Child and Youth Mortality Review Committee

Te Rōpū Arotake Auau Mate o te Hunga Tamariki, Taiohi

Third Report to the Minister of Health
Reporting mortality 2002–2004

Disclaimer

The Child and Youth Mortality Review Committee prepared this report.

This report does not necessarily represent the views or policy decisions of the Ministry of Health.

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- The Coroners' Council
- Government departments, particularly Births, Deaths and Marriages (Internal Affairs)
- Water Safety New Zealand
- Local child and youth mortality review agents
- Clinicians.

Abbreviations and Glossary

BDM	Births, Deaths and Marriages (Department of Internal Affairs)
CDRP	Cross Departmental Research Pool—The Cross Departmental Research Pool supports policy-related research in government departments. Departments are able to bid for funding (transferred from Vote Research, Science and Technology to their Vote) to carry out research of critical cross portfolio interest. The Cross Departmental Research Pool is managed jointly by the Ministry of Science and Technology and the Foundation for Research, Science and Technology (see www.morst.govt.nz).
CYM	Child and Youth Mortality (related to the Child and Youth Mortality Committee)
CYMRC	Child and Youth Mortality Review Committee
CYMRG	Child and Youth Mortality Review Group—these are local groups of Agents of the Child and Youth Mortality Committee based in DHB regions. They work locally and report to the Committee and also to the governance section of the DHB.
Data Group	The Data Group consists of the Otago University staff who run the mortality database in accordance with the formal Agreement between the Ministry of Health and the University of Otago.
DHB	District Health Board—responsible for providing, or funding the provision of, health and disability services in their district. There are 21 DHBs in New Zealand and they have existed since 1 January 2001 when the New Zealand Public Health and Disability Act 2000 came into force.
NHI	National Health Index—the National Health Index number is a unique identifier that is assigned to every person who uses health and disability support services in New Zealand. A person's NHI number is stored on the National Health Index along with that person's demographic details. The NHI and associated NHI numbers are used to help with the planning, co-ordination and provision of health and disability support services across New Zealand.
NSW	New South Wales, Australia
NZHIS	New Zealand Health Information Service
PHARMAC	Pharmaceutical Management Agency
PHI	Public Health Intelligence
SAFEKIDS	the injury prevention service of Starship Children's Health and a member of SAFE KIDS Worldwide
SIDS	Sudden Infant Death Syndrome—sudden and unexpected death of an apparently healthy infant during sleep
SUDI	Sudden Unexpected Death in Infancy—a broad category used to encompass SIDS, infants found in adult beds where no direct evidence of overlying exists and other similar deaths where a thorough post-mortem and death scene investigation are needed to determine cause of death. Unexpected means that the cause was not recognised before the death.

Chair's Introduction

This third report represents some maturing of the Mortality Review Process in New Zealand. We now have a detailed record of all child and youth deaths since January 2002. The quality of the information in these records is slowly improving as we get our information from an increasing number of sources. A discussion has begun with our Australian equivalents to standardise our reporting categories and exchange information about deaths in either country. The information on still-births and deaths in the first month of life (perinatal deaths) in this country will shortly be added to the same structure. There may be further changes with the introduction of a new coroner's act.

Much more important is how we can make this information work to decrease the number of preventable deaths in this country, as well as bring some further meaning to the deaths which we cannot prevent by learning as much from them as possible. To this end a workshop jointly sponsored by the Child and Youth Mortality Review Committee (CYMRC) and the Ministry of Health's chief advisor on Child Health, Dr Pat Tuohy, was held in May 2006 to review the New Zealand recommendations for the prevention of Sudden Unexpected Death and review how they are implemented. If we all used the knowledge currently available, 45 of our current approximately 50–60 deaths a year in this category, may not happen.

The information we gather on deaths must in the end change what individuals do. Currently, the CYMRC is able to appoint agents in each District Health Board (DHB) who report to the national committee. They are also able to take the wisdom and knowledge (but not the identifiable information) gained from detailed discussion of the deaths they have in their own area to improve processes locally. These agents, working as a local group, will also be expected to report annually to their local DHB with a formal reporting line through the Community and Public Health Advisory Committee. Those involved in this process can already see the importance of this review process and how it can change what happens locally. DHB structures are under many pressures – not all have been able to contribute to this national process. They are missing out on finding out what is happening in their own area and a critical method of improving local services.

Finally, I would like to thank all those involved in supporting the national committee and its processes – both in government, local DHBs and individuals throughout the sector.

Professor Barry Taylor
Chair
Child and Youth Mortality Review Committee

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Executive Summary

During 2005 the Child and Youth Mortality Review Committee (CYMRC) has undertaken a number of activities aimed at improving mortality review and producing useful feedback on New Zealand services to children. These activities are outlined in Section 1, Activities and Highlights of the CYMRC. Activities include work with local mortality review co-ordinators, improvements to mortality review systems and providing information on child and youth mortality and mortality review.

Data collection and analysis forms a significant part of the CYMRC's work and Section 2, Child and Youth Mortality, outlines methods and provides mortality data, analysis and recommendations for each of the age groups identified:

- post-neonatal (28 days to 12 months)
- children aged 1–4 years
- children aged 5–9 years
- children aged 10–14 years
- youth aged 15–19 years
- youth aged 20–24 years.

While each age group has its individual areas of concern, there are several common themes that occur across several age groups.

- Many infants and children in New Zealand are dying because of poor safety – especially during sleep in infancy and while awake in young children. This theme continues in adolescence when many deaths occur in dangerous circumstances.
- Intentional self harm especially suicide remains a major problem in our youth, with concern that over the last three years there are a number of deaths from suicide of children aged 10–14 years. These numbers appear to have increased between 2002 and 2004 and a high proportion of suicides among those under 15 years are in Māori children.
- There are major disparities in death rates between ethnic groups and by deprivation. In the most vulnerable age group (those aged 1–12 months) the disparity between ethnicities appears to have increased between 2002 and 2004.

Internationally (Section 3), mortality review processes are well established in the United States of America, Canada and Australia. The most recent report of the Queensland Commission for Children and Young People and Child Guardian's report, provides an overview of mortality review in Australia, New Zealand, the United States of America, and Canada.

All Australian states and New Zealand sent representatives to an inaugural meeting of Australasian Mortality Review Committees. The meeting made recommendations on consistent coding methods, dealing with inter-state and inter-country deaths and agreed that the chair and analyst meet annually to share information and maintain common standards of practice. A summary report of this meeting is included as Appendix D.

In 2005 the CYMRC commissioned two projects, which are outlined in Section 4. One of these looks at mortality among children and young people on New Zealand's public roads. The other project describes patterns of mortality among Māori children and young people in 2002 and 2003 and compares findings with mortality among non-Māori.

Findings from this project indicate that Māori child deaths comprise over one-third of child deaths (35.5%) in 2002 and 2003 and overall, the rate of child and youth death of Māori is twice that of non-Māori. Leading causes of deaths among Māori children and youth include transport related deaths, suicide and Sudden Unexpected Death in Infancy (SUDI). The greatest disparity between Māori and non-Māori is in SUDI-related deaths, where the rate of Māori deaths for 2002–2003 is calculated to be eight times that of non-Māori deaths in infants between one month and one year. Data from 2002 and 2003 reflect gender variation in death rates following a similar pattern to non-Māori gender patterns but the rate is higher for Māori males than non-Māori males and higher for Māori females than non-Māori females.

The CYMRC's objectives and goals for 2005/06 are outlined in Section 5. The objectives are divided into three key categories:

- Quality processes
  - Local mortality review process, training, extension to other DHBs
  - Dealing with complex data, especially qualitative data
  - Adding in parental reporting and taking this into account in analysis
  - Improving quality of health-data collected at the death scene – the Cross Departmental [government departments] Research Project (CDRP) project.
- Prevention and research
  - International collaboration in a project looking at SUDI deaths
  - Begin a new case-control study of SUDI (in partnership with Public Health Intelligence (PHI) and universities).
- Communication and partnership
  - Taking action about our increasing SUDI deaths in New Zealand – workshop on SUDI death prevention and whether or not to recommend pacifier use in high risk situations.

The report concludes by providing information and contact details for the CYMRC (Section 6), followed by the appendices, which provide 2005 meeting dates, and lists of CYMRC members and advisors.

Recommendations

The CYMRC has made recommendations throughout Section 2, Child and Youth Mortality. The following is a list of the recommendations.

The CYMRC recommends that:

- the Ministry of Health evaluates its current SUDI prevention messages and considers ways for effective health promotion strategies about baby-safe environments, particularly those relating to safe sleeping practices and smoking during pregnancy – these strategies need to be effective in Māori and Pacific communities
- the Minister of Health notes the ongoing high rate of mortality among Māori children and youth and the level of disparity between Māori and non-Māori
- the Minister of Health notes the CYMRC's concern that in some cases there is poor continuity of care in the post-neonatal age group
- the Minister of Health notes that CYMRC has written jointly with SAFEKIDS to the Minister of Consumer Affairs asking her to consider the banning of baby bath seats in New Zealand
- the Minister notes the emergence of suicide in the 10–14 year age group and that CYMRC will write to other relevant groups, including the All Ages Suicide Prevention Strategy Group, about this issue

- the New Zealand Health Information Service (NZHIS) discusses with the Department of Internal Affairs ways to more quickly transfer information from Births, Deaths and Marriages to NZHIS, and thus through to health organisations that use NHI numbers
- the Land Transport Safety Authority and government considers the findings of recent research[1] into vehicular-related deaths among children and young people in New Zealand and undertake any measures that may minimise the risk of such deaths
- the Minister of Health notes the need for consistent and adequate support for families after the death of their child. This does not appear to be the case at present and CYMRC will be having further discussions with Victim Support, Coroners and Police before making clear recommendations on this issue. The Minister should also note that the Cross Departmental Research Project developed by the CYMRC and sponsored by the Ministry of Health, may have some impact on this issue.

[1] Kypri, K., R. B. Voas, et al. (2006). Minimum purchasing age for alcohol and traffic crash injuries among 15- to 19-year-olds in New Zealand. *American Journal of Public Health.* 96(1): 126–131.

1 Activities and Highlights of CYMRC

This section overviews the activities undertaken by the Child and Youth Mortality Review Committee (CYMRC) from 1 January to 31 December 2005.

1.1 Local mortality review workshop

The CYMRC held a training day on 1 June 2005 for people involved in local mortality review. The day provided an opportunity for people to meet with other chairs, co-ordinators and DHB personnel involved in setting up local groups.

As well as a networking opportunity, the day involved discussion and training around mortality review, including what information is useful, obtaining that information, using the CYMR database, and case studies.

The training day was attended by 21 people from 15 DHBs. Participant feedback was largely positive, with most respondents indicating the day was useful. The participant feedback also provided some ideas for future training days or workshops. These included:

- more case studies
- more database training
- more time to raise and discuss local issues.

1.2 Development of parent/caregiver reporting processes

In recognition of the need many families express to try to prevent other families experiencing similar trauma, the CYMRC has continued to work on providing families with an opportunity to contribute confidential information directly to the Data Group. This information can then be assessed and help to inform the CYMRC's recommendations to the Minister of Health.

A draft information sheet and reporting form have been developed. The forms are being trialled with some families to ensure the language and information requested is appropriate.

It is anticipated that the reporting forms will be available on www.newhealth.govt.nz/cymrc for all interested families in 2006.

The CYMRC has again distributed pamphlets informing families of the existence and purpose of the CYMRC to the Funeral Directors Association of New Zealand for distribution among its members.

1.3 Appointment of Project Manager, Cross Departmental Research Project "Environmentally Sensitive Deaths in New Zealand Children and Youth: What are the modifiable factors?"

The Cross Departmental Research Project (CDRP) supports and funds policy-related research in government departments.

The CDRP's objectives are to:

- fund high quality cross-departmental research that will support the Government's policies
- facilitate new relationships and capabilities within and between departments so departments take greater responsibility for investing in long-term high quality research
- develop a portfolio of research activity divided between smaller, short-term projects to facilitate new relationships and capabilities, and multi-year large scale projects to provide key building blocks for the Government's decision making.

The CYMRC has developed a CDRP project with Public Health Intelligence within the Ministry of Health. This nationwide project *"Environmentally Sensitive Deaths in New Zealand Children and Youth: What are the modifiable factors?"* seeks to place trained health investigators into the coronial investigation team for two specific types of death – Sudden Unexpected Deaths in Infancy (SUDI), (50–60 deaths per year) and child and youth suicide deaths (about 100 deaths per year). The information collected will go directly to coroners and will also inform the CYMRC. These investigators will also assist families in accessing any health or support services needed. As part of the research team, and for SUDI deaths only, they will also ask the same questions (or similar) of a number of control families to establish the level of risk associated with specific environmental and social exposures that might then directly inform intervention at the population level.

Tina Ireland has been appointed Project Manager (employed by Public Health Intelligence (PHI) Ministry of Health) and progress on this project is expected in 2006.

1.4 Submission on the Coroner's Bill

The relationship between the CYMRC and the coroners is crucial to the functioning of mortality review processes. In light of this, the CYMRC took the opportunity to make a written submission to the Justice and Electoral Committee on the Coroners Bill.

The CYMRC submission supported the intent of the Coroners Bill and the need for a coronial system that is:

- more consistent and professional
- better resourced
- reflective of modern society
- able to be used to facilitate societal change and system improvement.

The submission identified issues related to a number of the Bill's clauses that the CYMRC considered may restrict the work of mortality review. The CYMRC supports the need for a coronial database and more specific legislation about transfer of information from coroners to the CYMR database.

1.5 Child and Youth Mortality Review database improvements

The CYMRC aims to ensure the CYMR database is as effective as possible. Several improvements have been made in 2005.

Changes have been made to allow information to be collected from lead clinicians for deaths occurring in hospital. In addition, data relating to medications prescribed in the three months prior to death have now been included from the New Zealand Health Information Service (NZHIS) Pharmhouse database, which holds information on the Pharmaceutical Management Agency (PHARMAC)-subsidised medicines.

Three changes have been made that directly effect local mortality review co-ordinators. First, there have been improvements in how local co-ordinators record a post-review case summary and, second, local co-ordinators are able to link multiple cases to common issues and recommendations to the national committee. Finally, an improved method of adding coronial and other written reports to the web database has been developed. This allows local co-ordinators to directly view the sometimes handwritten reports.

1.6 Bathing aids

A CYMRC and Water Safety New Zealand study, *Circumstances surrounding drowning in those under 25 in New Zealand (1980–2002),* examined the epidemiology of drowning in people aged 0–24 years in New Zealand to identify appropriate interventions that might reduce child and youth deaths from drowning. The full report is available on the CYMRC website (www.newhealth.govt.nz/cymrc) and the Water Safety New Zealand website (www.watersafety.org.nz).

One finding from the report was that 67 percent of infant and toddler drownings occurred in the bathtub. The potential risk posed by bathing aids (eg, baby bath seats) are of concern. The CYMRC met with the Ministry of Consumer Affairs to discuss the CYMRC's concerns.

SAFEKIDS shares the CYMRC's concerns about the risks associated with baby bath seats and has agreed a joint approach to highlighting the risks. A joint letter, and poster prepared by SAFEKIDS, urging the banning of baby bath seats has been sent to the Minister of Consumer Affairs.

2 Child and Youth Mortality

2.1 Introduction

Historical and population data

The CYMRC has reviewed available child and youth mortality figures and historical trends in New Zealand. The sources of data were:

- the New Zealand Health Information Service (NZHIS) for historic mortality rate data and also 2001 population data by ethnicity and age group
- Statistics New Zealand for live births and the mean resident population estimates for 2002, 2003 and 2004 for the total child and youth population and by age group (estimates for population data for all ethnic groups are not available for between-census years)
- the CYMRC database for mortality data for the years 2002 to 2004.

Information collected and kept by the NZHIS has been available in public reports since the 1930s. Usually official information is reported on average three years after the completion of each year. For this report, historic data we are reporting are data from 1979 until 2001. It is important to note that, NZHIS official death statistics are based on the year of registration of death, in contrast with the CYMRC data which are based on the date of death.

CYMRC data

An important issue to note in interpreting the CYMRC data is that the data are derived from a database that is continually being updated. This may be perceived as a limitation, however, the Child and Youth Mortality Data Group (the Data Group) believes very few deaths will be notified to it more than one year after the death and the rates will be comparable with finalised NZHIS figures. This will be able to be tested against the NZHIS official statistics for 2002.

The CYMRC collects data on deaths from 1 January 2002. Data come from a variety of sources including:

- individual coroners
- Births, Deaths and Marriages
- Ministry of Transport
- local CYMRC agents
- NZHIS
- clinicians
- Ministry of Justice
- Water Safety New Zealand.

Further data sources are being investigated.

Data from the various sources are linked using the National Health Index (NHI). Linking data received is not always straightforward, because:

- an individual may have several different NHI numbers
- an individual may have no NHI number

- some individuals are registered with different names and/or addresses to those recorded with the NHI or by the police
- of the delay in Births, Deaths and Marriages (Department of Internal Affairs) registration of some deaths.

Based on the information obtained, the data are coded across a range of variables. These include NHI, age group, ethnicity, the underlying cause of death and the DHB for each of: the usual residence (if known), the place of death and the region that should review the death. This process is overseen by members of the Data Group.

The category, cause and intent of all deaths has been checked and recoded when appropriate for all 2002 to 2004 deaths. Members of the Data Group designate the cause as the single underlying cause most likely to be considered preventable – usually the most distal of the specific identifiable causes that led to death. For example, where the actual death is by drowning, but the drowning is directly due to a prior transport incident, the cause of death has been recorded as transport.

As the CYMRC focus is prevention, an 'undetermined intent' code has been assigned to deaths where the person was participating in high-risk or reckless behaviour (e.g. butane inhalation or heavy alcohol consumption). Although the coroner may have found that death was accidental there are important preventable factors associated with such high-risk deaths, for example binge drinking, that can be identified within the data.

In 2005, a recoding exercise for all deaths was undertaken on the CYMR data. There appeared to be considerable discrepancy in how some jurisdictions described the cause of death when this occurred unexpectedly during sleep in infancy. In the recoding, if the death of an infant was sudden and unexpected, with no history of prior significant symptoms, then the death was labelled as SUDI. Previously, some were coded as infectious deaths on the basis of minor degrees of infection recorded at postmortem. The recoding has led to an increase in the total number of SUDI deaths for 2002/2003 from 89 deaths in the last report to 117 in the current report.

Method used to produce tables

The following method was used to produce the information found in this section of the report.

- The data were extracted from the CYMR database on 15 December 2005.
- The *Year of death* refers to calendar year of actual death (not of death registration).
- The *'Awaiting Coroner'* category refers to deaths for which no coroner's findings have yet been received and no information regarding the cause of death has been received from other sources.
- The cause *Transport/vehicular* includes deaths involving on and off road vehicles as well as trains, planes and watercraft.
- The denominator for mortality rates by ethnicity is taken from 2001 New Zealand Census numbers (by age group and ethnicity), rather than estimated mean resident population which is provided by Statistics New Zealand as a series of population projections for each year. This may produce slightly higher rates within all ethnic groups as projected estimated resident population for each group increases for each year.
- For the first time we have excluded deaths from non-New Zealand residents from the main sections of our report. A separate section (2.7) on deaths of overseas visitors is included so that we do not lose information on this important group of deaths. This has

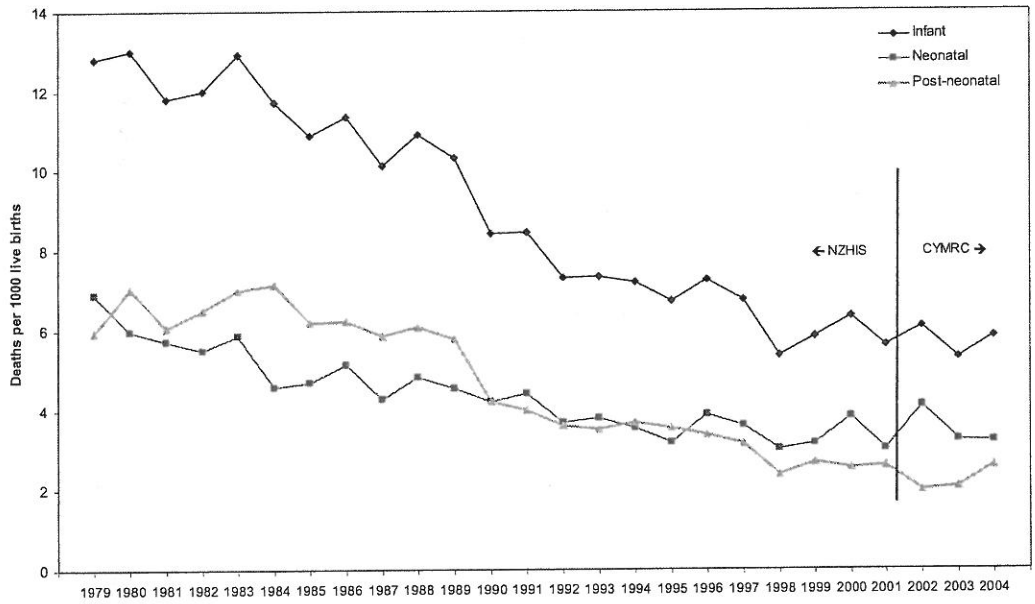
been done because the denominator in rate calculations does not include anyone who has not been resident in New Zealand more than six months.

2.2 Infant mortality (deaths in the first year of life)

Infant mortality – trends over time

Figure 1 shows trends over time from 1979 to 2004 for infant mortality, neonatal mortality and post-neonatal mortality. Infant mortality is the sum of neonatal (under 28 days) and post-neonatal (four weeks but less that one year) mortality. Mortality rates for the total infant population and by ethnicity are calculated from the Statistics New Zealand birth data for each year and rates are calculated as the number of deaths per 1000 live births in the respective year.

Figure 1: Infant, neonatal and post-neonatal mortality (rate per 1000 live births) by year 1979–2004



2.3 Post-neonatal mortality (28 days to 12 months)

Figure 2: Post-neonatal mortality (%) by category for 2002–2004 combined (374 deaths in total)

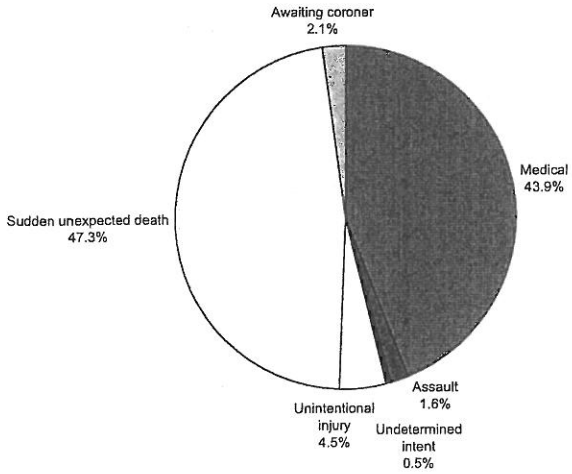


Table 1: Post-neonatal mortality (number and age-specific rate per 1000 live births) by cause and by year 2002–2004

Category	Cause	Deaths					Rate (per 1000 live births)		
		2002	2003	2004	Total	%	2002	2003	2004
Medical	Infectious and parasitic disease	10	10	22	42	11.2	0.19	0.18	0.38
	Neoplasms		2	1	3	0.8	0.00	0.04	0.02
	Endocrine, nutritional and metabolic diseases	1	1	2	4	1.1	0.02	0.02	0.03
	Diseases of nervous system		6	5	11	2.9	0.00	0.11	0.09
	Diseases of circulatory system	4	2	1	7	1.9	0.07	0.04	0.02
	Diseases of respiratory system		2		2	0.5	0.00	0.04	0.00
	Diseases of digestive system		1	3	4	1.1	0.00	0.02	0.05
	Diseases of genitourinary system			1	1	0.3	0.00	0.00	0.02
	Certain conditions originating in the perinatal period	15	9	12	36	9.6	0.28	0.16	0.21
	Congenital malformations, deformations and chromosomal abnormalities	20	17	17	54	14.4	0.37	0.30	0.29
	Total medical	**50**	**50**	**64**	**164**	**43.9**	**0.93**	**0.89**	**1.10**
Unintentional injury	Drowning/submersion	1	1	1	3	0.8	0.02	0.02	0.02
	Fire/burn/heat/smoke			1	1	0.3	0.00	0.00	0.02
	Transport	2		4	6	1.6	0.04	0.00	0.07
	Struck by, against			1	1	0.3	0.00	0.00	0.02
	Suffocation	2	2	2	6	1.6	0.04	0.04	0.03
	Total unintentional injury	**5**	**3**	**9**	**17**	**4.5**	**0.09**	**0.05**	**0.15**
Assault	Cut/pierce			1	1	0.3	0.00	0.00	0.02
	Struck by, against	1		1	2	0.5	0.02	0.00	0.02

	Suffocation	1		2	3	0.8	0.02	0.00	0.03
	Total assault	**2**		**4**	**6**	**1.6**	**0.04**	**0.00**	**0.07**
Undetermined intent	Firearm	1			1	0.3	0.02	0.00	0.00
	Struck by, against			1	1	0.3	0.00	0.00	0.02
	Total undetermined intent	**1**		**1**	**2**	**0.5**	**0.02**	**0.00**	**0.02**
Sudden unexpected death	**Total sudden unexpected death**	**48**	**60**	**69**	**177**	**47.3**	**0.89**	**1.07**	**1.19**
Coroner	**Total awaiting coroner**	**1**	**3**	**4**	**8**	**2.1**	**0.02**	**0.05**	**0.07**
Total		**107**	**116**	**151**	**374**	**100**	**1.98**	**2.07**	**2.60**

Figure 3: Post-neonatal mortality (age-specific rate per 1000 live births) for Māori and non-Māori, by year 2002–2004

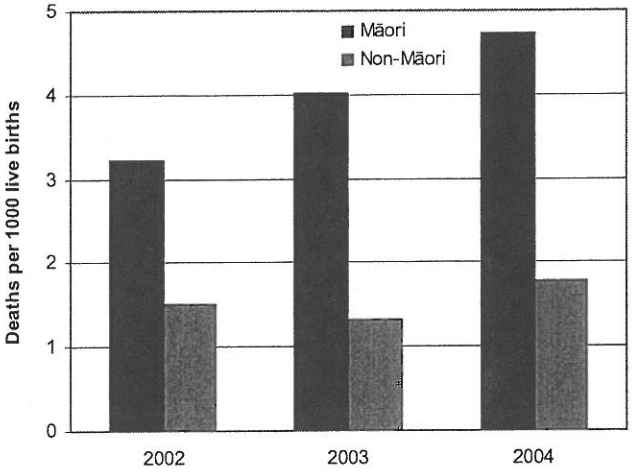


Table 2: SUDI deaths (number of deaths) by ethnicity, age and gender for 2002–2004 combined

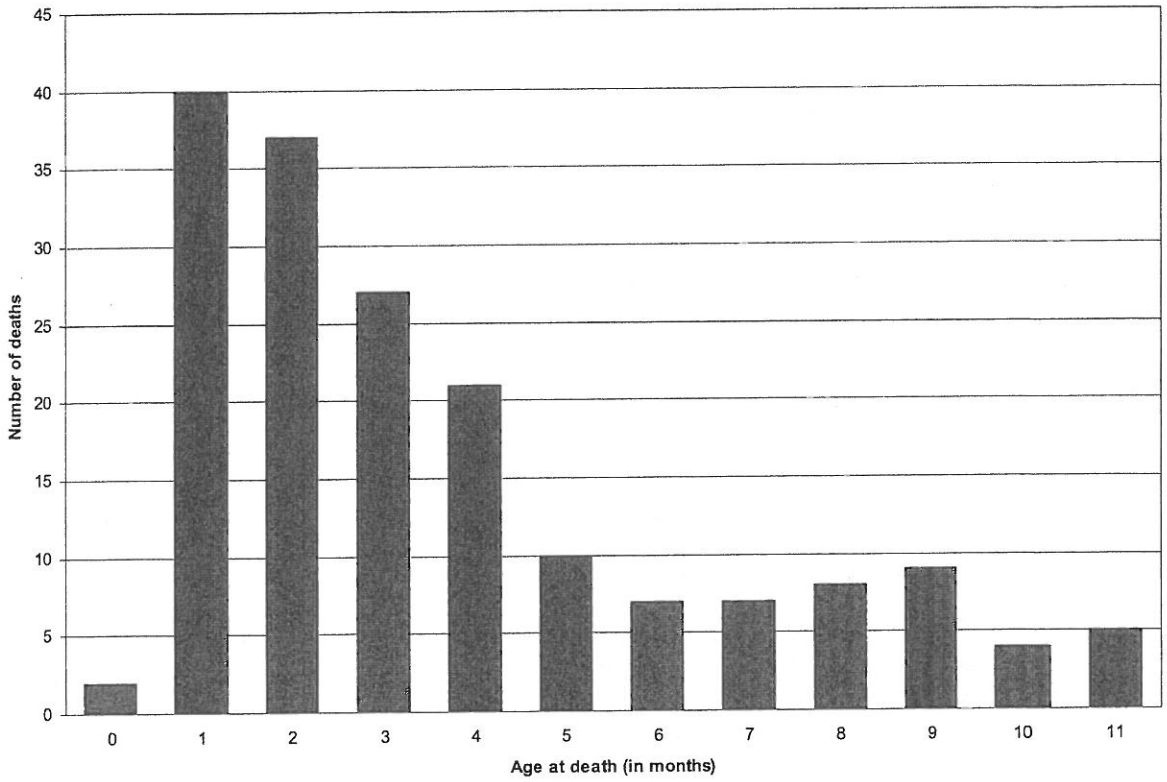
Ethnicity	Female			Male			Total
	4–52 weeks	1–4 years	Total	4–52 weeks	1–4 years	Total	
Māori	54	0	54	62	5	67	121
Pacific Island	13	1	14	8	0	8	22
Asian	0	0	0	1	0	1	1
Other	12	2	14	27	5	32	46
Total	**79**	**3**	**82**	**98**	**10**	**108**	**190**

Table 3: SUDI deaths (numbers and rates per 1000 live births) by ethnicity and year 2002–2004

Ethnicity	4–52 weeks							1–4 years			
	2002		2003		2004		Total	2002	2003	2004	Total
	Number	Rate	Number	Rate	Number	Rate					
Māori	30	2.02	42	2.68	44	2.71	116	1	2	2	5

Pacific Island	7	1.21	5	0.83	9	1.45	21		1		1
Other	11	0.33	13	0.38	16	0.45	40	3	2	2	7
Total	**48**	**0.89**	**60**	**1.07**	**69**	**1.19**	**177**	**4**	**5**	**4**	**13**

Figure 4: SUDI deaths (numbers) by age of death (months) 2002–2004 combined



Discussion

Historical trends over time

Figure 1 shows a reducing rate of infant mortality (both neonatal and post-neonatal mortality) over the time from 1979 to 1998 with rates for years from 1999 to 2004 being similar with no apparent reduction.

Leading causes of post-neonatal death

The majority of post-neonatal deaths occur outside hospital. SUDI (47%) and underlying medical illness (44%) are the two largest categories. Within medical cause of death, there has been an increase in infection-related deaths (from 10 in 2003 to 22 in 2004). The available information does not identify any specific reason for this increase and the CYMRC will monitor whether this is the start of a trend or a random increase.

Sudden Unexpected Death in Infancy (SUDI)

In the period from 2002–2004, SUDI accounts for approximately half (47%) of the total post-neonatal mortality rate and therefore is a strong contributor to patterns of post-neonatal mortality. The historical trends shown in Figure 1 are consistent with falling SUDI rates with particular falls from 1987/88 to 1991 and then a slower fall over the following

years to 1998. The trend from 1998 to 2004 seems to vary around a horizontal line, indicating no appreciable change.

The high post-neonatal SUDI rate evident from 2002–2004 is of concern. The number of SUDI in this period rose from 48 in 2002 to 60 in 2003 and 69 in 2004, with the SUDI rate rising from 0.89 in 2002 to 1.07 in 2003 and 1.19 in 2004 (refer Table 1). Findings for SUDI among Māori are particularly concerning with 65% of the total SUDI deaths (116 of 177) being Māori babies (Table 2). Table 3 indicates that two-thirds of the increased SUDI deaths (i.e. 14 of 21) between 2002 and 2004 are Māori babies.

Preliminary post-neonatal figures for 2005 indicate a lower number and rate of deaths and suggest that the longer-term trend is one of very little change, which is consistent with the view from 1998.

The rates themselves, however, give no cause for complacency for several reasons. Firstly, the previously documented decline in post-neonatal (and SUDI) deaths has stopped from 1998 onwards. Secondly, the rates are much higher than for comparable countries (e.g. the SUDI rate in the United States of America for 2002 was 0.57). Finally, the burden of mortality is largely borne by the Māori community. The Māori SUDI rate for this period is over five times the non-Māori/non-Pacific rate.

Pacific SUDI deaths appear to be constant over this period. However, it is of concern that Pacific SUDI deaths comprise 11% of the total number of SUDI deaths and that the rate is three times the non-Pacific/non-Māori rate. The non-Māori/non-Pacific SIDS rate of 0.45 is consistent with the rate of 0.57 in the United States of America referred to above.

The persistently high SUDI mortality rate indicates that extra effort and resource are needed for effective health promotion and SUDI prevention, directed primarily to reducing SUDI in the Māori and Pacific communities where rates are respectively five and three times higher than non-Māori/non-Pacific New Zealanders. Although there has been public information and parent education campaigns that target safe sleeping practices (i.e. babies sleeping on their back, the avoidance of maternal smoking, no bed sharing when the mother is a smoker, and avoiding covering the baby's face), the rate of SUDI deaths remains high. Health messages and strategies for delivering messages to Māori and Pacific communities need to be specifically developed in recognition that the 'one size fits all' brand of health marketing is ineffective in the New Zealand environment. In addition, broader health promotion approaches addressing the needs of Māori and Pacific families must be considered.

Finally, there is recent research and recommendations by the American Academy of Pediatrics – especially their recommendation for the use of dummies (pacifiers) after one month of age as a measure to prevent SUDI. New Zealand needs to re-evaluate both the content and implementation of its current public health recommendations on SUDI prevention.

Child and Youth Mortality Review Group (CYMRG) feedback on post-neonatal issues

Local case reviews identify issues around continuity of care when responsibility is transferred from the Lead Maternity Carer to Well Child services. CYMRC identified that there is no consistent follow-up process established between agencies to manage this transfer and there is no overlap period to better ensure a successful transition between services. This is important as early (during pregnancy if possible) and ongoing contact with Well Child providers who focus on prevention is essential to enable a relationship that is trusted and used to decrease risk to vulnerable babies.

In addition the need for successful communication and linkages between agencies/organisations is also identified in relation to incidents of post-neonatal drowning. There is a need for national consistency of processes for emergency services responding to a drowning in this age group to ensure that resuscitation is appropriately implemented.

Therefore, the CYMRC recommends that:

- the Ministry of Health re-evaluates its current SUDI prevention messages and health promotion strategies and considers ways for effective health promotion strategies about baby-safe environments, particularly those relating to safe sleeping practices and smoking during pregnancy – these strategies need to be effective in Māori and Pacific communities
- the Minister of Health note the CYMRC's concern that in some cases there is poor continuity of care in the post-neonatal age group.

2.4 Child mortality

The child mortality figures and tables are shown for three age bands:

- 1–4 years (Figures 5, 6 and 7, and Table 4)
- 5–9 years (Figures 8, 9 and 10, and Table 5)
- 10–14 years (Figures 11, 12 and 13, and Table 6).

The mortality rates for overall findings are calculated as the number of deaths per 100,000 estimated mean resident population of the respective age groups.

However, mortality rates for differing ethnic groups is calculated from a denominator sourced from 2001 New Zealand Census population numbers, due to a lack of availability of projected populations for specific ethnic groups between census years. This produces slightly higher rates than would be found if an estimated mean resident population figure was available (as estimated mean resident population goes up each year).

Overall, across the child age groups, the age of lowest mortality is between the ages of five and nine years. Medical causes (combined) are the leading cause of death, however over one-third of deaths are due to unintentional injury, with transport accidents being the major contributor.

2.4.1 Children aged 1–4 years

Figure 5: Mortality (age-specific rates per 100,000) in children aged 1–4 years by year 1979–2004

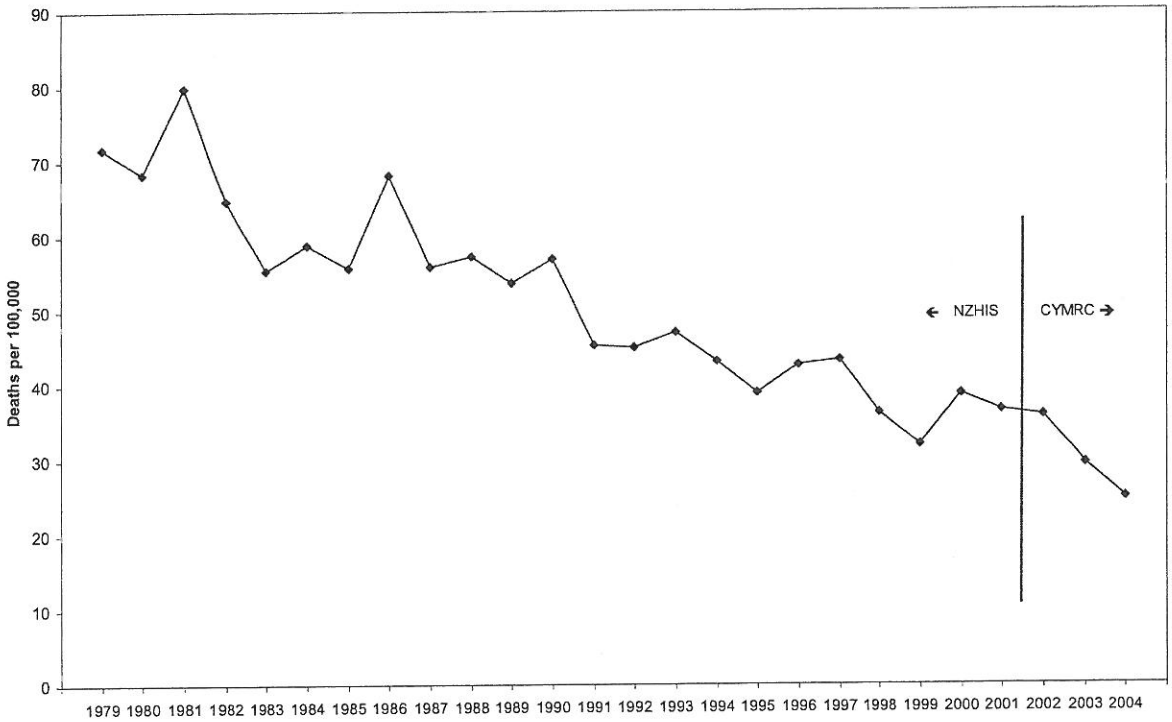


Figure 6: Mortality in children aged 1–4 years (%) by category of death, 2002–2004 combined (203 deaths)

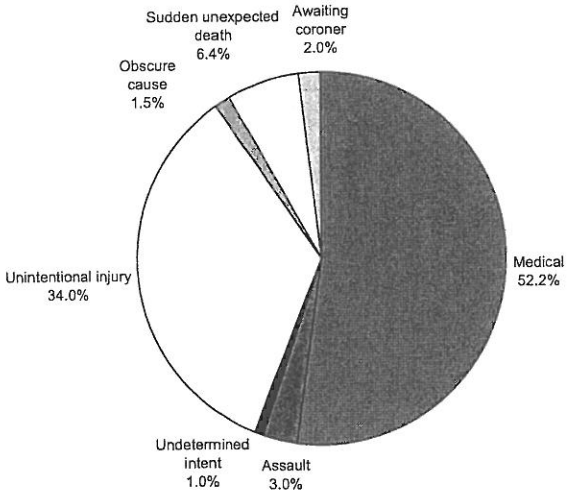
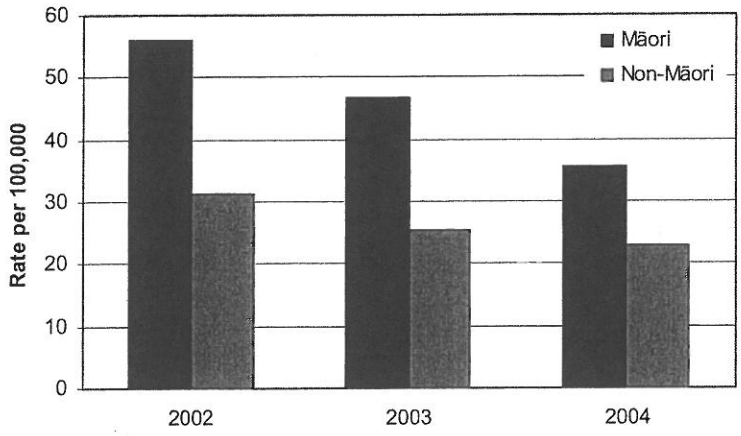


Table 4: Mortality in children aged 1–4 years (number of deaths and age-specific rate per 100,000) by cause and year 2002–2004

Category	Cause	Deaths					Rate (per 100,000)		
		2002	2003	2004	Total	%	2002	2003	2004
Medical	Infectious and parasitic disease	10	6	5	21	10.3	4.43	2.68	2.23
	Neoplasms	8	6	4	18	8.9	3.54	2.68	1.78
	Endocrine, nutritional and metabolic diseases	7	4	2	13	6.4	3.10	1.79	0.89
	Diseases of nervous system	4	4	1	9	4.4	1.77	1.79	0.45
	Diseases of circulatory system		1	2	3	1.5	0.00	0.45	0.89
	Diseases of respiratory system		1	1	2	1.0	0.00	0.45	0.45
	Diseases of digestive system	1	1	3	5	2.5	0.44	0.45	1.34
	Certain conditions originating in the perinatal period	6	4	2	12	5.9	2.66	1.79	0.89
	Congenital malformations, deformations and chromosomal abnormalities	3	10	10	23	11.3	1.33	4.46	4.45
	Total medical	**39**	**37**	**30**	**106**	**52.2**	**17.27**	**16.51**	**13.36**
Unintentional injury	Drowning/submersion	12	8	3	23	11.3	5.31	3.57	1.34
	Fall		1	1	2	1.0	0.00	0.45	0.45
	Fire/burn/heat/smoke	6	1		7	3.4	2.66	0.45	0.00
	Transport	9	10	9	28	13.8	3.99	4.46	4.01
	Poisoning	1		1	2	1.0	0.44	0.00	0.45
	Struck by, against	1			1	0.5	0.44	0.00	0.00
	Suffocation	2	2	1	5	2.5	0.89	0.89	0.45
	Electrocution	1			1	0.5	0.44	0.00	0.00
	Total unintentional injury	**32**	**22**	**15**	**69**	**34.0**	**14.17**	**9.82**	**6.68**
Assault	Cut/pierce			2	2	1.0	0.00	0.00	0.89
	Struck by, against	2	1	1	4	2.0	0.89	0.45	0.45
	Total assault	**2**	**1**	**3**	**6**	**3.0**	**0.89**	**0.45**	**1.34**
Undetermined intent	Transport			1	1	0.5	0.00	0.00	0.45
	Suffocation			1	1	0.5	0.00	0.00	0.45
	Total undetermined intent			**2**	**2**	**1.0**	**0.00**	**0.00**	**0.89**
Sudden unexpected death	**Total sudden unexpected death**	**4**	**5**	**4**	**13**	**6.4**	**1.77**	**2.23**	**1.78**
Obscure cause	**Total obscure cause**	**2**		**1**	**3**	**1.5**	**0.89**	**0.00**	**0.45**
Coroner	**Total awaiting coroner**	**2**	**1**	**1**	**4**	**2.0**	**0.89**	**0.45**	**0.45**
Total		**81**	**66**	**56**	**203**	**100**	**35.88**	**29.46**	**24.94**

Figure 7: Mortality (age-specific rate per 100,000) in Māori and non-Māori children aged 1–4 years, by year 2002–2004



Discussion

Figure 5 shows that over time from 1979 to 2004 there has been a decline in the mortality rate among 1–4 year-olds.

Overall, medical causes combined are the leading category of death. Within this category specific causes of congenital abnormality, infectious disease and neoplasm together make up 60% of medical deaths. Unintentional injury was the second leading category with transport deaths and drowning being important causes of death in this age group.

Transport deaths were the single leading cause of death overall and the rate of mortality due to 'transport' continues to be a concern. Case reviews raise concerns over incidents of deaths in home driveways where a driver has not seen a child behind the vehicle when reversing. The CYMRC commissioned research into vehicular deaths among children and young people. The CYMRC is considering the findings presented (refer section 4.2 Transport injuries).

Although drowning is an important cause of mortality in this age group, there has been a decrease in the rate of drowning in this age group between 2002 and 2004 (from 12 in 2002 to 3 in 2004). It is noted that baby bath seats were implicated in three deaths in 2002–2004 (see section 1.6). Water safety remains an ongoing issue in this age group and strategies to reduce drowning including effective messages about water safety, particularly bath tub and swimming pool safety should continue to be promoted.

In this age group in particular, the issue of vigilance over toddlers and small children is reinforced. A key issue common to many unintentional injury deaths is the need for families and caregivers to be constantly aware of where toddlers are and to supervise activities closely.

When findings for ethnicity are looked at there was a reduction in mortality between 2002 and 2004 with Māori deaths decreasing from 30 in 2002 to 19 in 2004 and non-Māori deaths decreasing from 51 to 37 deaths.

The CYMRC recommends that:

- the Minister note that CYMRC has written jointly with SAFEKIDS to the Minister of Consumer Affairs asking her to consider the banning of baby bath seats in New Zealand.

2.4.2 Children aged 5–9 years

Figure 8: Mortality (age-specific rates per 100,000) in children aged 5–9 years by year 1979–2004

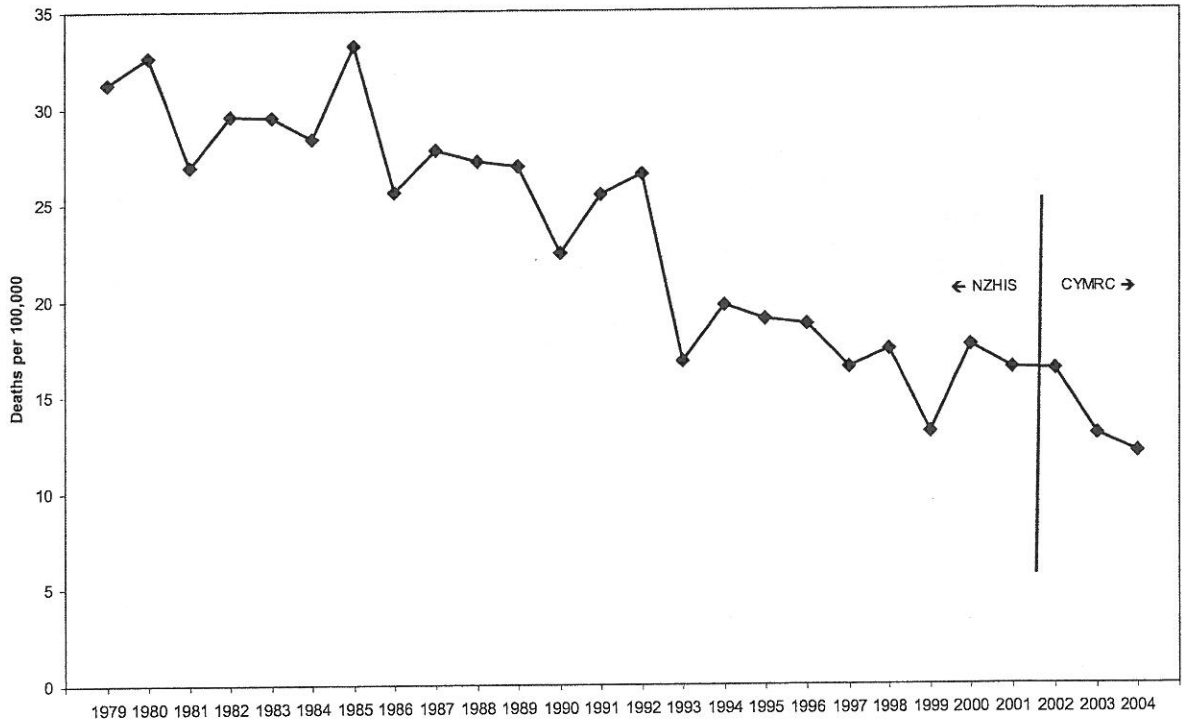


Figure 9: Mortality in children aged 5–9 years (%) by category of death, 2002–2004 combined (121 deaths)

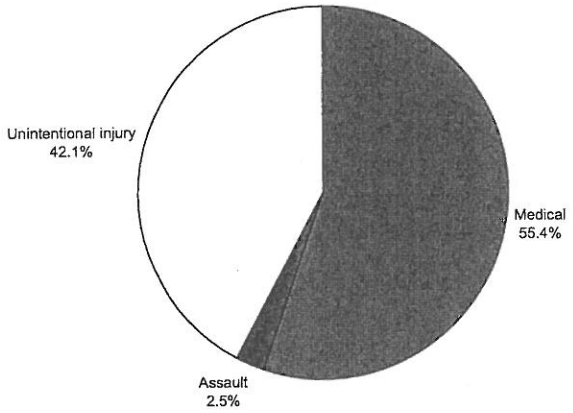
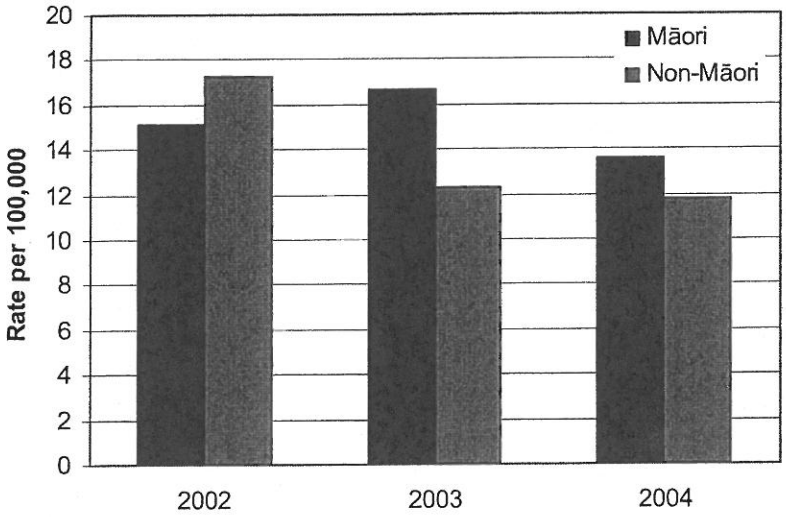


Table 5: Mortality in children aged 5–9 years (number of deaths and age-specific rate per 100,000) by cause and year 2002–2004

Category	Cause	Deaths					Rate (per 100,000)		
		2002	2003	2004	Total	%	2002	2003	2004
Medical	Infectious and parasitic disease	5	3		8	6.6	1.71	1.02	0.00
	Neoplasms	12	6	5	23	19.0	4.09	2.05	1.72
	Endocrine, nutritional and metabolic diseases		1	2	3	2.5	0.00	0.34	0.69
	Diseases of nervous system	1	1	3	5	4.1	0.34	0.34	1.03
	Diseases of circulatory system	3	4		7	5.8	1.02	1.36	0.00
	Diseases of respiratory system	2	1	1	4	3.3	0.68	0.34	0.34
	Diseases of digestive system	1			1	0.8	0.34	0.00	0.00
	Diseases of genitourinary system		1		1	0.8	0.00	0.34	0.00
	Certain conditions originating in the perinatal period	2	1	5	8	6.6	0.68	0.34	1.72
	Congenital malformations, deformations and chromosomal abnormalities	4	1	2	7	5.8	1.36	0.34	0.69
	Total medical	**30**	**19**	**18**	**67**	**55.4**	**10.23**	**6.48**	**6.19**
Unintentional injury	Drowning/submersion	4	2	5	11	9.1	1.36	0.68	1.72
	Fire/burn/heat/smoke		5		5	4.1	0.00	1.71	0.00
	Transport	14	9	9	32	26.4	4.77	3.07	3.09
	Struck by, against		1		1	0.8	0.00	0.34	0.00
	Suffocation		1	1	2	1.7	0.00	0.34	0.34
	Total unintentional injury	**18**	**18**	**15**	**51**	**42.1**	**6.14**	**6.14**	**5.16**
Assault	Cut/pierce			1	1	0.8	0.00	0.00	0.34
	Struck by, against		1	1	2	1.7	0.00	0.34	0.34
	Total assault		**1**	**2**	**3**	**2.5**	**0.00**	**0.34**	**0.69**
Total		**48**	**38**	**35**	**121**	**100.0**	**16.37**	**12.96**	**12.03**

Figure 10: Mortality (age-specific rate per 100,000) in Māori and non-Māori children aged 5–9 years, by year 2002–2004



Discussion

Figure 8 shows that overall there has been a decline in mortality among 5–9 year-olds from 1979. The leading category for mortality is medical causes making up 55.4% of all death followed by unintentional injury making up 42.1% of all deaths. Transport deaths were the single leading cause of death making up 26.4% of all deaths in 5–9 year-olds.

Rates of mortality between Māori and non-Māori are similar across 2002 to 2004.

2.4.3 Children aged 10–14 years

Figure 11: Mortality (age-specific rates per 100,000) in children aged 10–14 years by year 1979–2004

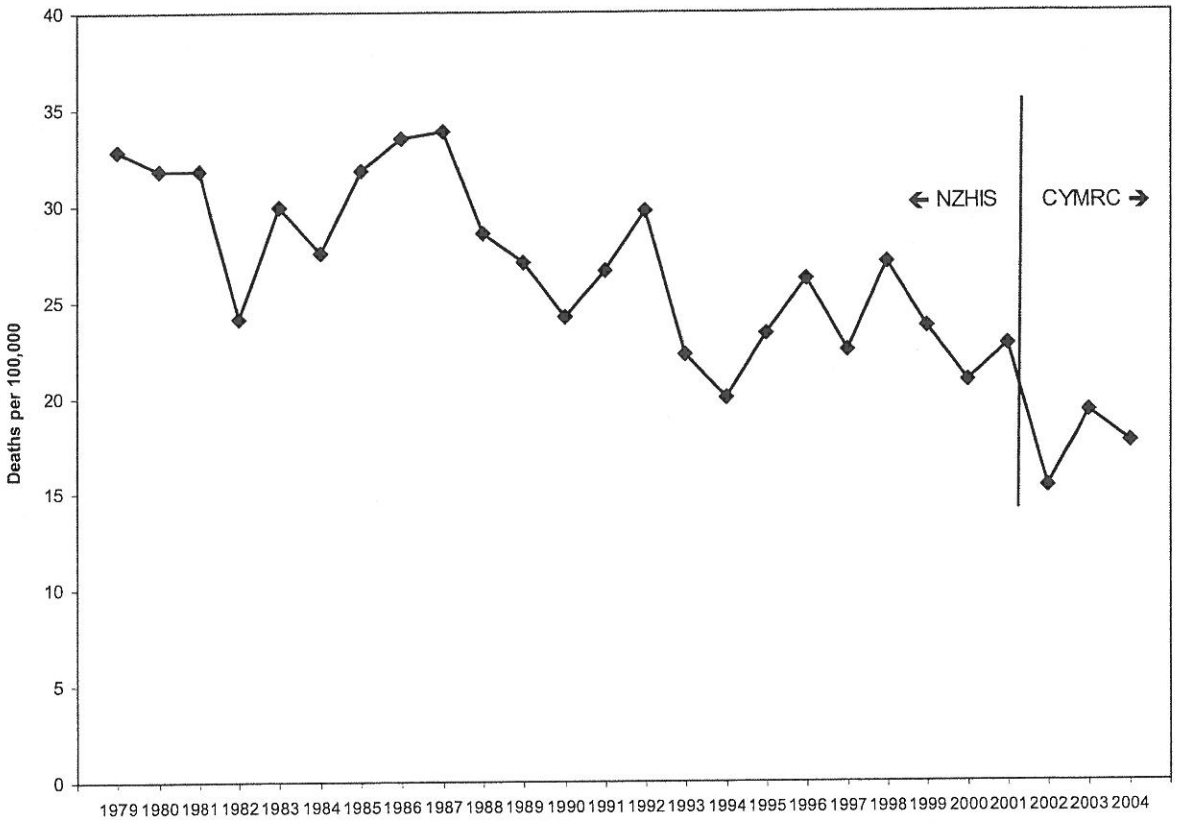


Figure 12: Mortality in children aged 10–14 years (%) by category of death, 2002–2004 combined (162 deaths)

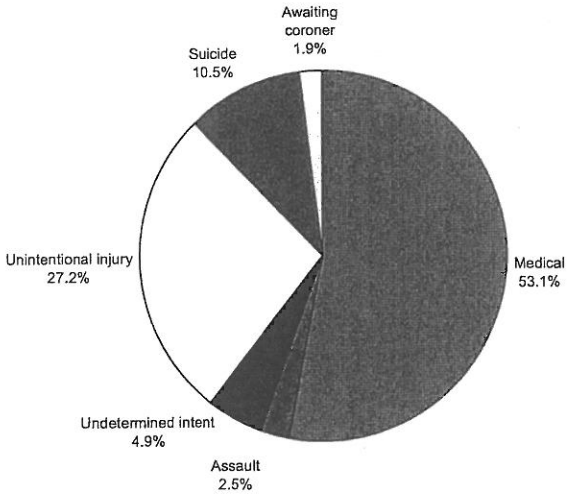
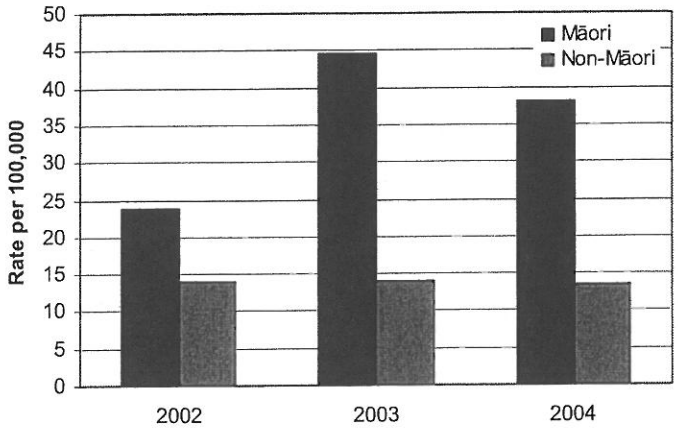


Table 6: Mortality in children aged 10–14 years (number of deaths and age-specific rate per 100,000), by cause and year 2002–2004

Category	Cause	Deaths					Rate (per 100,000)		
		2002	2003	2004	Total	%	2002	2003	2004
Medical	Infectious and parasitic disease		3	1	4	2.5	0.00	0.96	0.32
	Neoplasms	9	9	13	31	19.1	2.93	2.89	4.17
	Endocrine, nutritional and metabolic diseases	2	1	2	5	3.1	0.65	0.32	0.64
	Diseases of nervous system	3	7	6	16	9.9	0.98	2.25	1.92
	Diseases of circulatory system	2	2	4	8	4.9	0.65	0.64	1.28
	Diseases of respiratory system	1	2	1	4	2.5	0.33	0.64	0.32
	Diseases of digestive system			1	1	0.6	0.00	0.00	0.32
	Diseases of genitourinary system		1		1	0.6	0.00	0.32	0.00
	Certain conditions originating in the perinatal period	2	5	1	8	4.9	0.65	1.60	0.32
	Congenital malformations, deformations and chromosomal abnormalities	2	5	1	8	4.9	0.65	1.60	0.32
	Total medical	**21**	**35**	**30**	**86**	**53.1**	**6.83**	**11.23**	**9.62**
Unintentional injury	Drowning/submersion	1	2	2	5	3.1	0.33	0.64	0.64
	Fall	2	1		3	1.9	0.65	0.32	0.00
	Fire/burn/heat/smoke		1		1	0.6	0.00	0.32	0.00
	Transport	16	9	6	31	19.1	5.20	2.89	1.92
	Natural/environmental/animal			1	1	0.6	0.00	0.00	0.32
	Poisoning		1		1	0.6	0.00	0.32	0.00
	Suffocation		1	1	2	1.2	0.00	0.32	0.32
	Total unintentional injury	**19**	**15**	**10**	**44**	**27.2**	**6.18**	**4.81**	**3.21**
Suicide	Firearm			2	2	1.2	0.00	0.00	0.64
	Poisoning			1	1	0.6	0.00	0.00	0.32
	Suffocation	2	6	6	14	8.6	0.65	1.93	1.92
	Total suicide	**2**	**6**	**9**	**17**	**10.5**	**0.65**	**1.93**	**2.88**
Assault	Cut/pierce			1	1	0.6	0.00	0.00	0.32
	Struck by, against	2		1	3	1.9	0.65	0.00	0.32
	Total assault	**2**		**2**	**4**	**2.5**	**0.65**	**0.00**	**0.64**
Undetermined intent	Drowning/submersion		1		1	0.6	0.00	0.32	0.00
	Transport	2	1	1	4	2.5	0.65	0.32	0.32
	Poisoning	1		1	2	1.2	0.33	0.00	0.32
	Struck by, against		1		1	0.6	0.00	0.32	0.00
	Total undetermined intent	**3**	**3**	**2**	**8**	**4.9**	**0.98**	**0.96**	**0.64**
Coroner	**Total awaiting coroner**		**1**	**2**	**3**	**1.9**	**0.00**	**0.32**	**0.64**
Total		**47**	**60**	**55**	**162**	**100.0**	**15.29**	**19.26**	**17.63**

Figure 13: Mortality (age-specific rate per 100,000) in Māori and non-Māori children aged 10–14 years, by year 2002–2004



Discussion

Figure 11 shows a slow decrease in mortality in 10–14 year-olds from 1979 onwards. The leading category of deaths are medical deaths which make up over half of all deaths in this age group. Among medical deaths cancer deaths make up one third. Unintentional injury is the next leading category of death with transport deaths accounting for two-thirds. Although vehicular accidents account for a high proportion of deaths, the rate in 2004 is lower than in previous years. The transport group of deaths includes four deaths related to the use of quad/farm bikes.

The emergence of an increasing number of suicides in this age group is of extreme concern (from two in 2002 to nine in 2004). Suffocation (e.g. hanging) is recorded as the means of suicide in two-thirds of suicide deaths for this age group.

Of note, over 10% of all deaths in this age group were due to suicide. This raises a number of issues including the need to ensure monitoring of suicide trends in this age group, the need to ensure suicide strategies include addressing suicide in this age group and the need to ensure support systems and services for families where children die due to suicide.

There are considerable disparities in mortality between Māori and non-Māori in this age group with Māori rates being around three times higher than non-Māori in 2004. Although there was no increase in non-Māori deaths from 2002 to 2004, there was an increase among Māori children (from 15 in 2002 to 24 in 2004).

The CYMRC recommends that:

- the Minister notes the emergence of suicide in the 10–14 year age group and that CYMRC will write to other relevant groups including the All Ages Suicide Prevention Strategy Group about this issue.

2.5 Youth mortality

Youth mortality is divided into two age groups:

- 15–19 years (Figures 14, 15 and 16 and Table 7)
- 20–24 years (Figures 17, 18 and 19 and Table 8).

In these groups, unintentional injury and suicide are leading causes of death.

Mortality rates are calculated as the number of deaths per 100,000 estimated mean resident population of the respective age group.

The denominator for mortality rates by ethnicity is taken from 2001 New Zealand Census numbers (by age group and ethnicity), rather than estimated mean resident population which is provided by Statistics New Zealand as a series of population projections for each year. This may produce slightly higher rates within all ethnic groups as projected estimated resident population for each group increases for each year.

A significant group of injury deaths exists where the intent was unclear or no coronial decision on intent has been made. In future reports, and in collaboration with Australian Mortality review systems, we plan to report on a new category of deaths – those who die doing obviously seriously dangerous activities, where it is not obvious that the intent is to immediately cause death (but there is considerable risk of death).

2.5.1 Youth aged 15–19 years

Figure 14: Mortality (age-specific rates per 100,000) in youth aged 15–19 years by year 1979–2004

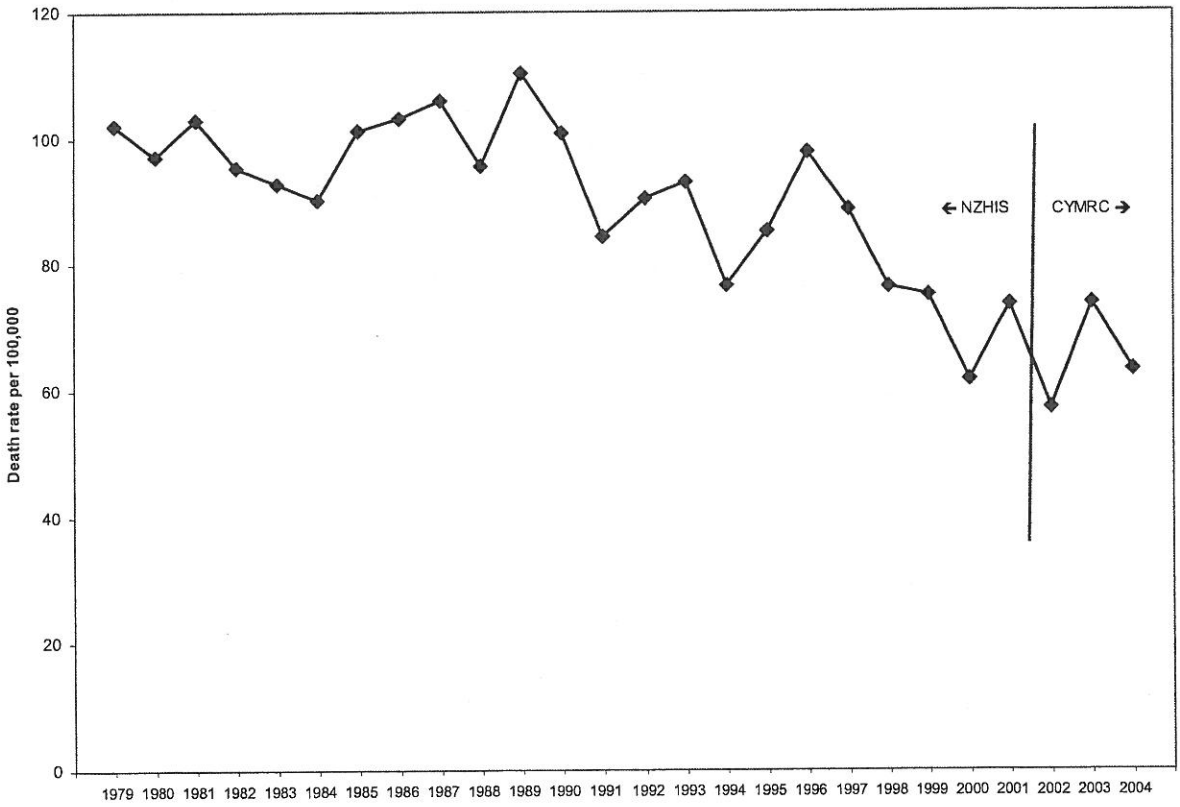


Figure 15: Mortality in youth aged 15–19 years (%) by category of death, 2002–2004 combined (572 deaths)

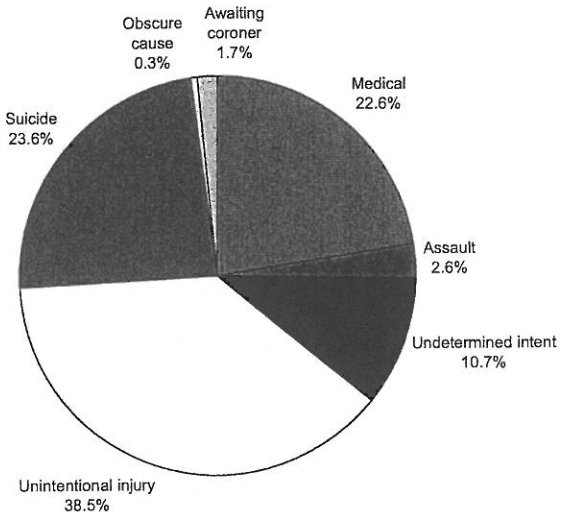
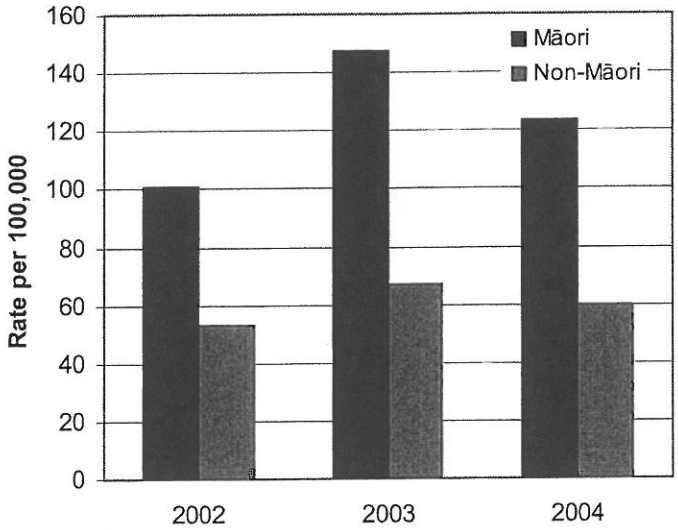


Table 7: Mortality in youth aged 15–19 years (number of deaths and age-specific rate per 100,000), by cause and year 2002–2004

Category	Cause	Deaths					Rate (per 100,000)		
		2002	2003	2004	Total	%	2002	2003	2004
Medical	Infectious and parasitic disease	8	7		15	2.6	2.79	2.37	0.00
	Neoplasms	7	17	11	35	6.1	2.44	5.75	3.66
	Diseases of the blood and blood-forming organs and disorders of immune system		1		1	0.2	0.00	0.34	0.00
	Endocrine, nutritional and metabolic diseases			1	1	0.2	0.00	0.00	0.33
	Mental and behavioural disorders	1			1	0.2	0.35	0.00	0.00
	Diseases of nervous system	8	5	6	19	3.3	2.79	1.69	2.00
	Diseases of circulatory system	7	5	8	20	3.5	2.44	1.69	2.66
	Diseases of respiratory system	2	3	6	11	1.9	0.70	1.02	2.00
	Diseases of digestive system		2		2	0.3	0.00	0.68	0.00
	Diseases of musculoskeletal system and connective tissue	1			1	0.2	0.35	0.00	0.00
	Diseases of genitourinary system		3		3	0.5	0.00	1.02	0.00
	Certain conditions originating in the perinatal period	2	1	1	4	0.7	0.70	0.34	0.33
	Congenital malformations, deformations and chromosomal abnormalities	3	8	5	16	2.8	1.05	2.71	1.66
	Total medical	**39**	**51**	**38**	**129**	**22.6**	**13.60**	**17.26**	**12.65**

Category	Cause	Deaths					Rate (per 100,000)		
		2002	2003	2004	Total	%	2002	2003	2004
Unintentional injury	Drowning/submersion	5	4	4	13	2.3	1.74	1.35	1.33
	Fall	2	1	1	4	0.7	0.70	0.34	0.33
	Fire/burn/heat/smoke	3			3	0.5	1.05	0.00	0.00
	Machinery	1			1	0.2	0.35	0.00	0.00
	Transport	51	67	74	192	33.6	17.78	22.67	24.63
	Struck by, against		2		2	0.3	0.00	0.68	0.00
	Suffocation	1	3	1	5	0.9	0.35	1.02	0.33
	Total unintentional injury	**63**	**77**	**80**	**220**	**38.5**	**21.96**	**26.06**	**26.63**
Suicide	Drowning/submersion			1	1	0.2	0.00	0.00	0.33
	Fall	1	2		3	0.5	0.35	0.68	0.00
	Firearm	4	2		6	1.0	1.39	0.68	0.00
	Transport	1	1		2	0.3	0.35	0.34	0.00
	Poisoning	4	5	5	14	2.4	1.39	1.69	1.66
	Suffocation	30	41	38	109	19.1	10.46	13.88	12.65
	Total suicide	**40**	**51**	**44**	**135**	**23.6**	**13.94**	**17.26**	**14.65**
Assault	Cut/pierce	1	1	2	4	0.7	0.35	0.34	0.67
	Transport	1	2	1	4	0.7	0.35	0.68	0.33
	Struck by, against	4	3		7	1.2	1.39	1.02	0.00
	Total assault	**6**	**6**	**3**	**15**	**2.6**	**2.09**	**2.03**	**1.00**
Undetermined intent	Adverse effect of drug or medicament	1			1	0.2	0.35	0.00	0.00
	Cut/pierce		1		1	0.2	0.00	0.34	0.00
	Drowning/submersion		1		1	0.2	0.00	0.34	0.00
	Fall	1	1	3	5	0.9	0.35	0.34	1.00
	Fire/burn/heat/smoke			1	1	0.2	0.00	0.00	0.33
	Firearm	1			1	0.2	0.35	0.00	0.00
	Transport	5	14	10	29	5.1	1.74	4.74	3.33
	Poisoning	6	10	4	20	3.5	2.09	3.38	1.33
	Suffocation		1		1	0.2	0.00	0.34	0.00
	Electrocution			1	1	0.2	0.00	0.00	0.33
	Total undetermined intent	**14**	**28**	**19**	**61**	**10.7**	**4.88**	**9.48**	**6.33**
Obscure cause	**Total obscure cause**	**2**			**2**	**0.3**	**0.70**	**0.00**	**0.00**
Coroner	**Total awaiting coroner**		**4**	**6**	**10**	**1.7**	**0.00**	**1.35**	**2.00**
Total		**164**	**218**	**190**	**572**	**100**	**57.17**	**73.78**	**63.25**

Figure 16: Mortality (age-specific rate per 100,000) in Māori and non-Māori youth aged 15–19 years, by year 2002–2004



Discussion

Figure 14 shows that although there was some reduction in mortality among 15–19 year-olds from 1979 onwards there appears to be little change in mortality rates in this age group over the last eight years.

Leading categories of death in this age group from 2002–2004 were unintentional injury, suicide and medical illness. Unintentional injury together with undetermined intent (predominantly high risk behaviour), account for 49% of all deaths in this age group.

Transport deaths are the single leading cause of death (39%) over 2002–2004 combined. Furthermore, transport deaths made up 87% of unintentional deaths and 47% of undetermined intent deaths in 2004.

The next largest cause of death among 15–19 year-olds is suicide (refer section 2.8 Youth Suicide).

Medical-related deaths are the third-highest category of death for this age group, with 28% of medical deaths being due to cancer.

Analysis of mortality among Māori and non-Māori youth aged 15–19 years shows Māori mortality is around two times that for non-Māori youth.

2.5.2 Young people aged 20–24 years

Figure 17: Mortality (age-specific rates per 100,000) in 20–24 year-olds by year 1979–2004

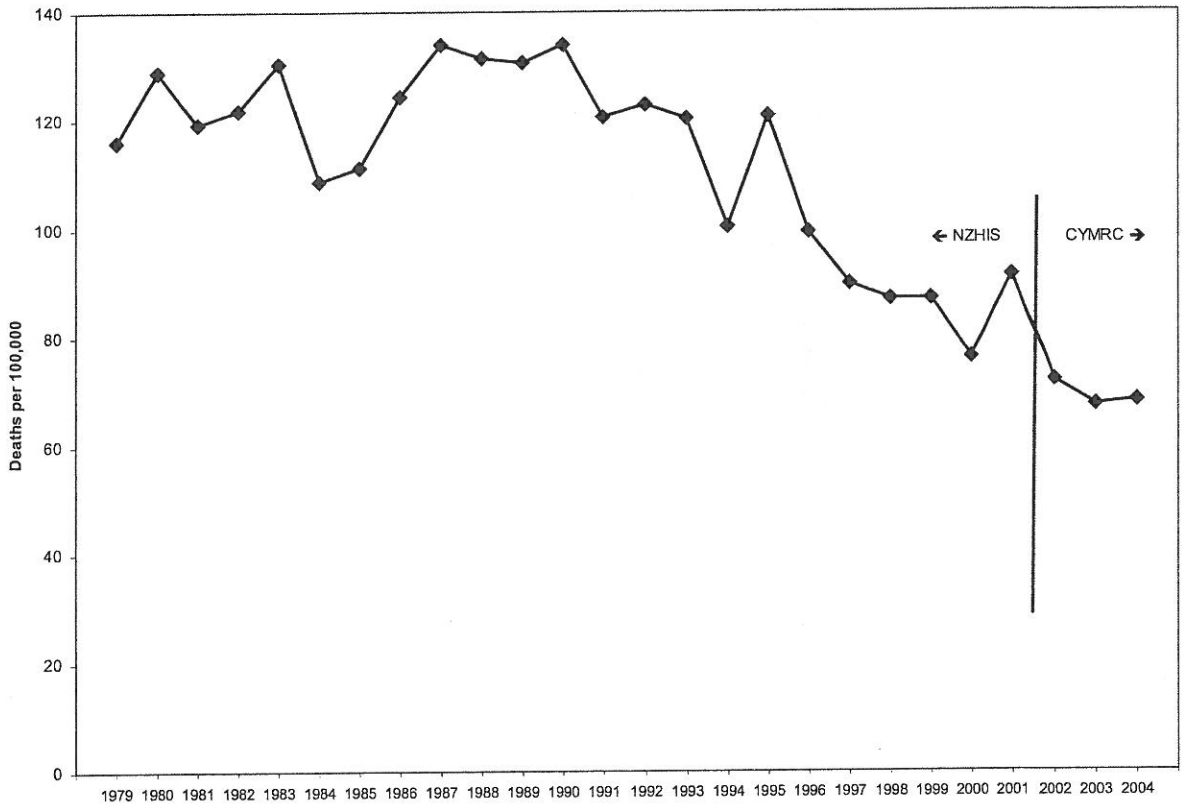


Figure 18: Mortality in 20–24 year-olds (%) by category of death, 2002–2004 combined (574 deaths)

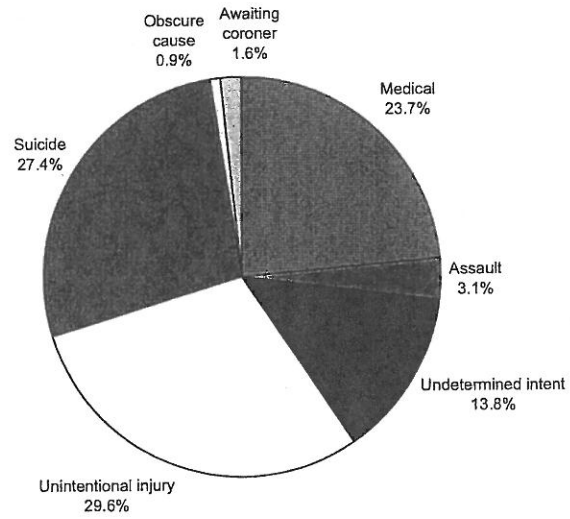
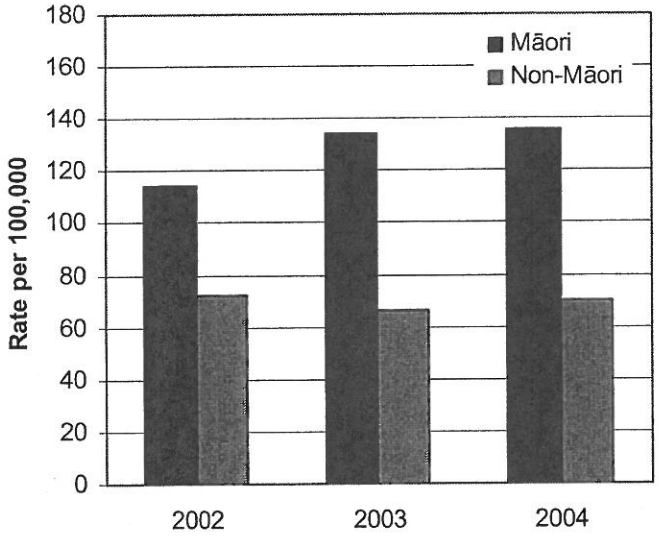


Table 8: Mortality in youth aged 20–24 years (number of deaths and age-specific rate per 100,000), by cause and year 2002–2004

Category	Cause	Deaths					Rate (per 100,000)		
		2002	2003	2004	Total	%	2002	2003	2004
Medical	Infectious and parasitic disease		5	6	11	1.9	0.00	1.79	2.10
	Neoplasms	16	16	13	45	7.8	6.03	5.74	4.54
	Diseases of the blood and blood-forming organs and disorders of immune system	1		1	2	0.3	0.38	0.00	0.35
	Endocrine, nutritional and metabolic diseases			1	1	0.2	0.00	0.00	0.35
	Mental and behavioural disorders	1	1		2	0.3	0.38	0.36	0.00
	Diseases of nervous system	7	7	9	23	4.0	2.64	2.51	3.15
	Diseases of circulatory system	7	8	6	21	3.7	2.64	2.87	2.10
	Diseases of respiratory system	9	3	6	18	3.1	3.39	1.08	2.10
	Diseases of genitourinary system		1		1	0.2	0.00	0.36	0.00
	Certain conditions originating in the perinatal period	2	2		4	0.7	0.75	0.72	0.00
	Congenital malformations, deformations and chromosomal abnormalities	4	2	2	8	1.4	1.51	0.72	0.70
	Total medical	**47**	**45**	**44**	**136**	**23.7**	**17.72**	**16.13**	**15.38**
Unintentional injury	Adverse effect of drug or medicament		1		1	0.2	0.00	0.36	0.00
	Drowning/submersion	6	6	8	20	3.5	2.26	2.15	2.80
	Fall	2	1	4	7	1.2	0.75	0.36	1.40
	Fire/burn/heat/smoke	2		1	3	0.5	0.75	0.00	0.35
	Firearm		1		1	0.2	0.00	0.36	0.00
	Transport	43	43	42	128	22.3	16.22	15.42	14.68
	Natural/environmental/animal	3	1		4	0.7	1.13	0.36	0.00
	Struck by, against	2	1	1	4	0.7	0.75	0.36	0.35
	Suffocation			1	1	0.2	0.00	0.00	0.35
	Electrocution		1		1	0.2	0.00	0.36	0.00
	Total unintentional injury	**58**	**56**	**57**	**170**	**29.6**	**21.87**	**20.08**	**19.93**
Suicide	Cut/pierce	1	1		2	0.3	0.38	0.36	0.00
	Drowning/submersion	2	1	1	4	0.7	0.75	0.36	0.35
	Fall	2	2	1	5	0.9	0.75	0.72	0.35
	Fire/burn/heat/smoke	1			1	0.2	0.38	0.00	0.00
	Firearm	2	1	1	4	0.7	0.75	0.36	0.35
	Transport	1		2	3	0.5	0.38	0.00	0.70
	Poisoning	14	11	15	40	7.0	5.28	3.94	5.24
	Suffocation	29	29	39	97	16.9	10.94	10.40	13.63
	Electrocution		1		1	0.2	0.00	0.36	0.00
	Total suicide	**52**	**46**	**59**	**157**	**27.4**	**19.61**	**16.49**	**20.62**

Category	Cause	Deaths					Rate (per 100,000)		
		2002	2003	2004	Total	%	2002	2003	2004
Assault	Cut/pierce	3	6	2	11	1.9	1.13	2.15	0.70
	Fire/burn/heat/smoke		1		1	0.2	0.00	0.36	0.00
	Firearm	1			1	0.2	0.38	0.00	0.00
	Transport	2		1	3	0.5	0.75	0.00	0.35
	Struck by, against		1		1	0.2	0.00	0.36	0.00
	Suffocation		1		1	0.2	0.00	0.36	0.00
	Total assault	**6**	**9**	**3**	**18**	**3.1**	**2.26**	**3.23**	**1.05**
Undetermined intent	Adverse effect of drug or medicament			1	1	0.2	0.00	0.00	0.35
	Cut/pierce	1		1	2	0.3	0.38	0.00	0.35
	Drowning/submersion	1		2	3	0.5	0.38	0.00	0.70
	Fall	3	2	4	9	1.6	1.13	0.72	1.40
	Fire/burn/heat/smoke	1			1	0.2	0.38	0.00	0.00
	Transport	9	19	12	40	7.0	3.39	6.81	4.19
	Poisoning	5	9	7	21	3.7	1.89	3.23	2.45
	Suffocation			1	1	0.2	0.00	0.00	0.35
	Electrocution			1	1	0.2	0.00	0.00	0.35
	Total undetermined intent	**20**	**29**	**29**	**79**	**13.8**	**7.54**	**10.40**	**10.14**
Obscure cause	**Total obscure cause**	**3**	**1**	**1**	**5**	**0.9**	**1.13**	**0.36**	**0.35**
Coroner	**Total awaiting coroner**	**5**	**2**	**2**	**9**	**1.6**	**1.89**	**0.72**	**0.70**
Total		**191**	**188**	**195**	**574**	**100**	**72.03**	**67.41**	**68.17**

Figure 19: Mortality (age-specific rate per 100,000) in Māori and non-Māori aged 20–24 years, by year 2002–2004



Discussion

Figure 17 shows a marked decrease in mortality among 20–24 year-olds between 1979 and 2002 with rates similar across 2002 to 2004. The decrease in deaths across the late 1980s and 1990s coincides with reductions in motor vehicle traffic crash deaths over this time period.

The pattern of mortality among 20–24 year-olds is similar to that of 15–19 year-olds, with the leading categories of death being unintentional injury, suicide (refer 2.8 Youth Suicide) and medical deaths.

As with 15–19 year-olds, transport related deaths are a leading cause of death in this age group. Transport deaths (unintentional deaths and those of undetermined intent) made up 30% of all deaths among 20–24 year-olds. The number of transport deaths was similar across 2002 to 2004.

Suicide is the second leading category of death in this age group and suicide deaths made up 27% of all deaths. Of note, there was no reduction in rates of youth suicide between 2002 and 2004. Among suicide deaths, 62% were due to hanging. Poisoning accounts for 25% of suicide deaths as well as 27% of undetermined intent deaths.

Rates of transport death and suicide remain high and there is a need for a persistent focus on unintentional injury, particularly motor vehicle traffic crashes and on suicide in this age group and among 15–19 year-olds.

Within the medical category, cancer deaths are the leading cause making up one-third of all medical deaths in 20–24 year-olds.

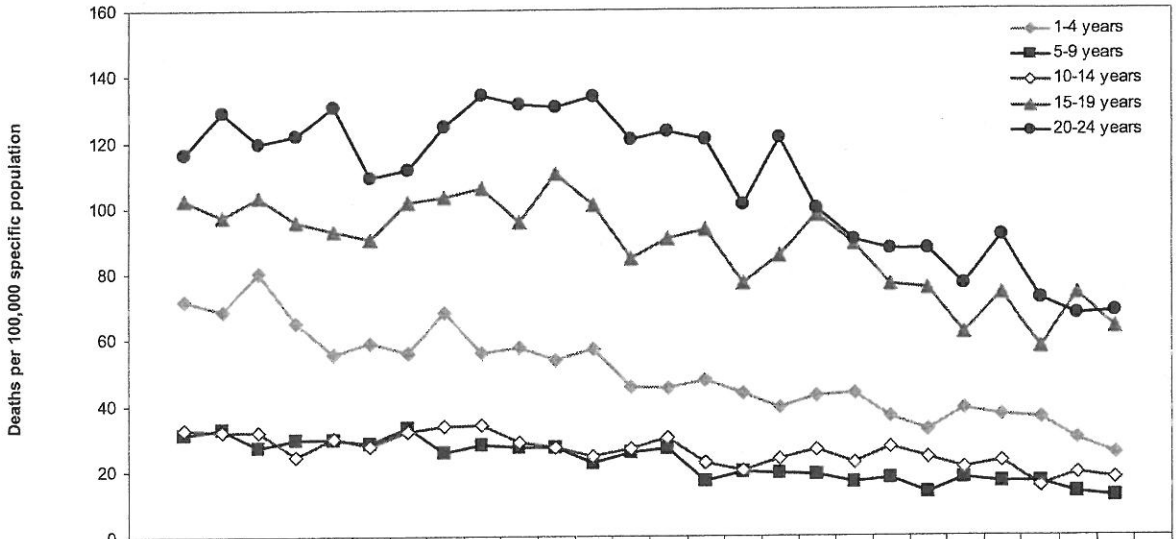
As with 15–19 year-olds, there are considerable disparities in mortality between Māori and non-Māori with Māori mortality rates being twice that for non-Māori in 2004.

2.6 All age groups (4 weeks to 24 years) mortality

This section summarises patterns of mortality across the age range of the CYMRC firstly presenting trends in mortality across time and then findings for 2002–2004 combined.

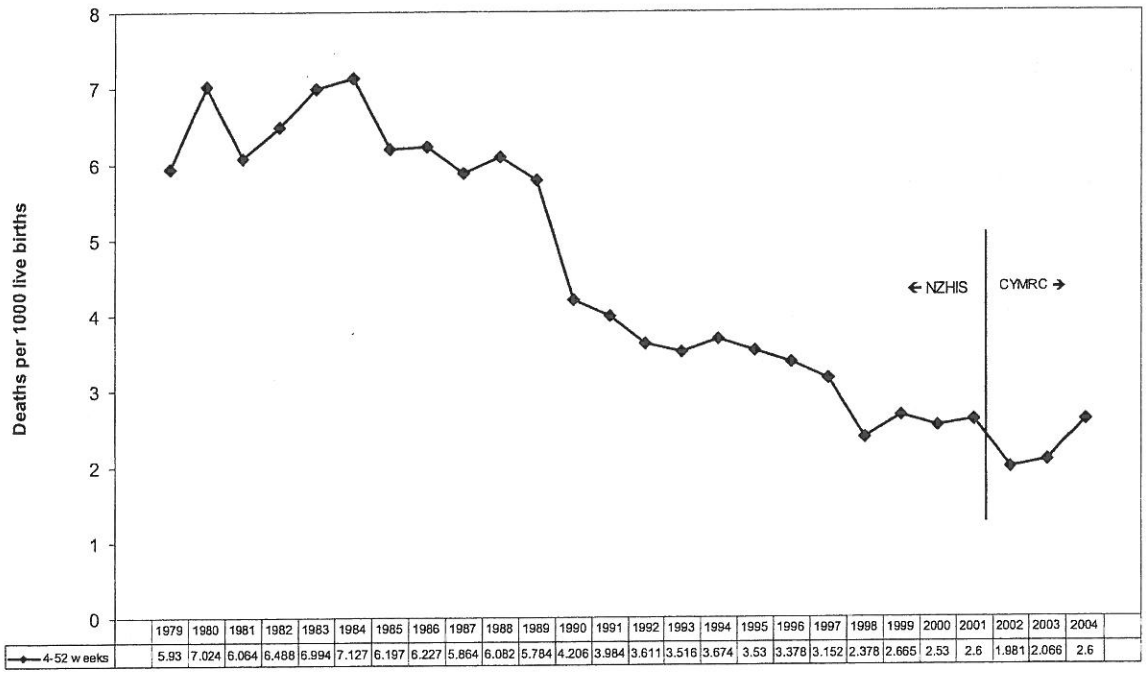
Figures 20 and 21 and Table 9 show the historical trend of reducing total deaths in each age group. Tables 10 to 12 show causes of death by age group, by gender and the leading causes of death for the population and each major ethnicity in 2001. Tables 13 and 14 relate deaths to DHBs.

Figure 20: Mortality (age-specific rates per 100,000) by age group (excluding post-neonatal mortality) by year 1979–2004



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
1-4 years	71.7	68.3	79.8	64.8	55.5	58.9	55.7	68.1	55.9	57.2	53.8	56.9	45.5	45.1	47.2	43.3	38.9	42.7	43.4	36.2	32.1	38.8	36.5	35.9	29.5	24.9
5-9 years	31.2	32.6	26.9	29.6	29.5	28.4	33.2	25.6	27.8	27.2	26.9	22.4	25.5	26.5	16.8	19.7	19	18.7	16.5	17.4	13.1	17.6	16.4	16.4	13	12
10-14 years	32.8	31.8	31.8	24.1	29.9	27.5	31.8	33.5	33.8	28.5	27	24.2	26.6	29.7	22.2	20	23.3	26.1	22.4	27	23.7	20.8	22.7	15.3	19.3	17.6
15-19 years	102	97.1	103	95.4	92.9	90.3	101	103	106	95.7	110	101	84.3	90.5	93	76.7	85.2	97.7	88.8	76.4	75.2	61.7	73.5	57.2	73.8	63.3
20-24 years	116	129	119	122	130	109	111	124	134	131	131	134	121	123	120	101	121	99.4	89.8	87	87	76.4	91.3	72	67.4	68.2

Figure 21: Post-neonatal mortality rate (per 1000 live births) by year, 1979–2004



It can be seen in the following table that the absolute number of deaths in each age group has declined markedly since 1979.

Table 9: Mortality (number of deaths) by age group by year 1979–2004

Year	4–52 weeks	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total
1979	310	149	95	99	322	303	1278
1980	355	138	96	96	305	344	1334
1981	308	160	77	97	315	326	1283
1982	324	129	82	74	288	343	1240
1983	353	111	79	92	279	381	1295
1984	368	118	74	84	272	323	1239
1985	321	112	85	95	308	326	1247
1986	329	135	65	97	312	351	1289
1987	324	112	70	94	325	375	1300
1988	350	116	68	76	295	364	1269
1989	336	111	67	70	335	360	1279
1990	253	120	56	62	299	375	1165
1991	240	99	64	68	241	328	1040
1992	214	102	68	75	249	341	1049
1993	207	109	44	56	250	338	1004
1994	211	102	53	51	203	283	903
1995	204	92	53	60	225	338	972
1996	194	95	54	69	257	270	939
1997	182	102	50	61	240	245	880
1998	137	85	53	75	207	231	788
1999	153	74	40	67	204	226	764
2000	143	88	53	61	169	195	709
2001	145	79	47	66	195	219	751
2002	107	81	48	47	164	191	638
2003	116	66	38	60	218	188	686
2004	151	56	35	55	190	195	682

Table 10: Mortality (number of deaths) by age group and by cause 2002–2004 combined

Category	Cause	4–52 weeks	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total	%
Medical	Neoplasms	3	18	23	31	35	45	155	7.7
	Congenital malformations, deformations and chromosomal abnormalities	54	23	7	8	15	8	116	5.8
	Infectious and parasitic disease	42	21	8	4	15	11	101	5.0
	Diseases of the nervous system	11	9	5	16	19	23	83	4.1
	Certain conditions originating in the perinatal period	36	12	8	8	4	4	72	3.6
	Diseases of the circulatory system	7	3	7	8	20	21	66	3.3
	Diseases of the respiratory system	2	2	4	4	11	18	41	2.0
	Endocrine, nutritional and metabolic diseases	4	13	3	5	1	1	27	1.3
	Other	5	5	2	2	9	5	27	1.3
	Total medical	**164**	**106**	**67**	**86**	**129**	**136**	**688**	**34.3**
Unintentional injury	Transport	6	28	32	31	192	128	417	20.8
	Drowning/submersion	3	23	11	5	13	20	75	3.7
	Suffocation	6	5	2	2	5	1	21	1.0
	Fire/burn/heat/smoke	1	7	5	1	3	3	20	1.0
	Other	1	6	1	5	7	19	39	1.9
	Total unintentional injury	**17**	**69**	**51**	**44**	**220**	**171**	**572**	**28.5**
Suicide	Suffocation				14	109	97	220	11.0
	Poisoning				1	14	40	55	2.7
	Other				2	12	20	34	1.7
	Total suicide				**17**	**135**	**157**	**309**	**15.4**
Sudden unexpected death	**Total sudden unexpected death**	**177**	**13**					**190**	**9.5**
Undetermined intent	Transport		1		4	29	40	74	3.7
	Poisoning				2	20	21	43	2.1
	Other	2	1		2	12	18	35	1.7
	Total undetermined intent	**2**	**2**		**8**	**61**	**79**	**152**	**7.6**
Assault	**Total assault**	**6**	**6**	**3**	**4**	**15**	**18**	**52**	**2.6**
Awaiting coroner	**Total awaiting coroner**	**8**	**4**		**3**	**10**	**9**	**34**	**1.7**
Obscure cause	**Obscure cause**		**3**			**2**	**5**	**10**	**0.5**
Total		**374**	**203**	**121**	**162**	**572**	**574**	**2006**	**100.0**

Table 11: Mortality (number of deaths) by gender and by cause 2002–2004 combined

Category	Cause	Female	Male	Total
Medical	Neoplasms	64	91	155
	Congenital malformations, deformations and chromosomal abnormalities	56	60	116
	Infectious and parasitic disease	47	54	101
	Diseases of the nervous system	29	54	83
	Certain conditions originating in the perinatal period	38	34	72
	Diseases of the circulatory system	20	46	66
	Diseases of the respiratory system	23	18	41
	Other	69	92	161
	Total medical	**303**	**385**	**688**
Unintentional injury	Transport	133	284	417
	Drowning/submersion	23	52	75
	Suffocation	5	16	21
	Fire/burn/heat/smoke	9	11	20
	Other	9	29	38
	Total unintentional injury	**179**	**392**	**571**
Suicide	Suffocation	67	153	220
	Poisoning	22	33	55
	Other	7	27	34
	Total suicide	**96**	**213**	**309**
Sudden unexpected death	**Total sudden unexpected death**	**82**	**108**	**190**
Undetermined intent	Transport	15	59	74
	Poisoning	14	29	43
	Other	7	28	35
	Total undetermined intent	**36**	**116**	**152**
Assault	Cut/pierce	7	13	20
	Struck by	9	10	19
	Suffocation	3	1	4
	Total assault	**24**	**28**	**52**
Awaiting coroner	**Total awaiting coroner**	**9**	**25**	**34**
Obscure cause	**Obscure cause**	**4**	**6**	**10**
Total		**733**	**1273**	**2006**

Table 12: Leading causes of mortality (numbers and rates per 100,000 in 0–24 age group, per year) for ethnic groups 2002–2004 combined

(A) Total of all ethnic groups

Category	Sub-type	Deaths	
Unintentional injury	Transport	418	
	Drowning	75	
	Other	79	
	Total		**572**
Suicide	Suffocation	219	
	Poisoning	55	
	Other	35	
	Total		**309**
SUDI			190
Cancer			155
Undetermined/high risk			152
Congenital abnormality			116
Infection			101
Nervous system			83
Perinatal condition			72
Circulatory			66
Assault			52
Respiratory			41
Other medical			53
Obscure cause and awaiting coroner			44

(B) NZ European

Type of Death	Deaths	Rate*
Transport	266	11.1
Suicide	162	6.7
Cancer	91	3.8
Congenital	52	2.2
Nervous system	48	2.0
SUDI	46	1.9
Perinatal	42	1.7
Infection	37	1.5
Drowning	37	1.5
Circulatory	31	1.3

* Average annual number of deaths divided by a 2001 census derived 0–24 year age group population.

(C) Māori

Type of Death	Deaths	Rate*
Transport	150	17.4
SUDI	121	14.0
Suicide	107	12.4
Cancer	45	5.2
Infection	42	4.9
Congenital	31	3.6
Drowning	30	3.5
Circulatory	25	2.9
Poisoning	21	2.4
Nervous system	18	2.1

(D) Pacific

Type of Death	Deaths	Rate*
Transport	38	12.1
Suicide	24	7.6
SUDI	22	7.0
Infection	19	6.0
Congenital	15	4.8
Cancer	9	2.9
Poisoning	8	2.5
Drowning	7	2.2
Nervous system	7	2.2
Perinatal	7	2.2

(E) Asian

Type of Death	Deaths	Rate*
Transport	39	13.0
Suicide	13	4.3
Congenital	12	4.0
Drowning	10	3.3
Nervous system	9	3.0
Cancer	8	2.7
Perinatal	6	2.0
Cut/pierce	5	1.7
Circulatory	3	1.0
Fall	3	1.0
Struck by, against	3	1.0
Endocrine	3	1.0

* Average annual number of deaths divided by a 2001 census derived 0–24 year age group population.

Discussion

Figure 20 shows clearly the overall reduction in mortality among different age groups from 1979 onwards with less downward trend over recent years. The high rate of mortality among 20–24 year-olds and 15–19 year-olds is apparent. Figure 21 shows post-neonatal mortality for the same period. The rates of death for the post neonatal period are effectively 10 fold higher that the rates for the other age groups show in Figure 20.

Table 9 highlights the overall reduction in mortality numbers in differing age groups from 1970 onwards. Between 2002 and 2004 there has been an increase in the number of deaths in infants aged four weeks to one year and among youth (15–19 and 20–24 years). It is difficult to interpret these findings however this finding raise the need to monitor closely mortality among these age groups.

Transport-related deaths overall are the leading single cause of mortality, impacting across all age groups and making up one quarter of deaths among children and youth, however particularly among 15–19 and 20–24 year-olds. Suicide (15.4%) and SUDI (9.5%) are also leading causes of death. One in three deaths (34.1%) is due to medical conditions with leading causes being cancer, congenital abnormality and infection. Other unintentional injury particularly drowning impacts across all ages and assault and deaths due to undetermined intent also are important causes of mortality.

When mortality is reviewed by gender, patterns show that for almost all causes, male numbers of deaths are higher than female however particularly so for injury deaths (particularly transport deaths) and for suicide.

Ethnicity comparison for leading causes of death reinforces the importance of transport deaths across all ethnic groups. Suicide is also among leading three causes among each group. The impact of SUDI on Māori and Pacific peoples is evident. The high rates of mortality among Māori for each cause, relative to other ethnic groups are evident also.

Local CYMRGs describe a variable use of victim support and other services between types of death and within the same types of death in different DHB regions. Most consistent is their involvement in the support of families where there has been a homicide. Significant deficits in care exist in particular for deaths due to injury from external cause.

The CYMRC recommends that:

- the Land Transport Safety Authority and Parliament considers the findings of recent research[2] into vehicular-related deaths among children and young people in New Zealand and undertake any measures that may minimise the risk of such deaths
- the Minister of Health notes the need for consistent and adequate support for families after the death of their child. This does not appear to be the case at present and CYMRC will be having further discussions with Victim Support, Coroners and Police before making clear recommendations on this issue. The Minister should also note that the Cross Departmental Research Pool project developed by the CYMRC and sponsored by the Ministry of Health may have some impact on this issue.

[2] Kypri, K., R. B. Voas, et al. (2006). Minimum purchasing age for alcohol and traffic crash injuries among 15- to 19-year-olds in New Zealand. *American Journal of Public Health.* 96(1): 126–131.

2.7 Mortality and DHB

Table 13: Mortality (numbers and age-specific rates) by age group and DHB of residence, 2002–2004 combined

Place of residence	Deaths							Rate (per 100,000) *	% resident deaths outside DHB
	4–52 weeks	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total		
Northland	21	7	9	8	30	22	97	63.9	14
Waitemata	37	20	15	14	47	53	186	39.7	39
Auckland	31	15	9	10	35	50	150	39.4	22
Counties Manukau	76	36	11	19	81	67	290	62.9	26
Waikato	32	23	13	14	62	50	194	53.3	15
Bay of Plenty	18	11	14	9	30	30	112	59.7	30
Lakes	7	3	6	6	24	25	71	64.6	23
Tairawhiti	11	4	3	5	3	8	34	64.5	29
Taranaki	12	8	6	10	26	19	81	73.3	17
Hawke's Bay	17	7	6	10	11	12	63	40.3	11
Whanganui	7	2	1	1	18	14	43	60.4	24
MidCentral	15	6	2	10	33	23	89	52.6	22
Wairarapa	1	1	4	2	6	8	22	56.7	36
Capital & Coast	17	11	3	8	29	37	105	40.1	22
Hutt Valley	17	8	2	6	17	18	68	46.5	24
Nelson Marlborough	5	6	5	6	16	11	49	40.7	18
West Coast	1	1			6	6	14	47.1	29
Canterbury	20	17	10	10	57	71	185	42.5	5
South Canterbury	3	3	1	5	5	2	19	38.2	16
Otago	10	5		7	19	22	63	34.6	8
Southland	11	7	1	1	15	23	58	54.0	12
Unknown	5	1		1	2	3	12		
Total	**374**	**203**	**121**	**162**	**572**	**574**	**2006**	**49.4**	

* The rate is calculated using the 2001 DHB child and youth population. For DHBs that experienced significant relevant population growth, the actual rate will be less than the calculated rate.

Table 14: Deaths occurring in each DHB region, 2002–2004 combined

DHB	Deaths in DHB		Deaths in DHB hospitals*		
	Number	% non-resident	Number	% deaths in DHB	% non-resident
Northland	96	14	14	15	15
Waitemata	133	14	5	4	
Auckland	291	60	216	74	78
Counties Manukau	237	9	50	21	18
Waikato	206	20	63	31	29
Bay of Plenty	92	16	13	14	15
Lakes	71	23	15	21	7
Tairawhiti	29	17	3	10	
Taranaki	57	7	8	14	
Hawke's Bay	87	16	23	26	4
Whanganui	38	14	5	13	
MidCentral	86	19	23	27	17
Wairarapa	18	22	1	6	
Capital & Coast	121	36	62	51	55
Hutt Valley	56	7	10	18	
Nelson Marlborough	46	13	7	15	
West Coast	14	29	1	7	
Canterbury	189	8	52	28	19
South Canterbury	19	16			
Otago	66	14	18	27	28
Southland	54	6	13	24	
Total	**2006**		**602**		

* The term hospitals in this table refers not only to public hospitals, but also to private hospitals, hospices and some medical centres. Seventy percent of deaths in this age group occur away from medical environments.

Discussion

In terms of service planning, it is important to note where deaths are happening. Whereas Otago and Canterbury have a low proportion of residents dying out of DHB, it is the opposite for Wairarapa, Waitemata, Bay of Plenty and Tairawhiti.

Some regions have a large proportion of deaths of residents of other DHBs. This is occurring not only in Auckland and Wellington, but also in regions such as Lakes, West Coast Wairarapa and Waikato. With the exception of the West Coast (where 90% of all in-region deaths are due to external causes), the South Island has a low proportion of deaths of residents from other DHBs.

Local CYMRGs have noted marked variation in the processes used in different health settings to identify that a death has occurred, with often no process for deaths that occur outside of the DHB region. Identifying that a death has occurred is important for many processes, including the sending of inappropriate appointments to those who have died. This can cause distress to the family.

The CYMRC recommends that:

- NZHIS discusses with the Department of Internal Affairs ways to more quickly transfer information from Births, Deaths and Marriages to the NZHIS, and thus through to health organisations that use NHI numbers.

2.8 Deaths of non-residents (overseas visitors)[3]

Table 15: Mortality (number of deaths) among non-New Zealand residents by cause of death and age group, 2002–2004 combined

Category	4–52 weeks	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total
Medical	6			3	3	1	13
Unintentional injury		2	1	1	5	11	20
Suicide						1	1
Undetermined intent					2	1	3
Obscure causes		1				1	2
Awaiting coroner						2	2
Total	**6**	**3**	**1**	**4**	**10**	**17**	**41**

Unintentional injury (51%) is the major cause of death for non-residents under 24 years of age, but medical causes (29%) are also prominent. Thirty-two percent of deaths are due to transport; 12% are due to congenital abnormalities; 10% are due to each of drowning and circulatory disease. The cause is obscure or unknown for a further 10%.

As with residents, deaths of non-residents vary by region. Forty-two percent of the non-resident deaths occurred in the South Island as compared with 19% of resident deaths. Ten percent of the non-resident deaths were in the West Coast, compared 0.7% of resident deaths.

Forty-four percent (18) of non-residents died in hospital compared with 30% of residents. Three of these were transferred to New Zealand as a result of an unintentional injury in another country. Fifteen of the hospital deaths were in Auckland, the remainder being in Wellington, Christchurch and Dunedin.

Deaths were recorded for residents of the countries shown in Table 16.

[3] It should be noted that a number of New Zealand residents die overseas and the causes of death are unknown.

Table 16: Non-resident deaths by country of residence

Country	Deaths
Japan	6
Australia	5
Cook Islands	5
England	5
Fiji	3
Tonga	3
French Polynesia	2
Samoa	2
Canada	1
Chile	1
China	1
Czech Republic	1
Denmark	1
Greece	1
Indonesia	1
Niue	1
Scotland	1
USA	1
Total	**41**

2.9 Youth suicide (deaths from intentional self-harm)

Readers need to be aware the coding of death to self-harm in the Data Group's figures combines information from multiple sources and the decision on the death being likely to be a self-harm death is based on consideration of this information. It is possible the Group's decisions may favour allocation of death to suicide compared with the final NZHIS figures. Initial comparison of our 2002 figures with the official NZHIS numbers for the same year suggest almost identical numbers of deaths from deliberate self-harm in the 15–24 year age group.

Youth suicide has been a health issue of concern in New Zealand across recent decades and specific strategies being put in place to reduce suicide among young New Zealanders have been developed and implemented. The findings from the CYMR database includes analysis of data from 2002 to 2004 and the information presented here is up to and including deaths in 2004. All-age suicide rates are reported by the Ministry of Health, and at the time of printing this report, will be available for the year 2003.

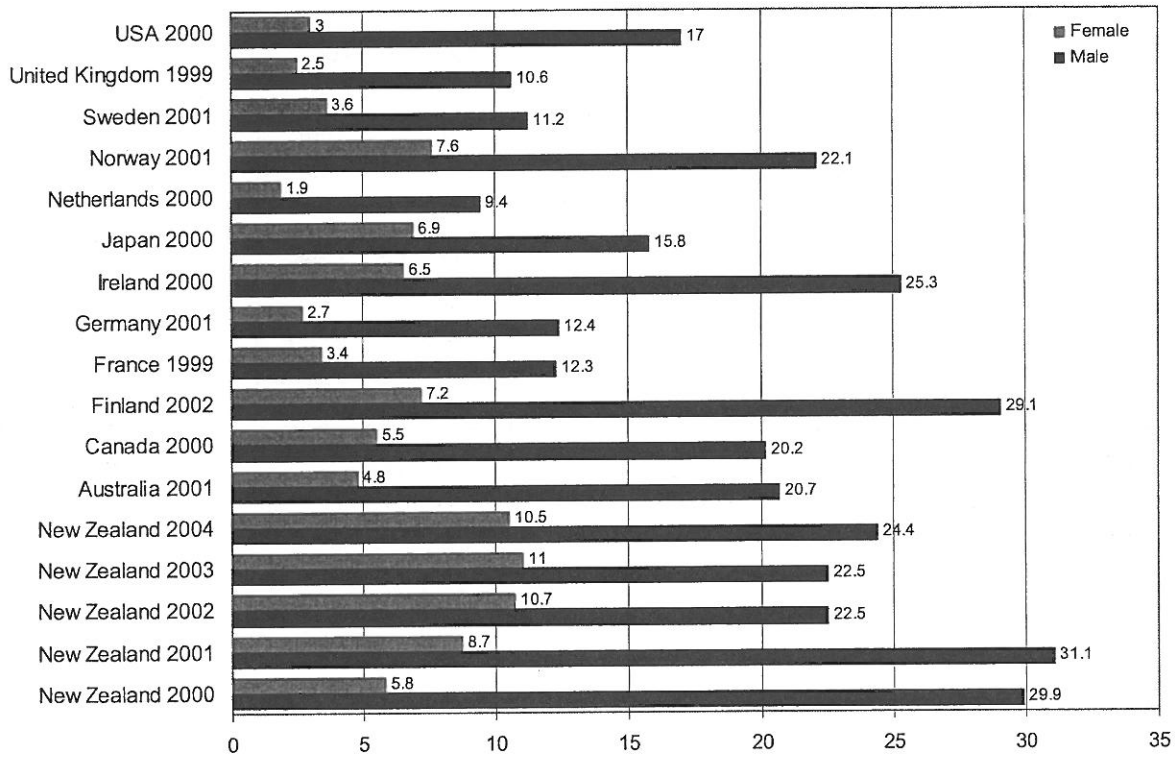
The findings show that there were a total of 309 youth suicide deaths between 2002 and 2004 (31% in females and 69% in males). There has been no reduction in youth suicide between 2002 and 2004 with slight increases in numbers and rates of suicide mortality among both males and females. Figure 22 below shows New Zealand data over five years in comparison with overseas data. Male rates appear unchanged in the last three years while female youth rates appear to have increased. For both sexes, these rates are some of the highest of comparable countries.

A concerning finding is the presence of deaths from deliberate self-harm in the 10–14 year age group. A paper describing suicide in this age group in New Zealand over a 10-year period showed that there had been an average of six deaths per year in this age group with around 60% in Māori children.[4] The findings here are consistent with that analysis. These findings are concerning and there appear increasing numbers within the data over 2002 to 2004.

In all age groups, the rate of Māori suicide is greater with rates twice that of other groups. with rates in 10–15 year-olds three times higher. The Asian rate is significantly lower than the overall rate for the age group. The Pacific Island is generally slightly higher and the NZ European rate slightly lower than the overall rate.

Overall, these findings are concerning. The lack of reduction in youth suicide and the presence of suicide in children have implications for prevention. It is important for close monitoring of trends in youth and in children with a particular need to determine how to prevent suicide in children under 15 years required. The all-age suicide strategy must be cognisant of suicide in children in addition to strategies focussed on youth and on adults.

Figure 22: International comparison of youth (15–24 years) age-specific suicide rates (deaths per 100,000 per year)



[4] Beautrais AL. 2001. Child and young adolescent suicide in New Zealand. *Aust NZ J Psychiatry* 35: 647–53.

Table 17: Suicide deaths (number) by means of suicide, gender and year 2002–2004

Means	Female					Male					Total
	2002	2003	2004	Total	%	2002	2003	2004	Total	%	
Suffocation	18	20	29	67	70	43	56	54	153	72	220
Poisoning	7	9	6	22	23	11	7	15	33	15	55
Firearm	1	1		2	2	5	2	3	10	5	12
Fall	1	2		3	3	2	2	1	5	2	8
Drowning	1			1	1	1	1	2	4	2	5
Transport						2	1	2	5	2	5
Cut, pierce						1	1		2	1	2
Fire, burn, smoke	1			1	1						1
Electrocution							1		1	0	1
Total	**29**	**32**	**35**	**96**	**100**	**65**	**71**	**77**	**213**	**100**	**309**

Table 18: Suicide deaths (numbers and age-specific rates per 100,000) by age group and year 2002–2004

Gender	Age group	Deaths				Rate		
		2002	2003	2004	Total	2002	2003	2004
Female	10–14 years		1	5	6		0.7	3.3
	15–19 years	14	16	16	46	10.0	11.1	10.9
	20–24 years	15	15	14	44	11.4	10.9	10.0
	15–24 years	29	31	30	90	10.7	11.0	10.5
	Total female	**29**	**32**	**35**	**96**	**6.9**	**7.6**	**8.3**
Male	10–14 years	2	5	4	11	1.3	3.1	2.5
	15–19 years	26	35	28	89	17.7	23.1	18.2
	20–24 years	37	31	45	113	27.7	21.9	30.8
	15–24 years	63	66	73	202	22.5	22.5	24.4
	Total male	**65**	**71**	**77**	**213**	**14.8**	**15.8**	**16.7**
Total		**94**	**103**	**112**	**309**			

Table 19: Suicide deaths (numbers and age-specific rates per 100,000) by ethnicity and year 2002–2004

Age group	Ethnicity	2002	2003	2004	Total	Rate
10–14 years	Māori	1	6	4	11	5.8
	Pacific Island			2	2	3.1
	NZ European	1		3	4	0.8
	Total	**2**	**6**	**9**	**17**	**1.9**
15–19 years	Māori	15	17	16	48	32.3
	Pacific Island	1	4	4	9	16.5
	NZ European	21	30	22	73	15.2
	Asian	2		2	4	5.1
	Not specified	1			1	
	Total	**40**	**51**	**44**	**135**	**17.0**
20–24 years	Māori	16	15	17	48	38.0
	Pacific Island	7	2	4	13	25.1
	NZ European	26	23	36	85	19.5
	Asian	3	6		9	13.1
	Other			2	2	
	Total	**52**	**46**	**59**	**157**	**21.8**
15–24 years	Māori	31	32	33	96	34.9
	Pacific Island	8	6	8	22	20.7
	NZ European	47	53	58	158	17.2
	Asian	5	6	2	13	8.9
	Other	1		2	3	4.2
	Total	**92**	**97**	**103**	**292**	**19.3**
Total		**94**	**103**	**112**	**309**	

3 Mortality Review, Australia

3.1 Annual Report, Victoria

The Consultative Council on Obstetric and Paediatric Mortality and Morbidity, in Victoria, Australia, has published its Annual Report for the Year 2004.

This report covers maternal deaths and deaths of children aged 0–14, and identifies indigenous mortality rates. The Council reports its lowest ever number of deaths for children aged 1–14.

The full report is available on the Council's website (www.health.vic.gov.au/perinatal).

3.2 Annual Report, Queensland

The Commission for Children and Young People and Child Guardian, Queensland, Australia, has published its inaugural Annual Report on Deaths of Children and Young People, 2004–2005.

In addition to analysis and discussion on the causes of death among children and young people in Queensland, Chapter 1 of the report provides an historical overview of child death review. This chapter outlines child mortality review in each of the Australian states, the United States of America, Canada, the United Kingdom, and New Zealand. This provides a useful international context for child mortality review.

The full report is available on the Commission's website (www.ccypcg.qld.gov.au).

3.3 New South Wales (NSW) Child Death Review Team[5]

The NSW Child Death Review Team was established in 1996 to prevent or reduce the number of child deaths in NSW. In 2003 the NSW Ombudsman became responsible for reviewing child deaths where abuse or neglect or suspicions of abuse or neglect exist for children in care or where there were known risk factors.

Since 1999 the NSW Team has produced seven annual reports and four special reports. The special reports are:

- *Fatal Assault in Children and Young People* (June 2002)
- *Suicide and Risk-taking Deaths of Children and Young People* (January 2003)
- *Fatal Assault and Neglect of Children and Young People* (October 2003)
- *Sudden Unexpected Deaths in Infancy: the New South Wales Experience* (February 2005).

These special reports, and the annual reports, are available on www.kids.nsw.gov.au/publications/cdrt2000.

The NSW Team has recently commenced an analysis of its 10 years of data: 1996–2005.

[5] NSW Commission for Children and Young People. 2006. *Overview of Australia and New Zealand Child Death Review Teams*. Unpublished report.

3.4 Western Australia Mortality Review[6]

Western Australia's Advisory Council on the Prevention of Deaths in Children and Young People was established in 2003. To date the Advisory Council has been looking retrospectively at the deaths of children in Western Australia who were also born in the state. The intention is to extend this to include all deaths of children and young people registered in Western Australia.

In 2005 the Advisory Council produced its *First Research Report*, which recommends the development of a process and structure to establish a comprehensive system of reviewing all deaths of children and young people within Western Australia, and to report annually on mortality trends and patterns. These recommendations were endorsed by the Western Australian Parliament. The Advisory Council has produced one annual report.

[6] NSW Commission for Children and Young People. 2006. *Overview of Australia and New Zealand Child Death Review Teams*. Unpublished report.

4 Projects Commissioned by the CYMRC

The CYMRC commissioned two research projects in 2005:

- Māori child and youth mortality project
- Transport injuries.

4.1 Māori child and youth mortality 2002 and 2003

The CYMRC supported an analysis of Māori child and youth mortality to be undertaken in 2005. This project has involved analysis of data from 1 January 2002 to 31 December 2003. These years were chosen as data for 2002 and 2003 were the most complete at the time of data extraction from the database (August 2005). Data were analysed and written up between August and November 2005. A literature review of relevance to Māori child and youth mortality was also undertaken.

The summary in Appendix D describes a selection of key findings from data analysis. A full report was provided to the CYMRC. The Committee considered the report and makes the following recommendation:

- the Minister of Health notes the ongoing high rate of mortality among Māori children and youth and the level of disparity between Māori and non-Māori.

4.2 Transport injuries

Road traffic fatalities are an increasing problem globally, and New Zealand is no exception. The influence of alcohol in road traffic accidents is one area of concern. In 1999, an amendment to the Sale of Liquor Act reduced the minimum age at which alcohol can be purchased from 20 to 18 years. Since this amendment much debate has occurred over its impact on road fatalities involving teenagers.

The CYMRC commissioned a project to research mortality among people under 24 years on public roads in New Zealand from 1990–2003. The project had two aims:

- to examine the question of whether or not the lowering of the drinking age has had a measurable impact on road safety among teenagers
- to examine trends in the pattern of fatal injuries to children and young people on public roads in New Zealand.

The CYRMC is considering the project's findings.

5 Future Challenges and Strategic Objectives for 2006

In its second annual report, the CYMRC agreed its strategic objectives, and developed goals for 2005 and 2006, a copy of the table outlining the strategic objectives and goals is printed in Table 20 below.

Table 20: CYMRC's strategic objectives and goals

Strategic objectives	**Goals for 2005/06**
Quality processes	Develop processes for mortality review at a local level. Improve the quality and analysis of the database, including the establishment of parents reporting to database. Refine and identify multiple cause attribution for cases. Enhance data links from other national databases. Develop a methodology for making evidence-based recommendations to reduce child and youth mortality.
Prevention and research	Identify priorities to reduce Māori child and youth mortality. Provide in-depth analysis of high priority areas. Oversee the Cross Department Research Pool project.
Communication and partnership	Enhance an effective working relationship with other review processes, especially the coronial and death investigation process. Promote the broad ownership of the mortality review process.

6 Further Information

6.1 Website

The CYMRC website (www.newhealth.govt.nz/cymrc) is supported by the Ministry of Health. The CYMRC uses the website to provide the wider community with more information about mortality review.

Mortality review committees established under sections 11 and 18 of the New Zealand Public Health and Disability Act 2000 must report at least annually to the Minister of Health. CYMRC annual reports are available from http://www.newhealth.govt.nz/cymrc/publications.htm.

6.2 Information brochure for families and whānau

The information brochure for families and whānau is available on the CYMRC website (http://www.newhealth.govt.nz/cymrc/) under 'Publications & Media' then 'Brochures' or by emailing cymrc@moh.govt.nz.

6.3 Contact details

The CYMRC can be contacted at:

Child and Youth Mortality Review Committee
c/o Ministry of Health
PO Box 5013
Wellington

Phone: (04) 470 8773 0r (04) 496 2288
Email: cymrc@moh.govt.nz

Appendix A: CYMRC Membership and Meetings 2005

Membership

Professor Barry Taylor (Professor) (Chair)
Amster Reedy (resigned September 2005)
Christopher Morris
David Tipene-Leach (Dr)
Ian Hassall (Dr)
Joanne Baxter (Dr)
Marie Connolly (nominee of the Chief Executive of Child Youth and Family Service)
Pat Tuohy (Dr) (nominee of the Director-General of Health)
Russell Franklin (Dr)
Tracie Mafile'o

For more information about the CYMRC and its membership, see its website (www.newhealth.govt.nz/cymrc).

Meetings

The CYMRC met four times in Wellington during 2005. Three of the meetings were held over two days, and the last meeting was one day. The meeting format includes report backs and discussion on CYMRC projects, an opportunity to comment on mortality data, and a meeting with advisors from government ministries. Two updating teleconferences were held between most two-day meetings. Meetings in Wellington were held on:

- 10 and 11 February 2005
- 23 and 24 June 2005
- 13 and 14 October 2005
- 18 November 2005.

Appendix B: Advisors to CYMRC

The CYMRC has maintained links with several government agencies that also have a policy or an operational focus on the health and wellbeing of children and young people.

The government agencies and their advisors are as follows:

Child, Youth and Family	Kate Ridley
Ministry of Education	Cathye Haddock
Ministry of Health (Mental Health Directorate)	Basia Arnold
Ministry of Pacific Island Affairs	Petra Solia
Ministry of Youth Development	Monique Leerschool and Emma Churchill
Office of the Children's Commissioner	Mavis Duncanson
Office of the Police Commissioner	Steve Christian
Ministry of Economic Development	Bob Jones
Te Puni Kōkiri	None at present

The advisors are invited to meet with the CYMRC on the second day of each two-day CYMRC meeting.

The relationship between the CYMRC and the coroners is crucial to the functioning of review processes. The Coroners' Council has nominated a representative who attends CYMRC meetings (as able) as an advisor and liaison point between the two groups. David Dowthwaite, the Rotorua Coroner is the current representative.

Appendix C: Preliminary Report on the First National Meeting of Australian and New Zealand Child Death Review Teams

This is not a set of minutes but a preliminary report to alert members of the committee to the main points covered by the meeting held at the office of the NSW Commission for Children & Young People, Sydney, 2 December 2005.

1.0 Introduction

Glenys Needs and Ian Hassall participated in this one-day meeting on behalf of the CYMRC of New Zealand. The meeting was called by the NSW Commissioner for Children and Young People, Gillian Calvert, who is also the convenor of the NSW Child Death Review Team.

The purpose was to discuss key issues now that all states and territories of Australia and New Zealand have established child death review processes. Gillian asked for the Chair or her nominee and the technical expert from each team to attend.

Each of the eight Australian states and territories and New Zealand were represented at the meeting. While the death review processes in these jurisdictions are diverse, they hold much in common. An 18-page paper circulated at the meeting summarises the situation in each jurisdiction (Agenda paper 1). In addition, the latest reports from WA, NSW, Victoria, Queensland and New Zealand were tabled.

The agenda covered four main items all essentially to do with alignment of information systems to enable comparability and improvement of death review: Across border reporting: Coding and classification of death: Consistency in data collection and reporting: and Where to from here? Papers on each of these items were circulated before the meeting.

2.0 Across border reporting

Teams have varying mandates in relation to which deaths they review. There is an advantage in not only reviewing all child deaths that occur within each territory whether or not they are citizens or residents of that territories but also in reviewing all deaths of citizens or residents no matter where they die. The situation of the significant numbers of sick children who are transferred across borders for medical treatment highlights this point. In the territory where the child died as well as the one she was transferred from there is information that could be useful in improving services in each of those territories.

The problem at present is that there is no agreement on how these deaths are to be counted and how information is to be accessed across borders. Understandably, there is initial resistance from health service officials etc to information sharing between jurisdictions which have no control over one another's confidentiality/privacy processes.

3.0 Consistency in classification of cause of death

While all teams use a standard classification of deaths based on the ICD 10 and its Australian modification, some have also introduced their own coding systems for the reasons New Zealand have. A diagnostic code consisting of a common core set of diagnoses, which will not necessarily replace local codes is being proposed for the sake of comparability. Teams covering perinatal deaths will continue to use the PSANZ coding system as well as ICD 10.

As part of the evolving process, both WA and New Zealand have introduced local 'enhancements' to standard ICD coding. WA's is traceable back to both PSANZ and ICD 10. New Zealand codes to chapter level plus a locally defined intent code, which is less detailed than the proposed three character category.

The advantages to New Zealand of becoming consistent are:

1. international comparability in reporting;
2. relative simplicity of coding to international definitions; and
3. ease of searching for specified conditions such as low speed run-over, epilepsy or staphylococcus aureus.

The disadvantages are:

1. the cost of finding/training/contracting a qualified health information manager; and
2. managing any inconsistency between the standardised coding and our current coding.

If there are differences between the agreed standard and our present coding, to both maintain our current focus and be standardised we would need to code twice. Firstly, using our coding conventions and secondly, when more data sources are available, using the three character category. In the future should we be looking at coding:

1. How they died (say drowning); and
2. Why they died (insufficient strength to safely manage an ATV); leading to
3. Recommendation (investigate age/strength minimum for ATV)?

We are effectively working away from a descriptive classification toward a prevention-oriented classification of causes of death.

4.0 Recording and reporting comparable child death data

Information gained from review of child deaths is variably recorded and reported. A common minimum dataset is proposed. Although ethnicity is not recorded in Australia at present, we asked that ethnicity be included in the dataset.

NSW have evolved a tidy and adaptable system for recording data which they are willing to share. While some states in the process of setting up their death review system could immediately commence using the NSW database, we will not be able to make direct use of this. It will however be of interest to see how reports are generated from their recorded data. In particular it will be interesting to see how risk factors are being recorded and reported on. A comparable level of reporting could be built into the New Zealand system – again at an initial set up cost and we would be responsible for maintaining our database should Australia/NSW vary their system.

Most of the Australian reporting is at the chapter level, hence we are currently "consistent". However for example, at present we code a death as transport/vehicular, if someone drove off the road into a river and subsequently drowned. If these deaths are coded as drownings in the standardised system, would we have two lots of reporting plus an explanation of the differences?

NZHIS already produce the official statistics. What would we be adding to what is already available (albeit after a gap of some years in order to obtain a more complete list of coronial findings)?

5.0 Where to from here?

It is valuable to share information. This meeting focused on data consistency but touched on many other issues such as joint research programmes, joint conferences, parental involvement, multiple risk factor coding, negotiated information sharing with local agencies, collaboration with coronial systems, participation by prevention agencies and relationships with international bodies. These could all be usefully discussed in the near future.

It is expected that resolution of some of the interstate and inter-country matters will need to be facilitated at the level of the joint ministerial meetings eg, Australian Health Ministers' Advisory Committee, with briefings of our respective ministers when we have some agreed proposals.

It has been proposed that an email list be established for further discussion and that an annual meeting be planned. For the first three years the Chair of the NSW team will take responsibility for these things.

Ian Hassall
Glenys Needs
14 December 2005

Appendix D: Māori Child and Youth Mortality 2002 and 2003

A summary of key findings from a report prepared for The New Zealand Child and Youth Mortality Review Committee (November 2005), Melanie Sargent and Joanne Baxter, Ngai Tahu Māori Health Research Unit, University of Otago.

Introduction

The CYMRC supported an analysis of Māori child and youth mortality to be undertaken in 2005. This project has involved analysis of data from 1 January 2002 to 31 December 2003. These years were chosen as data for 2002 and 2003 were the most complete at the time of data extraction from the database (August 2005). Data were analysed and written up between August and November 2005. A literature review of relevance to Māori child and youth mortality was also undertaken. This summary describes a selection of key findings from data analysis and a more full report has been provided separately to the CYMRC.

The aim of the analysis was to describe for the CYMRC the extent and pattern of mortality in Māori children and youth (aged one month to 24 years) and to describe the extent and pattern of disparity between Māori and non-Māori. The data source is the database of child and youth mortality that is overseen by the New Zealand CYMRC. A secondary aim was to explore methodological issues that may arise in analysing this database by ethnicity.

Methods

The analysis is a descriptive epidemiological analysis of the CYMR database. For 2002 and 2003 the denominator data were census population projections for Māori and for Non-Māori, provided by age group and ethnic group. Rate calculations for age-specific groups were calculated based on the number of deaths within an age group and divided by the number of children or young people in that age group.

Due to the need to be able to compare between age groups, 'per 100,000 population' was used for all age-specific analyses comparing age groups. For most analyses, data were combined for 2002 and 2003 and rates were calculated for numbers of deaths in 2002 and 2003 over population in 2002 and 2003.

Ethnicity data

In order to define ethnicity, ethnicity data were linked across death registration, birth registration and NHI records.

Matching ethnicity across death, birth or NHI records results in an increase in number of Māori from 442 to 478 (an increase of 36 deaths or 8.1%) (refer Table 20). The number of death registrations with a specified non-Māori ethnicity (N=863) reduced by one death. The number with no recorded ethnicity reduced from 44 to 35 (i.e. a reduction of 80%). We have thus chosen to define Māori based on ethnicity data linked across death registration, birth registration and NHI number.

Table A1: Deaths (number) by ethnicity on deaths registration, births and deaths combined, and births/deaths/NHI number combined

	Source of ethnicity data		
	Death registration only	**Ethnicity on deaths and births registration data combined**	**Ethnicity on death and birth registration and NHI record combined**
Māori ethnicity	442	458	478
Non-Māori ethnic groups	863	856	862
No ethnicity recorded	44	35	9

Māori child and youth mortality 2002 and 2003

This section presents the results of analysis of Māori mortality data for the years 2002 and 2003. The total number of Māori child and youth deaths for 2002–2003 was 478 with an overall mortality rate of 73.2 per 100 000.

Gender and age

Table A2: Mortality (number and rates) in Māori children and youth by gender and by age 2002 and 2003

Demographic profile	**N**	**% of Māori deaths**	**Rate***
Gender			
Female	181	37.9	56.4
Male	297	62.1	89.5
Total	**478**	**100**	**73.2**
Age group (years)			
1 month to < 1 year	119	24.9	393.7
1–4 years	57	11.9	47.6
5–9 years	21	4.4	14.4
10–14 years	45	9.4	31.6
15–19 years	126	26.4	107.2
20–24 years	110	23.0	113.8
Total	**478**	**100**	**73.2**

* Rates per 100,000 1 month to 24 years for males, and for females. Rates for age group are age-specific rates per 100,000 population.

Gender: Māori males made up almost two-thirds of all deaths (62.1%) and are 1.6 times more likely to die between ages 1 month to 24 years than Māori females in this age group (37.9%).

Age: Māori infants aged 1 month to < 1 year have the highest age-specific rates of mortality (393.7 per 100,000) and 1 in 4 of all Māori child and youth deaths were in this age group. Māori children aged 1–4 years made up 11.9% of all Māori child and youth deaths. Those aged 5–9 years had the lowest rates of mortality and were 4.4% of Māori child and youth deaths. Māori aged 15–19 years had the highest number of deaths within an age group and 26.4% of Māori child and youth deaths were 15–19 years. Māori aged 20–24 years also had high numbers of deaths (110 deaths) and 23.0% of Māori child and youth deaths were in this age group.

Table A3: Māori child and youth mortality by gender and age (age-specific rates per 100,000)

Age (years)	Gender					
	Male			Female		
	N	%	Rate*	N	%	Rate*
1 month to < 1 year	68	23%	439.0	51	28%	346.2
1–4 years	30	10%	48.6	27	15%	46.4
5–14 years	42	14%	28.4	24	13%	17.1
15–24 years	157	53%	147.3	79	44%	73.4
Total	**297**	**100**	**89.5**	**181**	**100**	**56.4**

* Age-specific rate per 100,000 population.

Māori male rates are higher overall and in each age group with greatest difference in the 15–24 year age group. Māori male mortality in the 15–24 year age group comprises almost one in three (157 of 478 in total) deaths among Māori children and youth in this data set. Māori infants aged 1 month to < 1 year have the highest age-specific mortality rates across all age groups for both males and females. Māori children aged 5–14 years have the lowest age-specific rate of death for males and females.

Māori mortality by cause of death

Table 23 shows Māori mortality by cause. Overall the highest number of deaths due to specific causes were:

(i) death due to transport/vehicular injury (95 deaths or 19.9%)

(ii) suicide (76 deaths or 15.9%)

(iii) sudden unexpected death in infancy (SUDI) (68 deaths or 14.2%).

Overall these three causes made up half of all Māori child and youth deaths (239 out of 478 deaths).

Medical causes made up 28% of all deaths. Deaths due to infectious diseases (28 deaths) and neoplasms (28 deaths) made up 20% each of medical deaths. Circulatory system deaths (17 deaths) and conditions originating in the perinatal period (17 deaths) each made up just over 12% of medical deaths.

Unintentional injury deaths were almost one in three of all Māori child deaths. Vehicular related deaths were almost two-thirds of these deaths (95 of 154). Drowning, followed by poisoning were the next most common. Over 2002 and 2003 there were 23 deaths in Māori children and youth that were due to drowning.

Within the CYMR database for 2002 and 2003 causes of death that were defined as "undetermined/obscure cause/subject to coroners" made up just over 6% of deaths.

Table A4: Mortality (number and rates) in Māori children and youth 2002 and 2003 by cause

Category			N	%	Rate*
Medical		Infectious and parasitic disease	28	5.9	4.3
		Neoplasms	28	5.9	4.3
		Diseases of circulatory system	17	3.6	2.6
		Certain conditions originating in perinatal period	17	3.6	2.6
		Diseases of nervous system	12	2.5	1.8
		Congenital malformations etc	12	2.5	1.8
		Diseases of respiratory system	11	2.3	1.7
		Endocrine, nutritional and metabolic diseases	4	0.8	0.6
		Other medical causes	5	1.1	0.8
		Total medical	**134**	**28.0**	**20.5**
Injury	Unintentional injury	Vehicular	95	19.9	14.6
		Drowning	23	4.8	3.5
		Poisoning	14	2.9	2.1
		Suffocation	11	2.3	1.7
		Fire/burn/heat/smoke	8	1.7	1.2
		Fall	3	0.6	0.5
		Other	2	0.4	0.3
		Total all unintentional injury	**156**	**32.6**	**23.9**
	Intentional self-harm and assault	Suicide	76	15.9	11.6
		Assault	14	2.9	2.1
		Total unintentional and intentional	**246**	**51.0**	**37.7**
SUDI		All SUDI	68	14.2	10.4
All other		Undetermined/obscure/subject to coroners	30	6.3	4.6
Total		**Total all causes**	**478**	**100**	**73.2**

* Rate per 100,000 population 1 month to 24 years.

Māori mortality by cause and age group

Table A5: Māori child and youth mortality for age groups by cause 2002 and 2003

Age		Cause							
		Medical	Vehicular	Non-vehicular unintentional injury	Suicide	Assault	SUDI	Undetermined/ obscure/subject to coroner	Total
1 month to <1 year	N	38	1	6	0	2	65	7	119
	Rate*	125.7	3.3	19.9	0	6.6	215.0	232	393.7
	% within age	31.9	0.8	5.0	0	1.7	54.6	5.9	100
1–4 years	N	16	10	20	0	1	3	7	57
	Rate*	13.4	8.3	16.7	0	0.8	2.5	5.8	47.6
	% within age	28.1	17.5	35.1	0	1.8	5.3	12.3	100.0
5–14 years	N	29	16	11	8	0	0	2	66
	Rate*	10.1	5.6	3.8	2.8	0	0	0.7	22.9
	% within age	43.9	24.2	16.7	12.1	0	0	3.0	100.0
15–24 years	N	51	68	24	68	11	0	14	236
	Rate*	23.8	31.8	11.2	31.8	5.1	0	6.5	110.2
	% within age	21.6	28.8	10.2	28.8	4.7	0.0	5.9	100.0
Total	N	134	95	61	76	14	68	30	478
	Rate*	20.5	14.6	9.4	11.6	2.1	10.4	4.6	73.2
	% of total	28.0	19.9	12.7	15.9	2.9	14.2	6.3	100

* Rate is age-specific rate per 100,000.

This table shows:

- **1 month to < 1 year**: Māori age-specific mortality rates are greatest in this age group with rates three times higher than in any other age group. SUDI (54.6%) is the leading cause of death followed by medical causes (31.9%) in this age group.
- **1 to 4 years**: Age-specific rates are lower than in those aged under 1 year, however higher than in the 5–14 age group. Unintentional injuries are the leading cause (35.1%) followed by medical causes (28.1%) in this age group.
- **5 to 14 years**: Age-specific rates of mortality in Māori children are lowest in this age group. Medical causes are the leading cause (43.9%) followed by vehicular injury (24.4%). Over 1 in 10 deaths was due to suicide (12.1%).
- **15 to 24 years**: Age-specific mortality rates in this age group are higher than all child and youth apart from those 1 month to < 1 year. Suicides (28.8%) and vehicular injury deaths (28.8%) combined made up almost 60% of all deaths in this age group. Medical causes made up just over 1 in 5 deaths also (21.6%) and other unintentional injury makes up just over 1 in 10 deaths (10.2%).

Māori and non-Māori child and youth mortality 2002 & 2003

The following section shows findings for Māori and non-Māori.

Mortality by year and total

Table A6: Child and youth mortality (numbers and rates) by ethnicity and by year 2002 and 2003

Year	Māori			Non-Māori			Total	Relative risk M:NM
	N	%	Rate*	N	%	Rate*	N	
2002	213	44.6	65.7	438	50.3	39.5	651	1.7
2003	265	55.4	80.6	433	49.7	38.3	698	2.1
Total	**478**	**100**	**73.2**	**871**	**100**	**38.9**	**1349**	**1.9**

* Rate per 100,000 population 1 month to 24 years.

The Māori mortality rate overall was almost twice that for non-Māori (RR=1.9, 73.2 per 100,000 compared with 38.9 per 100,000). Mortality rates for Māori were higher in 2003 than in 2002, however rates for non-Māori were very similar across the time period.

Gender

Table A7: Child and youth mortality (numbers and rates) by ethnicity and by gender 2002 and 2003

Gender	Māori			Non-Māori			Total	Relative Risk M:NM
	N	%	Rate*	N	%	Rate*	N	
Male	297	62.1	89.5	558	64.1	48.6	855	1.8
Female	181	37.9	56.4	313	35.9	28.7	494	2.0
Total	**478**	**100**	**73.2**	**871**	**100**	**38.9**	**1349**	**1.9**

* Rate per 100,000 population 1 month to 24 years.

Almost two out of three deaths occurred in males for both Māori (62.1%) and non-Māori (64.1%). Māori rates of mortality were 1.8 times higher in males and twice as high in Māori females when compared with non-Māori.

Age

Table A8: Child and youth mortality (numbers and rates) by ethnicity and by age group 2002 and 2003

Age group	Māori			Non-Māori			Total	Relative risk M:NM
	N	%	Rate*	N	%	Rate*	N	
1 month to <1 year	119	24.9	393.7	106	12.2	134.4	225	2.9
1 to 4 years	57	11.9	47.6	93	10.7	28.2	150	1.7
5 to 9 years	21	4.4	14.4	65	7.5	14.8	86	1.0
10 to 14 years	45	9.4	31.6	65	7.5	13.6	110	2.3
15 to 19 years	126	26.4	107.2	260	29.9	55.9	386	1.9
20 to 24 years	110	23.0	113.8	282	32.4	63.0	392	1.8
Total	**478**	**100**	**73.2**	**871**	**100**	**38.9**	**1349**	**1.9**

* Age-specific rate per 100,000 population aged 1 month to 24 years.

Māori age-specific rates of mortality were higher across all age groups apart from those aged 5–9 years where rates were the same (RR = 1.0). The highest rates of mortality for both Māori and non-Māori were in the 1 month to < 1 year. This age group also had the highest disparity evident between Māori and non-Māori with Māori mortality 2.9 times higher and there were more Māori deaths than non-Māori deaths in this age group. Further disparities are seen in those aged 10–14 years where Māori were more than twice as likely to die than non-Māori rates of mortality in those aged 15–19 years, and 20–24 years were almost twice that for non-Māori.

Māori and non-Māori mortality by cause of death – total

Table A9: Māori and non-Māori child and youth major causes of death 2002 and 2003

Cause	Māori			Non-Māori			Relative risk M:NM
	N	%	Rate*	N	%	Rate*	
Medical	134	28.0	20.5	339	38.9	15.2	1.4
Vehicular	95	19.9	14.6	232	26.6	10.4	1.4
Non-vehicular unintentional injury	61	12.8	9.4	102	11.7	4.6	2.1
Suicide	76	15.9	11.6	131	15.0	5.9	2.0
Assault	14	2.9	2.1	18	2.1	0.8	2.7
SUDI	68	14.2	10.4	27	3.1	1.2	8.6
Undetermined/obscure/subject to coroner	30	6.3	4.6	22	2.5	1.0	4.7
Total	**478**	**100**	**73.2**	**871**	**100**	**38.9**	**1.9**

* Rate per 100 000 population aged 1 month to 24 years.

Across each cause group, Māori rates of mortality are higher than those for non-Māori. The greatest disparity is for SUDI. As a rate calculated across those aged 1 month to 24 years, Māori infants were more than eight times more likely to die as a result of SUDI than non-Māori. Māori were 1.4 times more likely to die from medical related causes. Māori vehicular related deaths were 1.4 times higher than non-Māori and were the second leading cause of death in both. Non-vehicular unintentional injuries were twice as high for Māori than non-Māori. Suicide was the third leading cause of death (in terms of numbers) and Māori suicide rates were two times higher than non-Māori. Assaults made up just over 2.1% of non-Māori deaths and 2.9% of Māori deaths. In total, there were 52 cases that were either still subject to coroners, or had causes that were obscure or undetermined. Of these 30 were in Māori and 22 in non-Māori.

Summary of key findings

Mortality in Māori children and youth

There were 478 Māori child and youth deaths over 2002 and 2003 combined and an age-specific rate of 73.2 per 100,000. Amongst these deaths, the level and pattern varied by gender and by age group.

With regards to gender:

- Of the 478 Māori deaths almost two-thirds (62.1%) were in Māori males. The difference between Māori males and Māori females occurred across all age groups and was greatest in those aged 15–24 years, and least in those aged 1–4 years.
- The difference between Māori males and Māori females also occurred across all causes but was particularly so for suicide and vehicular injury in youth.

With regards to age:

- Around half of all Māori child and youth deaths (49.4%) were in those aged 15–24 years. Māori males in this age group comprised almost one in three (157 of 478 total) of all deaths in Māori children and youth in this data.
- Age-specific mortality rates were highest in those aged 1 month to < 1 years where rates (393.7 per 100,000) were over five times higher than the mortality rate for Māori children and youth overall (73.2 per 100,000). Mortality in this age group made up almost one in four (24.9%) of all Māori child and youth deaths.
- The lowest numbers and rates of mortality were in those aged 5–9 years.
- Gender difference between Māori males and Māori females occurred across all age groups and was greatest in those aged 15–24 years, and least in those aged 1–4 years.
- Patterns of mortality by cause varied with age group. In those aged 1 month to < 1 year, SUDI and medical causes were the leading cause. In those aged 1–4 years unintentional injury (non-vehicle) and medical causes were the leading causes. In those aged 5–14, medical causes followed by vehicular injury were leading causes and in those aged 15–24 years, vehicular injury and suicide were leading causes and made up almost 30% (28.8%) each.

With regards to cause:

- The greatest number of deaths due to a single cause was vehicular injury (95 deaths) followed by suicide (76 deaths) and followed by SUDI (68 deaths).
- When specific causes were aggregated, medical causes made up 28% of all deaths with infectious disease and neoplasms being the leading causes making up 20% each of medical causes.

- Unintentional injury deaths were also an important cause of mortality with vehicular injury making up two-thirds of these deaths (95 of 154). Drowning and poisoning were the next most common causes of unintentional injury death.
- A total of 6% of all the Māori deaths in this data (as extracted in August 2005) had causes that were undetermined, obscure or subject to coroners.

Māori and non-Māori

Analysis of the CYMR database describing findings for both Māori and non-Māori enabled differences in mortality rates and patterns of mortality to be identified. Mortality rates in Māori and non-Māori overall, by gender, age and cause have been presented.

Key findings include:

- Overall:
  - Mortality rates comparing Māori with non-Māori show Māori rates are 1.9 times that of non-Māori in those aged 1 month to 24 years.
- Gender:
  - The overall proportion of mortality by gender is similar in Māori and in non-Māori with around two-thirds of deaths in both Māori (62.1%) and non-Māori (64.1%) being male.
  - Mortality rates are higher in both Māori males and Māori females when compared with non-Māori. The relative risks of mortality for Māori when compared with non-Māori 1.8 for males and 2.0 for females.
  - The highest rates of mortality were in Māori males (89.5 per 100,000), Māori females (56.4 per 100,000), non-Māori males (48.6 per 100,000) and non-Māori females (38.9 per 100,000).
- Age-group:
  - Patterns of disparity by age vary between age groups. The greatest difference between Māori and non-Māori is in those aged 1 month to < 1 year where Māori rates are almost three times higher (RR=2.9). This contrasts with those aged 5–9 years where Māori rates were the same as non-Māori (RR=1.0).
  - Mortality rates in Māori were almost twice that for non-Māori in those aged 1–4 years (RR= 1.7), 15–19 years (RR=1.9) and 20–24 years (RR=1.8) and over twice that for non-Māori in those aged 10–14 years.
  - Overall, the highest age-specific rates when gender and ethnicity are also considered, were in Māori aged 1 month to < 1 year (393.7 per 100,000). The next highest age-specific rate was in non-Māori in this age group (134.4 per 100,000).
- Cause of death:
  - With regards to patterns of mortality for specific causes, the leading single cause of mortality for both Māori and non-Māori were vehicular injury. Vehicular injury accounted for almost one in five Māori child and youth deaths (19.9%) and one in four non-Māori child and youth deaths (26.6%). Rates of vehicular injury death were 1.4 times higher in Māori.
  - The next leading specific cause of mortality for both Māori and non-Māori was suicide with suicide contributing to 15.9% of Māori deaths, and 15.0% of non-Māori deaths. Māori deaths made up 36.7% of all suicide deaths (76 of 207) with rates that were two times higher than non-Māori. Of concern, all suicide deaths in 2002 and 2003 in those aged under 15 years were Māori (N=8).

- When causes were aggregated, medical causes overall make up just over one in four Māori deaths (28%) and over one in three non-Māori deaths (38.9%). Māori deaths make up 28.3% of all medical deaths and Māori mortality rates for medical causes are 1.4 times higher than non-Māori.
- The greatest disparity between Māori and non-Māori was for SUDI. Māori deaths made up 72% of all SUDI deaths (68 out of 95 deaths). While SUDI made up 14.2% of all Māori child and youth deaths, it comprises 3.1% of all non-Māori child and youth deaths. Overall age-specific child and youth mortality rates (with population of 1 month to 24 years as the denominator) are 8.6 times higher in Māori. Age-specific mortality for SUDI in those aged 1 month to < 1 year show a rate of 215 per 100,000 in Māori that is 7.1 times higher than the age-specific rate in non-Māori in this age group.
- For both Māori and non-Māori age-specific mortality rates were greatest in those aged 1 month to < 1 year. For both Māori and non-Māori the next highest rates were in those aged 20–24 years followed closely by those aged 15–19 years.

Recommendations

A range of recommendations to the CYMRC have been made within the report. These are divided into:

(i) recommendations for addressing Māori child and youth mortality

(ii) recommendations for the CYMR database.

Recommendations for addressing Māori child and youth mortality included:

- maintaining Māori child and youth mortality as a priority area within the activity of the CYMRC
- support for current and further work to address Māori child and youth mortality priorities including support for ongoing projects and consideration of new projects addressing specific areas of concern regarding Māori child and youth mortality
- The need for an ongoing process of monitoring Māori child and youth mortality with a recommendation that the CYMRC supports a system for ongoing monitoring of Māori child and youth health within the CYMR database with reports on Māori child and youth mortality, updated annually.

Recommendations for the CYMR database included:

- continuation of initiatives that will gain more complete records on deaths in order to increase the capacity to gain more detailed understanding around specific causes and areas for prevention
- development of policies related to ethnicity analysis within the CYMR
- consider as to what would be required of the database in order to utilise the database to monitor Māori child and youth mortality (see above comments re monitoring)
- developing an equivalent of a data dictionary describing variables and how they arose (so that in future anyone analysing the data knows the source of data for each variable and how it has been coded)
- ensure analyses from the data are labelled with the date that the data were extracted so that changes made to the data following, are easily interpreted.

Overall conclusions

Strengths and limitations of the analysis

This is the first opportunity to investigate Māori child and youth mortality in detail within the context of the CYMR. The CYMR database consists of records on mortality from 1 January 2002 onwards, encompassing mortality in children from one month through to youth aged 24 years. In having multiple sources of data and opportunities for increased depth of information, there is an important opportunity to provide more detailed information on Māori child and youth mortality. It may be used also for determining if the patterns of mortality that were evident over the past decades exist within this data. This report will add updated data with capacity to explore specific issues further.

The analysis is limited to 2002 and 2003 as these were the years of most complete data at the time of analysis. It will be possible to update data with later years in future analyses. This report also does not include perinatal mortality (i.e. mortality in those aged under one month). The Perinatal Mortality Review Committee will be reviewing mortality in those aged under one month and thus analyses of this age are not presented here.

A further limitation is the capacity to undertake in-depth analyses of specific causes, e.g. youth suicide using the more detailed information in the database. Due to issues of completeness of the detailed data on particular causes of death, it is not possible to analyse this information quantitatively without risking misleading analyses.

Finally, it is beyond the scope of this report to review programmes and interventions that may reduce mortality and it is likely that in a range of areas, specific work on what are likely to be effective interventions will be needed.

Areas for prevention and intervention

If the various forms of describing lead causes of mortality are put together then the following priorities are identified:

a) SUDI – this cause is a leading cause of disparity and one of the leading contributors to the number of deaths in Māori children. In the very young (1 month to < 1 year) Māori deaths due to SUDI constitute 72% of all SUDI deaths.

b) Suicide – this is an area of disparity and of high numbers of deaths. It is described here as a high priority in particular due to the concerning finding of a number of 10–14 year old-suicide deaths who were Māori. Thus consideration of youth suicide and concerning numbers of Māori child suicide is a high priority.

c) Vehicular injury – based on numbers and across all ages particularly in youth vehicular injury is an important area for prevention.

d) Medical causes – medical causes aggregated across specific causes are still a major cause of death however and span a diverse range of conditions and ages. Areas of importance are infectious disease and neoplasms. Age groups in particular are those under one year and youth.

e) Non-vehicular unintentional injury – this is also an area with significant scope for prevention across a variety of causes including drowning, poisoning, suffocation and death in fires. Disparity is evident, particularly in those aged 1–4 years and in youth.

f) Assault – is an area of ongoing concern across ages with numbers dying due to assault being highest in youth.

Conclusion

The picture of Māori child and youth mortality in 2002 and 2003 CYMR data is one of concern. Māori child and youth deaths make up over one in three of all child and youth deaths and mortality in Māori children and youth is almost twice that for non-Māori. All areas of mortality are important however some areas are highlighted as particularly important for Māori: SUDI in infants, suicide in those 10 years and upwards, and vehicular injury across all ages, however particularly Māori aged 15–24 years.

This is not to say that there is any room for complacency in any other area. Differences in rates and patterns by cause highlight the need to consider age when determining where to place strategies and interventions to reduce mortality. Medical causes also are an area of need including for preventable causes such as infectious disease. In addition unintentional injury (non-vehicle), across all ages is also a priority, however particularly important in young children aged 1–4 years and in youth. Assault again is important and although there are smaller numbers it is a very important area of disparity.

This analysis describes many areas for reducing mortality among Māori children and youth. The CYMRC is well placed to be describing, documenting and disseminating information about Māori child and youth mortality. In addition, the CYMRC has an important role in providing advice on how to reduce mortality in Māori children and youth.

This first analysis of the database for the CYMRC has commenced this process by starting with the first task, i.e. describing, documenting and disseminating information about Māori child and youth mortality in 2002 and 2003. The next challenge is to work with the information, gain new information and develop advice and strategy to ultimately lead to a reduction in mortality in Māori children and youth.