CIRCULATORY	9.4		3.4		2.8
Ischaemic Rheumatic Hypertensive Cerebrovascular	3.9 1.7 0.2 1.3	2 3 4	1.9 0.2 0.2 0.8	1 10= 10= 5	2.1 8.5 1.0 1.6
RESPIRATORY	3.0		0.5		6.0
Asthma	1.1	6	0.12		9.2
NEOPLASTIC	5.9		3.8		1.6
Large bowel Ovary Lung Brain Breast Stomach Pancreas Cervix	0.18 0.18 0.37 0.37 1.3 0.55 0.34 0.92	 5 10 7	0.83 0.17 0.33 0.38 0.52 0.10 0.06 0.09	4 8 7 6	0.22 1.1 1.1 0.97 2.5 5.5 5.7 10
ENDOCRINE	1.5		0.4		3.8
Diabetes mellitus Obesity	0.55 0.74	10 9	0.25 0.06	9	2.2 12
DIGESTIVE	1.1		0.5		2.2
ACCIDENTS	10		4.7		2.1
Motor vehicles Suicide Homicide Poisoning	5.0 0.7 0.2 0.2	1 9	1.5 1.2 0.04 0.13	2 3	3.3 0.58 5.0 1.5

Deaths due to infectious diseases were 7 times more common in Maoris than in non-Maoris and half these were due to tuberculosis. The death rate due to tuberculosis was 20 times more common in the Maori than non-Maori group.

Deaths due to neoplasms were 1.6 times more common in the Maori group (5.9) than the non-Maori group (3.8). Against this trend, however, was the death rate due to large bowel cancer which

was over 4 times greater in the non-Maori (0.83) than Maori (0.18). The most common neoplasms were those of the breast, cervix,and stomach in the Maori group. Cancers of the cervix, pancreas, and stomach were 10, 5.7, and 5.5 times more common in the Maori than non-Maori.

Diseases of the circulatory system were an important cause of death in both Maoris and non-Maoris, the Maori rate of 9.4 being 2.8 times greater than the non-Maori rate (3.4). Deaths due to ischaemic heart disease were more than twice as common in Maoris, whilst deaths due to rheumatic heart disease were 6 times more common. Deaths due to cerebrovascular disease were also more common, being 1.6 times greater in Maoris than non-Maoris.

Respiratory deaths were 6 times more common in the Maori than non-Maori and this is largely due to a high death rate due to asthma. The Maori rate due to asthma of 1.1 was 9.2 times greater than that for non-Maoris (0.12). Compared with the 1968–69 period, deaths due to circulatory and respiratory disorders were less in both Maori and non-Maori groups in 1975.

Deaths related to the digestive system were more common in Maoris (1.1) than non-Maoris (0.5). More than two-thirds of the deaths in Maoris were due to alcoholic cirrhosis.

Deaths due to endocrine and metabolic disorders were also more common in Maoris, the rate being 1.5 in Maoris as compared with 0.4 for non-Maoris. Seven of the eight deaths in the Maoris were attributed to obesity (four cases) and diabetes (three cases). The death rate for diabetes was 2.2 times greater for Maoris than non-Maoris, whilst that for obesity was 12 times greater.

(iii) Mortality Ages 45–64 Years (rates per 10,000 population)

In this age group the death rate from all causes for Maoris was 2.2 times greater than that for non-Maoris – the Maori rate was 212 compared with 97 for non-Maoris. These figures are only slightly different from those recorded in the 1954–58 and 1964–68 periods. The most common causes of death in both groups were circulatory and neoplastic *(Table 18).*

In the Maori group circulatory deaths accounted for 100 deaths per 10,000 population, whilst in the non-Maori group the rate was 47. The death rate due to ischaemic heart disease was 2.1 times higher in the Maori group (54) compared with non-Maoris (33).

TABLE 18:

CAUSES OF DEATH : AGES 45–64 YEARS

Rates per 10,000 Population 1975

	Maori	Rating	Non-Maori	Rating	Ratio Maori to Non-Maori
ALL DEATHS	212		97		2.2
CIRCULATORY	100		47		2.1
Ischaemic	54	1	33	1	1.6
Rheumatic	5.8	9=	0.99		5.9
Hypertension	8.0	6=	1.0		8.0
Cerebrovascular	11	5	8.7	2	1.3
NEOPLASTIC	47		29		1.6
Lung	12	2=	6.8	3	1.8
Large bowel	2.2		4.9	4	0.45
Brain	0.88		0.92		0.96
Ovary	-		1.3		-
Cervix	2.7		0.74		3.6
Stomach	5.8	9=	1.4	10=	4.1
Pancreas	1.8		1.3		1.4
Breast	6.2	8	3.2	6	1.9
Uterus	0.44		0.17		2.6
RESPIRATORY	21		5.2		4.0
Chronic obstructive respiratory disease	12	2=	3.6	5	3.3
ACCIDENTS	15		5.8		2.6
Motor vehicle	8.0	6=	1.5	9	5.3
Falls	2.2		0.51		4.3
Suicide	0.44		1.9	7	0.23
Homicide	0.88		0.15		5.9
DIGESTIVE	8.0		3.5		2.3
Alcoholic cirrhosis	4.0		1.4	10=	2.9
Peptic ulcer	1.3		0.50		2.6
Gallstones	0.88		0.18		4.9
GENITOURINARY	9.8		0.59		17
Chronic nephritis	3.5		0.29		12
Pyelonephritis	0.99		0.18		5.5
ENDOCRINE	15		2.2		6.8
Diabetes mellitus	12	2=	1.8	8	6.7
Obesity	1.3		0.18		7.2
INFECTIVE & PARASITIC	1.8		0.25		7.2
Tuberculosis	.9		.04		23

Deaths due to hypertensive disease were 8 times more common in the Maori than non-Maori, whilst those due to rheumatic heart disease, 5.9 times more common in the Maori than non-Maori. Maori females have a disproportionately high mortality from ischaemic heart disease, their rate of 47 being 3.6 times greater than the non-Maori female rate of 13. Whereas ischaemic heart disease deaths were 2.6 times greater for non-Maori males than females, there was little difference in the rates for Maori males and females. Mortality due to rheumatic heart disease was 1.7 times greater for the Maori female than male and 7.8 times greater than her non-Maori counterpart.

The Maori death rate due to neoplastic disease was 1.6 times greater than the non-Maori rate. A notable exception was that due to large bowel cancer, where the non-Maori rate (4.9) was more than twice the Maori rate (2.2). Neoplasms involving the stomach, cervix, uterus, breast, lung, and pancreas were 4.1, 3.6, 2.6, 1.9, 1.8, and 1.4 times more common in the Maori than non-Maori group. Along with diabetes mellitus and chronic obstructive respiratory disease, carcinoma of the lung was the second most common cause of death amongst Maoris in this age group.

Deaths due to respiratory diseases were 4 times more common in the Maori group. The greatest cause for this were deaths due to chronic obstructive respiratory disease which were 3.3 times more common in Maoris than non-Maoris.

Diseases due to endocrine and metabolic disorders accounted for 15 deaths per 10,000 in Maoris, compared with 2.2 in non-Maoris. A high mortality rate was noted in association with diabetes mellitus (12) which was 6.7 times higher than in non-Maoris. Deaths due to obesity were 7 times more common in the Maori than non-Maori.

Diseases of the digestive system were responsible for 8 deaths per 10,000 in Maoris, as compared with 3.5 in non-Maoris. Deaths due to alcoholic cirrhosis were over 3 times more common in Maoris (4 per 10,000), whilst deaths associated with ulcer disease and gallstones were 2.6 and 4.9 times greater in Maoris than non-Maoris respectively.

A very large discrepancy in death rates is noted with urinary tract disease in which the Maori rate of 9.8 was 17 times greater than that for non-Maoris (0.59). Chronic nephritis accounted for

4.9 deaths per 10,000, a figure which was 12 times greater than that for non-Maoris. Likewise, deaths due to pyelonephritis were 5.5 times more common in Maoris.

Again, an appreciable mortality is associated with accidents. The Maori rate of 15 was 2.6 times greater than that for non-Maoris (5.8). Motor vehicle accidents were again the single most common cause (8 per 10,000) for Maoris, and these figures were 5.3 times greater than for non-Maoris. Deaths due to falls were notably higher in the Maori group (4.3 times), whilst suicide deaths were almost 4 times as high in the non-Maori group. Deaths due to homicide were nearly 6 times greater in the Maori group.

When the figures for 1975 are compared with those of 1968-69, it is noted that deaths due to diseases of the circulatory system have not changed much for Maoris, whilst there has been a small decrease for non-Maoris. Also, there has been a slight increase in deaths due to neoplasms in both Maoris and non-Maoris, whilst deaths due to respiratory diseases have changed very little. There has been an increase in Maori deaths due to endocrine and metabolic disorders and this has been due to an increase in deaths associated with diabetes mellitus. The rates for infective and parasitic diseases have decreased sharply for both Maoris and non-Maoris since 1968–69, but the Maori rate still remains over 7 times greater. This disparity is magnified by deaths due to tuberculosis which are 23 times greater in Maoris than non-Maoris. Digestive diseases have shown an increased mortality rate for both Maoris and non-Maoris since 1968–69, and the single most important cause in both groups is alcoholic cirrhosis. Deaths due to complications of peptic ulcer and gallstone disease have increased and are more common in the Maori. A striking increase in Maori mortality due to chronic nephritis and pyelonephritis has occurred since 1968–69, while accidental causes of death have increased in both Maoris and non-Maoris. Mortality associated with accidents has increased by 50 percent in Maoris since 1968–69.

(iv) Mortality Ages 65 Years and Over (rates per 10,000 population)

Since the 1954–58 and 1964–68 periods, mortality rates for both Maoris and non-Maoris have changed very little. The Maori rate for 1975 was 1.3 times greater than the non-Maori rate – the respective figures being 676 deaths per 10,000 and 502 *(Table 19)*.

TABLE 19:

CAUSES OF DEATH : AGES > 65 YEARS

Rates per 10,000 Population 1975

	Maori	Rating	Non-Maori	Rating	Ratio Maori to Non-Maori
ALL DEATHS	676		502		1.3
INFECTIVE & PARASITIC	20		3.4		5.9
Tuberculosis	6.8		1.3		5.2
Viral	1.7		0.43		4.0
Gastroenteritis	3.4		0.66		5.2
NEOPLASTIC	139		112		1.2
Stomach	20	8	9.3	10	2.2
Large bowel	12		20	6	0.6
Pancreas	13	10	6.2		2.1
Lung	41	4	21	5	2.0
Uterus	-		1.6		-
Cervix	1.7		1.2		1.4
Breast	3.4		7.4		0.46
Prostate	6.8		9.0		0.76
CIRCULATORY	310		352		0.88
Ischaemic heart disease	163	1	186	1	0.88
Rheumatic heart disease	22	7	4.8		4.6
Hypertension	24	6	10.8	9	2.2
Cerebrovascular	61	2	102	2	0.6
ENDOCRINE	36		14		2.6
Diabetes mellitus	36	5	12	8	3.0
RESPIRATORY	92		53		1.7
Chronic obstructive airways disease	54	3	30	3	1.8
Pneumonia	20	9	23	4	0.87
DIGESTIVE	32		17		1.9
Alcoholic cirrhosis	1.7		1.5		1.1
Peptic ulcer	10		4.4		2.3
Gallstones	3.4		1.6		2.1
Bowel obstruction	1.7		2.4		0.70
GENITOURINARY	10		7.5		1.3
Nephritis	6.8		2.4		2.8
Pyelonephritis	3.4		1.7		2.0
ACCIDENTS	19		24		0.79
Motor vehicle	10		3.3		3.0
Falls	1.7		16	7	0.11
Homicide	-		0.11		-
Suicide	-		1.8		-
LOCOMOTOR	5.1		4.9		1.0
NERVOUS	5.1		6.7		0.76

The most common causes of death in both Maoris and non-Maoris were circulatory disorders, neoplasms, and respiratory diseases.

The Maori death rate for circulatory disorders was 310 which was 12 percent less than that for non-Maoris (352). The Maori death rates, however, were higher for rheumatic heart and hypertensive diseases being 4.6 and 2.2 times higher respectively than the non-Maori rates. These rates, however, are small when compared with those due to ischaemic and cerebrovascular disease, both of which had a higher death rate in the non-Maori.

Neoplastic diseases were slightly more common (1.2 times) in the Maori group, but again the numbers are small. Neoplasms accounted for higher death rates in non-Maoris when involving the colon, breast, prostate, and uterus. Deaths due to neoplasms involving the stomach, pancreas, lung, and cervix were 2.2, 2.1, 2.0, and 1.4 times more common in the Maori than non-Maori.

Deaths due to respiratory disorders were 1.7 times higher in the Maori than non-Maori group, the respective rates being 92 and 53. The higher death rate in the Maori was due to chronic obstructive respiratory disease which was almost twice as high as for non-Maoris. Deaths due to pneumonia were common but less frequent in both groups.

Endocrine and metabolic deaths were also considerably higher (2.6 times) in Maoris than non-Maoris, all deaths in the Maori group being due to diabetes mellitus. The death rate for diabetes mellitus for Maoris was 36 compared with 12 for non-Maoris.

Deaths due to digestive diseases were approximately twice as high for the Maori group, the largest single cause being related to peptic ulceration. Deaths due to gallstone disease were twice as high in the Maori group, whilst deaths due to bowel obstruction were higher in the non-Maori group. In contrast with the younger age groups, death rates relating to alcoholic cirrhosis were equally common for Maoris and non-Maoris.

The death rate for genito-urinary diseases was 1.3 times higher in the Maori group, the Maori rate being 10, whilst that for non-Maoris 7.5. Chronic nephritis and pyelonephritis were 2 to 3 times more common causes of deaths in Maoris than non-Maoris.

The death rate from accidents was 20 percent higher in the non-Maori group and this is largely due to a high death rate associated with falls. The Maori is still more likely to die from a motor

accident, the Maori rate being 10 compared with 3.3 for the non-Maori.

Deaths related to disorders of the locomotor and nervous systems were equally common in both groups.

Compared with figures for 1968–69, deaths from all causes in both Maoris and non-Maoris are slightly less. This is largely due to a reduction in deaths due to diseases of the circulatory system – the Maori death rate has decreased from 487 to 310, whilst that for non-Maoris has decreased from 400 to 352. Death due to neoplasms has increased since 1968 in both Maoris and non-Maoris. On the other hand, deaths due to diseases of the respiratory system have fallen quite sharply for both Maoris (172 to 92) and non-Maoris (83 to 53) since 1968. Deaths in Maoris due to endocrine and metabolic disorders have increased since 1968 (27 to 26) and this is largely due to a high death rate associated with diabetes mellitus. Death rates due to infective and parasitic diseases have stayed much the same as have those due to digestive and genito-urinary diseases, and accidents.

5. Summary of Mortality Data

(i) There has been a marked decrease in the Maori infant mortality rate in the past 20 years, the greatest reduction having occurred in the decade prior to 1975. However, within this group, post neonatal deaths made the largest contribution and were still 3 times greater for Maoris than non-Maoris.

(ii) The major causes of post neonatal Maori mortality are respiratory infections (influenza, pneumonia, and bronchitis) and "cot deaths". The majority of "cot deaths" are respiratory in origin (71 percent), occur in the 1–6 month age group (83 percent), and are 2 to 3 times more common for Maoris than non-Maoris.

(iii) In pre-school children (1–4 years) accidents are the major cause of death, the Maori rate being 3 times greater than the non-Maori rate. Deaths due to falls were the single most common type of accidental death and were 8 times more common in the Maori group. Deaths due to accidents have increased since the 1968–69 period.

(iv) Accidents are the most common cause of death in Maoris from ages 1 to 44 years. Whilst falls are the most important cause in the pre-schooler, from the ages of 5 to 44 years motor vehicle accidents are the biggest contributor. Apart from the over 65 year age group, deaths due to accidents in the Maori are approximately twice those for non-Maoris. From the age of 5 years onwards the Maori has a 3 times greater chance of dying from a motor vehicle accident than a non-Maori and this difference seems to be greatest beyond the age of 25 years.

(v) From the age of 5 years onwards Maori deaths associated with homicide are up to 6 times greater than for non-Maoris. There is also a disproportionate number of deaths in Maoris aged 15–24 years due to poisoning (5 times), and in the 45–64 year age group due to falls (4 times).

(vi) At all ages the Maori death rate from respiratory causes is appreciably higher than the non-Maori rate in spite of quite marked reductions in the past 20 years.

(vii) In the 1–15 year age group there is an excess of deaths in Maoris due to pneumonia. In the 15–44 year age group, deaths due to asthma are up to 9 times more common in the Maori than

non-Maori. Beyond the age of 44 lung cancer and chronic obstructive respiratory disease cause death in Maoris 2 to 3 times more often than in non-Maoris and are the most important causes of death behind ischaemic heart disease for a Maori in this age group. In addition, the Maori female (over 45 years) is 3 times more likely to die from lung cancer than her non-Maori counterpart.

(viii) In the mid years (25–64 years) the Maori death rate from circulatory disorders is approximately 2 to 3 times that for non-Maoris. The single most important cause is ischaemic heart disease which is twice as common in the Maori. In addition, the death rate for Maori females in this age group is disproportionately high with respect to ischaemic and rheumatic heart disease. In the 45–64 year age group deaths due to hypertension are 8 times more common in the Maori than non-Maori and 6 times more common for rheumatic heart disease.

(ix) Whilst circulatory deaths have diminished since 1968–69 in both the over 65 and 25–44 year age groups, they have remained much the same in the 45–64 year age group. In the greater than 65 year age group the Maori death rate due to circulatory disease was lower than that for non-Maoris.

(x) Deaths due to metabolic and endocrine disorders are 2 to 7 times greater for Maoris than non-Maoris from ages 25 years onwards. This mortality has increased since the 1968–69 period and is largely due to deaths associated with diabetes mellitus.

(xi) Deaths attributed to obesity are noted to be 7 to 12 times more frequent in the Maori than non-Maori from age 25 years onwards.

(xii) Deaths due to digestive diseases in Maoris have increased in the 25–64 year age group, whilst the rates have remained stationary beyond the age of 65 years. Alcoholic cirrhosis is the most important cause of death in this Maori group and is over 3 times higher for Maoris than non-Maoris. From the age of 45 years onwards deaths due to peptic ulceration are also appreciably more common in Maoris and are the single most important cause of digestive death in the Maori beyond 65 years. Deaths due to gallstones are nearly 5 times greater for Maoris than non-Maoris from the age of 45 years onwards.

(xiii) A striking increase in mortality in Maoris due to urinary tract disease has occurred since 1968–69. This is largely due to the high

death rates associated with chronic nephritis and pyelonephritis in the Maori.

(xiv) Deaths in Maoris due to infective and parasitic causes have decreased sharply in most age groups. Tuberculosis remains the single most important cause of Maori death, the rate being 5 to 20 times greater in Maoris than non-Maoris. In the very young and the elderly, gastroenteritis and viral infections are important causes of death in the Maori. Overall, deaths due to infective and parasitic causes are disproportionately high for Maoris.

(xv) Deaths in Maoris due to neoplasms are more frequent than in non-Maoris and have increased in incidence in recent years. The commonest neoplasms are lung, stomach, breast, pancreas, and cervix, all of which are 2 to 4 times more common in the Maori than non-Maori. Large bowel cancer, on the other hand, is 2 to 3 times more common in the non-Maori than Maori.

EPIDEMIOLOGICAL DATA

Thus far it has been possible to highlight many areas in which the Maori mortality rate is appreciably higher than that for non-Maoris. Indeed with respect to ischaemic heart disease and lung cancer the Maori female is a world-beater. Mortality from infective causes is still disproportionately high for the Maori though their rates have decreased sharply over the past 20 years. On the other hand, deaths due to diseases which might be attributed to habits of modern living (smoking, alcohol, and over-eating) are on the increase and include diabetes mellitus, obesity, lung cancer, chronic obstructive respiratory disease, alcoholic cirrhosis, and accidents.

Although much useful information can be derived from mortality statistics, carefully undertaken epidemiological studies are necessary to measure the true prevalence and incidence of diseases in the community. With regard to the Maori population, Dr I. Prior and his group in Wellington have provided the greatest input in this area in the past 20 years.

1. Circulatory

(i) Ischaemic Heart Disease

Mortality data have indicated that Maoris have high coronary heart disease death rates and that the rate for Maori females is higher than for women in any other country. In 1978 Beaglehole and colleagues[2] confirmed the fact that Maoris are at a high risk of developing and dying from coronary heart disease. The incidence of coronary heart disease over a 5 year study period (1969–74) was 9.4 percent in men and 12.3 percent in women. In terms of the average annual incidence rate of coronary heart disease this was 1.8 percent for Maori men and 2.3 percent for Maori women. There are no incidence data available for Europeans in New Zealand to compare with these data but the incidence rates for men are comparable with rates in American men in the Framingham study. The average annual incidence rates in Maori women, however, are extraordinarily high by world standards; the Framingham study rate being 0.5 percent per year for women aged 30–62 years. The Maori rate is, therefore, about 4 times higher than the rate reported for women in other studies and is in keeping with their high national mortality rates.

During the 5 year follow-up period, between 1968–69 and 1974, a total of 77 individuals in the sample died. Interestingly, fatalities due to coronary heart disease were twice as high in men as in women which is in direct contrast to the national mortality figures. Significant risk factors were defined and included age, systolic blood pressure, body mass (in males), and serum triglycerides and electrocardiographic left ventricular hypertrophy (in women). Details of the incidence rates for Maori males and females are shown in Table 20.

TABLE 20:

FIVE YEAR INCIDENCE RATES (%) OF CORONARY HEART DISEASE IN MAORIS AGE SPECIFIC AND AGE ADJUSTED

(*Beaglehole et al,* 1978)

AGE (Years)	MALE	FEMALE	TOTAL
35 - 44	1.4	5.9	3.6
45 - 54	11.7	14.1	12.9
55 - 64	16.3	12.5	14.7
65 - 74	17.6	31.3	24.2
TOTAL	9.5	12.2	10.8
Age Adjusted Rate	9.4	12.3	

It is interesting to compare the Maori incidence rates of coronary heart disease with the prevalence rates for angina in the Ruatahuna study[24]. In this latter study, in Maoris aged 30 years and over, the prevalence was 16 percent in females and 6.6 percent in males. Corresponding figures from the Carterton European Adult Study[26] indicated a prevalence rate in European females of 11.5 percent, whilst that in European males was 6.5 percent.

(ii) Hypertension

From epidemiological studies carried out in the 1960s[26] it was found that the prevalence of hypertension was high in both Maoris and Europeans and, in particular, in Maori females. Age standardised data for Maori and non-Maori populations are shown in Table 21.

TABLE 21:

BLOOD PRESSURE CATEGORIES: MAORI AND NON-MAORI

Age Standardised Rates per 10,000

(*Prior*, 1974)

	MALES		FEMALES	
	Borderline Hypertension	Definite Hypertension	Borderline Hypertension	Definite Hypertension
MAORI (Tikitiki and Rotorua)	243.4	287.6	201.6	317.6
NON-MAORI (Carterton)	241.8	265.9	208.7	224.9

Borderline: Systolic 140 - 159 and/or diastolic 90 - 94

Definite: Systolic > 160 and/or diastolic > 94

Also, an assessment of hypertensive heart disease was made and rates of 1.5 percent and 1.2 percent for Maori males and females compared with rates of 1.7 percent and 0.5 percent in the Carterton European male and female samples. To be noted, is the Maori female rate, which was over twice as high as the European female rate.

(iii) Rheumatic Fever

In contrast with many other countries, a declining incidence of rheumatic fever has not been evident in New Zealand. Furthermore, Wairoa County has the highest hospital admission rate within New Zealand (232 admissions per 100,000 population per year), which is 5 times the national average. A recently reported study[12] has reported a prevalence of definite fever and rheumatic heart disease of 1.5 percent. Racial differences in prevalence were evident; the more Maori a person was, the greater his or her susceptibility to rheumatic fever. Although a variety of characteristics, including sex, socio-economic status, geographic and climatic factors, sibling concordance, and crowding in the home were examined, only Maori ethnicity could be shown to relate to rheumatic fever and rheumatic heart disease prevalence. A combination of increased exposure to invasive streptococci and genetic susceptibility were proposed as possible explanations for the high prevalence rates.

(iv) Varicose Veins

Varicose veins are an extremely common reason for surgery in New Zealand though their prevalence has only recently been documented in both Maoris and Pakehas[3]. In Maoris the age standardised prevalence rates of varicose veins were 36.3 percent in males and 47.4 percent in females. In Pakehas the rates were 21.6 percent in males and 40.4 percent in females. In both sexes Maoris had a significantly higher prevalence of the more severe category of varicose veins *(Table 22)*. All variables studied (race, age, sex, height, weight, Quetelet index, and parity) were associated with the prevalence of varicose veins although the relationship varied with race and sex.

TABLE 22:

PREVALENCE OF VARICOSE VEINS IN MAORIS AND NON-MAORIS : AGES 15 TO 64 YEARS

Age Standardised Prevalence Rates (%)

CATEGORY	MALE		RATIO Maori to Non-Maori	FEMALE		RATIO Maori to Non-Maori
	Maori	Non-Maori		Maori	Non-Maori	
Mild	14.5	12.9	1.1	18.2	26.5	0.69
Moderate	21.8	8.7	2.5	29.3	14.0	2.1
TOTAL	36.3	21.6	1.7	47.4	40.4	1.2

2. Metabolic and Endocrine

(i) Diabetes Mellitus

Age standardised prevalence rates for diabetes in Maoris and non-Maoris are shown in Table 23. High rates are noted in the Maori group, being 5.8 times higher in Maori males and 2.2 times in Maori females, than in non-Maori males and females. The high Maori rates are in keeping with the noted higher mortality rates associated with this disease. There is a close relationship between diabetes and obesity, and the prevalence of hypertension and gout are also much higher in diabetics compared with non-diabetics[27].

TABLE 23:

PREVALENCE OF DIABETES AND OBESITY IN MAORIS AND NON-MAORIS

Age Standardised

(*Prior et al,* 1978)

	MALE		RATIO	FEMALE		RATIO
	Maori	Non-Maori	Maori to Non-Maori	Maori	Non-Maori	Maori to Non-Maori
DIABETES	8.7%	1.5%	5.8	6.9%	3.1%	2.2
OBESITY (120% ideal body weight)	37%	7%	5.3	59%	24%	2.5

(ii) Obesity

There is a striking degree of obesity in the New Zealand Maori compared with Europeans. The prevalence rates for Maori males and females were 37 and 59 percent respectively, whilst those for non-Maori males and females were 7 and 24 percent respectively *(Table 23).* Obesity was over 5 times more prevalent in the Maori male than European male. It has been noted previously that obesity afflicts the rural Maori twice as commonly as the urban Maori, this difference being largely due to a high prevalence in the rural Maori male. With respect to energy intake, studies in 104 New Zealand Maori family groups and 61 Carterton European family groups, indicated the Maori groups consumed 13% more calories than the non-Maori.

The high prevalence of obesity in Maoris is of vital importance when one considers its close relationship to the problems of ischaemic heart disease, diabetes, hypertension, and gout.

(iii) Hyperuricaemia and Gout

It has been shown previously that Maori adults have high levels of serum uric acid and that gout is common[19, 29]. This has been confirmed in a recent study[4] in which the 11 year follow-up status of 388 Maori males and 378 Maori females was reported. High mean levels of serum uric acid were found, 0.42 mmol/l in males and 0.35 mmol/l in females. On the basis of traditional criteria (serum uric acid above 0.42 mmol/l in males and above 0.36 mmol/l in females) the prevalence of hyperuricaemia was 49 percent in males and 42 percent in females *(Table 24).* The Maori male and female rates were 2.1 and 2.5 times higher than those for non-Maori males and females reported in the Carterton study. The prevalence of gout in the Maori group was 8.8 percent for males and 0.8 percent for females,whilst in the non-Maoris was 2 percent for males with no cases being reported for females. The male rate was 4.4 times higher for Maoris than non-Maoris. A finding of some practical importance was that the incidence rate of gout in both Maori males and females increased sharply with serum uric acid levels above 0.48 mmol/l.

Using this higher cut-off point for the serum uric acid the base line prevalence of hyperuricaemia is considerably reduced (26.8 percent in males and 10.1 percent in females) but parallels very closely the likelihood of developing gout (10.3 percent in males and 4.3 percent in females). The use of this single reference value (serum uric acid of 0.48 mmol/l) would appear to be a more useful reference point with respect to its predictive power for gout. In Brauer and Prior's study[4] the occurrence of gout correlated with body mass, blood pressure, and muscle mass (in males).

Why Maoris should have such a predisposition to hyperuricaemia and gout is still uncertain. Environmental factors such as body mass and muscle size have been demonstrated, whilst the role of genetic factors needs clarifying. Recent work[5] has established that Maoris, both gouty subjects and asymptomatic hyperuricaemics, are capable of binding more sodium urate than Caucasian gouty or hyperuricaemic subjects. These differences in urate binding need further study and it remains possible that they may have a genetic basis. It also needs to be shown that these binding differences are not simply a function of body mass or muscle size.

TABLE 24:

PREVALENCE OF HYPERURICAEMIA AND GOUT IN MAORIS AND NON-MAORIS

(*Brauer and Prior*, 1978; *Prior et al*, 1966)

	MAORI	NON-MAORI	RATIO, MAORI TO NON-MAORI
HYPERURICAEMIA			
Male	49%	23%	2.1
Female	42%	16.6%	2.5
GOUT			
Male	8.8%	2%	4.4
Female	0.8%	-	-

Hyperuricaemia ≥ 0.42 mmol/l (7 mg%) for males
≥ 0.36 mmol/l (6 mg%) for females

(iv) Lipids

Cholesterol levels in Maori males and females were significantly lower than for non-Maori males and females *(Figure 2)*. In a separate report[28] a relationship was demonstrated in the Ruatahuna Maori group between excess body weight and higher cholesterol levels. Since obesity is much more common in the Maori it is surprising that cholesterol levels are significantly lower in Maoris than non-Maoris.

(v) Anaemia

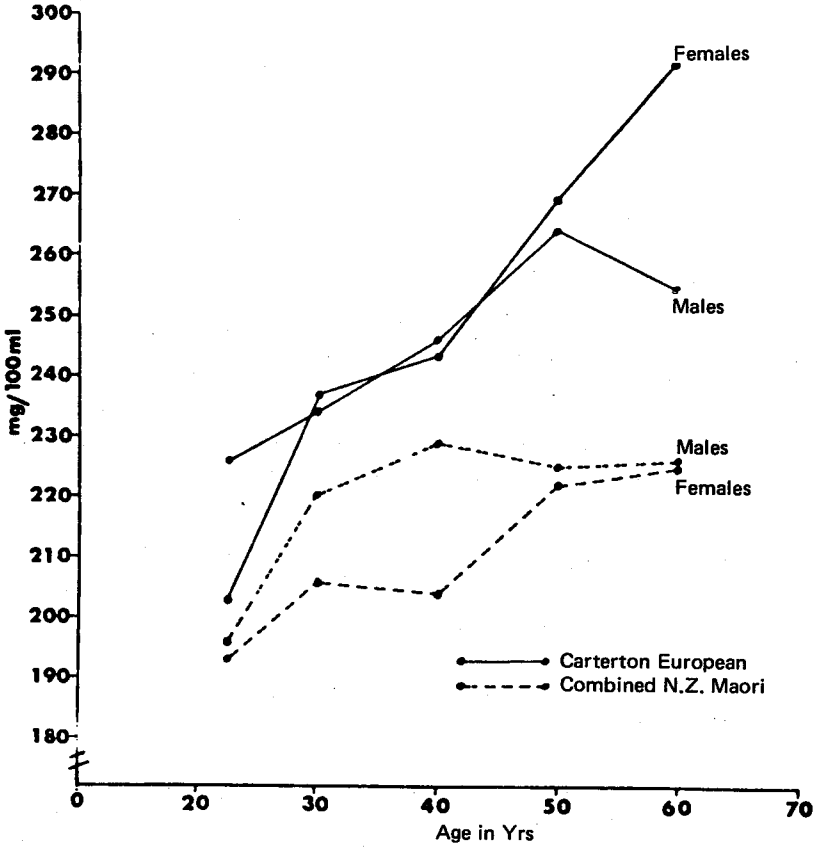
In a survey of Maori and European infants in Napier in 1956 it was shown that the Maori group had considerably lower haemoglobin levels than the Europeans[35]. The likely reason for the lower Maori haemoglobin levels was thought to be due to insufficient iron received from the mother, a conclusion supported by significantly lower levels of cord haemoglobins in Maori mothers. The lower haemoglobin levels in Maori infants may be important if it increases their susceptibility to infections.

In a more recent study[7] the problem of iron deficiency in Maori children was documented again. In this study anaemia appeared to be a postnatal problem and responded to parenteral iron therapy. There was no relationship between cord haemoglobin and either birth weight or parity. However, cord haemoglobin was higher (mean 17.2g percent) in quarter caste Maori infants than in infants with half or more Maori ancestry (mean 14.8g percent).

FIGURE 2:

MEAN CHOLESTEROL LEVELS (mg%) IN NEW ZEALAND MAORI AND CARTERTON EUROPEANS BY AGE AND SEX

(*Prior*, 1974)



In adult males anaemia has not been shown to be a problem of note in either Maoris or non-Maoris. However, mild anaemia (haemoglobin less than 12g percent) was reported in 18.5 percent of Maori women aged 15–49 years, compared with 9.2 percent in European women aged 30–59 years[25]. Antenatal iron therapy and greater Maori parity rates were considered likely aetiological factors explaining the higher anaemia rate in the Maori adult female.

3. Infective

(i) Ear Disease

Maori children have a higher rate of ear infection than European children[36]. Furthermore, the hearing defect rate in Maori primary school children in the Auckland area has been 20–25 percent compared with 8–10 percent for Europeans. Improvement in these figures is noted at the secondary school age with figures of 10–12 percent in Maoris and 3–4 percent in Europeans[36]. In a survey of ear disease in Maori pupils aged 5–15 years in the Waikato an ear disease incidence of approximately 12 percent was recorded of whom one in six had an accompanying hearing defect.

A study made of students at Wairoa College in 1975–76 showed a high prevalence of inflamed ears and perforated drums in younger school children and of perforated and scarred drums in older children[34]. Abnormal drums were more common in the Maori children than non-Maori and their rate of recovery was lower. In the Wairoa study the perforation rate was 8.7 percent compared with 5.8 percent in the Waikato study report.

(ii) Respiratory Disease

Respiratory diseases are a common cause of death and hospital admission in Maoris of all ages. Though deaths in Maori children due to respiratory disease have dropped sharply over the past 20 years, this rate is still disproportionately high when compared with that of the non-Maori.

There is a paucity of information concerning respiratory disease in Maori children and why it is they should be more susceptible to such problems. Deficiencies of immunoglobulins and cows' milk allergy have been suggested as possible aetiological factors but neither of these possibilities was supported by recent studies of four Maori children[18]. Anaemia was noted in the four children, however, the mean haemoglobin level being 99g/l. It has been postulated previously that anaemia may increase the susceptibility of the Maori child to infection.

4. Environmental

(i) Cigarette Smoking

The importance of cigarette smoking with respect to Maori health is clear when one considers the disproportionate mortality rates for lung cancer and chronic obstructive respiratory disease. In addition, smoking is an important risk factor in coronary artery disease for which the Maori female has a higher mortality rate than for women in any other country. In 1962 Prior[24] reported the cigarette smoking habits of 212 rural Maoris. Fifty-eight percent of the men were smokers compared with 70 percent of the women. These figures compare with smoking rates of 38 percent in men and 31 percent in women in the 1976 New Zealand Census[13].

In a recent study among adolescents in a rural community 46 percent of students aged 12–18 years were current cigarette smokers[33]. Among students who reported half or more Maori ancestry, the prevalence rate was 57 percent in boys and 63 percent in girls, compared with rates of 26 percent and 20 percent in non-Maori boys and girls respectively. Elder siblings, peers, and parental attitudes were seen as important factors in determining smoking habits. Likewise it was suggested that the key to cigarette smoking prevention in the Wairoa community may be one of parent and early child education. It should be noted as well that intervention programmes undertaken in two urban secondary schools in Wellington were ineffective[1] suggesting again that parent and early child education may be a more profitable area to aim a smoking prevention programme.

5. Hospital Admissions

(i) Physical Health

The leading causes of hospital admissions for Maoris are shown in Table 25. There has been no change in the two leading causes of admission, namely, pneumonia and fractures. As a percentage of the total admissions, pneumonia was 37 percent less frequent a cause of admission in 1973 than in 1961. There has also been an appreciable reduction in admissions for diseases of the skin which made up 5.2 percent of all Maori admissions in 1961 compared with 3.3 percent in 1973. Admissions due to accidents and injury were proportionately the same in 1961 and 1973 in spite of an increase in the proportion of head injury admissions in 1973.

TABLE 25:

CAUSES OF HOSPITAL ADMISSIONS IN MAORIS

CAUSE	RANKING		PERCENTAGE OF TOTAL MAORI ADMISSIONS	
	1961	1973	1961	1973
Pneumonia	1	1	9.8	6.2
Fractures	2	2	5.3	5.9
Diseases of Skin	3	11	5.2	3.3
Symptoms & Ill-defined Conditions	4	3	4.8	4.9
Open Wounds	5	9	4.0	3.5
Tuberculosis	6		3.8	
Diseases of Breast & Female Genital Organs	7	5	3.6	4.1
Bronchitis, Asthma & Emphysema	8	10	3.5	3.5
Appendicitis	9		3.2	
Infective & Parasitic Diseases (except Tb)	10	7	3.2	4.0
Diseases of Intestines & Peritoneum	11		3.1	
Head Injuries	12	6	2.9	4.1
Acute Respiratory Infections		8		3.9
Ear & Mastoid		12		3.0
Other Injuries & Adverse Effects		4		4.8

(ii) Mental Health

The commonest cause of admission for mental disorders in Maoris was "schizophrenia and paranoid states" which made up 15 percent of total Maori admissions. Only slightly less common were admissions for "other personality disorders". In non-Maoris the most frequent cause of admission was "depressive neurosis", whilst "alcoholism" and "schizophrenia and paranoid states" were the next most common causes.

In Table 26 the major causes of Maori and non-Maori first admissions for mental disorders in 1974 are shown. The Maori rate of admission of 5.5 per 10,000 for "schizophrenia and paranoid states" in the 25–44 year age group was the highest rate for any disorder in any age group, Maori or non-Maori. From the age of 15 years onwards the admission rate for "schizophrenia and paranoid states" is 1.6 times greater for Maoris than non-Maoris.

On the whole, admissions for depressive illnesses were more common in non-Maoris though a rate of 5.4 per 10,000 in the 14–24 year age group for Maoris is noted. Admission rates for "alcoholism", "mental retardation", and "transient situational disturbances and behaviour disorders of children" are also slightly higher for Maoris than non-Maoris.

TABLE 26:

FIRST ADMISSIONS FOR MENTAL DISORDERS 1974 : MAORI AND NON-MAORI

Rates per 10,000 Population

DIAGNOSES	<5 Years		5 - 14 Years		15 - 24 Years		25 - 44 Years		45 - 64 Years		>65 Years	
	M	N-M	M	N-M	M	N-M	M	N-M	M	N-M	M	N-M
Schizophrenia & Paranoid States	-	0.04	0.26	0.23	4.90	4.20	5.50	3.10	3.10	1.60	2.0	1.20
Other Personality Disorders	-	-	0.13	0.02	0.97	1.40	2.20	2.30				
Depressive Neurosis	-	-	0.13	0.18	5.40	4.30	3.30	5.20	0.88	3.00	-	1.70
Mental Retardation	1.9	2.30	3.50	1.80	0.97	0.71	1.10	0.28	-	0.17	-	0.04
Alcoholism	-	-	-	0.02	1.40	0.74	4.10	3.30	3.50	4.90	2.0	0.31
Depressive Psychosis	-	-	0.13	0.02	0.97	1.40	2.20	2.30	2.20	4.20	-	4.00
Other Functional Psychoses	-	-	-	-	1.60	0.55	2.00	0.97	1.80	1.30	6.1	1.30
Other Neuroses & Psychosomatic Disorders	-	-	0.26	0.11	1.20	1.40	0.74	1.50	0.44	0.82	-	0.34
Senile & Presenile Dementia	-	-	-	-	-	-	-	0.01	0.88	0.28	4.1	9.10
Transient Situational Disturbances & Behaviour Disorders of Children	-	0.04	1.70	1.40	2.90	1.60	0.92	0.32	0.44	0.26	-	0.23

6. Summary of Epidemiological Data

(i) The annual incidence rate of coronary heart disease in Maori women is 4 times higher than that reported in women in the Framingham study. The corresponding rate for Maori men is comparable with the rate in American men in the Framingham study. The high Maori female incidence is in accordance with their noted high mortality rate from coronary heart disease.

(ii) As with coronary heart disease, the Maori female has a high incidence of hypertension and hypertensive heart disease. Maori male rates are comparable with rates for non-Maori males.

(iii) Maori children are more susceptible to rheumatic fever than non-Maori. In contrast to many other countries, the declining incidence in rheumatic fever has not been evident in New Zealand, and this to some extent is due to very high rates in the Wairoa County.

(iv) Varicose veins are extremely prevalent in New Zealand, especially in multiparous, obese, Maori females.

(v) The prevalence of both diabetes and obesity in Maori adults is many times higher than in the non-Maori population. This would accord with the increasing mortality noted with these conditions.

(vi) Positive correlations have been shown between obesity, on the one hand, and coronary heart disease, hypertension, diabetes mellitus, varicose veins, hyperuricaemia, and gout, on the other. These correlations are of some interest in view of the high prevalence of obesity in Maori females (59 percent) and their disproportionately high mortality from coronary heart disease and hypertension.

(vii) The prevalence of hyperuricaemia and gout is much higher in Maoris than non-Maoris. Correlations with body weight and muscle mass (in males) have been demonstrated. Preliminary data also suggest differences in urate binding between Maoris and non-Maoris, which could possibly have a genetic basis.

(viii) Maori subjects with a serum uric acid level above 0.48 mmol/l (8 mg percent) have a high risk of developing gout. Active intervention in high risk subjects would seem to be indicated on the basis of these findings.

(ix) In contrast to most other disorders, serum cholesterol levels are notably higher in New Zealand Europeans than Maoris.

(x) Anaemia, ear infections, and respiratory disease are all more common in the Maori than European infant and child. The precise reasons for these differences remain unclear.

(xi) In rural school children cigarette smoking is more prevalent in Maori females than either Maori males or non-Maoris. In adults the most prevalent smoking group is Maori females. These findings are significant in view of the risk factor status of smoking in coronary heart disease and lung cancer, both of which are associated with disproportionately high mortality rates in Maori females. In addition, smoking is associated with low birth weight babies and higher perinatal mortality.

(xii) In terms of Maori hospital admissions, pneumonia is the most frequent cause, as was the case 12 years previously. The percentage of admissions due to accidents or injuries in Maoris remained constant between 1961 and 1973. However, their admissions for head injuries were notably higher in 1973 than in 1961.

(xiii) With respect to mental disorders in Maoris, the commonest category of admission was "schizophrenia and paranoid states". These conditions were notably higher in the Maori than non-Maori. Higher Maori rates are also to be noted for "transient situational disturbances and behaviour disorders of children" and "other functional psychoses". Neuroses, on the whole, were a more common cause of admission for the non-Maori than Maori.

CONCLUSIONS

Although the health status of the Maori has improved considerably over the past 20 years, and this is reflected in his improved life expectancy from birth, the incidence and mortality from most of the common killing diseases in this country are still appreciably higher in the Maori than non-Maori. The major cause of mortality in the Maori child and young adult are accidents, and there is no evidence to show that this has improved in recent years. There is also an alarmingly high discrepancy in Maori deaths due to asthma in young adults and this needs some explanation. In the later years, ischaemic heart disease, lung cancer,and chronic obstructive respiratory disease are the major killers, whilst deaths due to diabetes mellitus are on the increase. There are also a disproportionate number of deaths in Maoris related to chronic renal disease.

With so many of the diseases so far discussed there are aetiological factors which are common to several, and these will be highlighted with respect to possible future study or intervention programmes.

(i) Over-nutrition

Perhaps the commonest nutritional problem in our society, or for that matter in most Western countries, is over-nutrition as manifested by obesity. With respect to Maori adults the prevalence of obesity is extremely high. When one considers the relationship between obesity, on the one hand, and diabetes mellitus, hypertension, ischaemic heart disease, hyperuricaemia, gout,and varicose veins, on the other, the importance of obesity becomes much clearer. There is also the possibility that obesity may impair normal ventilatory mechanisms and, together with smoking, predispose the individual to chronic respiratory disease which has a notably higher mortality in Maoris than non-Maoris. There would appear to be very little information as regards the nutritional status and eating habits of Maoris in all age groups and whether obesity is just as common a problem in the young as it is in the older age groups. Finally, the definition of obesity (greater than 120 percent of ideal body weight) is extraordinarily generous and one might argue that any weight over and above the ideal is excessive.

(ii) Cigarette Smoking

Maoris have a disproportionately high mortality with respect to lung cancer, chronic obstructive respiratory disease, and ischaemic heart disease (females). In these conditions cigarette smoking is a major aetiological factor. The Maori female death rates from ischaemic heart disease and lung cancer are the highest in the world. The habit of smoking seems to be more prevalent among Maoris than non-Maoris, but perhaps of more significance is the higher rate of smoking in Maori females, both secondary school age and adults. Finally, smoking females bear smaller babies whose chances of survival are adversely affected.

(iii) Alcohol

It is difficult to gauge precisely the adverse effects of alcohol within the community and to know whether this is a problem which affects the Maori more than the non-Maori. However, as an indicator, it has been noted that Maori adults have an excessive mortality from alcoholic cirrhosis, though by world standards this is not high. Once in a motor vehicle, the Maori is 2 to 3 times more likely to die on the road than the non-Maori; there is an excessive death rate in Maoris related to homicide; 18 percent of Maori admissions to hospital are related to accidents or injuries of some sort – it would seem pertinent to establish whether alcohol was an important factor in these situations or not. The Maori also has an excessive mortality due to peptic ulceration, a condition in which alcohol may be regarded as a risk factor. The contribution that alcohol makes to the total calorie intake of the Maori adult would be worth assessing also, in view of the high prevalence of obesity and its related conditions. Finally, such basic information as the alcohol consumption of the Maori versus the non-Maori is lacking.

(iv) Susceptibility to Infection

Although marked reductions in mortality due to infections have occurred in the Maori, the rates are still considerably higher than those for non-Maoris. In the post neonatal period, for instance, Maori "cot deaths" are 2 to 3 times more common than in non-Maoris and these are largely the result of respiratory infections. Gastroenteritis remains a problem in the young and the elderly and still has an appreciable mortality in these age groups. The incidence and mortality in Maoris due to tuberculosis and rheumatic fever remains disproportionately high, whilst ear disease is an all too common problem in the young Maori. Deaths due to chronic renal disease are disproportionately high in the Maori adult and an infective aetiology remains possible here.

In spite of some important contributions to the above there is still a paucity of information establishing the prevalence of infective problems in Maoris. In addition, it is not clear why Maoris should be more susceptible to infections, though many factors have been suggested including genetic differences, disturbed immunity, anaemia, and social factors (for example, poor housing, overcrowding, etc). With none, however, is the evidence convincing. In infancy, it is well established that breast fed babies are much less likely to suffer from infective illnesses than bottle fed infants, yet information regarding infant feeding practices in the Maori is lacking.

The excessive Maori mortality may equally reflect other factors such as the late presentation of illness; underestimating the need for, or impaired access to, medical treatment; and inadequate treatment (patient may stop treatment inappropriately). Such factors need further study.

It is an impression that recurrent infections are more common in Maoris than non-Maoris and there would seem good reason to substantiate this. Possible factors here would include compliance with therapy, drug resistance, and differences in drug metabolism.

Finally, although not primarily an infection, deaths due to asthma are excessively high in young Maori adults.

(v) Accidents

The Maori is accident prone. From the age of 1–44 years accidents are the major cause of death in Maoris. Furthermore, the Maori death rates are higher than for non-Maoris and have increased in the past 10 years. As already mentioned, the motor vehicle is lethal in the hands of many Maoris and, unfortunately, the same applies to the home for too many Maori pre-schoolers. Accidental falls are an important cause of death in the latter age group. There is a need to discover why it is that there is an excessive death rate in Maoris associated with motor vehicles, and also a need to educate Maori mothers with respect to accidents occurring in the home. It is to be noted that deaths due to poisonings were not infrequent in the 15–24 year age group in Maoris. In terms of hospital admissions, those because of head injuries appear to be disproportionately high with respect to Maoris.

(vi) Neoplasms

Maori adults have a disproportionately high mortality from neoplastic diseases when compared with non-Maoris, the most important exception being large bowel cancer. Cancer of the lung, stomach, breast, cervix, and pancreas are 2 to 4 times more common in the Maori than non-Maori. There is a need to support these findings with epidemiological data and to determine what the important risk factors might be.

(vii) Mental Health

There is a paucity of information relating to the mental health status of the Maori, though his high admission rate to mental institutions for "schizophrenia and paranoid states" is noted. The non-Maori, in contrast with the Maori, appears to suffer more from depressive and other neuroses.

RECOMMENDATIONS

The poor health status of the Maori at the present time is largely due to environmental factors. I have no doubt that any substantial improvement in Maori health status will only come about by primary preventive measures. There is, therefore, an urgent need to define more clearly the role of the important environmental factors such as over-nutrition, smoking, alcohol, and infection, if intervention programmes are to be mounted.

It should be stressed that the Maori is very sensitive to issues which affect his wellbeing and status within the community, and it will be necessary for him to see the logic behind any proposed studies or intervention programmes and to see a clear benefit to himself. I see his co-operation and involvement in planning from the outset as being vital.

I would make the following recommendations:

(i) A comprehensive survey of the nutritional status and eating habits of the New Zealand Maori, both young and old, should be undertaken and contrasted with similar data from Europeans. With this information as a base line, an intervention programme fostering sound nutritional habits could be set up. However, such a programme will fail unless the Maori firstly sees for himself that his eating habits are poor and, secondly, that a change would bring about a clear benefit in his own health status. Education is the key to any intervention programme here and will require detailed planning.

(ii) More information is required on the smoking habits of the Maori to consolidate available information suggesting that this is more prevalent in Maoris, especially females. It has been said already that intervention programmes with respect to cigarette smoking have failed at the secondary school level, and so any intervention programme from an educational standpoint should be aimed at the younger child and the smoking female adult. The education programme should outline very clearly the excessive mortality that Maoris suffer in terms of ischaemic heart disease, lung cancer, and chronic obstructive respiratory disease.

(iii) There is a need to define more clearly the role that alcohol plays with respect to overall nutrition, motor vehicle accidents, other accidents and injuries, and homicide in the Maori. Again, any preventive programme should be educational, but more hard data are needed to highlight its importance as an adverse factor.

The question of alcohol and Maori health is likely to be an extremely sensitive one, and would need very careful planning and data handling.

(iv) The increased susceptibility of the Maori to infections requires more study. There is a need to document the prevalence of common respiratory, renal, and gastrointestinal infections in Maoris and to determine what factors are important. In addition, an assessment of drug compliance, drug resistance, and drug metabolism in the Maori would seem worth undertaking as it is possible any or all of these factors could influence the outcome of infectious diseases.

(v) There is an urgent need to explore further the problem of deaths due to accidents in Maoris. The motor vehicle requires special attention and consideration should be given to mounting an educational preventative programme.

(vi) There is a need to investigate further the excessive mortality in Maori adults due to asthma and chronic renal disease.

(vii) Further studies are required to define the important risk factors that might account for the higher mortality in Maoris from stomach, breast, cervical, and pancreatic cancer.

(viii) There are important differences in the types of mental health disorders that affect Maoris and non-Maoris most commonly and further studies in this area should be undertaken to determine the role of genetic and environmental factors.

(ix) The areas in which further study and where intervention programmes might be considered are many and varied. I would, therefore, recommend that the Medical Research Council consider setting up a "working party" or "workshop" to tackle some or all of the problem areas outlined in this report.

Finally, the opinions expressed in this report are solely those of the author.

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