

Nelson Marlborough District Health Board

Health Needs Assessment

2011

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1. Introduction

This document is an update to the full 2010 Health Needs assessment released in October 2010. It provides sections on Mortality, Foetal and Infant Mortality, Enrolment of Newborns with General Practitioners, Cancer Registrations and Deaths and Unplanned Readmission to Hospital, but the most powerful and recurring theme in the sections that follow these is Health Equity and Health Equality, (the ethical principle concerning the absence of systematic disparities in health (or in the major social determinants of health) between groups with different levels of underlying social advantage/disadvantage).

Health Equity, as well as being the subject of Health Equity and Health Equality, also has a significant impact on Cancer Registrations and Deaths, Smoking, Syndemics (two or more Afflictions Interacting Synergistically), and Emergent Knowledge from International and NZ Practices. Furthermore it has an impact on Mortality, Foetal and Infant Mortality, Acute Demand Analysis and Unplanned Readmission to Hospital.

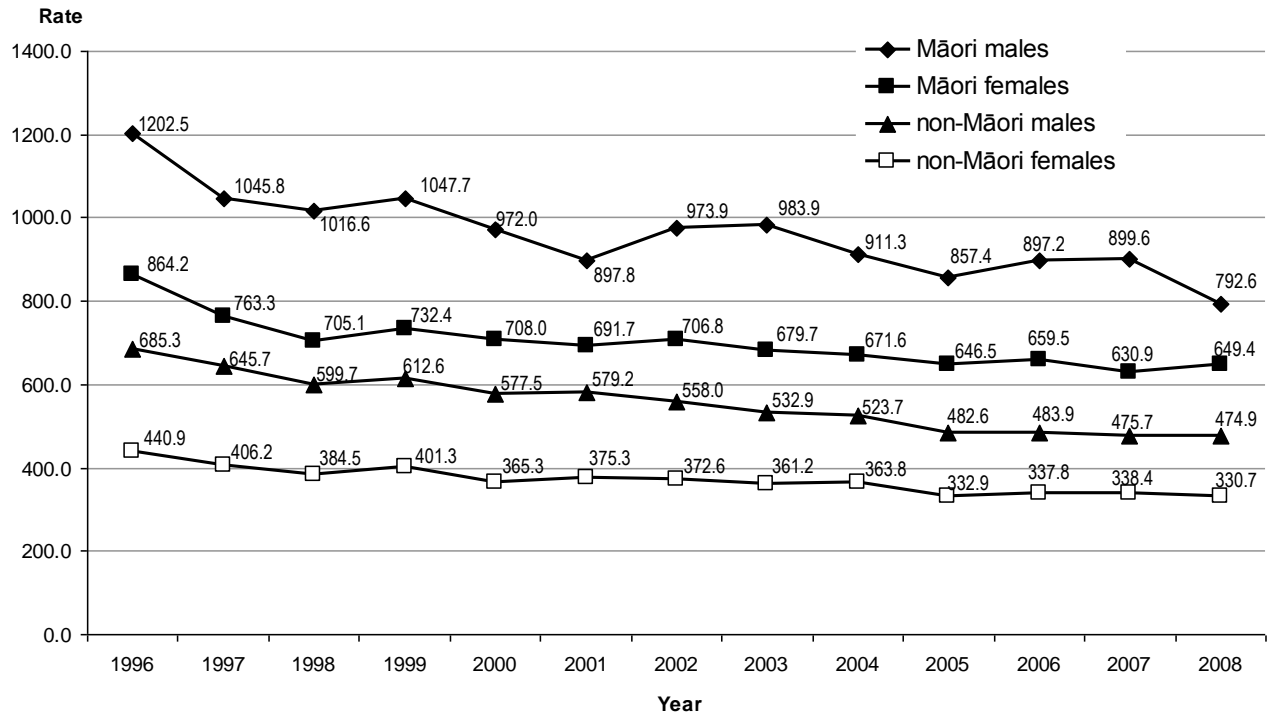
Effecting changes to health equity will require action on the determinants of health. These are not controlled by authorities within the health sector so we require coalitions that reach beyond the confines of familiar partnerships. NMDHB's work with Talking Heads, a cross sector group led by the Mayors of Nelson City, Tasman District and Marlborough Councils is a step towards this direction.

Another area in which we could reap benefit for NMDHB and possibly in a smaller timeframe (because it falls to a large extent within our circle of influence) might be Unplanned Readmission to Hospital. Assessing patients during admission (prior to discharge) to assess their LACE index¹ to identify patients at high risk of readmission could enable these patients to be targeted for hospital discharge programmes such as that described by Jack et al² which reduced emergency department visits and readmissions by 30%. (The LACE index uses Length of stay (L); acuity of illness at the time of the index admission (A); Charlson co-morbidity score (C); and number of emergency department visits in the 6 months before the index hospitalisation (E) -see Unplanned Readmission to Hospital page 25). In addition to achieving a significant improvement in patients' quality of life, cost savings might be realised.

2. Mortality

In March 2011, the Ministry of Health released the high-level New Zealand mortality statistics (Figure 1) showing data from 1950 to 2010.³

Figure 1 Death rates from all causes of death, by sex and ethnicity, 1996 to 2008*



* Data for 2008 is provisional.

Rates per 100,000 population, age-standardised to WHO World Standard Population.

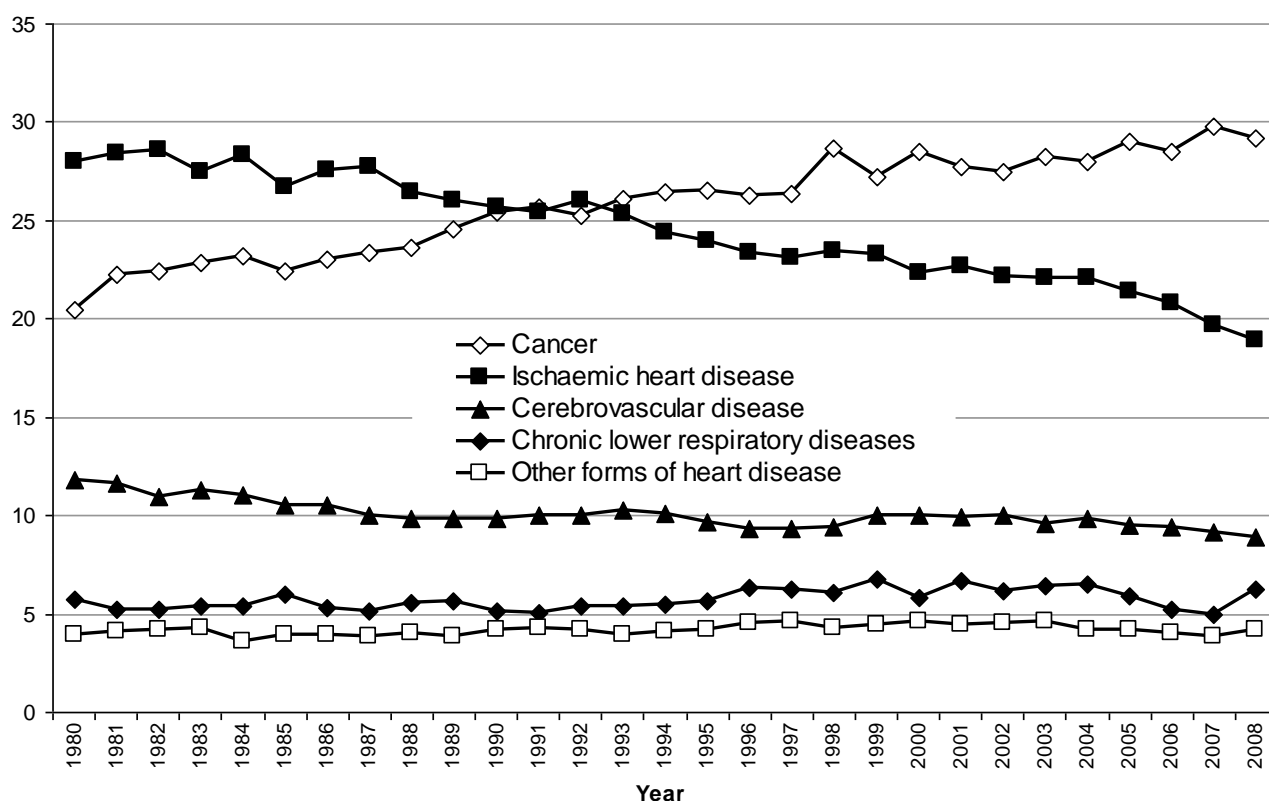
Source: Ministry of Health Mortality Data.

While the non Maori rates have not changed substantially, the death rate for Maori males has improved from 899.6 to 792.6 per 100,000 population but the Maori female rate has increased from 630.9 to 649.4 between 2007 and 2008. All rates are age-standardised to WHO World Standard Population.

The five major causes of mortality 1980 to 2008, shown in Figure 2 show that the percentage of deaths caused by cancer continues to climb while that caused by ischaemic heart disease continues to drop. Cerebrovascular deaths have also shown a decline over the last 28 years. Chronic lower respiratory diseases and other forms of heart disease have remained at a consistent level over the period.

Figure 2 Five major causes of mortality, 1980 to 2008

Percentage



* Data for 2008 is provisional.

Rates per 100,000 population, age-standardised to WHO World Standard Population.

Source: Ministry of Health Mortality Data.

Standardised death rates can be compared across DHBs. This has been done in the tables which follow.

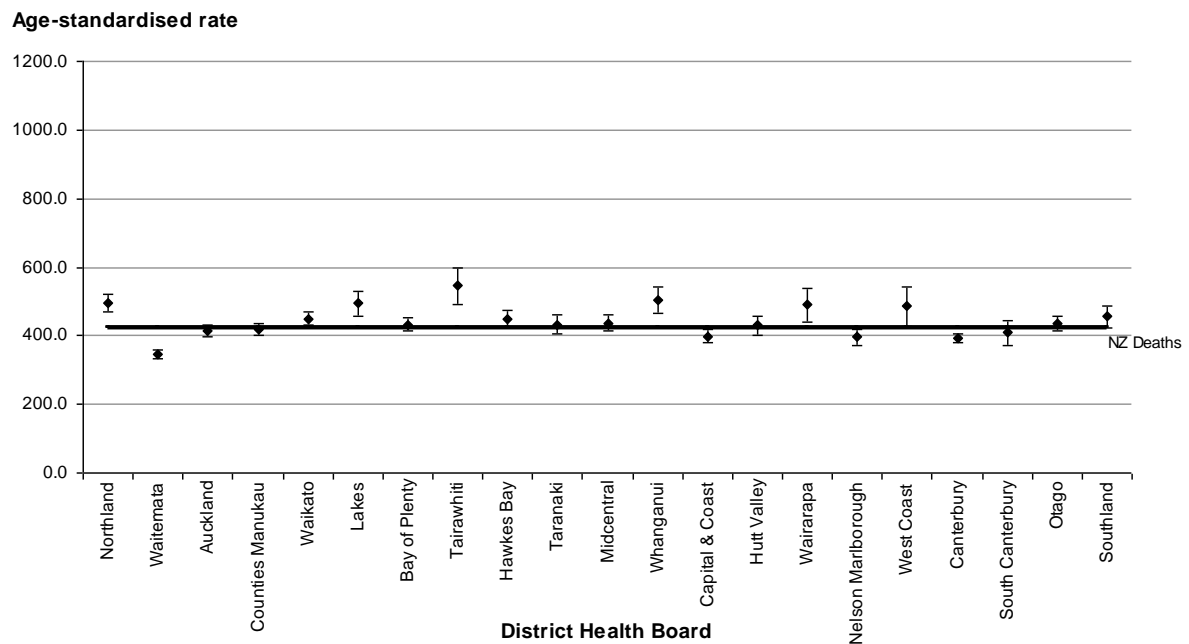
The error bars describe the confidence intervals around each data point. If the error bars do not overlap the New Zealand rate then it is reasonable to assume that the difference between the two rates is significant (ie not a product of chance).

If two confidence intervals overlap, it is not possible to make any conclusion about the significance of any difference between the rates without conducting a statistical test of difference.

Figure 3 show that while the NMDHB age standardised death rate is lower than the New Zealand (NZ) average, the error bar overlaps the NZ average so the difference is not likely to be statistically significant.

In Figure 4 on the other hand, there is no overlap so it is reasonable to assume that the Maori age-standardised rate is significantly lower than the NZ Maori average rate. In Figure 5, the error bars again overlaps the NZ average thus the non-Māori population age-standardised rates is not significantly different from the NZ average rate.

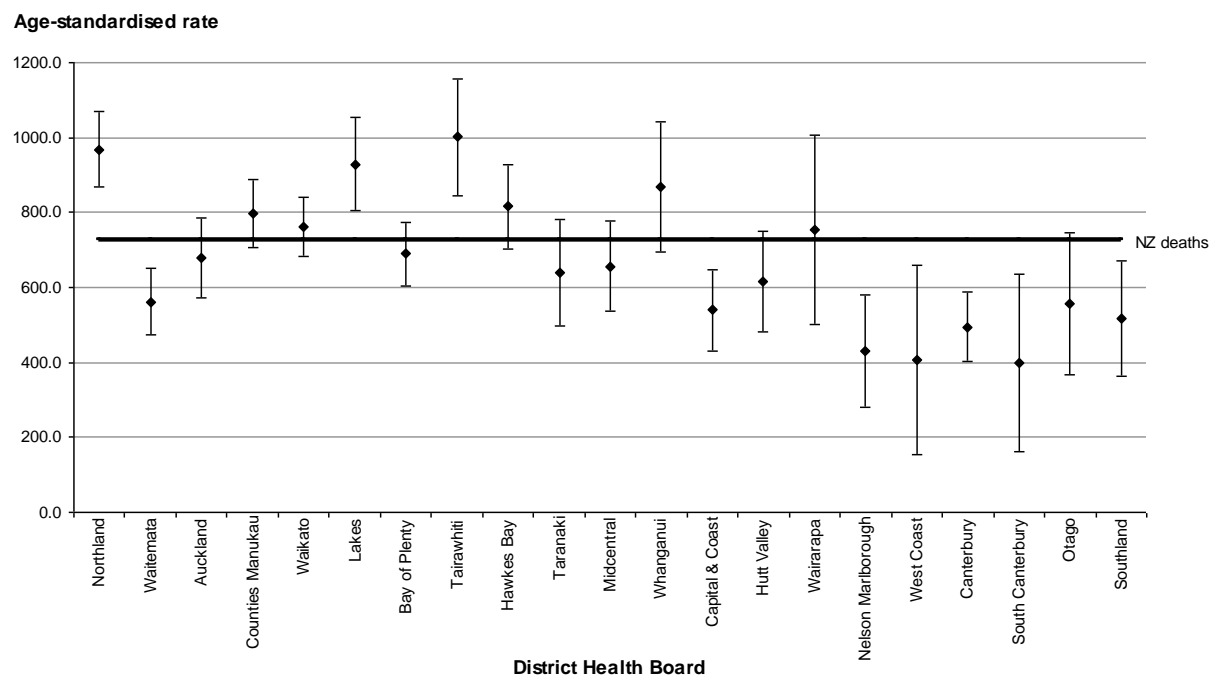
Figure 3 Death rates by DHB, total population, age-standardised rates, 2008 (provisional data)



Rates per 100,000 population, age-standardised to WHO World Standard Population.

Source: Ministry of Health Mortality Data.

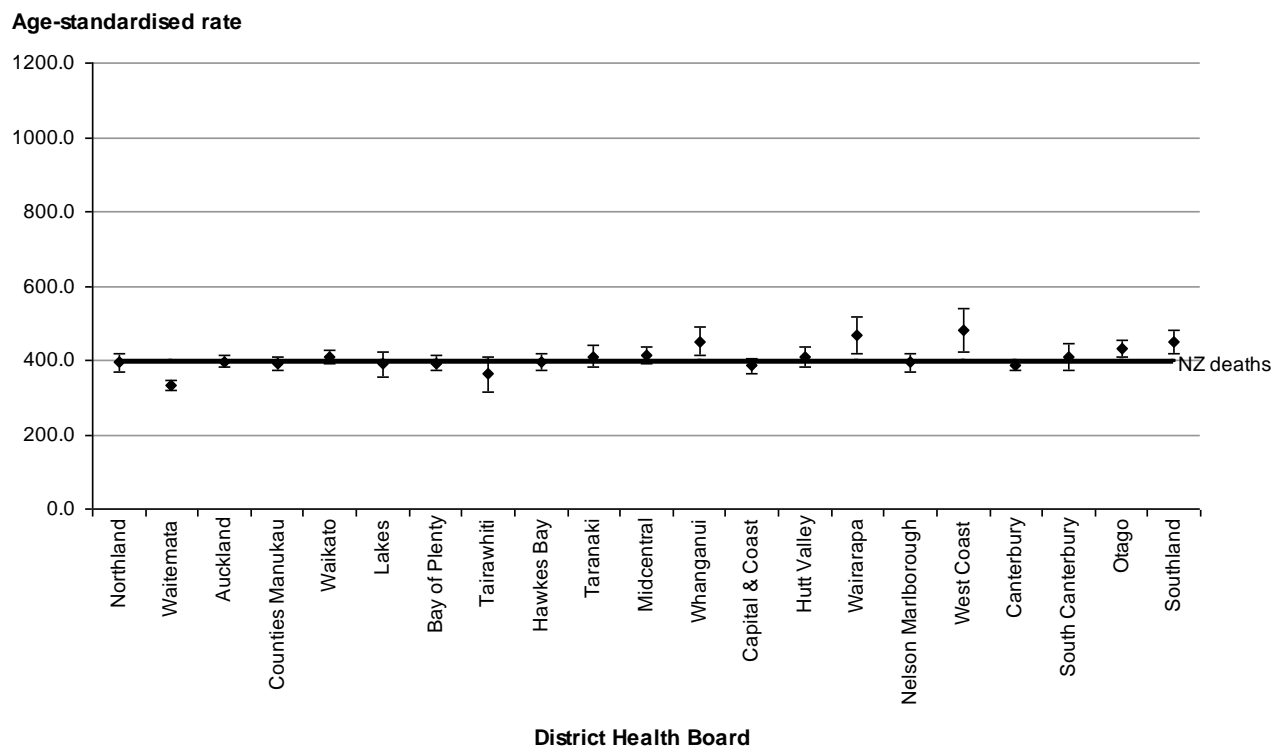
Figure 4 Death rates by DHB, Māori population, age-standardised rates, 2008 (provisional data)



Rates per 100,000 population, age-standardised to WHO World Standard Population.

Source: Ministry of Health Mortality Data.

Figure 5 Death rates by DHB, non-Māori population, age-standardised rates, 2008 (provisional data)



Rates per 100,000 population, age-standardised to WHO World Standard Population.

Source: Ministry of Health Mortality Data.

3. Foetal and Infant Mortality

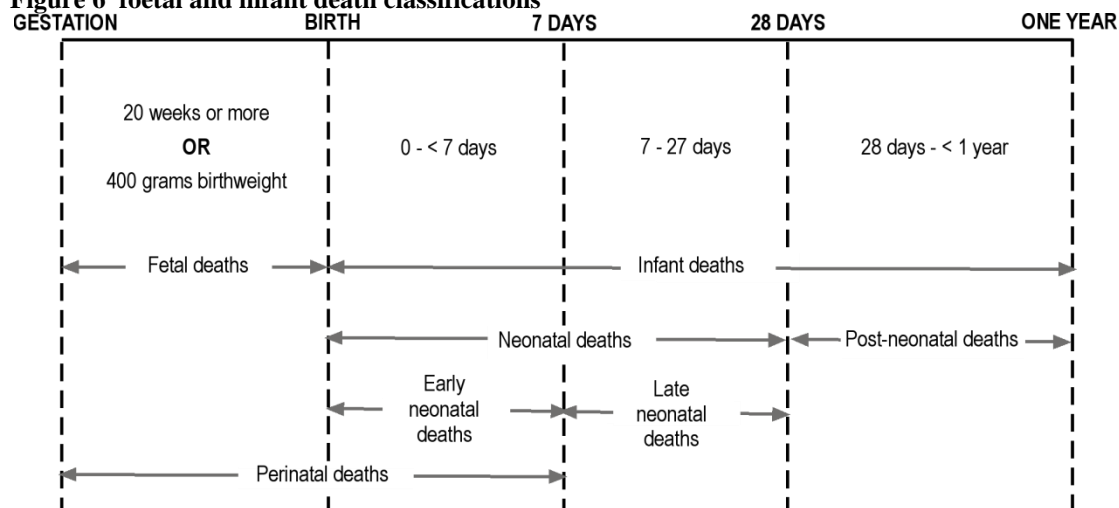
Foetal and Infant mortality 2006, 2007 and 2008 (provisional) were released at the end of June 2011.

There are a number of measures of deaths of children aged less than 1 year. They are defined as shown in Table 1 and Figure 6:

Table 1

Measure	Definition
Foetal death (also known as stillbirths)	foetal deaths of 20 weeks' or more gestation, or 400g or more birth weight
Late foetal deaths	The death of foetuses of 28 or more weeks gestation
Perinatal deaths	foetal deaths and deaths in the first week of life (early neonates)
neonatal deaths	the death of a live born infant before the 28th day of life
post-neonatal death	the death of a live born infant between the 28th day and the first year of life
infant death	a live born infant dying before the first year of life is completed

Figure 6 foetal and infant death classifications



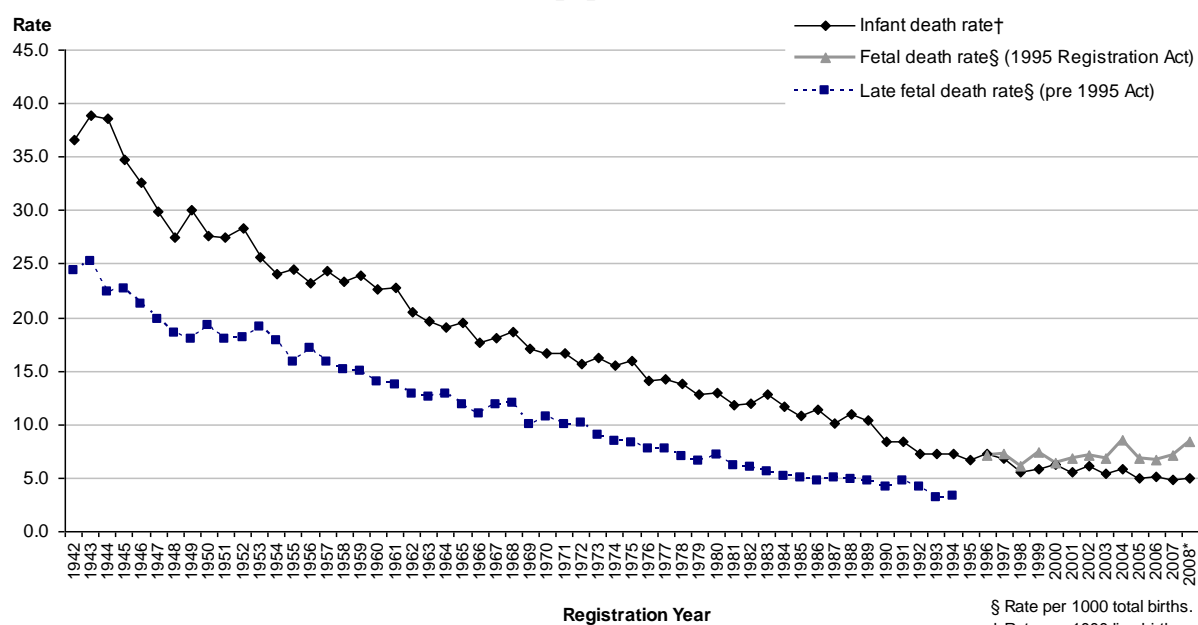
There have been some issues relating to the data in recent years. The data shown here are collated by year of registration - deaths by year of death registration and stillbirths by year of birth registration. Births, Deaths and Marriages (BDM) have traditionally faced issues in securing timely registrations of stillbirths with the result that many stillbirths are registered after the actual year of birth. This has resulted in fluctuations in annual stillbirth registrations.

The data show that between 2007 and 2008 there has been a large increase in the number of foetal death registrations (from 471 in 2007 to 555 in 2008). Approximately half of this increase is thought to be due to natural fluctuations in the data, with the remaining increase almost certainly due to an improvement in registration process. The data are presented by the year of registration, and in 2008 the registration process was altered. Prior to 2008 any deaths that were known through the hospital system, but were not known by Births, Deaths and Marriages were registered by the Ministry of Health after two years had passed. In 2008 the Ministry improved the timeliness of this data processing by reducing the time to one year. This resulted in an artificial inflation in the 2008 registration data. This process change will only affect one year of data, and will stabilise in 2009.

3.1 Key Facts:

- The infant mortality rate has shown a downward trend from 1942 to 2004 and then stabilised between 2005-2008.
- There are significant and relatively stable differences in infant mortality rates between Maori and Other (non Maori, non Pacific) from 1996 to 2008.
- In 2008 the Pacific foetal mortality rate is slightly higher than Maori and Other rates. This trend is generally consistent with previous years.
- Congenital abnormalities caused the highest number of infant deaths in 2008.

Figure 7 Foetal and Infant death rates, total population, 1942 to 2008*



* Data for 2008 is provisional.

§ Rate per 1000 total births.

† Rate per 1000 live births.

Source: Ministry of Health

Figure 8 Foetal death rates per 1000 total births by ethnicity, 1996 to 2008*

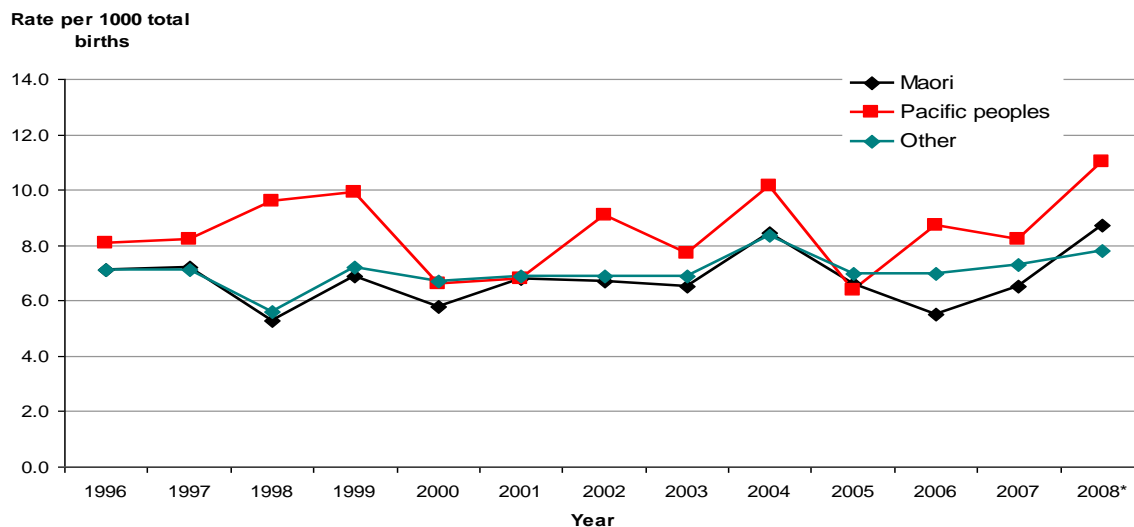
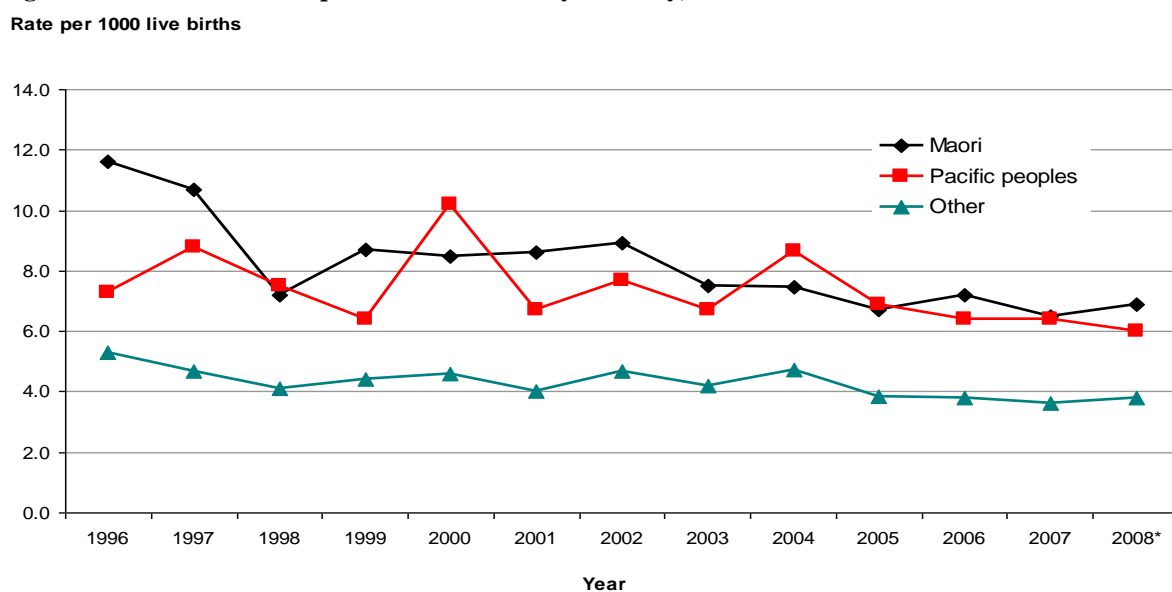
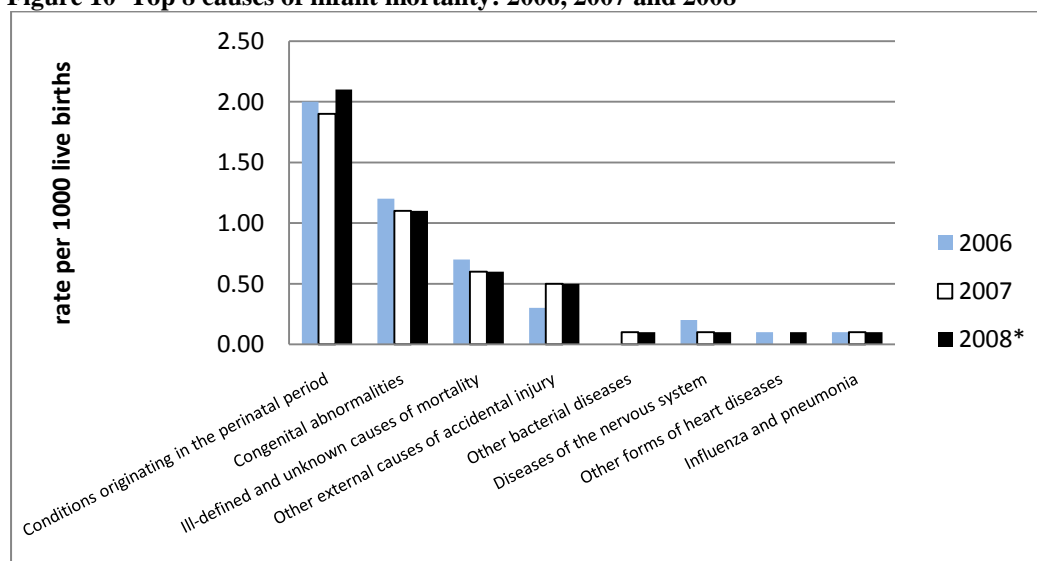


Figure 9 Infant death rates per 1000 live births by ethnicity, 1996 to 2008*



The top 8 causes of infant mortality in New Zealand are shown in Figure 10.

Figure 10 Top 8 causes of infant mortality: 2006, 2007 and 2008*⁴



4. Enrolment of Newborns with General Practitioners

General Practice explicitly facilitates responsibility for a public health dimension to health care for a defined population. It emphasises teamwork, consultation skills, management of undifferentiated symptoms, and the integration of psychosocial and biological aspects of health and illness in the context of the family and community⁵. It is also the home of immunisation.

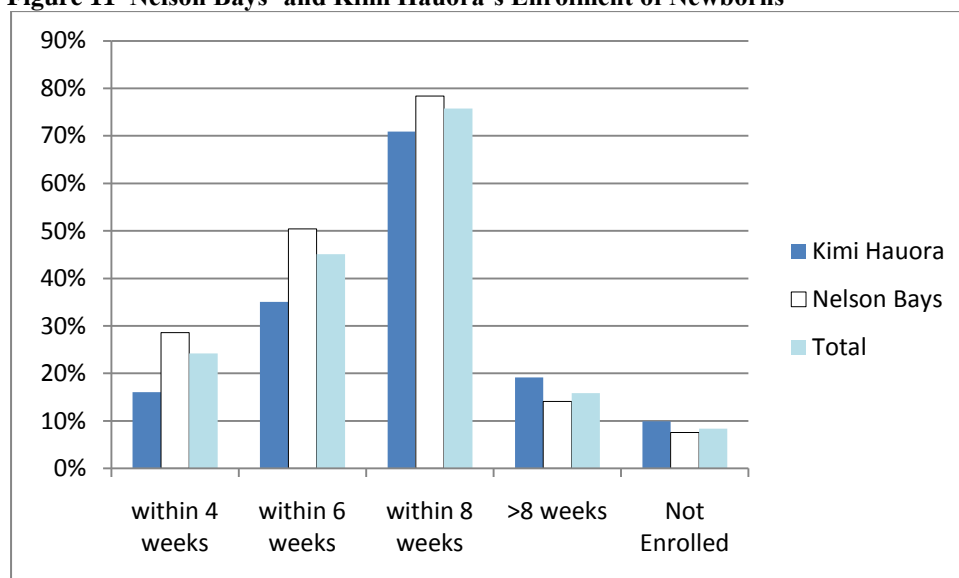
NMDHB is developing an indicator for the Strategic Balanced Score Card to measure the percentage of Nelson Marlborough newborns enrolled with a General Practitioner at four weeks of age. The aim is for greater than 90% of infants to be enrolled at 4 weeks. If this could be achieved, it would have a positive influence on Immunisation coverage. The 90% target is designed to support high levels of General Practitioner (GP) engagement with infants by four weeks of age in order to achieve health gain, including high levels of timely immunisation.

4.1 Baseline Statistics

A list of the newborn National Health Indices (NHIs) for the 2010 calendar year were obtained and a list was created for each Primary Health Organisations (PHO) based on the Postcode for the patients' address. The relevant list was then forwarded to each of the 2 PHOs in Nelson Marlborough requesting dates of enrolment for the babies.

Data were received from both Nelson Bays Primary Health Organisation (NBPH) and Kimi Hauora Wairau Primary Health Organisation (KHW MPH). The results are shown in Figure 11.

Figure 11 Nelson Bays' and Kimi Hauora's Enrolment of Newborns



Both PHOs were above 70% enrolment within 8 weeks of age with Nelson Bays at 50% and Kimi Hauora at 35% within 6 weeks and Nelson Bays at 29% and Kimi Hauora at 16% within 4 weeks. Nelson Bays has a higher percentage enrolled within each period at this point in time, possibly because they have had the capacity to carry out this checking operation for over a year; this has been the first check for Kimi Hauora for any cohort of more than a month's worth of births.

With this process for reporting now set up, we can work towards achieving the target of 90% of newborns enrolled with a GP within 4 weeks of birth by putting in place a system that facilitates the enrolment at this early stage of the children's lives. This will involve many players; the midwives who deliver these babies and care for them for the first 6 weeks of their lives will be vital players in achieving this aim.

5. Acute Demand Analysis

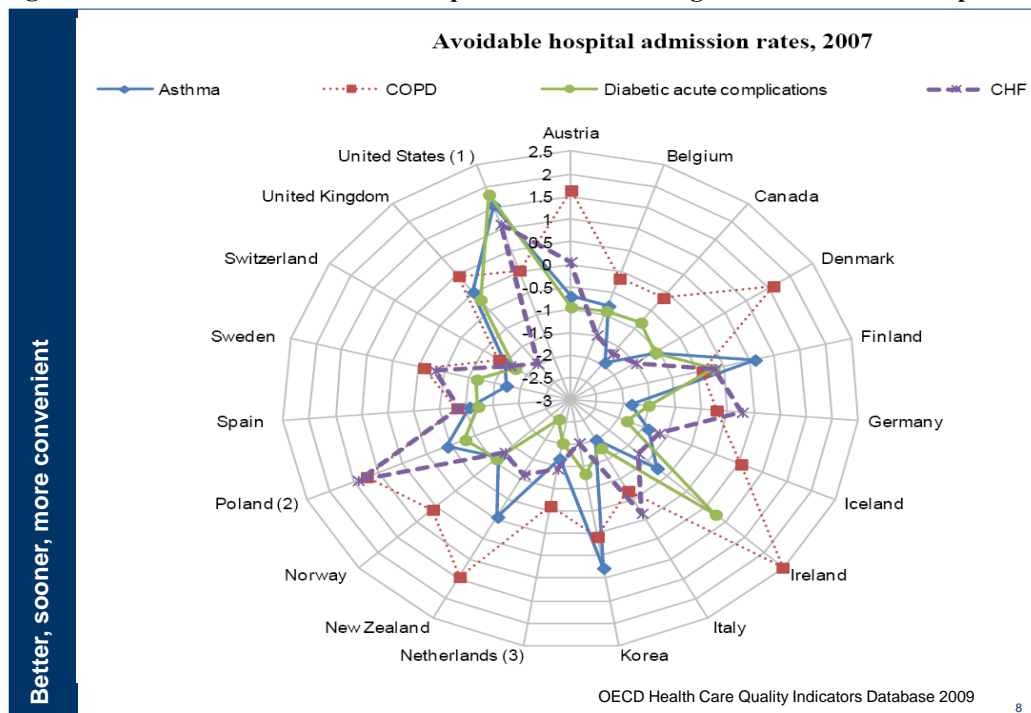
The Ministry of Health has undertaken significant analysis of national datasets⁶ to better understand acute demand growth in New Zealand over the last decade.

5.1 Avoidable admission rates

New Zealand has the OECD's lowest avoidable admission rates for diabetes acute complications (the scale in Figure 12 relates to where we are in terms of the OECD average rate); and asthma and congestive heart failure admission rates were also below the OECD average. Rates of admission for COPD, however, were one of the highest across the 19 countries analysed.

Chronic obstructive pulmonary disease (COPD) is not included in our ambulatory sensitive hospitalisation (ASH) analysis, (it is a Population Preventable Hospitalisation (PPH) condition and national data of this set of indicators is not currently available but being chased up). Nelson Marlborough for the most part has good ASH rates compared with national rates. Dental conditions (Other ethnicity, 0-74 year olds) are the only condition for which rates are significantly higher than the rest of New Zealand.

Figure 12 OECD countries' relationship to the OECD average rate of avoidable hospital admission rate



5.2 Acute Admissions

Eight conditions accounted for 24 percent of acute admissions in 2009. These were:

- chest pain
- oesophagitis, gastroenteritis and other digestive system conditions
- respiratory infections and inflammations
- cellulitis
- neonate admissions
- circulatory disorders

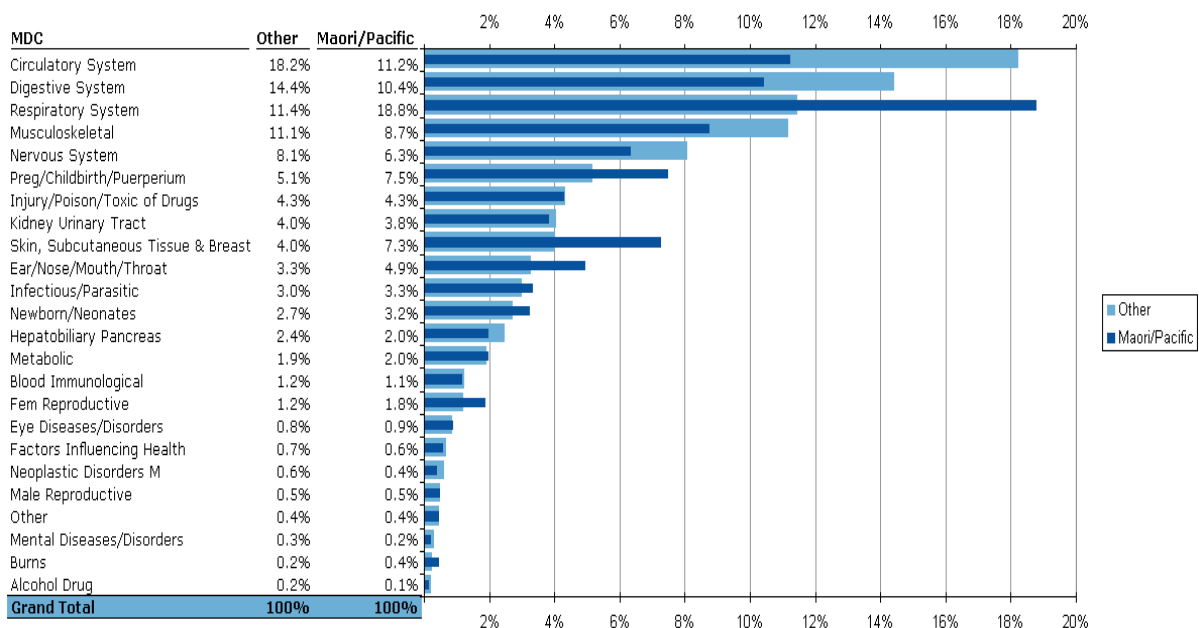
- chronic obstructive pulmonary disease
- abdominal pain or mesenteric adenitis

The conditions that trigger acute admission vary by ethnicity (Figure 13), with Maori and Pacific peoples more likely to be admitted with:

- respiratory conditions
- skin, tissue and breast conditions
- conditions relating to pregnancy and childbirth
- ear, nose, mouth and throat conditions

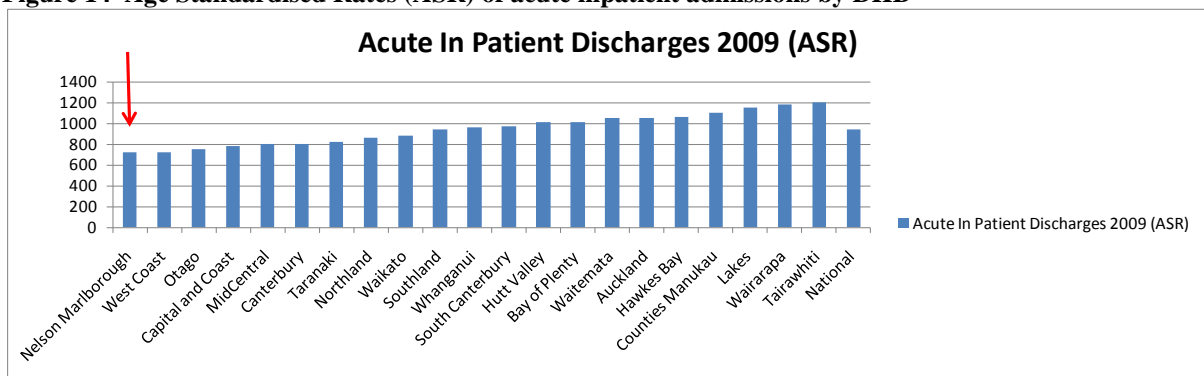
Figure 13 Conditions Vary by Ethnicity

Composition of Number of Discharges by MDC Comparing Maori/Pacific to All Other Ethnicities



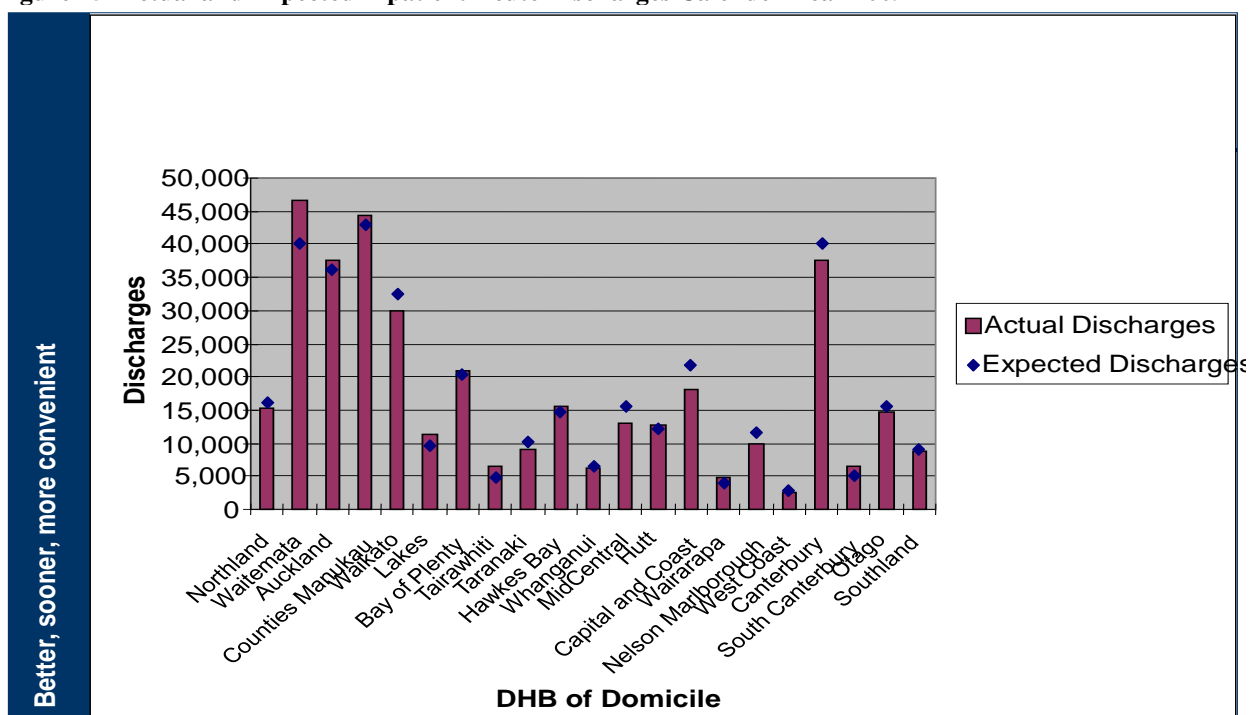
The Age Standardised Rates (ASR) of acute inpatient admissions are shown by DHB in Figure 14. Nelson Marlborough has the lowest acute inpatient admission rate.

Figure 14 Age Standardised Rates (ASR) of acute inpatient admissions by DHB



In fact, Nelson Marlborough District Health Board (NMDHB) had fewer than expected discharges in 2009 (Figure 15). The expected discharges (represented by the dots) are the numbers of discharges that could be expected based on the population size and characteristics (age, ethnicity & deprivation) in each DHB multiplied by the national average discharge rates for these population sub-groups

Figure 15 Actual and Expected Inpatient Acute Discharges Calendar Year 2009



This low rate of acute admission was despite a low GP full time equivalent (Figure 16)

Figure 16 GPs and Acute Hospital Discharge Rates.

Better, sooner, more convenient

GPs & Acute Hospital Discharge Rates

	Low GP FTE per 100,000			High GP FTE per 100,000		
	DHB	Acute ASR	GP FTE	DHB	Acute ASR	GP FTE
High acute discharge rates	Wairarapa	1184	74	Tairāwhiti	1201	84
	Counties Manukau	1102	59	Lakes	1153	83
	Waitemata	1049	58	Hawkes Bay	1061	80
	Bay of Plenty	1012	79	Auckland	1052	103
	Hutt Valley	1009	67	Whanganui	958	88
				South Canterbury	971	85
Low acute discharge rates	Waikato	882	67	Southland	939	83
	Taranaki	823	56	Northland	866	81
	MidCentral	803	71	Canterbury	860	84
	West Coast	724	75	Capital & Coast	778	84
	Nelson Marlborough	722	75	Otago	752	94

Acute inpatient discharge rate, age standardised. (2009)
Medical Council Workforce Survey (2009)

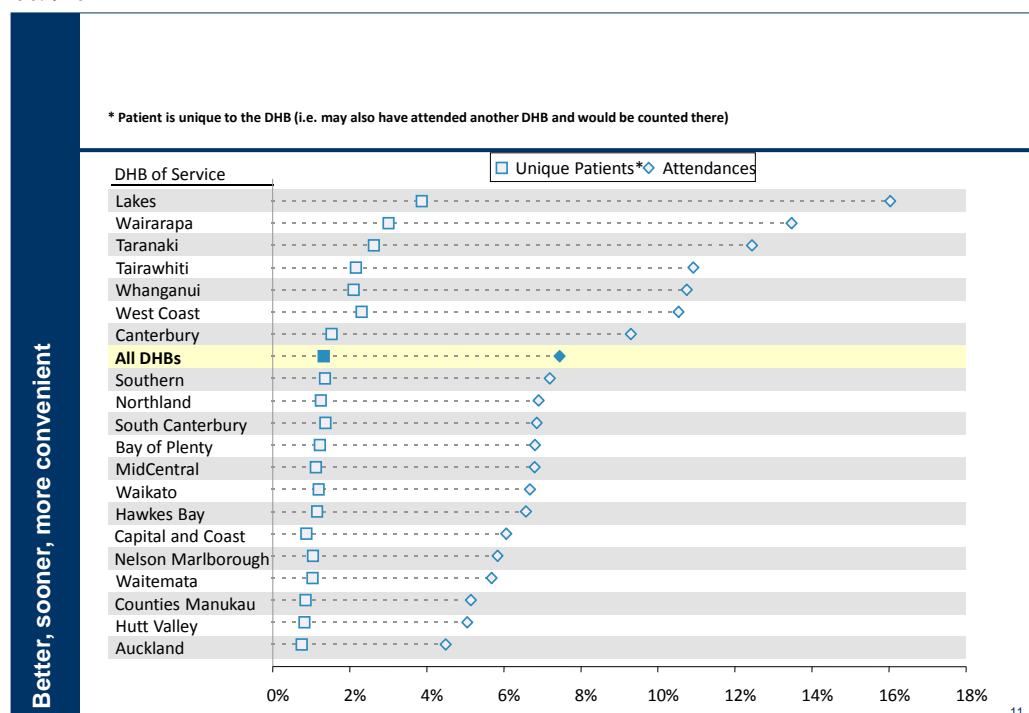
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5.3 Emergency Department (ED)

Interestingly, the pattern of ED attendance also differs across the country. And while the majority of people who visit ED do so only once each year, a small number – about 1.5

percent – visit six times or more times; and in some DHBs, 4 percent of their patients visit six or more times each year (Figure 17).

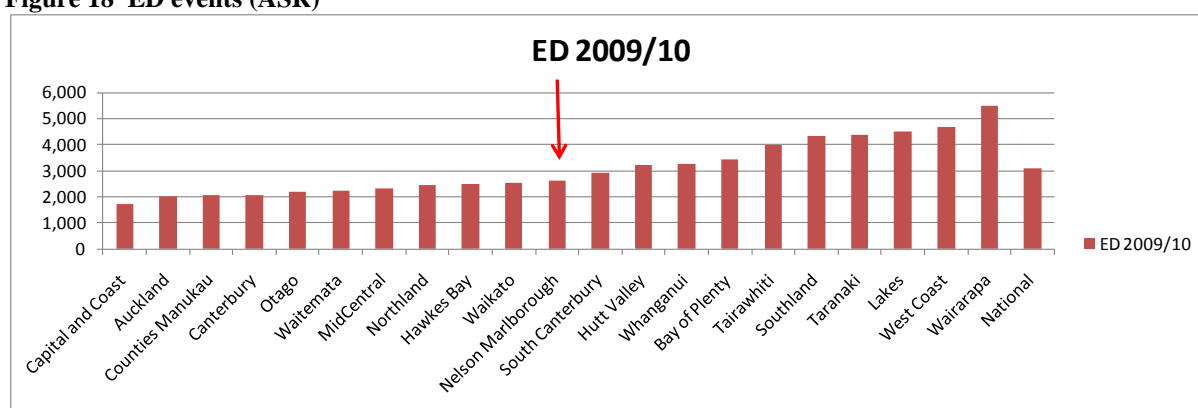
Figure 17 Ranked Percentage Of Attendances And Patients Who Attended ED 6 Or More Times Within 2009/10



For example 3.9% of unique patients in Lakes DHB visited ≥ 6 times – and this group of patients accounted for 16% of all their ED attendances. In NMDHB, less than 1% of unique patients visited ≥ 6 times – and this group of patients accounted for less than 6% of all our ED attendances. Nelson Marlborough is down there with the metropolitan areas where there are lots of private EDs and this was just at the beginning of the after hours service; it may have improved when later data are analysed

The ED event ASRs are shown in Figure 18

Figure 18 ED events (ASR)



6. Cancer Registrations and Deaths

The Ministry of health has recently released Cancer: New Registrations and Deaths 2008⁷. The section which follows, briefly explores the findings in this document and outlines how NMDHB compares with New Zealand as a whole in terms of age standardised rates for cancer registration and death as a result of selected common cancer types.

6.1 Cancer Registrations

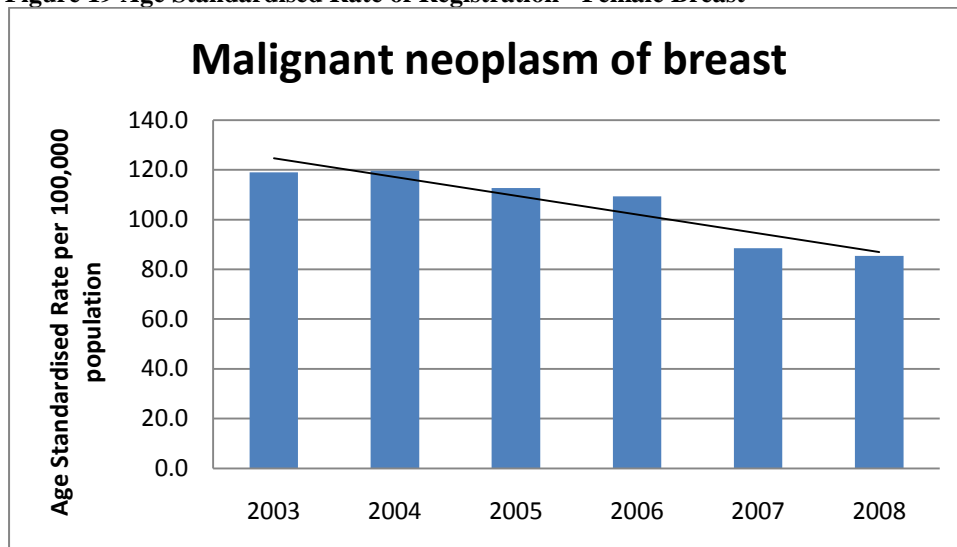
Table 2 shows the Numbers and Age standardised rates for Cancer Registrations for NMDHB⁸ and Total New Zealand Population in 2007. NMDHB has a higher rate of registration for malignant neoplasm of breast, colorectal cancer, malignant melanoma and malignant neoplasm of the prostate.

Table 2 Numbers and Age standardised rates for Cancer Registrations for NMDHB and Total New Zealand Population 2008

Year	Cancer	NMDHB		NZ		Group
		Cases	Age standardised rate	Cases	rate	
2008	Malignant neoplasm of breast (ICD-10-AM code C50):	78	85.5	2732	48.9	Female
2008	Colorectal cancer (ICD-10-AM codes C18-C21):	115	48.9	2801	44.4	Total
2008	Malignant neoplasm of the trachea, bronchus and lung (ICD-10-AM codes C33-C34)	61	20.3	1864	30.0	Total
2008	Malignant melanoma of the skin (ICD-10-AM code C43):	103	49.9	2256	39.7	Total
2008	Malignant neoplasm of the prostate (ICD-10-AM code C61):	131	149.3	2939	48.9	Male
2008	All cancers	747	333.0	20,317	344.0	Total

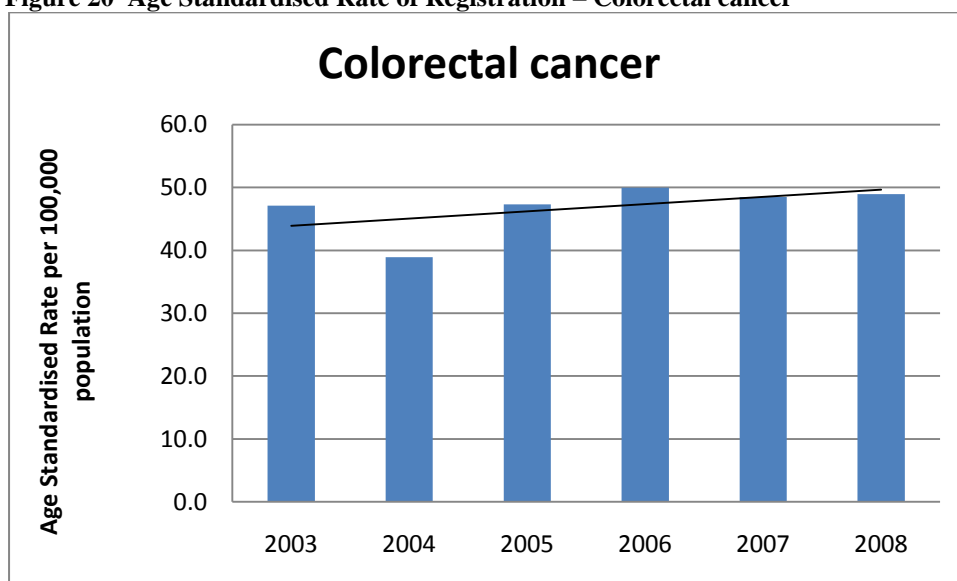
The Age Standardised Rate of Registration of Female Breast cancer has fallen consecutively over the last 5 years of available data (Figure 19) and the trendline generated by Microsoft Excel echoes this.

Figure 19 Age Standardised Rate of Registration - Female Breast



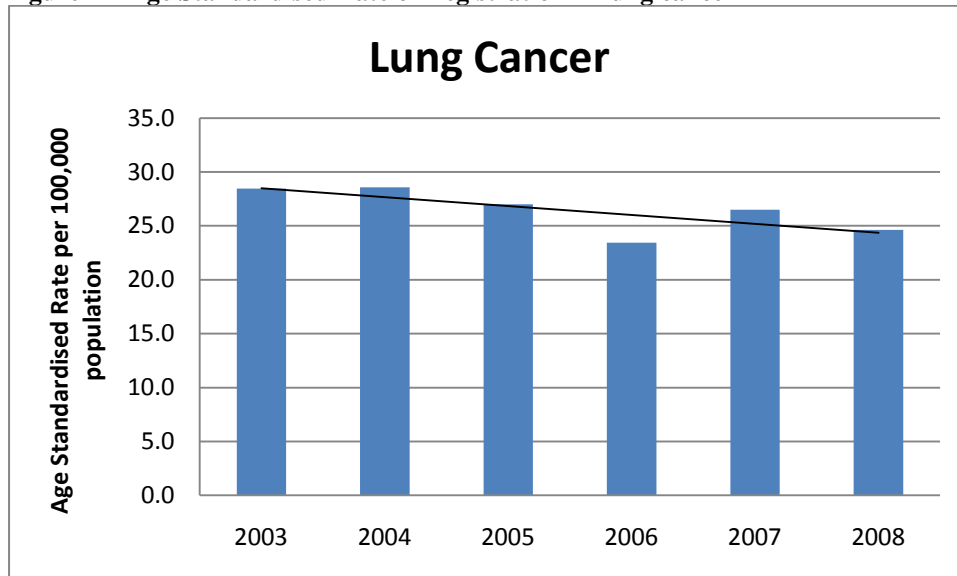
The Age Standardised Rate of Registration of Colorectal cancer has varied over the last 6 years of available data but the trendline generated by Microsoft Excel shows that the rate has generally increased (Figure 20).

Figure 20 Age Standardised Rate of Registration – Colorectal cancer



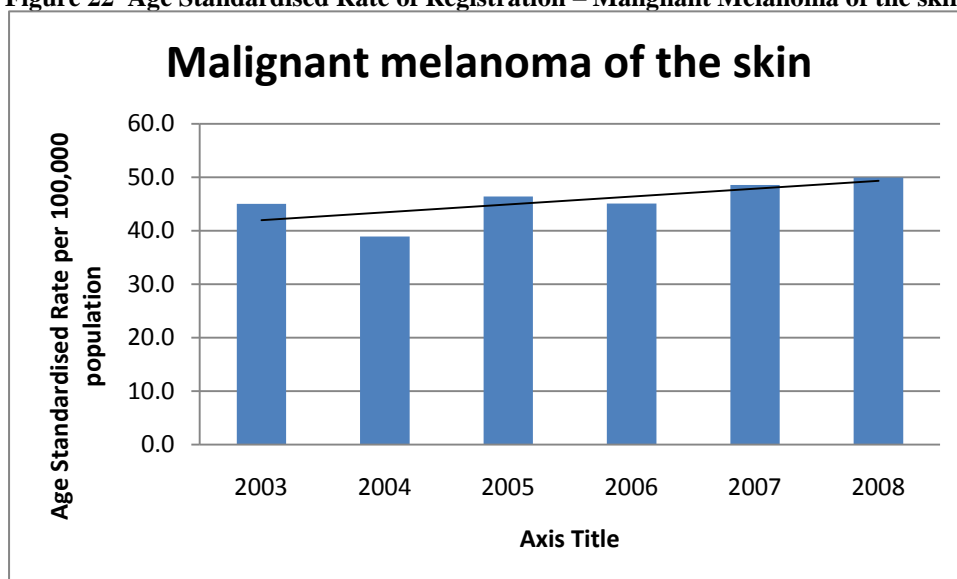
The Age Standardised Rate of Registration of Lung cancer has shown a trend of decreasing over the last 6 years of available data and the trendline generated by Microsoft Excel echoes this (Figure 21). This is consistent with the good results of the ASH year 10 survey of 14 and 15 year old boys and girls shown in Figure 31 on page 30.

Figure 21 Age Standardised Rate of Registration – Lung cancer



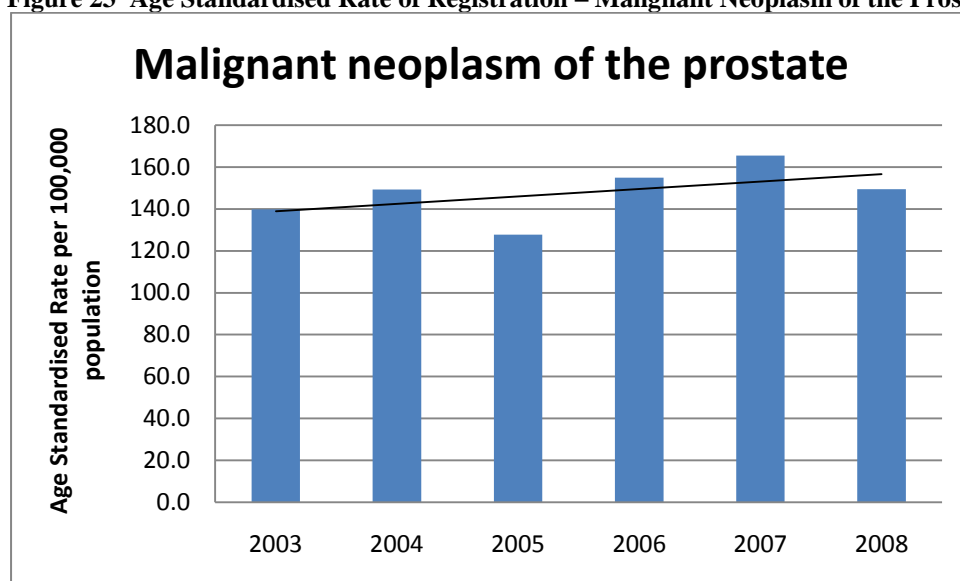
The Age Standardised Rate of Registration of Malignant Melanoma of the skin has shown an increasing trend over the last 6 years of available data and the trendline generated by Microsoft Excel highlights this (Figure 22).

Figure 22 Age Standardised Rate of Registration – Malignant Melanoma of the skin



The Age Standardised Rate of Registration of Malignant Neoplasm of the Prostate has shown an increasing trend over the last 6 years of available data and the trendline generated by Microsoft Excel echoes this Figure 23.

Figure 23 Age Standardised Rate of Registration – Malignant Neoplasm of the Prostate.



6.2 Cancer Deaths

The number of deaths and the age standardised rates for Cancer Deaths for the NMDHB population (2004-2008) and Total New Zealand Population (2008) are shown in Table 3. NMDHB has higher rates than New Zealand as a whole for malignant neoplasm of breast and malignant neoplasm of the prostate and similar rates for Colorectal cancer and malignant melanoma of the skin. The number of deaths is very variable year on year (Figure 24 and Figure 25.) Lung cancer has a lower age standardised rate in NMDHB than New Zealand as a whole.

Table 3 Numbers and Age standardised rates for Cancer Deaths for NMDHB and Total New Zealand Population

Year	Cancer	NMDHB		NZ		Group
		Cases (2004-2008)	Rate (2004-2008 average)	Cases (2008)	Rate (2008)	
2008	Malignant neoplasm of breast (ICD-10-AM code C50):	121	21.9	624	10.2	Female
2008	Colorectal cancer (ICD-10-AM codes C18-C21):	232	19.5	1280	19.3	Total
2008	Malignant neoplasm of the trachea, bronchus and lung (ICD-10-AM codes C33-C34)	254	21.6	1634	25.7	Total
2008	Malignant melanoma of the skin (ICD-10-AM code C43):	76	6.6	371	5.1	Total
2008	Malignant neoplasm of the prostate (ICD-10-AM code C61):	114	14.2	670	9.3	Male
2008	All sites	1527	128.2	8566	132.3	Total

Figure 24 Malignant neoplasm of breast age standardised death rates

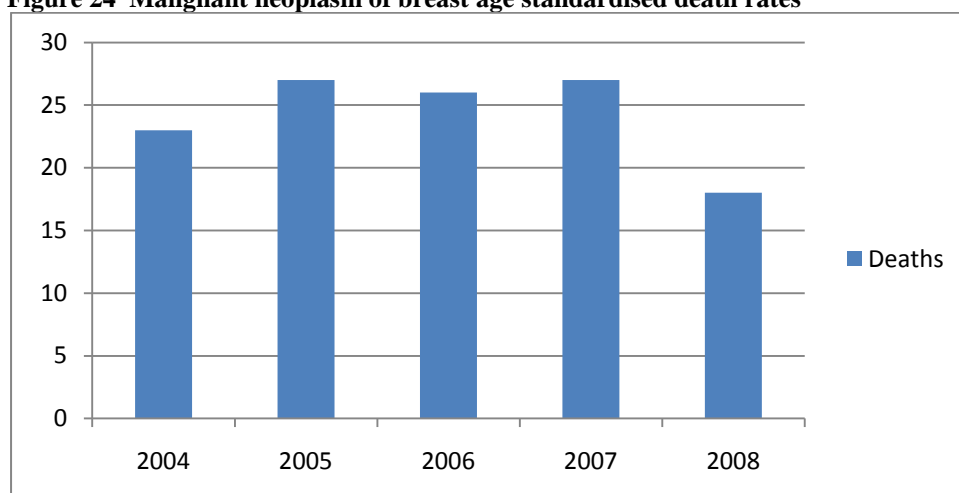
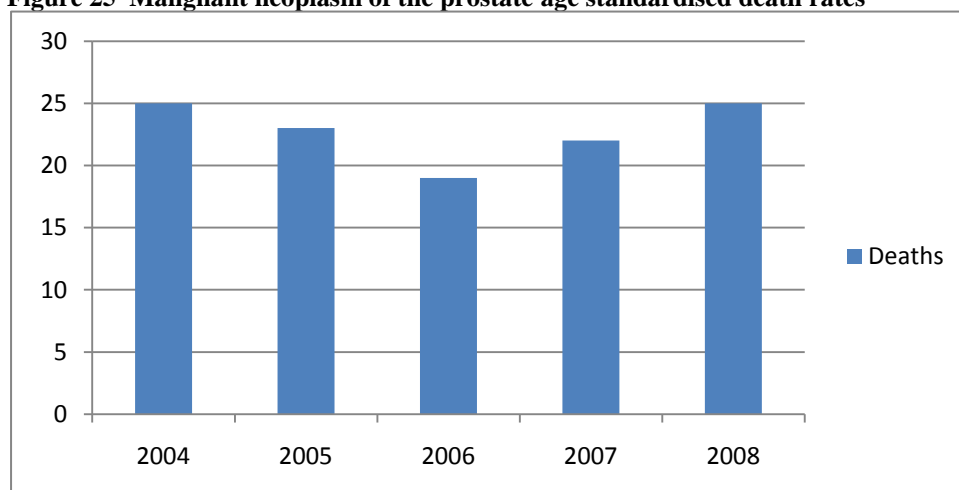


Figure 25 Malignant neoplasm of the prostate age standardised death rates



6.3 Inequalities

Considerable inequality exists in term of deaths from cancer.

Ethnicity

In 2008 the New Zealand Māori rate (210.8 deaths from cancer per 100,000 population) was 68 percent higher than the non-Māori rate (125.2 per 100,000 population).

Non-Māori cancer mortality rates decreased by 14 percent between 1998 and 2008; Māori cancer rates fell by 10 percent over the same period.

In 2008 the Māori male age-standardised cancer mortality rate was 211.2 per 100,000 Māori population, which was 41 percent higher than the non-Māori rate of 149.7. This disparity between ethnic groups remained largely unchanged from 1998 to 2008, although both groups show an overall downward trend. The ethnic disparity in male cancer mortality rates is more pronounced than that in registration rates.

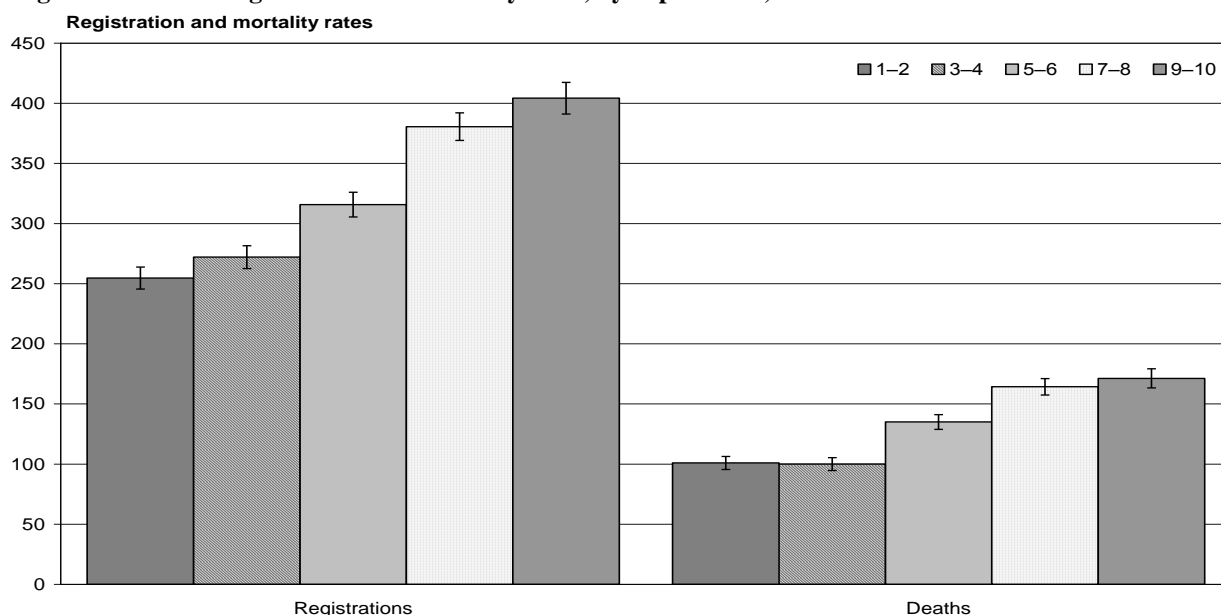
In 2008 the Māori female age-standardised cancer mortality rate was twice that of the non-Māori female rate (212.4 per 100,000 population compared to 106.6 for Māori females). As seen for the male rates, this disparity between ethnic groups remained relatively unchanged between 1998 and 2008.

Māori show higher death rates than non-Māori for all of the sites analysed with the exceptions of colorectal cancer and melanoma.

Deprivation

Total cancer registration and mortality rates broken down by deprivation quintiles are shown in Figure 26. In 2008 rates for both cancer registrations and deaths from cancer display the same pattern: the most deprived show the highest rates for both registration and death, and these differences are significant (as shown by the confidence intervals).

Figure 26 Cancer registration and mortality rates, by deprivation, 2008



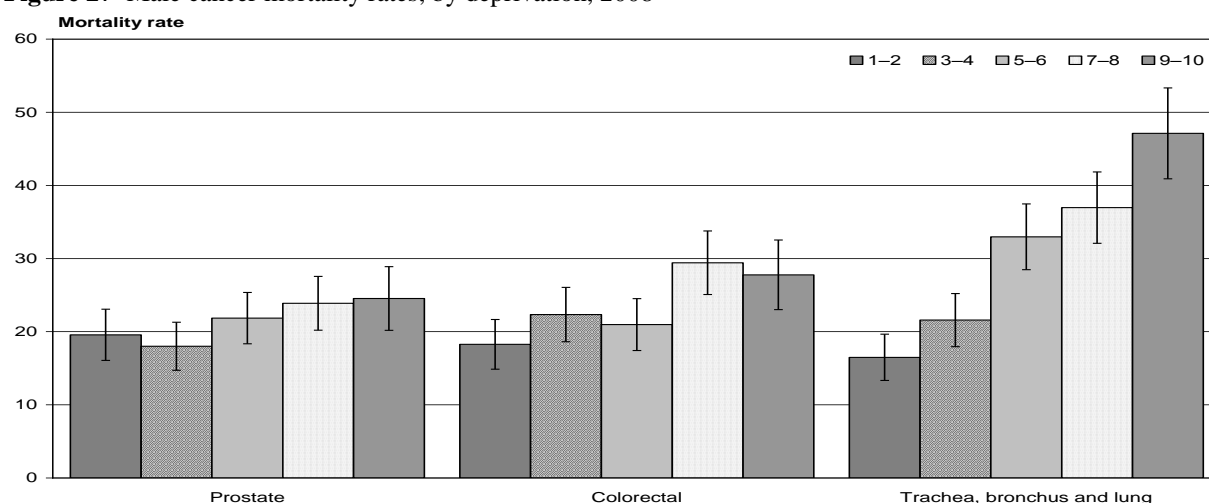
Source: New Zealand Cancer Registry and New Zealand Mortality Collection.

Note: The rate shown is the age-standardised rate per 100,000 population, standardised to the WHO world standard population; 95% confidence intervals.

Figure 27 shows the three most common causes of cancer death for males in 2008, with age-standardised rates broken down by deprivation quintile. Neither prostate nor colorectal cancer mortality rates showed consistent significant differences across deprivation quintiles.

For lung cancer, although there was some overlap between the confidence intervals of neighbouring quintiles, mortality rates increase with deprivation. The male lung cancer mortality rate for the most deprived group was three times higher than that seen in the least deprived group.

Figure 27 Male cancer mortality rates, by deprivation, 2008



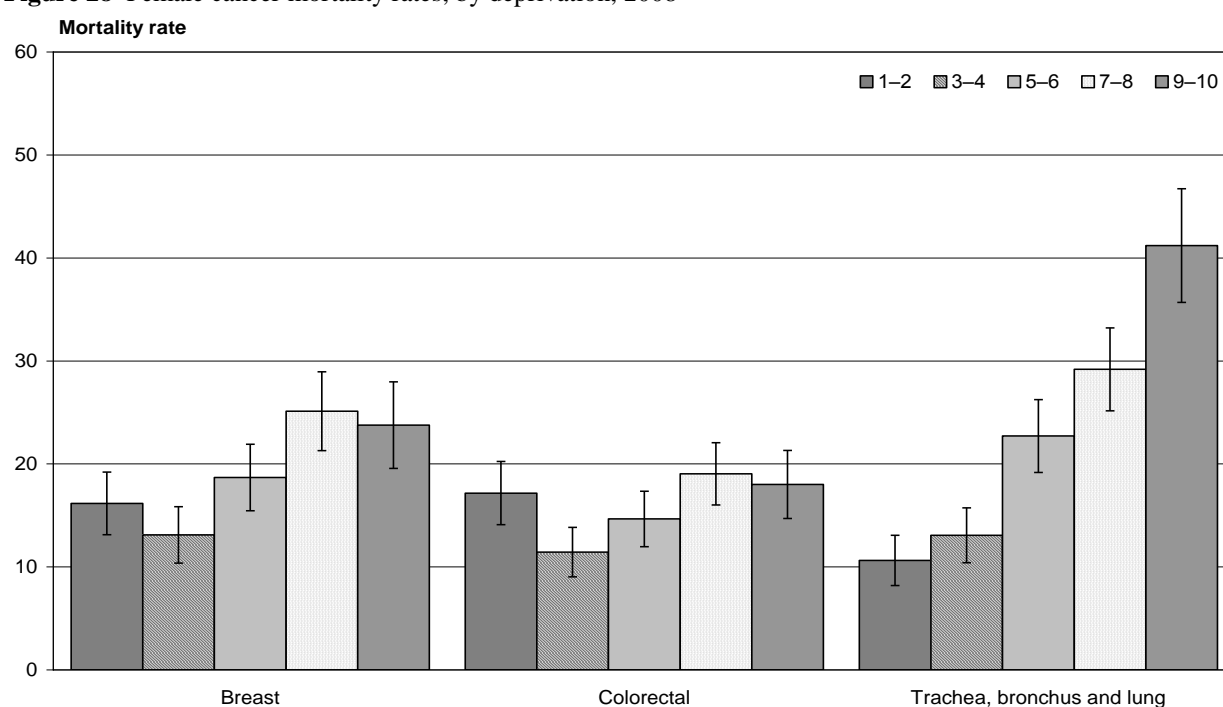
Source: New Zealand Mortality Collection

Note: The rate shown is the age-standardised rate per 100,000 population, standardised to the WHO world standard population; 95% confidence intervals.

Female mortality rates broken down by deprivation quintile are shown in Figure 28. For breast cancer there are significant differences between mortality rates for the least and most deprived women. Differences between mortality rates for women with colorectal cancer are not as clear.

As with males, rates of lung cancer in females show a strong relationship to deprivation levels. Females in the most deprived group show mortality rates that are four times higher than those seen in the least deprived group.

Figure 28 Female cancer mortality rates, by deprivation, 2008



Source: New Zealand Cancer Registry

Note: The rate shown is the age-standardised rate per 100,000 population, standardised to the WHO world standard population; 95% confidence intervals.

6.4 Trends over time

Lung cancer

- Male mortality rates decreased by 22 percent between 1998 and 2008, while female mortality rates **increased** by 12 percent over the same period.
- Between 1998 and 2008 Māori female registration rates for lung cancer **increased** by almost 49 percent; non-Māori female rates **increased** by 20 percent.
- Between 1998 and 2008 mortality rates for this cancer decreased by 31 percent for Māori males and by 22 percent for non-Māori males.
- Female mortality rates for lung cancer do not appear to be showing the same downward trend.

Melanoma

- Melanoma was the fourth most commonly registered cancer (accounting for 11 percent of all registrations) and the sixth most common cause of death from cancer (4 percent) in 2008.
- Māori accounted for only 1 percent of cancer registrations and deaths from melanoma.
- Between 1998 and 2008 rates of registration for this cancer showed an upward trend, increasing by 12 and 16 percent for males and females, respectively.

6.5 Summary

So it would seem then that some cancers may have begun the downward trend (eg lung cancer in males) but others are still growing (eg lung cancer in females and melanoma in non Maori.)

In order to see long term results from our efforts, we have some considerable gaps to close (eg smoking in women) but results to date show that it **is** possible to make an impact at a population level.

7. Unplanned Readmission to Hospital

Unplanned hospital readmissions are common, expensive and often preventable, but most importantly have a very substantial impact on patients' quality of life. A recent Canadian publication⁹ by Andrea Gruneir, Irfan A Dhalla, et al pointed out that strategies designed to reduce readmissions should target patients at high risk and went on to investigate the use of a recently published and validated algorithm (the LACE index¹) to identify patients at high risk of readmission and to examine their actual hospital readmission rates.

7.1 The LACE index and Gruneir et al's results

The LACE index uses Length of stay (L); acuity of illness at the time of the index admission (A); Charlson co-morbidity score (C); and number of emergency department visits in the 6 months before the index hospitalisation (E).

They found that of 26,045 medical patients, 12.6% were readmitted to hospital within 30 days. Using a LACE index score of 10, they identified patients with a high rate of readmission who may benefit from improved post-discharge care. High-risk patients (LACE ≥ 10) accounted for 34.0% of the sample but 51.7% of the patients who were readmitted within 30 days. High-risk patients were readmitted with twice the frequency of other patients, had longer lengths of stay and were more likely to die during the readmission. Their findings suggest that the LACE index is a potentially useful tool for identifying appropriate patients for post-discharge interventions.

Andrea Gruneir, Irfan A Dhalla, et al⁹ looked at live discharges of adults aged 18 to 105 years after a hospital stay for a medical indication during the 2007 calendar year. They selected the first hospital discharge for each patient during the study period and designated it as the index hospitalisation. They excluded patients admitted for chemotherapy, radiotherapy or a cancelled surgery. They further excluded index hospitalisations with discharge to rehabilitation or continuing care facilities, because these facilities are intended to provide post-acute care services. They followed each eligible patient after discharge from the index hospitalisation and counted the frequency of emergency department visits in the following 30 days.

Their study cohort consisted of 26 045 medical patients had a median age of 65. The most commonly reported diagnoses included heart failure, pneumonia, and gastrointestinal disorders. From this full cohort, 3,286 (12.6%) patients visited an ED, and 3,270 (12.6%) were readmitted to hospital within the 30 days of discharge. Among patients at high risk for readmission, 1299 (14.7%) made an ED visit and 1,690 (19.1%) were readmitted to hospital in the 30 days after discharge, while among patients with a low risk for readmission, 1,987 (11.6%) made an ED visit and 1580 (9.2%) were readmitted within the same time. The risk of readmission was twice as high for high-risk as it was for low-risk patients. The most common reasons for readmission were heart failure, gastrointestinal disorders, and pneumonia. The length of stay for readmissions were slightly longer than for index hospitalisations and 14% of readmitted patients died.

Approximately 34% of all discharged medical patients would be identified as being at high-risk of readmission using the LACE index with a cut-off of 10. Among these high-risk patients, 19% were readmitted within 30 days. They also found that, despite the ability of the LACE index to identify a group with greater post-discharge complications, it identified only half of all discharged patients who were readmitted within 30 days.

The high-risk group accounted for over half of all readmissions. These findings suggest that the LACE index is a useful tool to aid in the identification of appropriate candidates for post-discharge interventions. However, the fact that only half of all readmitted patients were identified using LACE as being at high risk for readmission suggests that additional research may be helpful in optimizing strategies to identify patients for resource intensive post-discharge intervention. It may be that the strongest predictive algorithms require both patient- **and** system-level factors, and that clinical tools such as the LACE index may require some “tweaking” in different contexts.

7.2 NMDHB

The beginnings of a similar exercise were carried out looking at NMDHB discharges. There were 7,408 medial discharges aged greater than 18 years between 1 Jul 2010 and 30 April 2011 (Table 4). 4,731 of these discharges fulfilled the criteria for being the “Index” hospitalisation. That is they were

- the first discharge for that patient in the time period
- not Radiotherapy or chemotherapy discharges
- not cancelled operation of rehabilitation discharges.

Table 4 Discharges from NMDHB hospitals 1 Jul 2010 to 31Mar 2011

Discharges		
Service name	True index	Total
Disability	no	570
Maternity	no	1,338
Medical	Index	4,360
	no	2,318
Surgery	no	7,958
Grand Total		

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The age and length of stay of the 4,360 index hospitalisation are shown in Table 5.

Table 5 Age and length of stay of 4360 index hospitalisation

	LOS	age
mean	1.97	61.13
median	1	64

The top 10 principal diagnosis groups for the 4360 index admissions are shown in Table 6.

Table 6 Top 10 reasons for Index Admissions 1 Jul 2010 to 31Mar 2011 (4,360 in total)

Subchapter	Discharges
R00–R09 Symptoms and signs involving the circulatory and respiratory systems	439
I20–I25 Ischaemic heart diseases	425
I30–I52 Other forms of heart disease	362
R50–R69 General symptoms and signs	185
J40–J47 Chronic lower respiratory diseases	167
I60–I69 Cerebrovascular diseases	159
J10–J18 Influenza and pneumonia	159
R10–R19 Symptoms and signs involving the digestive system and abdomen	150
T36–T50 Poisoning by drugs, medicaments and biological substances	115
S00–S09 Injuries to the head	112

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734 of the 4,360 patients (17%) with an index event as described above were readmitted at least once within 30 days. Some of these individuals had more than one readmission. This number is considerably higher than the 12.6% reported by Andrea Gruneir, Irfan A Dhalla, et al⁹ for their cohort overall, but not as high as the 19.1% in their high risk group based on LACE¹. The LACE score of individuals in this NMDHB cohort of patients has not been calculated at this point in time.

The age of the patients and length of stay of the 734 first readmissions after index events are shown in Table 7.

Table 7 Age and length of stay of 734 first readmissions after index event.

	LOS	age
mean	2.99	63.30
median	2	66

The top 10 principal diagnosis groups for the 734 first readmissions after index events are shown in Table 8.

Table 8 Top 10 reasons for readmission within 30 days Jul 2010 to Apr 2011

Subchapter	Total
I20–I25 Ischaemic heart diseases	98
I30–I52 Other forms of heart disease	50
Z40–Z54 Persons encountering health services for specific procedures and health care	43
R00–R09 Symptoms and signs involving the circulatory and respiratory systems	40
R10–R19 Symptoms and signs involving the digestive system and abdomen	23
J40–J47 Chronic lower respiratory diseases	23
R50–R69 General symptoms and signs	22
J10–J18 Influenza and pneumonia	21
I60–I69 Cerebrovascular diseases	16
K55–K63 Other diseases of intestines	13
Z70–Z76 Persons encountering health services in other circumstances	13
A30–A49 Other bacterial diseases	13

Further work could be done to investigate reducing readmissions at NMDHB. The LACE index could be calculated retrospectively, given time, from coding data or done prospectively by nursing staff prior to patients discharge.

If patients at high risk for readmission could be identified prospectively during their index (or any) admission, it would be possible to target them for effective discharge programmes such as that described by Brian W. Jack, and Veerappa K. Chetty et al². In this reengineered hospital discharge program to decrease rehospitalisation, a nurse discharge advocate worked with patients during their hospital stay to:

- arrange follow-up appointments,
- confirm medication reconciliation, and
- conduct patient education with an individualised instruction booklet that was sent to their primary care provider.

In addition, a clinical pharmacist called patients 2 to 4 days after discharge to reinforce the discharge plan and review medications.

This hospital discharge programme decreased hospital utilisation (combined emergency department visits and readmissions) within 30 days of discharge) by about 30% among patients in a general medical service of an urban, academic medical centre. More intervention group participants reported seeing their primary care physician for follow-up

within 30 days and reported higher levels of preparedness for discharge. In addition, the intervention was successful in reducing hospital utilisation among participants who frequently used hospital services.

A 2007 review¹⁰ of discharge interventions concluded that "there is some evidence that some interventions may have a positive impact, particularly those with educational components and those that combine pre-discharge and post-discharge interventions. However, on the whole there is only limited summarised evidence that discharge planning and discharge support interventions have a positive impact on patient status at hospital discharge, on patient functioning after discharge, on health care use after discharge, or on costs."

7.3 OS8 Acute Readmissions to Hospital Indicator

Nelson Marlborough did well in the most recent results of the OS8 Acute Readmissions to Hospital Indicator (Table 9 and Figure 29). The Standardised Acute Admission Calculation is done by the MoH:

Results are extracted from NMDS with application of the standard WIESNZ09 casemix filter. The standardised rate is calculated by indirect standardisation using regression analysis to assess the impact of a wide range of factors including casemix.

The standardising method produces an 'expected readmission rate', which represents the rate that would be seen if the DHB operated in line with national regression results. The 'standardised readmission rate' is (unstandardised rate/expected rate)x(national rate).

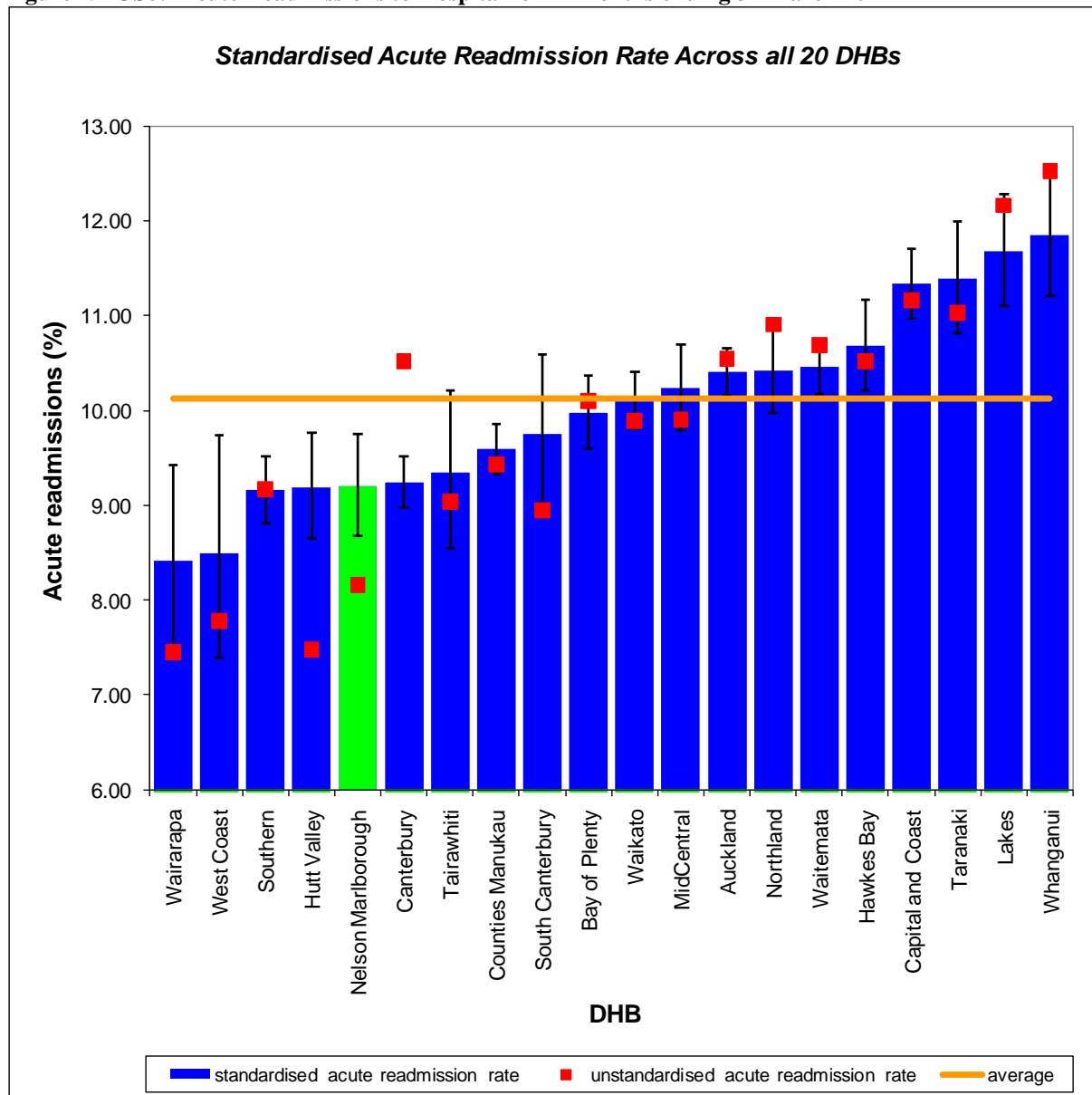
Table 9 OS8: Acute Readmissions to Hospital for 12 months ending 31 March 2011

Comparative Table of Acute Readmission Rates Across 20 DHBs				
DHB	discharges	acute readmissions	unstandardised acute readmission rate	standardised acute readmission rate
Auckland	101,362	10,690	10.55	10.41
Bay of Plenty	39,412	3,980	10.10	9.98
Canterbury	66,523	6,997	10.52	9.25
Capital and Coast	49,840	5,564	11.16	11.34
Counties Manukau	88,064	8,306	9.43	9.59
Hawkes Bay	28,356	2,984	10.52	10.69
Hutt Valley	22,385	1,673	7.47	9.19
Lakes	19,178	2,333	12.16	11.68
MidCentral	30,872	3,057	9.90	10.24
Nelson Marlborough	22,058	1,799	8.16	9.20
Northland	29,914	3,263	10.91	10.42
South Canterbury	10,047	899	8.95	9.75
Southern	43,849	4,021	9.17	9.16
Tairāwhiti	8,571	775	9.04	9.35
Taranaki	20,298	2,239	11.03	11.39
Waikato	66,371	6,565	9.89	10.10
Wairarapa	6,522	486	7.45	8.41
Waitemata	74,932	8,012	10.69	10.46
West Coast	4,228	329	7.78	8.49
Whanganui	15,260	1,912	12.53	11.85
Total*	749,717	75,884	10.12	10.12

*Total figures include a small number of events from private/NGO facilities not shown elsewhere in the table.

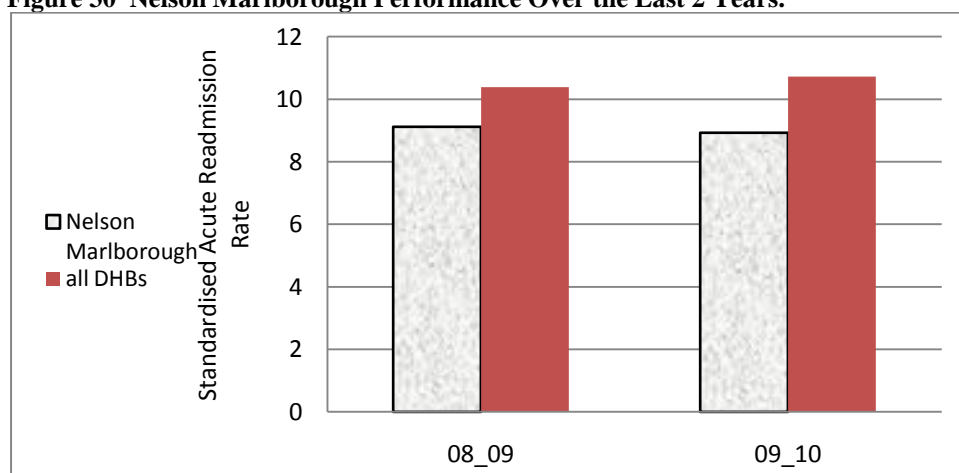
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Figure 29 OS8: Acute Readmissions to Hospital for 12 months ending 31 March 2011



The results over the last 2 years are shown in Figure 30.

Figure 30 Nelson Marlborough Performance Over the Last 2 Years.



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8. Smoking

Tobacco use is the leading cause of preventable death in New Zealand, accounting for around 4300 to 4600 deaths per year¹¹. Half of the people who smoke today and continue smoking will eventually be killed by tobacco¹². Half of them will die in middle age¹¹. Tobacco use is currently responsible for the death of one in ten adults worldwide.

8.1 Tobacco and health inequalities

Tobacco use contributes significantly to the health inequalities in New Zealanders¹³. Smoking in New Zealand is increasingly concentrated among socio-economically disadvantaged communities and is much commoner among Maori. Raising the price of cigarettes through increases in taxation and duties is the tobacco control intervention with the strongest evidence of effectiveness at reducing smoking prevalence. Increasing tobacco tax (and dedicating tax revenue to improved tobacco control) is highly desirable from a public health perspective. Furthermore, increased tobacco tax (if dedicated) is what a majority of New Zealand smokers themselves appear to want, which helps makes this approach politically feasible.

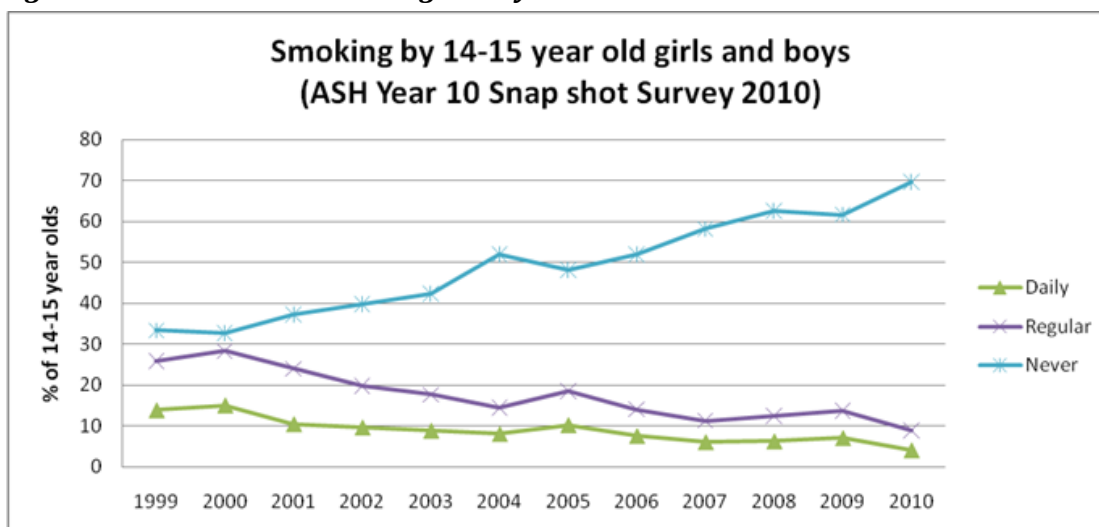
The last major tax increase on tobacco in New Zealand was on 28 April 2010¹⁴. This saw a 24% increase on the excise rate for loose- leaf tobacco and 10 percent for factory made cigarettes. The tobacco excise tax rose again by a further 10% on 1 January 2011 and will rise again by 10% on 1 January 2012.

The international evidence increasingly favours tobacco tax being a pro-equity strategy¹³. For example, a systematic review reports evidence for greater price sensitivity among low-income adults and hence the potential for such tax to contribute to reducing health inequalities.

8.2 ASH Year Ten Smoking Survey Results

The increase in tobacco tax may have contributed to the good NMDHB 2010 results¹⁵ from the ASH Year Ten smoking survey (Figure 31).

Figure 31 ASH Year Ten smoking survey 2010



The results show that in Nelson Marlborough:

- Daily smokers have reduced from 7.1% to 4.1% of 14- to 15-year-olds
- Regular smokers have reduced from 13.8% to 8.9% of 14- to 15-year-olds

- Never smokers have increased from 61.7% to 69.7% of 14- to 15-year-olds
- Smoking in the home of families of 14- to 15-year olds reduced from 19% to 15.1%.

9. Health Equity and Health Equality

Definition of Equity

In 2003, P Braveman, and S Gruskin¹⁶ defined equity in health as

“the absence of systematic disparities in health (or in the major social determinants of health) between groups with different levels of underlying social advantage/disadvantage—that is, wealth, power, or prestige. Inequities in health systematically put groups of people who are already socially disadvantaged (for example, by virtue of being poor, female, and/or members of a disenfranchised racial, ethnic, or religious group) at further disadvantage with respect to their health; health is essential to wellbeing and to overcoming other effects of social disadvantage”.

They continued that it was

“an ethical principal” and “the right to the highest attainable standard of health as indicated by the health status of the most socially advantaged group.”

9.1 Position Statement on Health Equity by the NZMA

The Ministry of Health has been targeting equity in health for most of this century. On 4 March 2011, the New Zealand Medical Association published a Position Statement on Health Equity¹⁷.

They started by outlining some important definitions:

Table 10 Definitions used in the New Zealand Medical Association Position Statement on Health Equity

Term	Definition
Health equality	a description of 'sameness' in health
Health equity	An ethical principle concerning the absence of systematic disparities in health (or in the major social determinants of health) between groups with different levels of underlying social advantage/disadvantage.
Health inequity	The presence of systematic disparities in health between groups.
Social determinants of health	The conditions in which people are born, grow, live, work and age, including factors such as indigenous status, early life conditions, disability status, education, employment/unemployment and working conditions, food security, sex, health care services, housing, income, ethnic differences, social position and social exclusion.

They stated that the position statement used the term equity in preference to equality because it better recognises that people differ in their capacity for health and their ability to attain or maintain health. Consequently, equitable outcomes in health may require different (i.e. unequal) inputs to achieve the same result. This is the concept of vertical equity (unequal, or preferential, treatment for unequals) in contrast to horizontal equity (equal treatment for equals).

They went on to point out that it is now well recognised that a society's health status is closely linked to various social determinants. Further, a lot of interest centres on the relative contributions two different pathways related to income inequalities may contribute to health inequities.

- The material deprivation pathway states that income inequality is related to health through a combination of negative exposures and lack of resources held by individuals, along with systematic underinvestment across a wide range of human, physical, health and social infrastructures. Examples of these include education, health services, transportation, environmental controls, availability of good quality food, quality housing, and occupational health regulations.

Meanwhile

- the psychosocial pathway argues that income inequality affects health through individuals' perception of place in the social hierarchy. These perceptions are argued to produce negative emotions such as stress, shame and distrust that are translated "inside" the body into poorer health via psycho-neuro-endocrine-immunological-genetic mechanisms and stress induced behaviours such as smoking and overeating. Simultaneously, perceptions of relative position and negative emotions are translated "outside" the individual into antisocial behaviours such as violence, including homicides, traffic accidents, and reduced civic participations, which result in a loss of social capital and social cohesion within the community.

This opens the discussion to include the findings of a significant book: "The Spirit Level: Why Equality is Better for everyone"¹⁸

9.2 Income Inequality and Health

This is an influential book, written by epidemiologists Richard Wilkinson and Kate Pickett who argue that societies with a more equal distribution of incomes have better health outcomes than ones in which the gap between richest and poorest parts society is greater. They then go on to present the evidence for the theory using data from 23 rich countries and 50 US states on conditions including obesity, teenage pregnancy, depression and murder; they also look at life expectancy itself. They found problems are anything from three to ten times as common in more unequal societies. Again and again, the Scandinavian countries and Japan are at one end of the scale as the most equal, with the US, UK and Australia at the other.

The authors argue that the evidence shows that all levels of society, not just the poorest, benefit from more equality. For health, "at almost any level of income, it's better to live in a more equal place". Whether rich or poor, inequality causes stress, which causes biological reactions that put pressure on the body and increase illness.

They point out that "we must try to bring about a shift in public values so that instead of inspiring admiration and envy, conspicuous consumption is seen as the problem, a sign of greed and unfairness that damages society and the planet" They conclude by saying "our future lies in improving the quality of the social environment in our society".

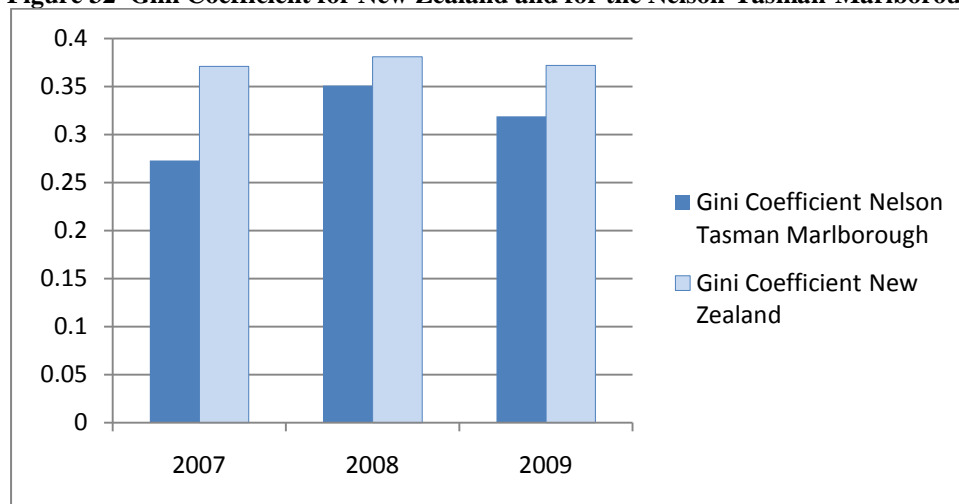
9.3 Gini coefficient for Nelson Marlborough Tasman

As a step towards gaining a more in depth view of the level of inequality locally, an estimation of the Gini coefficient in Nelson Marlborough Tasman was carried out. The Gini coefficient is a measure of the inequality of a distribution, a value of 0 expressing total equality and a value of 1 maximal inequality. It is commonly used as a measure of inequality

of income or wealth. Worldwide, Gini coefficients for income range from approximately 0.23 (Sweden) to 0.70 (Namibia) but not every country has been assessed. Gini coefficients for Nelson, Marlborough and Tasman using data from the Household Economic Survey (HES) were sourced from Statistics New Zealand.

While these results are based on areas below published regions, they show that the Gini Coefficient is consistently below that of New Zealand indicating a smaller level of inequality in Nelson Marlborough Tasman than in New Zealand as a whole. No indication of the statistical significance of these results can be given as the size of the area is below published regions; however, the results for Nelson Marlborough Tasman appear to be telling a different story from the NZ total.

Figure 32 Gini Coefficient for New Zealand and for the Nelson-Tasman-Marlborough Region



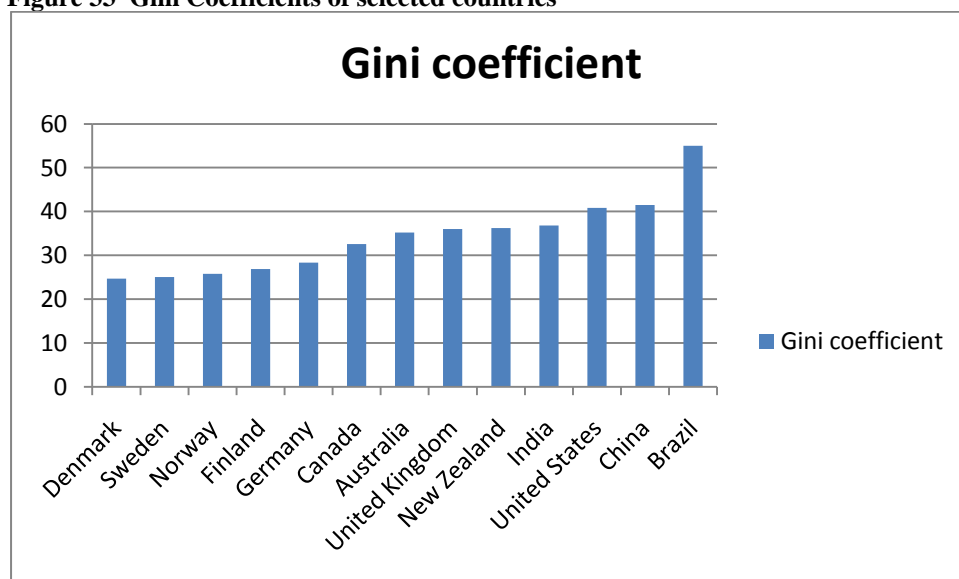
(1) The Gini coefficient presented here is based on disposable household income

(2) Estimates based on areas below published regions are below the design level of the survey and should be treated with caution

Statistics New Zealand

To give an idea we sit in global terms, Figure 33 shows the Gini coefficients of a selection of countries.

Figure 33 Gini Coefficients of selected countries



World Bank (2009d). "World Development Indicators". Washington DC: World Bank

10. Syndemics (two or more Afflictions Interacting Synergistically)

Following on from progress made during the last century, life expectancy has continued to increase in the early years of this. However, between 1993 and 2006 adults in the United States reported a sharp decline in health-related quality of life, indicated by a 17% increase in the average number of unhealthy days per month¹⁹.

One explanation of this is that health problems within populations almost never exist independently. For instance, people experiencing one affliction (e.g. diabetes) tend to be affected by many (e.g., obesity, heart disease, cancer, asthma, or depression), and those problems are often mutually reinforcing. Because of those interconnections, it is necessary to address the particular features of each disease while also crafting conditions that free people from becoming vulnerable to such massively entangled health threats in the first place.

10.1 “Syndemic” the mutually reinforcing nature of health crises

Anthropologist Merrill Singer used the term “*syndemic*” to describe the mutually reinforcing nature of health crises—such as substance abuse, violence, and AIDS—that take hold among people facing harsh and inequitable living conditions.

Observers throughout history have recognised that different disease processes interact in populations, much as they do within individuals, but Singer’s innovation was to interpret those connections as evidence of a higher order phenomenon, which he and his colleagues called a syndemic.

In his publication²⁰ Bobby Milstein of the Centers for Disease Control and Prevention has explored the recent introduction of the term syndemic, along with related shifts in thinking and action that occur when operating from a syndemic orientation. Distinguishing between a single epidemic and the phenomenon of syndemics expands, in very particular ways, the conceptual, methodological, and moral dimensions of public health work.

The science of epidemiology was developed in the 19th century to understand and control discrete, sporadically occurring, and widespread health problems—and it has proven to be an indispensable tool for guiding certain aspects of public health work. The notion of a syndemic, by contrast, challenges us to develop a complementary science of relationships, one that is capable of better understanding and more effectively governing the dynamic forces that surround multiple health problems, along with the intricate organisational systems that we as a society create to anticipate and respond to them.

The first syndemic to have been so named and analysed in the professional public health literature was reported by Merrill Singer and Nancy Romero-Daza²¹. It comprised substance abuse, violence, and AIDS, the “SAVA” syndemic conveyed what they saw as inextricable and mutually reinforcing connections between three conditions that disproportionately afflict those living in poverty in U.S. cities. They reported that they have introduced the term “syndemic” to refer to the set of synergistic or intertwined and mutually enhancing health and social problems facing the urban poor. Violence, substance abuse, and AIDS, in this sense, are not concurrent in that they are not completely separable phenomena. Rather, they emerge in the lives of participants in the study as closely intertwined threads in the often tattered fabric of their daily lives.

Merrill Singer has written many papers on syndemics. In one, “Syndemics and Public Health: Reconceptualising Disease in Bio-Social Context²²” he provided a comprehensive explanation of the concept. In this, he points out that “normal practice in biomedicine, whether in its diagnostic, research, or treatment capacities, is guided by the conceptualisation of diseases as distinct, discrete, and disjunctive entities that exist (in theory) separate from other diseases and from the social groups and social contexts in which they are found. Alternative views exist. The critical biocultural approach, part of an ongoing effort to build a new biocultural synthesis for the social sciences, for example, attempts to identify and understand the determinant interconnections among pressing health problems, sufferer and community understandings of the illness(es)/disease(s) in question, the relevant social, political, and economic forces in play, and (in no small measure as a result of these three influences) the environmental conditions that may have contributed to the development of ill health.”

Syndemic is a new term in epidemiological and public health thinking. Looking at the concept at its simplest level – the population level, **syndemic** refers to two or more epidemics interacting synergistically and contributing, as a result of their interaction, to excess burden of disease in a population. Singer goes on to give a definition:

“Syndemics occur when health-related problems cluster by person, place or time. The problems—along with the reasons for their clustering—define a syndemic and differentiate one from another (though they may have nested or overlapping relationships). To prevent a syndemic, one must not only prevent or control each disease but also the forces that tie those diseases together.”

The synergism of a syndemic can be

- biological synergism

Central to the syndemic concept is the assumption that in cases of co-affliction with two or more diseases, actual biological interaction occurs. The nature of this interaction may vary and need not require direct physical interaction to produce new or amplified health consequences.

The synergism of a syndemic can also be of

- Social context

Syndemics are not merely co-occurring epidemics in populations that are embodied as co infections or coexistent afflictions of or within individual patients. They also involve the interaction of diseases or other adverse health conditions (e.g., malnutrition, substance abuse, stress) as a consequence of a set of health-threatening social conditions (e.g., noxious living, working or environmental conditions, or oppressive social relationships). In other words, a syndemic is a set of intertwined and mutually enhancing epidemics involving disease interactions at the biological level that develop and are sustained in a community/population because of harmful social conditions and injurious social connections.

Some Examples of Syndemics

Singer then goes on to outline some examples of syndemics:

- Infants and young children with asthma who also suffer from Respiratory Syncytial Virus (RSV) infection have a higher probability of asthma exacerbation and of induced attacks of greater severity²³, suggesting the possibility of a synergistic effect.
- Researchers found that children exposed to violence in their neighbourhood (e.g., hearing gunshots or witnessing physical violence) were twice as likely to experience wheezing and to use bronchodilator asthma medication for wheezing, and almost

three times as likely to be diagnosed with asthma compared with children not exposed to violence²⁴. In sum, while research is needed to explore the linkages, considering asthma as a syndemic may prove to be a useful strategy for uniting diverse findings.

- David Barker²⁵ and Clive Osmond demonstrated a close association between geographic areas with current high mortality rates for ischemic heart disease and previous high rates of infant mortality (and other indicators of high rates of poverty and malnutrition) during the period that the adults coming down with heart disease were children.
- Om Prakesh²⁶ notes that approximately 400,000 individuals in the United States are coinfectd with hepatitis C virus (HCV) and HIV and that about half of these individuals consume alcohol. The latter are known to suffer an accelerated rate of liver disease development and to be at increased risk for liver cancer
- In a study of over 500 street outreach-recruited women²⁷ involved in regular illicit drug use, the difference in various health outcomes between those who did and did not report childhood sexual abuse (CSA) were examined. They found that those reporting CSA had significantly higher rates of hepatitis C, skin abscesses, STDs, drug overdoses, pneumonia, and mental illness ($p < .01$). This suggests that violence victimisation, particularly childhood sexual abuse, may be a significant social condition that increases the likelihood of syndemics within vulnerable populations.

Current Possible Syndemics Recently Reported

Health associated with hepatitis C co-infection among people living with HIV

Data on 482 (95 HCV/HIV co-infected and 387 HIV mono-infected) adults were analysed²⁸. Compared with participants infected with HIV only, those who were co-infected with HIV and HCV were more likely to be heterosexual, Aboriginal, less educated and unemployed. They were more likely to have a low income, to not be receiving antiretroviral treatment, to live outside the Greater Toronto Area (GTA), to use/abuse substances, experience significant depression, and utilise addiction counselling and needle-exchange services. They were also more likely to report a history of homelessness and perceived housing-related discrimination and to have moved twice or more in the previous 12 months. Factors independently associated with HCV/HIV co-infection were history of incarceration, history of homelessness, and using/abusing substances in the past 12 months.

They concluded that

“differences in Social determinants of Health (SDOH) exist between HIV/HCV co-infected and HIV mono-infected adults. History of incarceration, history of homelessness, substance use, and living outside the Greater Toronto Area were independently associated with HCV/HIV co-infection. Interventions that reduce homelessness and incarceration may help prevent HCV infection in people living with HIV.”

Comorbid Depression in Adults With Diabetes

Anderson et al conducted a meta- analysis²⁹ which looked at 42 studies including 20,218 subjects. The odds of depression in the diabetic group were twice that of the nondiabetic comparison group and did not differ by sex, type of diabetes, subject source, or assessment method. The prevalence of comorbid depression was significantly higher in diabetic women (28%) than in diabetic men (18%), in uncontrolled (30%) than in controlled studies (21%), in clinical (32%) than in community (20%) samples, and when assessed by self-report questionnaires (31%) than by standardised diagnostic interviews (11%).

They concluded that the presence of diabetes doubles the odds of comorbid depression. This might be another syndemic.

A famous seventeenth century British physician, Thomas Willis³⁰ (1621–1675) saw diabetes as a consequence of sadness or long sorrow. Though better known for describing what eventually became known as the “Circle of Willis”, he provided a fairly comprehensive description of the role of nervous system in disease. In subsequent years and centuries, psychosomatic medicine has fallen in and out of favour many times. Depending on whom we ask, and what we focus on, we are currently witnessing exciting and challenging times for psychosomatic research.

10.2 Reorienting Public Health Work

Seeing through a syndemic orientation involves not just one, but a sequence of shifts in perspective. The convention in other forms of health research is to begin by conceptualising a specific disease or risk factor, and then use that as the boundary for all subsequent analysis and action. This point helps clarify why the problem of “confounding” is so central to epidemiologic inquiry. Whereas epidemiologists seek to exclude or neutralise the influence of confounders, persons working from a syndemic orientation choose to expand their frame of reference and question what it is that explains the overall dynamic formed by the relating afflictions.

The conventional approach, with its emphasis on excluding confounders, prohibits a full view of the social system in which different kinds of people and different kinds of problem- solving strategies all interact. The alternative is to first specify a place or a population as the initial referent, and then cooperate with residents or members to address the entire set of forces that constitute the health threat that they face. In this way, a place- or population based orientation acknowledges more of the plurality that exists throughout the health system (in terms of people, problems, and policies).

The first step in using this orientation involves seeing more than one problem at a time; this is the crux of the syndemic idea. It highlights ties among different disease processes, which often pose as much of a problem as the diseases themselves. Sometimes even more so, because the overall burden of affliction in a population can persist unless all major causal forces are taken into account.

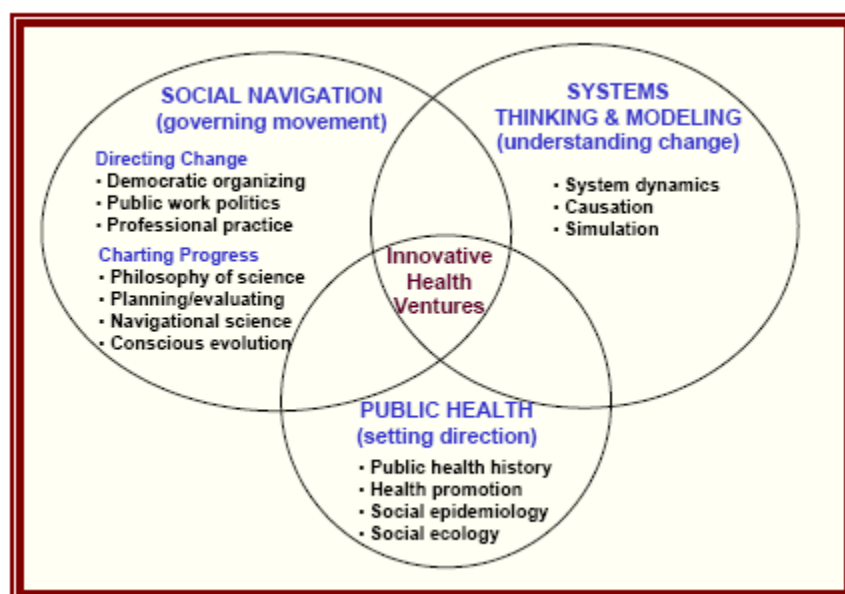
One interpretation of Singer’s innovation recognises its position and heritage within three broad but distinct spheres of scholarship (

Figure 34):

- The *public health* sphere is the domain where society’s health-related goals are set. This sphere provides the context for learning what health leaders have set out to accomplish at different times, in different cultures, and from different points of view. Writings on public health history, health promotion, social epidemiology, and social ecology are among the most relevant strands of scholarship here.
- The sphere of *systems thinking and modelling* aims to improve understanding in a world marked by dynamic complexity and animated by various forms of causal relationships (e.g., reinforcing and balancing feedback structures). This sphere provides a focus for questioning what processes cause health problems to emerge, how different health problems are related, what kinds of responses they evoke, and what it takes for health systems to change. Roles for analytic methods that focus explicitly on understanding causal relationships—like causal modelling, system dynamics mapping and simulation modelling—come to the forefront, as do philosophical considerations about the nature of causal reasoning itself.
- Finally, the sphere of *social navigation* encompasses those aspects of thinking and action that address goal-directed movement, specifically the organisation and governance of health related conditions. This area deals with questions about who does the work to effect health related change, by what means, against what forms of

resistance, and in pursuit of which values. It also includes a reflexive dimension for discerning how health-related conditions are changing, for whom, and in what directions.

Figure 34 Selected Fields and Sub-Fields Shaping Innovative Health Ventures³¹



10.3 Seeing Health Protection as a Whole System

Perhaps the most pervasive image used to describe the essence of public health work was described by McKinlay, 1979³².

The parable is of a river filled with people flowing toward a dangerous waterfall. Unable to get out of the current, the people cannot save themselves and so their fate rests with those of us on shore, those who see the problem and are moved to respond.

Observers standing downstream, below the waterfall, see an urgent crisis of tragic proportions. They search frantically to find anyone who somehow survived the drop amidst the many who inevitably drowned. Soon, the downstream river banks team with rescue workers and equipment in support of a crisis that they are unable to stop.

Upstream, on the shore above the waterfall, most observers do not notice any problem at all; and the ones that do, perceive it as having very different dimensions. Unable to see exactly what is happening below, they are not aware of the catastrophe unfolding. Some hear the calls for assistance and rush to help with the rescue effort. Others see only swimmers in flat water without thinking about the danger ahead. Even the swimmers themselves may not understand the full scope of their predicament. But certain observers, those who know the terrain best, who appreciate how powerful the current is and where it goes—recognise the need for immediate action. Animated by the foresight of an impending tragedy, they begin alerting people to the danger ahead and extending lifelines to encourage their peers safely ashore.

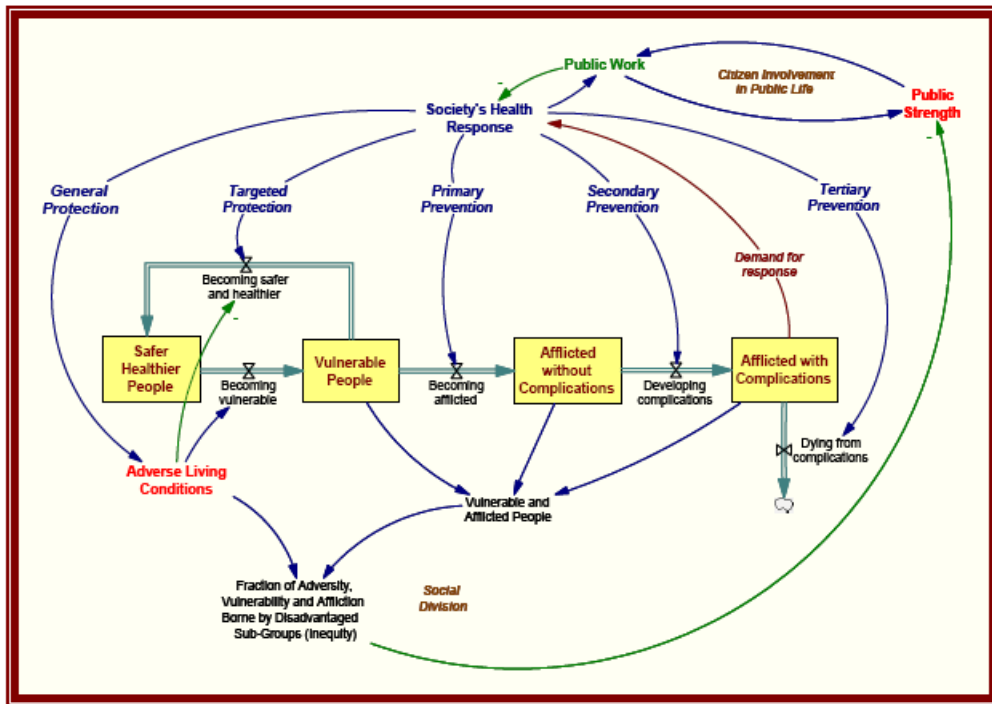
News of the crisis eventually travels even farther upstream. First, to people on the bridge, who set out to repair the hole where most of the swimmers fell through and then to engineers at the dam, who manage to close the broken flood gate and dry up the river itself.

This parable of public health illustrates the natural, humane tendency to care for those who fall ill as well as the profound inadequacy of relying solely on those last minute services.

More importantly, it reveals practical opportunities to avert tragedy long before the worst occurs.

Upstream action tends to be held as the ideal of public health work and its relative infrequency is rightfully criticised as the chief failing of our society. But in the macroscopic view that a syndemic orientation offers, we see not just the need for vigorous upstream effort, but rather the imperative to organise a balanced system of health protection: one that orchestrates as seamlessly as possible a variety of simultaneous efforts to safeguard people's health. Figure 35, developed in collaboration with system dynamics expert Jack Homer, presents a sketch of what such a system might include.

Figure 35 A Balanced System of Health Protection³³

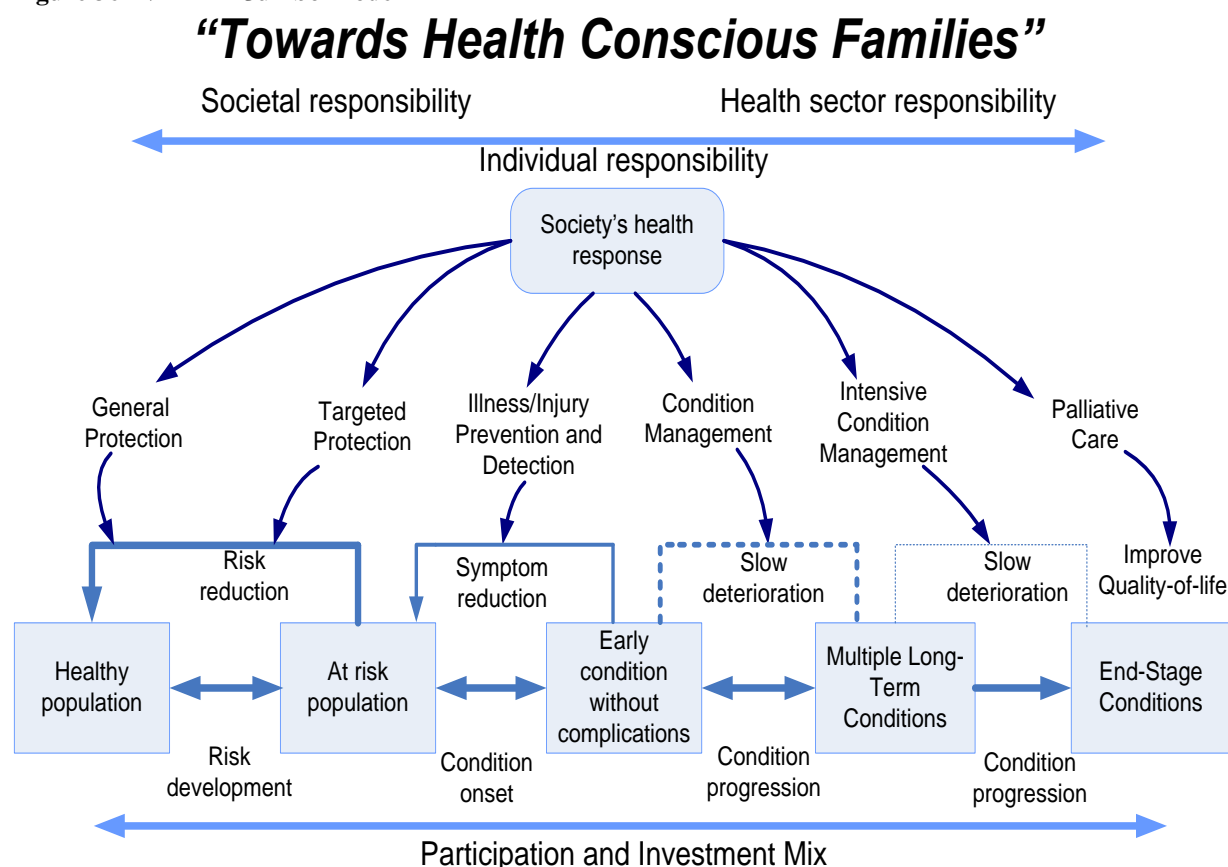


The four boxes represent different states of health that people in a population could enter. Movement between these boxes and how long our “spells” in each state last is influenced to varying degrees by our genetic inheritance; exposures to environmental conditions at home, work, play and elsewhere; individual behaviours in response to those environments (or in spite of them); social networks; income; education; receipt of health care services; and thousands of other factors. Moreover, any one of these factors may influence and be influenced by the others; forming a massively entangled feedback dynamic that drives movement throughout the system.

10.4 Syndemic model of Health Protection Mimics NMDHB “Jumbo”

Figure 35 bears a great deal of similarities to the NMDHB Jumbo Model (Figure 36). The main divergence appears to be “condition management” (NMDHB Jumbo model) versus “secondary” and “tertiary” prevention (Syndemic Health protection). Whether this reflects an actual difference in the approaches in terms of actions or is simply a perspective issue might warrant discussion.

Figure 36 NMDHB Jumbo Model



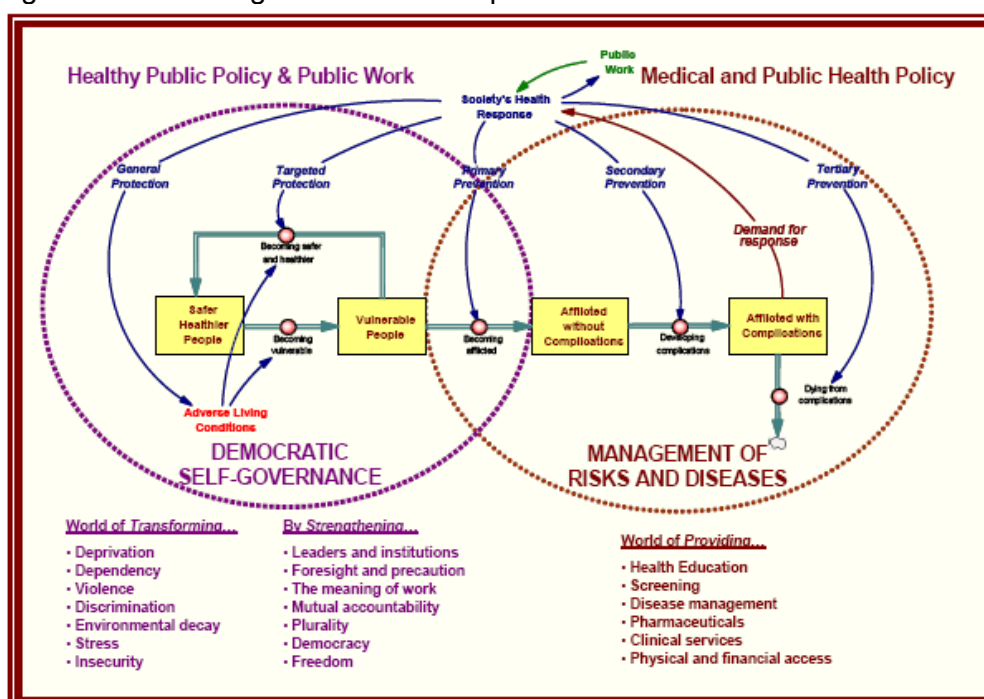
As the number of people with afflictions and complications rises, the demand for some kind of societal response builds. Initially, that response might be concentrated entirely downstream in an effort to slow the rate at which people are dying prematurely (tertiary prevention). Regardless of how successful that work is, its limited impact, signalled by the continued growth of people with afflictions and complications eventually prompts a complementary effort to reduce the rate at which people are developing complications (secondary prevention). By that same logic, the response portfolio expands still further to include efforts to limit the number of people who are becoming afflicted in the first place (primary prevention).

Most formal teaching, research, and policy analysis tends to focus on one or more of these three responses: primary, secondary, and tertiary prevention. The best that we can do, one may conclude from mainstream authors, is prevent people at risk from becoming sick, suffering complications, and dying prematurely. But even a rudimentary system analysis suggests that there is more to the story. Over the past four decades, as ecological and systems thinking have reshaped our collective consciousness, it has become increasingly clear that we need not accept health risks at face value. Instead, we may “question the givens” by examining and ultimately transforming the myriad ways in which human societies configure and distribute vulnerability differentially through our public and private choices. This line of inquiry joins health science with a vast history of ideas about power, how it is used, and how it affects both people and the world in which we live. Even before turning to the formidable task of developing theories about the social production of risks and diseases there are practical steps that we can take to complete our map of the health system. Returning to Figure 35, we may look still farther upstream, beyond primary prevention, by recognizing that those who become afflicted come from a group who are vulnerable to the risks for one or more types of disease, injury, or disability. Likewise, the population of vulnerable people comes from those who are safer and healthier, through a process of

becoming vulnerable to adverse living conditions that for whatever reason they are unable to avoid. Placing these population groups on the map reveals two additional types of health response: targeted protection and general protection.

As Figure 37 indicates, public work powers the overall societal response, but each of the five particular response types has a different structural property in that each affects a different rate of flow. The three downstream actions are labelled prevention because they work to prevent or slow the progression from an undesirable health state to one that is even worse. By contrast, the two upstream actions are protective in that they seek to help people move away from positions of vulnerability (targeted protection), or eliminate the adverse conditions that threaten people's health and loom so large as culprits in the forced migrations from the kingdom of the well to the kingdom of the sick (general protection). The capacity to perform public work in any of these modes, however, rests on the degree of public strength, which itself is undermined by the processes of social division or enriched through social equity. Unlike material resources, such as money or technology, public strength builds with its use as citizens enter and become involved as actors in governing public life.

Figure 37 Balancing two Areas of Emphasis



A syndemic orientation is primarily distinguished from other perspectives by its explicit emphasis on examining connections between health-related problems³⁴. With this concern, it offers a broader framework for understanding how multiple health problems interact in particular settings. A syndemic orientation elevates public health inquiry beyond its many individual categories to examine directly the conditions that create and sustain overall population health.

The medical model of disease specialisation, once praised for its utility and versatility, is proving inadequate for confronting such contemporary public health challenges as eliminating health disparities. Although conventional prevention programs have had strong effects, for the most part the categorical approach has failed to assure the conditions for overall community health, and it has done little to spread successes equitably among subgroups in society.

10.5 Syndemic Orientation Offers Possibilities for Improving Health Research.

A profound tension now exists between the desire to engage in comprehensive health improvement initiatives and the need to present scientific evidence of effects based on categorical models of disease. A syndemic orientation offers the possibility to cut through this bind. It could, in fact, open the way to establishing new theories of change, new alliances among interest groups, new funding policies, new insight about the root causes of health and social problems, and new levels of achievement in improving population health.

Part of the promise inherent in a syndemic orientation, lies in its ability to:

- provide a mandate for disrupting forces that cause multiple health-related problems to cluster
- repairing fragmentation of the infrastructure needed to protect the public's health
- expanding research and action agendas by more explicitly linking health and social justice
- introducing new methods of analysis and synthesis

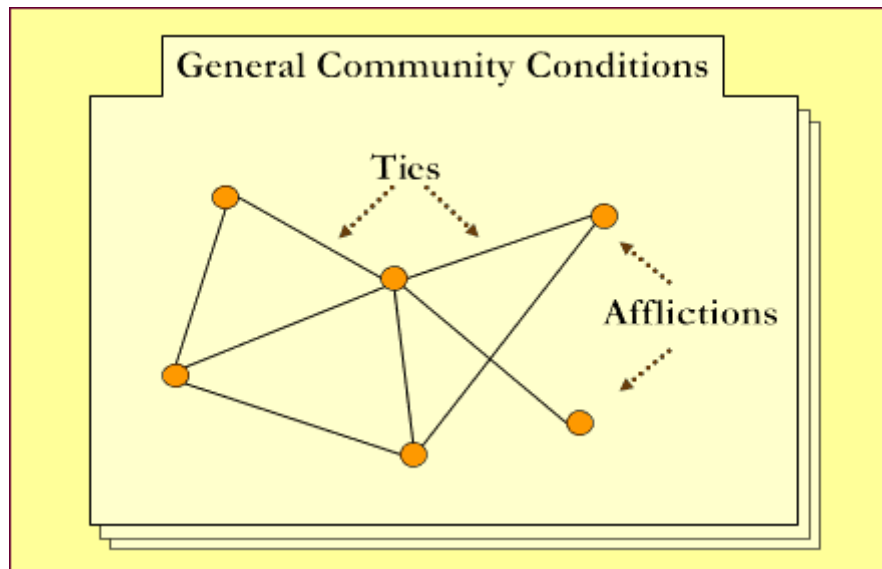
As long as the most valued outcomes of prevention are measured as reductions in specific diseases, at present, practitioners have little incentive to collaborate across program boundaries to improve the public's health. Natural partners in the effort to prevent syndemics must also be sought outside the formal public health system. Changing determinants of health that are not controlled by authorities within the health sector requires coalitions that reach beyond the confines of familiar partnerships.

Fortunately, the importance of forming inclusive partnerships to protect the public's health is becoming more widely understood. In fact, efforts are already under way to position public health services as shared responsibilities of an entire system of organisations working in partnership with their constituents, and not just governmental health departments. This work is essential for building society's organisational capacity to understand and prevent both epidemics and syndemics.

In a step towards this direction, NMDHB works with Talking Heads. Talking heads is a cross sector group led by the Mayors of Nelson City, Tasman District and Marlborough Councils. It includes the local heads of government agencies active in the Nelson Tasman and Marlborough Region as well as representatives from the health and education sectors. Talking Heads was established according to the principles of the Ottawa Charter and is committed to a community centred model of health and wellbeing. This group meets twice per year. Its main Community focus at present, is to act as the Governance group for the World Health Organisation's Safe at the Top accreditation project.

The practical advantage of a syndemic orientation can be seen with a network diagram (Figure 38). The nodes represent diseases, and the edges represent ties, or forces that cause the diseases to concentrate by person, place, or time. Professionals, trained as disease specialists, focus mainly on the nodes. While citizen leaders, steeped in neighbourhood context, tend to focus on the ties. Beyond the diseases themselves, citizen advocates see forces that hold the entire constellation of disorders together. Those connecting forces can be as much of a problem as the diseases themselves. Sometimes they are even more so, because it is logical to assume that the overall structure of disease in the area will persist unless those connecting forces are addressed.

Figure 38 A Syndemic Network

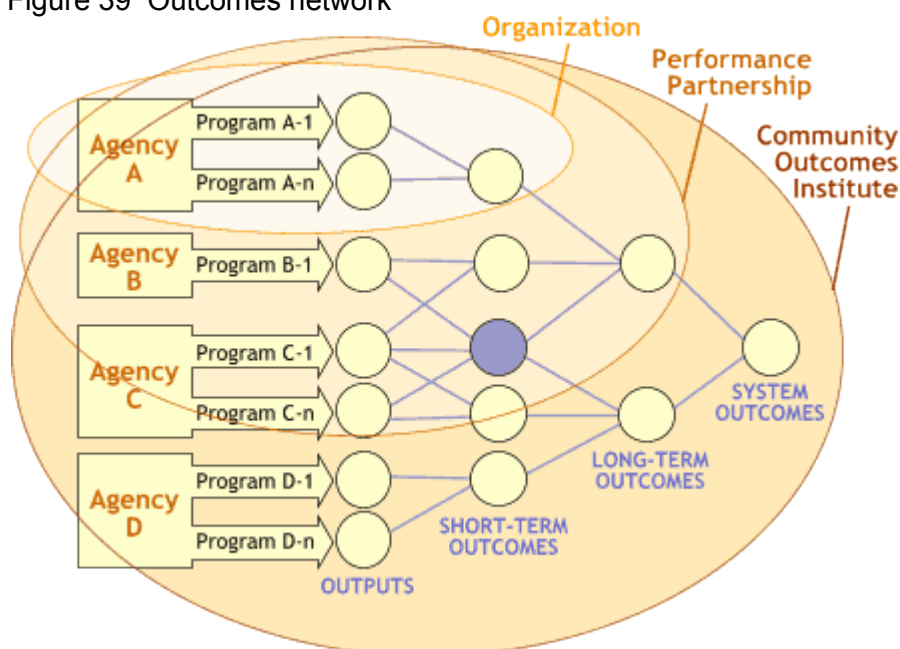


10.6 Planning and Evaluating Syndemics

The methods for planning and evaluating syndemic prevention initiatives draw upon established techniques as well as innovative options that have been, and are continuing to be developed. Planners and evaluators of comprehensive health improvement initiatives benefit by using a syndemic orientation because it provides a systematic framework:

Activity must be aligned across a number of problem areas so that they have a combined effect on reducing the burden of disease from interrelated causes. Through the analysis of contribution, new independent variables might be found, and linked groups of dependent variables could be used to differentiate effects for different degrees of collaborative action. Tools such as the outcomes network (Figure 39), which incorporate higher degrees of organisational depth than conventional logic models, can help clarify complex relationships and spot areas of convergence.

Figure 39 Outcomes network³⁵



Changes in community conditions and systems generally have an indirect effect on health status because they alter individual behaviour (e.g., tobacco use) or biology (e.g., blood pressure), which in turn affects health. Some system changes can exert a direct effect on health, however, such as those that remove harmful exposures from the environment or eliminate obstacles to life-saving services (e.g., improve response time by police, fire fighters, or ambulances).

10.7 Emerging Priorities within the Syndemic Orientation

Taken together, the emerging priorities in public health (Table 11) seem to reflect a struggle to overcome constraints imposed by the categorical perspective used throughout the public health system. Using a syndemic orientation, it might be possible to better define the conditions under which categorically organised interventions can be effective and the extent to which fragmentation of the public health system might itself be a barrier to the goal of protecting the public's health.

Faced with increasingly complex problems in communities, practitioners are reorganizing and realigning their work and in the process challenging traditional assumptions about prevention science. As trends continue to draw community residents and public health workers into more complex participatory initiatives, and as demand grows for obtaining scientific evidence of effectiveness, the need to understand more about syndemics will predictably increase.

Table 11 Emerging Priorities within the Syndemic Orientation

Trends and Emerging Priorities	
Steps in Public Health Problem Solving	
Define the problem	Eliminating health disparities Quality of life
Determine the cause	Social determinants of health Community context Adverse childhood experiences
Develop and test interventions	Comprehensive community initiatives Ecological interventions
Implement Programs/Policies	Policy interventions Change community conditions and systems Adapt to local context
Management Processes	
Creating a science base for action	Community-based prevention research Guide to community preventive services Best practices recommendations
Forging partnerships	Organisational coalitions Community engagement and participation
Planning intervention strategy	Logic models (theories of change) Mobilising action through planning and partnership (MAPP)
Using information	Evidence-based decision making

Trends and Emerging Priorities

Steps in Public Health Problem Solving

	Surveillance integration
	Knowledge management
Measuring performance	Outcome indicators
	Community indicators and report cards
	Health employer data and information system (HEDIS)
	Summary measures of population health
Conducting evaluations	Framework for program evaluation
Meeting accountability requirements	Government performance and results act
	Public health performance standards
Strengthening infrastructure	Workforce development
	Community capacity
	Organisational networks
Leveraging resources	Advocacy
	Litigation
	Public-private partnerships
	Philanthropy

10.8 Syndemics Overview

A substantial amount of work needs to be done to understand what a syndemic orientation is and what it has to offer. The implications of organising around the goal of preventing syndemics have not been systematically studied; methodologies have not been identified for planning and evaluating syndemic prevention strategies, nor are there efforts under way to prepare the public and the public health workforce to support initiatives in preventing syndemics.

At present there is a growing consensus that a new, transdisciplinary approach is needed to solve current and emerging problems in public health. Even so, the field has not adopted a framework that transcends current tensions between science and practice at a population level.

A person born in the United States in 1900 could expect to live about 45 years but boys and girls born in 2001 will probably live to almost 80 (Figure 10). The New Zealand life expectancy figures³⁶ were about 57 (male) and 60 (female) in 1900, 67 and 71 in 1950 and 76 and 81 in 2000. This increase is not predicted to go much higher (84 and 87 by 2050). This increase was primarily due, not to medical breakthroughs but to decisive public health actions (e.g. vaccination, family planning, enactment of workplace safety laws, improving motor vehicle safety, making foods safer and healthier, promoting healthier mothers and babies, control of infectious diseases, efforts to reduce heart disease and stroke, and recognition of tobacco as a health hazard). Public health achievements of the 20th century dwarf those accumulated in the previous 19.

Although the science of epidemiology has yielded remarkable achievements, even further advances can be made by incorporating into epidemiology a syndemic orientation. Public health leaders today must maintain past achievements while also confronting entrenched

problems, such as health disparities, which have been notoriously resistant to change. In addition, community residents are contending with a growing number of health threats in a world that is undergoing profound social and demographic change (e.g., intensifying conflict, aging of the population, globalisation, spread of information technology, environmental degradation increasing gaps between rich and poor). New ways of thinking and working will be needed to find solutions for today's and tomorrow's challenges.

11. Emergent Knowledge from International and NZ Practices

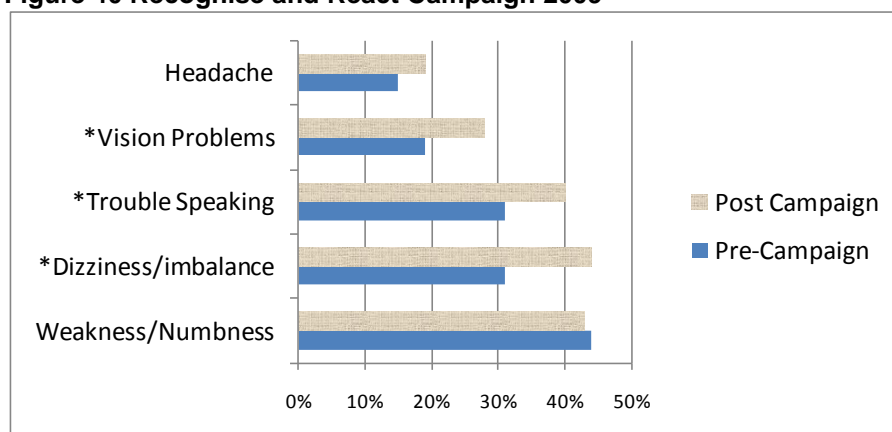
11.1 Alberta Provincial Stroke Strategy (APSS)

The Alberta Provincial Stroke Strategy (APSS) evaluation report (Dec 2010)³⁷ reported that fewer Albertans were dying because of stroke and more are gaining timely access to urgent stroke treatment. The report showed that since 2005, when the APSS was established, there have been significant gains in improving access to stroke treatment and prevention across Alberta, resulting in improved outcomes for patients³⁸. The strategy can be divided into 4 main strands:

Educating Albertans about Stroke

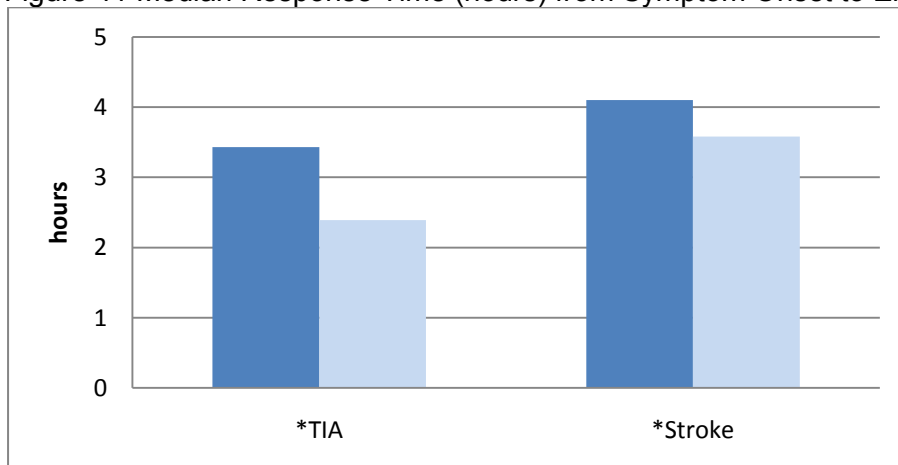
The “Recognise and React” public awareness campaigns in 2007 and 2009 produced a 4-13% increase in awareness of specific symptoms of stroke but awareness declined between campaigns. The median time from symptom onset to emergency department arrival decreased significantly by 62 minutes for Transient Ischaemic Attack patients (TIAs) and by 31 minutes for stroke patient. The proportion of TIA and stroke patients arriving within the treatable time window (at the time) of 2.5 and 4 hours increased significantly.

Figure 40 Recognise and React Campaign 2009



*denotes statistical significance

Figure 41 Median Response Time (hours) from Symptom Onset to Emergency Room Arrival



*denotes statistical significance

The key recommendations for this strand were:

- Sustained public messaging to maintain the gains
- A greater emphasis on public awareness of symptoms is required as only a small proportion of the population can identify some of the symptoms of stroke
- Emphasis should be placed on the most important symptoms of stroke namely (in order of priority)
 1. Numbness or weakness of half the body
 2. Sudden speech disturbance
 3. Sudden vision loss
 4. Sudden severe headache
- Continued emphasis on “in-the-field” stroke recognition and transport

Reducing stroke occurrence and mortality

There were significant improvements in prescription of antithrombotic agents at discharge from hospital in patients without atrial fibrillation (AF) (94 to 96%) and anticoagulants in patients with AF (64 to 75%) between 2004/5 and 2007/8.

There was no increase in prescription of antihypertensive agents. The rate was high at baseline for ischaemic stroke (72%) but lower for intracranial haemorrhage (42%).

There was a significant 15% absolute increase in the use of lipid lowering medications between 2004/5 and 2007/8. Despite this, they may still be underused with only 61% of ischaemic stroke patients receiving prescriptions for them on discharge.

There was a statistically significant 23% decline in the age standardised emergency department and inpatient hospital visits for ischaemic stroke and there was also a 27% reduction in the 30 day mortality for ischaemic stroke between 2004/5 and 2007/8.

The key recommendations for this strand were:

- Continue to ensure that antihypertensive therapy is initialled in stable ischaemic stroke patients
- More research is required to determine why the rate of antihypertensive therapy is lower in haemorrhagic stroke patients than in ischaemic stroke patients
- Increase the use of lipid lowering agents
- Maintain primary and secondary stroke prevention services
- Support of research into new treatments and methods of care delivery for haemorrhagic stroke whose mortality rate remains more than double that of ischaemic stroke.

Improving Access to Best Care

The proportion of patients with ischaemic stroke who received intravenous Tissue Plasminogen Activator (tPA) increased from 8.6 to 11.3% by 07_08.

The median Emergency department (ED) arrival to treatment time reduced by almost 10 minutes in the 3 years between chart reviews. The proportion of patients treated within 1 hour of arrival in ED was 34.8.

The percentage of TIA and ischaemic stroke patients receiving imaging of the carotid arteries prior to discharge increased significantly.

For ischaemic stroke and TIA patients, the use of antiplatelet agents or anticoagulants or anticoagulants within 48 hours of admission increased to 85.4% by 2007/08.

The proportion of ischaemic stroke and TIA survivors discharged back to their preadmission residence increased significantly to 80.8%.

The number of stroke prevention clinics (SPCs) in Alberta tripled between 2004/05 and 2007/08. The proportion of ischaemic stroke and TIA survivors receiving a referral to a SPC increased significantly and substantially.

The key recommendations for this strand were:

- Although median ED to treatment times have decreased, stroke programme should continue to expedite the reduction of the assessment- investigation- management of acute ischemic stroke to decrease this time to less than 60 minutes.
- The goal should be that the majority of stroke patients receive tPA in this time frame.
- Increase the proportion of TIA and ischemic stroke patients who have carotid artery imaging within their admission.
- Higher priority should be given to reduce complications following stroke; especially pneumonia and urinary tract infection. To facilitate this, swallowing screens and assessments should be performed on almost all stroke patients prior to initiation of oral intake and early mobilisation is important.
- The proportion of ischaemic stroke and TIA patients receiving a referral to a SPC should increase further. It may be beneficial to increase the proportion of haemorrhagic stroke patient a referral to a SPC.

Improving Health Care System Efficiency

Due to increased rural capacity to manage stroke patients, there has been a reduction in transfers from rural areas to tertiary EDs. Despite an aging population, there has been a decline in the actual numbers of stroke patients presenting to EDs and admitted to hospital

The estimated cost savings derived from the use of intravenous tPA for ischaemic stroke for 2004/05 was Can\$141,000 at 1 year and projected to be Can\$789,000 at 30 years. With the increased rate of tPA use to 11.3% of all ischaemic strokes, the cost saving increased to Can\$174,000 at 1 year and Can\$975 at 30 years in 2007/08.

The key recommendations for this strand were:

- Support primary care to allow stroke patients to receive care as close to home as possible
- Focus on primary and secondary prevention

Improving Satisfaction with Care

Overall 94-95% of inpatients were moderately or very satisfied with the inpatient care they received 2007 to 2009. The satisfaction levels were lower for care received after leaving hospital. Over 2 years there was a significant improvement in satisfaction with care received after leaving hospital from 75 to 85%

The key recommendations for this strand were:

- The proportion of stroke patients very satisfied with their care should increase further
- It is extremely important to continue to build home care and community support programmes for stroke patients.

Nelson Marlborough District Health Board Stroke Patients

Data extracted from the NMDHB patient management system shows stroke discharges (principle diagnosis starting with I6*) from Nelson and Wairau Hospitals fiscal years 08_09, 09_10 and 10_11 to 27 March (Figure 42.)

Figure 42 Stroke admissions (principle diagnosis start with I6*) over the last 2.5 years

		08_09			09_10			10_11			Total
		Died	discharged	Total	Died	discharged	Total	Died	discharged	Total	
Nelson	?	8	49	57	8	43	51	6	32	38	146
	haemorrhagic	8	21	29	11	28	39	8	24	32	100
	ischaemic	3	71	74	6	68	74	8	51	59	207
	Total	19	141	160	25	139	164	22	107	129	453
Wairau	?	2	38	40	3	32	35	2	27	29	104
	haemorrhagic	4	15	19	5	11	16	1	14	15	50
	ischaemic	4	20	24	6	31	37	3	30	33	94
	Total	10	73	83	14	74	88	6	71	77	248
Total		29	214	243	39	213	252	28	178	206	701

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2009 National Acute Stroke Services Audit

This audit provided a stocktake of acute stroke services in New Zealand District Health Boards (DHBs), and a benchmark against which to compare subsequent improvement and development of services. This audit concentrates solely on the provision of acute stroke services, and does not cover stroke rehabilitation services or hospital care beyond seven days of stroke onset. A national audit of stroke rehabilitation services is planned.

Given that the audit recognised thrombolytic therapy with intravenous recombinant tissue plasminogen activator (rt-PA) within 4.5 hours of stroke symptom onset is proven to reduce the combined endpoint of death and disability for ischaemic stroke, it was disappointing that only 3% of ischaemic stroke patients in both Australia and New Zealand are treated with rt-PA.

The main barriers to early delivery of thrombolytic therapy were discussed in relation to audit findings below:

- Difficulties in patient recognition of stroke symptoms and delay in seeking appropriate emergency help.
- Delays in reaching hospital by ambulance. While 75% of audited patients with acute stroke arrived by ambulance, only one third of patients with a known time of symptom onset actually reached hospital within three hours and only 38% reached hospital within four hours. Only 10% of DHBs reported arrangements with ambulance services.
- Triage priorities in emergency departments (EDs). Less than half of DHBs reporting that their ED had protocols for acute stroke care.
- Delays in obtaining urgent imaging. All DHBs have onsite CT brain scanning and 24 hour access to CT. Most DHBs have onsite MRI and most can provide access within 24 hours when this is required. Further, 88% of all audited patients received brain imaging within 24 hours. However, while all DHBs have onsite ultrasound carotid Doppler and two-thirds can provide access within 24 hours, only 22% of audited patients had carotid imaging studies while still in hospital, compared to 50% of all Australian audited patients.

In terms of specific results for NMDHB, processes are in place in NMDHB for offering thrombolysis (Table 12 and Table 13)

Table 12 Processes in NMDHB offering thrombolysis

	NZ Total	NMDHB
Total number stroke admissions last year	6,194	90
Thrombolysis offered 24 hrs/7 days	43%	Y
Total number thrombolysed	128	7

The Clinical Audit involved retrospective review via patient record of up to 40 consecutive stroke patients admitted, treated and discharged from acute care in individual DHBs between 1 June 2008 and 31 December 2008. NMDHB results were considerably better than New Zealand overall.

Table 13 Thrombolysis treatment for patients with ischaemic stroke by DHB category and stroke unit status

	NZ total	Your DHB
(All ischaemic stroke)	(N=2,442)	(N=37)
Patients thrombolysed	82 (3%)	3 (8%)
(All ischaemic stroke arrived in 3 hrs)	(N=638)	(N=17)
Patients thrombolysed	63 (10%)	3 (18%)

11.2 Chronic Cerebrospinal Venous Insufficiency in Multiple Sclerosis

Multiple sclerosis

Multiple sclerosis (MS) is a major cause of lifelong disability commencing in early adulthood. It is defined as a cell mediated auto immune disease on the basis of genetic, immunological, experimental and epidemiological data.

In 2006, the New Zealand Prevalence study³⁹ identified 2,896 people with MS living in New Zealand on census day (7 March 2006). Of the 2,896 people with MS, 2,176 (75%) were women and 720 (25%) were men; giving a female to male ratio of 3:1.

- The overall prevalence of MS in NZ is 71.9 per 100,000.
- For Maori the age-standardised prevalence of MS was 17.5 (12.7 to 22.4).
- For males age-standardised prevalence of MS was 37.0 per 100,000 (34.3 to 39.7).
- For females age-standardised prevalence of MS was 104.3 per 100,000 (99.9 to 109).

The results show a geographic gradient in prevalence, with the age-standardised prevalence increasing from north to south. This has been linked to vitamin D.

Table 14 Age-standardised prevalence of multiple sclerosis in New Zealand by region (from north to south).

Region	Number with MS	age-standardised prevalence rate per 100,000	Confidence Interval
Northland	82	50.8	(39.7 to 61.8)
Auckland	732	59	(54.7 to 63.3)
Waikato	177	46.4	(39.6 to 53.3)
Bay of Plenty	132	50	(41.4 to 58.5)
Gisborne	20	46.7	(26.6 to 67.2)
Hawkes Bay	82	54.3	(42.5 to 66.1)
Taranaki	72	66.8	(51.3 to 82.4)
Manawatu-Wanganui	120	54	(44.3 to 63.7)
Wellington	383	86.2	(77.6 to 94.9)
Nelson-Tasman	75	77.7	(60.0 to 95.3)
Marlborough	42	86.8	(60.2 to 113)
Canterbury	557	103	(94.4 to 112)
West Coast	40	119.2	(81.9 to 157)
Otago	234	119.3	(104 to 135)
Southland	148	134.6	(112 to 157)

MS patients at NMDHB

Nelson Marlborough had a total of 117 people with the disease in the prevalence study.

Inpatient events

There were 64 admissions to NMDHB hospitals in fiscal year 09_10 for patient with, and relevant to, the diagnosis of multiple sclerosis (based on ICD10 code). These admissions cost a total of \$200,000.

Outpatient events

The outpatient contacts and costs are more difficult to pinpoint for a couple of reasons –

- 1) because there is no diagnosis code in outpatient data; there is just a single free text referral reason and
- 2) because cost of the support of the under 65 year olds is borne directly by the Ministry of health. The total cost to NMDHB for fiscal year 09_10 for patients with a referral reason of “MS” or “multiple sclerosis” was \$3,500, but this selection only captured 10 neurology outpatient appointments so is unlikely to be complete.

Drugs

Drugs (Table 15) are another cost to NMDHB for a relatively small number of patients. The total was \$400,000.

Table 15 NMDHB's drug spend in 2009/10 on MS treatments.

MS Treatments	Drug Cost*
Glatiramer acetate	\$50,000
Interferon beta-1-alpha	\$150,000
Interferon beta-1-beta	\$200,000
Total	\$400,000

*Drug cost=total cost to DHB. There are no mark-ups, dispensing fees and patient contributions for MS treatments.

Support

The support of the MS patients aged under 65 years is shown in Table 16. The support of the over 65 MS patients is difficult to separate MS needs support from the support required due to their age so it has not been attempted. NB these costs are currently borne by the Ministry of Health not by NMDHB

Table 16 Support to the under 65 Nelson Marlborough population with multiple sclerosis

ServiceDescription_Value	Total
IF Household Management	5,778
IF Personal Care	22,063
Individualised Funding Personal Care Tasks	4,749
YP Day Care L1	487
YP Household Management	95,256
YP in a Hospital	125,738
YP Personal Care	280,506
YP Respite - Hospital	8,439
YP Respite - Rest Home	4,720
YP Rest Home	24,958
YP SIL L1	23,560
YP-carer support	5,168
Grand Total	601,422

In summary, there are about 120 MS patients in NMDHB. The cost of these patients to NMDHB is about \$600,000 per year on medical care and drugs in addition to about \$600,000 per year in support costs borne by the Ministry of Health, a total of \$1.2million dollars for no improvement in health or quality of life. This is an average of \$10,000 per patient per year before the physiotherapy and other disability related DSS services are included.

Treatment Options

Until very recently there has been very little hope for patients. Drugs do exist; these so called “disease modifying drugs” are expensive but available in New Zealand under strict criteria. In the United Kingdom they are available under a risk sharing scheme, set up in

2002 after the National Institute for Health and Clinical Excellence (NICE) recommended against use of interferon beta and glatiramer acetate⁴⁰.

Under the scheme, the aim was that patients were closely monitored to confirm the cost effectiveness of the drugs, with an agreement that prices would be reduced if patient outcomes were worse than predicted. The first report on the scheme, in 2009, showed patient outcomes were much worse than predicted but judged that it was premature to reduce prices. The outcomes were not only worse than predicted but also were worse than those of *untreated* patients. The annual cost of the scheme was £50 million⁴¹.

The widely accepted autoimmune model, in which the immune system is sensitised to myelin by external influences such as an infection has been challenged over the last 20 years. The doubts are raised by a number of factors including:

1. Current immune based therapies have little if any, effect on disease progression,
2. Neurodegeneration appears to be an important part of MS throughout the disease development
3. Myelin disintegration precedes the invasion of the immune system
4. MS lesions are venocentric and often associated with iron deposits
5. Immune activity sometimes occurs associated in the optic nerve where no myelin is present
6. No autoimmune activity occurs in the peripheral nervous system where myelin *is* present

The challenge has been heightened in the last 2 years following the observation that many people with MS have a newly defined condition called Chronic Cerebrospinal Venous Insufficiency (CCSVI). CCSVI is characterised by impaired drainage of the venous blood from the brain due to venous malformations.

Chronic Cerebrospinal Venous Insufficiency (CCSVI)

Impaired venous outflow from the brain and spinal cord is thought to lead to breakdown of the blood-brain barrier which initiates autoimmunity. This is an important, yet not the only problem encountered by patients with CCSVI. They also have hypoperfusion related to venous stenoses which appears to be an even more important problem. These Impairments can be detected by Dopplar sonography with CCSVI being recognised as a condition in which two of five measured parameters of venous blood flow from the brain are anomalous⁴². CCSVI is characterised by stenoses affecting the main extracranial venous outflow pathways and by a high rate of cerebral venous reflux. Diagnosis cannot always be made at ultrasound, the gold standard is catheter venography; CT venography is also used. A publication to review the detection is expected soon from Ivo Petrov (Bulgaria).

The first randomised clinical study⁴³ to determine if persons with MS exhibit narrowing of the extracranial veins, causing restriction of normal outflow of blood from the brain, done in Buffalo, New York found that more than 55 percent of multiple sclerosis patients participating were found to have the abnormality. When the 10.2 percent of subjects in which results were border line were excluded, the percentage of affected MS patients rose to 62.5 percent, preliminary results show, compared to 25.9 percent of healthy controls. Earlier, smaller trials showed a greater percentage. There appears to be considerable operator variation in results.

There has been substantial criticism of this study in terms of anti CCSVI bias by one of the funding charities – Direct MS⁴⁴. Most notable was the claim in the paper and press release that their data demonstrate that CCSVI is an effect of MS rather than a cause. In the paper

they offered the evidence of CCSVI being more common in more progressive cases as proof of this interpretation. Of course, such a relationship can just as easily be explained by CCSVI as an important cause of MS and thus their analysis holds no water.

More recently (Mar 2011) a 500 patient study from Poland has been submitted for publication⁴⁵ by Prof Miro Denisic which showed CCSVI on venography, the gold standard, in 94% of cases. This paper will be of immense importance as it bypasses the controversy over the negative Doppler studies, very dependent on operator bias.

Most importantly, Professor Zamboni achieved excellent and very hopeful results⁴⁶, finding that outpatient endovascular treatment of CCSVI was feasible, with a minor and negligible complication rate. CCSVI endovascular treatment significantly improved MS clinical outcome measures, especially in the Relapsing Remitting group. Physical Quality of life (QoL) improved significantly in Relapsing Remitting (RR) and in Primary Progressive patients with a positive trend in Secondary Progressives. He concluded that percutaneous transluminal angioplasty (PTA) of venous strictures in patients with CCSVI is safe, and especially in patients with RR, the clinical course positively influenced clinical and QOL parameters of the associated MS compared with the preoperative assessment.

Another study⁴⁷ found that the reestablishment of cerebral venous return dramatically reduced chronic fatigue perception in a group of MS patients with associated CCSVI, suggesting that chronic fatigue is likely a symptom of CCSVI.

A further study⁴⁸ evaluated the safety of outpatient endovascular treatment of the internal jugular and azygos veins in MS patients with CCSVI. The authors retrospectively reviewed 247 procedures for post operative complications up to 30 days post op. 229 (92.7%) were primary procedures and the rest were repeat procedures where the patients had re-stenosed. Of the primary procedures the vast majority were simple angioplasties (86%) with 26 (11%) having at least one stent implanted. Five patients were not treated with either procedure. Of the 18 patients treated for a second time, half had stent implantation.

Over 50% of these procedures were carried out in an outpatient setting and a remarkable 99.2% of the total, were discharged within three hours of the treatment. Complications were rare; three patients had abnormalities of heart rate of which two required hospital admission. One patient had a prolonged stay due to clot formation in the stent.

8.5% of patients had headache post op, only one patient still had this at 30 days. 15.8% complained of neck pain post operatively of which over half had stent implantation.

Support from the Establishment for CCSVI Treatment

Organisations such as the MS Society of New Zealand and equivalent organisations in the UK, US and Canada have been less than supportive of patients in their quest to find something that works against this disease saying that more research is required so that they only recommend evidence based interventions (and we have seen what that did with the “disease modifying” drugs with the recommendations leading to the industry’s wasting of billions of dollars). Research is progressing but for the patient, who understands that not only is their life severely curtailed now by growing disability now, this emerging treatment cannot resurrect dead neurons, so time is of the essence in terms of achieving a reasonable quality of life in the future.

Social networking websites have been instrumental in allowing patients with MS to share information about this procedure⁴⁹. These sites, together with the internet-based access that physicians now have with both existing and potential patients, have ushered in an era of communication that has driven a new procedure into the repertoire of a growing number of

interventional radiologists. Social networking websites on the internet have been critical in rapidly advancing the role of venous angioplasty in the treatment of CCSVI in MS patients.

It has enabled patients to access information about the procedure available overseas, for example in the UK for about £10,000 (NZ\$22,000). The brave and the affluent can access this procedure in the UK, US, Poland, and India to name a few.

In the last few months, a handful of MS patients have received the venoplasty procedure at the Wakefield hospital, Wellington. The procedure is only available privately, under the care of vascular surgeon, Mr Dilip Naik and the procedure is carried out by Interventional radiologist Dr Billy Chong. The cost of the procedure is about NZ\$8,500.

The procedure is only available privately

It would seem then, that this is just another area of health where inequity prevails and the best chance goes to the rich or those brave enough to commit to repaying a sizeable loan. At least there is a chance that this procedure will be available in time for our children to benefit from it.

11.3 High Dose Vitamin D improves COPD Rehabilitation

50 COPD patients with a history of exacerbations, who were referred for rehabilitation, were randomly assigned to receive either a monthly dose of 100,000 IU of vitamin D or placebo⁵⁰. All subjects participated in a 3-month pulmonary rehabilitation program. At the end of the program, vitamin D levels in the treatment group had increased significantly, compared with the placebo at 3 months.

Patients receiving vitamin D had significant improvements in nearly all measures of COPD. Compared with patients in the placebo group, those receiving vitamin D showed a larger improvement in maximal oxygen consumption.

The vitamin D group also showed improvements in maximal workload; 6-minute walking distance, quadriceps force; inspiratory muscle force, expiratory muscle force; and Chronic Respiratory Disease Questionnaire score for dyspnoea. A small increase in forced expiratory volume in 1 s was similar in both groups.

Dr. Casaburi (who is associate chief for research and professor of medicine in Harbor–UCLA Medical Center's division of respiratory and critical care physiology and medicine) commented "We have been seeking pharmacologic options to boost the effectiveness of pulmonary rehabilitation for some time. So far, no drugs have been shown to amplify the effects of rehabilitation on exercise endurance," he said. "The trends shown here indicate that vitamin D supplementation is worth pursuing in this context."

"Although the results are encouraging, the largely nonstatistically significant trends cannot be considered definitive. A larger, adequately powered study would be of great interest," Dr. Casaburi noted.

12. Chronic Conditions

Chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality⁵¹ in the world, representing 60% of all deaths. This invisible epidemic is an under-appreciated cause of poverty and hinders the economic development of many countries. Contrary to common perception, 80% of chronic disease deaths occur in low and middle income countries.

12.1 Impact of Chronic Conditions in NMDHB

As a step towards understanding the impact of chronic conditions, the principal diagnosis ICD10 code of discharges from NMDHB hospitals over the 12 months to 30 April 2011 (total 26,548 discharges) were checked for the occurrence of chronic conditions. The chronic conditions sought were:

- all Cancers
- vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease
- congestive heart disease
- neuromuscular conditions
- mental illness
- COPD/Sleep Apnoea/asthma
- Diabetes
- Other Chronic Disease

The number of events and individuals discharged along with the number of deaths that occurred in hospital are shown in Table 17.

Table 17 Events, Individuals Discharged and deaths that occurred in hospital, by chronic condition as indicated by principal diagnosis for the 12 months to 30 April 2011

	Events	Individuals	Deaths
All cancers	1,753	1,252	23
congestive heart disease	723	608	24
COPD/Sleep Apnoea/asthma	435	338	11
Diabetes	249	199	3
mental illness	156	138	6
neuromuscular conditions	380	283	5
vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease	1,465	1,121	72
Other Chronic Disease	641	529	1
Principal diagnosis not one of specified chronic conditions	20,744	15,621	134
uncoded	2	2	0
subtotal chronic conditions	5,802 (22%)	4,216 (23%)	145 (52%)
Total	26,548	18,374	279

Looking at the subtotal for chronic conditions identified by the principal diagnosis only, they were the cause of 22% of events and the cause of admissions for 23% of individuals. However, they accounted for 52% of in hospital deaths.

Moving beyond looking at just the principal diagnosis, the first 6 ICD10 codes of discharges from NMDHB hospitals over the same 12 period were checked for the occurrence of chronic conditions. The chronic conditions sought were the same as with the principal diagnosis search ie

- all Cancers

- vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease
- congestive heart disease
- neuromuscular conditions
- mental illness
- COPD/Sleep Apnoea/asthma
- Diabetes
- Other Chronic Disease

The number of events and individuals discharged over the 12 months to 30 April 2011 for the top 25 combinations of chronic conditions are shown in Table 18.

The conditions, in descending order were:

- “All Cancers” (2,016 events in 1,303 individuals)
- vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease , (1,365 events in 999 individuals)
- congestive heart disease, (839 events in 679 individuals)
- Other Chronic Disease, (702 events in 569 individuals)
- neuromuscular conditions, (552 events in 400 individuals)
- COPD/Sleep Apnoea/asthma, (498 events in 384 individuals)
- Diabetes, (313 events in 267 individuals)

The most frequent combinations were:

- “congestive heart disease” + “vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease” (291 events in 252 individuals)
- “neuromuscular conditions” + “vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease” (258 events in 183 individuals)
- “neuromuscular conditions” + “vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease” (223 events in 159 individuals)
- “mental illness” + “neuromuscular conditions” (68 events in 56 individuals)
- congestive heart disease + COPD/Sleep Apnoea/asthma (67 events in 52 individuals)

After that, the numbers fall to less than 50 in each group. In addition to being the second most frequent single chronic condition, vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease also a prominent feature in the most frequently occurring combinations.

Table 18 Chronic Conditions (first 6 diagnoses) in the 26,548 discharges from NMDHB hospitals 1/5/2010 to 30/4/2011

Chronic Condition	Events	Individuals
Not identified as specified chronic conditions	18,204	14,339
+ all Cancers	2,016	1,303
+ vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease	1,365	999
+ congestive heart disease	839	679
+ Other Chronic Disease	702	569
+ neuromuscular conditions	552	400
+ mental illness	502	416
+ COPD/Sleep Apnoea/asthma	498	384
+ Diabetes	313	267
+ congestive heart disease + vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease	291	252
+ neuromuscular conditions + vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease	258	183
+ Diabetes + vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease	223	159

Chronic Condition	Events	Individuals
+ mental illness + neuromuscular conditions	68	56
+ congestive heart disease + COPD/Sleep Apnoea/asthma	67	52
+ COPD/Sleep Apnoea/asthma + mental illness	47	42
+ mental illness + vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease	43	40
+ all Cancers + congestive heart disease	42	40
+ all Cancers + vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease	37	35
+ congestive heart disease + Diabetes + vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease	35	32
+ all Cancers + mental illness	28	25
+ all Cancers + neuromuscular conditions	25	19
+ congestive heart disease + neuromuscular conditions	25	23
+ congestive heart disease + mental illness	24	22
+ congestive heart disease + Other Chronic Disease	24	21
+ congestive heart disease + neuromuscular conditions + vascular diseases – IHD, Stroke, Renal Failure, peripheral vascular disease	23	20
Other chronic condition combinations	297	254
Total discharges	26,548	18,374

Details of ICD10 codes included in each of the chronic conditions are available on request from Sarah Simmonds at sarah.simmonds@nmhs.govt.nz⁵².

13. Health Implications of Weight Stigma

The health implications of obesity as one of the most important modifiable risk factors for a number of major diseases, including type 2 diabetes mellitus, ischaemic heart disease, ischaemic stroke and several common cancers were raised in the last Health Needs Assessment⁵³.

13.1 Nutrition and Physical activity (NPA) Baseline Survey

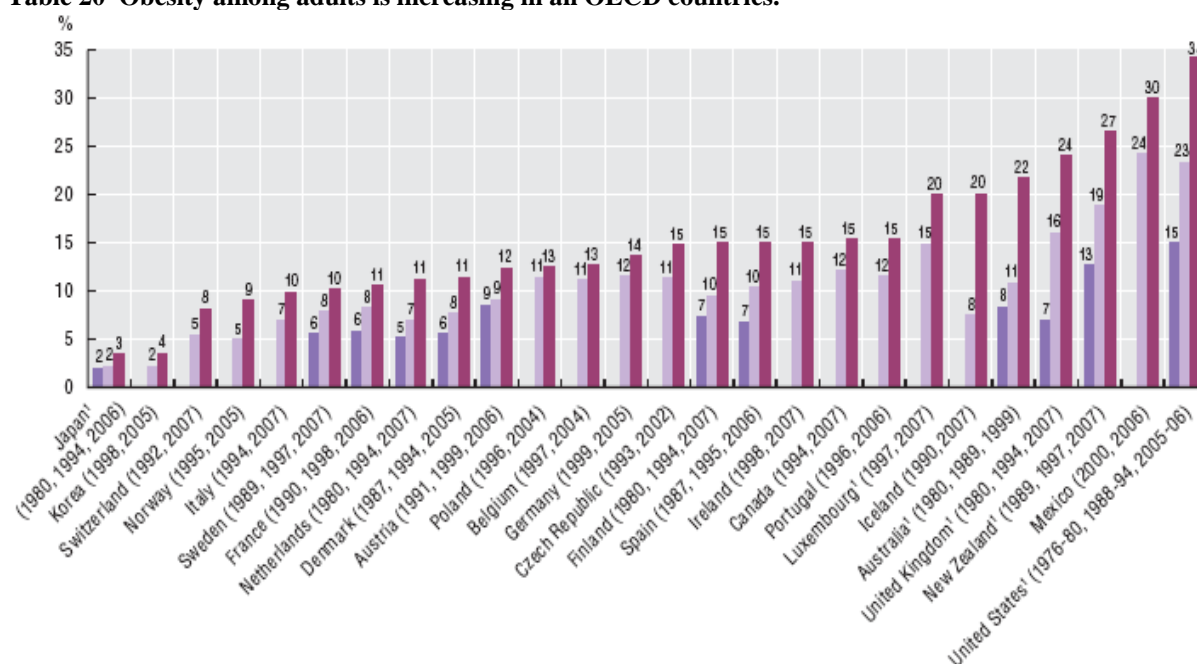
A snapshot of the results of the 2008 Nutrition and Physical activity (NPA) Baseline Survey is shown in Table 19.

Table 19 % of NMDHB Population falling into each BMI category

	Underweight		Healthy Weight		Overweight		Obese	
	NMDHB	National	NMDHB	National	NMDHB	National	NMDHB	National
Ethnicity								
Maori	9.8▲	1 (0.6-1.7)	34.9▲	24.1 (22.0-26.2)	34.5▲	31.7 (29.6-33.7)	20.8▼	43.2 (41.2-45.2)
Non-Maori	9.0▲	1.6 (1.2-2.0)	51.1▲	40 (38.8-41.3)	28.2▼	35.2 (34.1-36.3)	11.7▼	23.2 (22.1-24.3)
Age group								
16-24	6.6▲	3.2 (1.9-4.4)	73.3▲	58.7 (55.5-61.9)	9.0▼	24 (21.3-26.6)	11.2▼	14.2 (12.3-16.1)
25-34	9.6▲	1.6 (1.0-2.5)	45.4▲	39.4 (36.4-42.5)	33.6▼	34.6 (31.7-37.5)	11.4▼	24.4 (22.0-26.8)
35-44	10.7▲	0.6 (0.3-1.0)	43.1▲	33 (30.8-35.2)	32.3▼	38 (36.0-40.1)	13.9▼	28.4 (26.3-30.5)
45-54	6.8▲	0.7 (0.3-1.4)	46.0▲	29.1 (26.8-31.4)	34.0▼	39.7 (37.4-42.0)	13.2▼	30.5 (28.0-33.0)
55-64	7.8▲	0.6 (0.2-1.1)	42.3▲	25.1 (22.7-27.5)	38	38.5 (35.6-41.4)	11.9▼	35.9 (33.1-38.6)
65-74	11.7▲	0.8 (0.3-1.5)	37.9▲	23.3 (20.5-26.1)	36.9▼	43.2 (39.8-46.5)	13.5▼	32.8 (29.8-35.9)
75+	14.4▲	1.3 (0.7-2.3)	52.9▲	32.8 (29.6-36.1)	26.5▼	45 (41.4-48.5)	6.2▼	20.8 (18.0-23.7)
Gender								
Male	4.8▲	1.3 (0.8-1.8)	50.3▲	33.2 (31.3-35.0)	31.6▼	40.7 (39.1-42.3)	13.2▼	24.8 (23.3-26.2)
Female	13.0▲	1.6 (1.1-2.1)	50.1▲	43 (41.5-44.5)	25.4▼	29.4 (27.9-30.8)	11.5▼	26.1 (24.7-27.5)
Total	9.0▲	1.4 (1.1-1.8)	50.2▲	38.1 (36.9-39.2)	28.5▼	35 (34.0-36.0)	12.3▼	25.4 (24.5-26.4)

While the percentage of obese people was significantly lower in Nelson Marlborough than in New Zealand as a whole, 12.3% of the NMDHB population was obese and New Zealand is third in global terms for obesity⁵⁴ (Table 20) and Obesity among adults is increasing in all OECD countries.

Table 20 Obesity among adults is increasing in all OECD countries.



13.2 Weight Stigma and its Health Implications

Stigma and prejudice toward obese persons occur frequently and unlike other forms of social bias, weight-based stigmatisation is largely acceptable in our culture, and no law prohibits weight discrimination.

Although weight discrimination is often framed and discussed as an issue of social injustice, it is equally important to understand and address this form of discrimination as a public health problem. Unfortunately, despite the consensus that disease stigma undermines Public Health; this principle has not been applied to the obesity epidemic. Instead the stigma of obesity has been largely ignored in the context of public health. There is even a public perception that stigma might serve as an incentive to motivate obese persons to adopt healthier lifestyle behaviours.

This is concerning, given evidence that stigmatisation of obese individuals poses serious risks to their psychological and physical health, generates health disparities, and interferes with implementation of effective strategies to address obesity⁵⁵.

Looking at the issues more closely:

Weight Stigma Compromises Psychological Well-Being

Evidence consistently demonstrates that weight stigma increases negative psychological outcomes such as

- depression,
- anxiety,
- low self-esteem,
- body dissatisfaction

in obese children and adults, even after accounting for variables such as age, sex, obesity onset, and body mass index (BMI). This means that they are arising from the stigma, rather than from body weight per se.

The psychological toll of weight stigmatisation can be devastating, particularly for children who are vulnerable to teasing and bullying and research indicates that overweight youth who are teased about their weight are 2-3 times more likely to engage in suicidal thoughts and behaviours compared with their overweight peers who are not teased.

Weight Stigma Is Not an Effective Motivator for Lifestyle Changes

Despite a common public perception that stigmatising obese individuals might provide necessary incentive to engage in healthier lifestyle behaviours, the science suggests that the opposite is true. If weight stigma were effective in promoting healthier lifestyle behaviours and weight loss, then the increased weight stigmatisation witnessed over the past several decades should be accompanied by a reduction in obesity rates. Not only are more people now obese, but more obese people are also reporting discrimination on the basis of their weight.

Recent research demonstrates that obese children and adults who experience weight stigma have a higher likelihood of engaging in unhealthy eating behaviours and lower levels of physical activity, both of which exacerbate obesity and weight gain. For example, overweight children who experience body weight-related teasing are more likely to engage in binge-eating and unhealthy weight control behaviours compared with overweight peers who are not teased, even after controlling for BMI and socioeconomic status.

Similar findings exist for overweight and obese adults, who engage in more frequent binge-eating, and report lower motivation and participation in exercise if they have been stigmatised about their weight. In fact, some research shows that adults report coping with experiences of weight stigma by eating. In 1 study of more than 2400 overweight and obese women, 79% reported coping with weight stigmatisation by eating more food, and 75% reported coping by refusing to diet.

Weight Stigma Affects Healthcare

Most concerning is the finding that Weight Stigma Affects Healthcare. - The healthcare setting is a typical backdrop for weight stigmatisation. Numerous studies have demonstrated that a range of healthcare providers (physicians, nurses, psychologists, dieticians, medical students) hold negative stereotypes and attitudes toward obese patients. Opinions that obese patients are lazy, lacking in self-discipline, dishonest, unintelligent, annoying, and noncompliant with treatment are typical. Moreover, research shows that providers spend less time during appointments and provide less health education with obese patients compared with thinner patients. Obese patients frequently report experiences of weight bias in healthcare, and being disrespected by providers.

Weight stigma also can influence healthcare utilisation. Obese persons are less likely to undergo age-appropriate preventive cancer screenings, even when accounting for factors such as education, income, health insurance, and illness burden. Weight stigma may be a specific contributor to these outcomes. Women reported delaying and avoiding medical appointments because of disrespectful treatment and negative attitudes from providers, and embarrassment about being weighed, receiving unsolicited advice to lose weight, and being forced to use medical equipment that is too small to be functional for their body size. The percentage of women reporting these barriers increased with the women's BMIs.

Weight Stigma Interferes With Effective Obesity Intervention

Societal views about obesity and obese persons play an important role in influencing policy responses to address obesity. Because obesity is often viewed as a personal failing, policy efforts to address obesity have primarily focused on nutrition education to promote personal responsibility for body weight, rather than more comprehensive strategies that address the underlying societal and environmental causes of obesity.

In fact, in the United States, legislation has primarily focussed on laws to protect the food and restaurant industry from potential civil injury claims rather than addressing the societal and environmental causes of the disease.

Moving Forward: Eliminating Weight Stigma

Taken together, the evidence highlights the importance of recognising the damaging effects of weight stigma on quality of healthcare, psychological health, lifestyle behaviours, and obesity interventions. To improve quality of life of obese persons and optimise efforts to address obesity, weight stigma needs to be addressed.

Possible strategies to achieve this goal include the following:

- Provide sensitivity/stigma-reduction training for health providers and educators;
- Move beyond "education" and "individual" strategies to address obesity, and implement comprehensive strategies that address societal, environmental, and economic contributors to obesity;
- Incorporate anti stigma messages into obesity prevention/intervention campaigns;
- Increase the focus of intervention on health **behaviours** -- not just body weight;
- Implement policies to prohibit weight-based bullying in schools and the workplace.

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