



# **Child and Youth Mortality Review Committee**

Te Rōpū Arotake Auau Mate  
o te Hunga Tamariki, Taiohi

**Fourth Report to the Minister of Health  
Reporting mortality 2002–2005**

**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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# Acknowledgements

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- the Chief Coroner
- government departments, particularly Births, Deaths and Marriages (Internal Affairs) and the New Zealand Health Information Service (NZHIS)
- Water Safety New Zealand
- CYMRC agents, in particular chairs and co-ordinators of Local Mortality Review Groups
- clinicians
- the mortality database group in Otago University (the Data Group).

## Abbreviations and Glossary

ACC	Accident Compensation Corporation. ACC administers New Zealand's accident compensation scheme, which provides personal injury cover for all New Zealand citizens, residents and temporary visitors to New Zealand. In return, people do not have the right to sue for personal injury, other than for exemplary damages.
Bed-sharing	Also known as 'co-sleeping', this refers to when a baby is put to sleep in the same bed, or on the same mattress, etc as an older child or adult. Problems can arise if the older person is under the influence of alcohol or other drugs.
Case conferencing	A formal, planned and structured event with the goals of providing holistic, co-ordinated and integrated service review across providers, and reducing duplication. Case conferences are usually interdisciplinary and include one or more internal and external providers. Case conferencing differs from local mortality review group (LMRG) meetings because it includes all those who were involved in the care of the child or youth, whereas an LMRG (in order to comply with the Act) has Agents representing the organisations – not necessarily those directly involved. Those directly involved with the child or youth may attend the LMRG, but only individually.
CDRP	Cross departmental research pool. The CDRP funding 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 CDRP money is managed jointly by the Ministry of Science and Technology and the Foundation for Research, Science and Technology (see <a href="http://www.morst.govt.nz">www.morst.govt.nz</a> ).
CMO	Chief Medical Officer. A senior doctor who is part of the executive team of an organisation and provides leadership on a number of matters, such as clinical quality improvement, risk management, and health-related legal issues.
CYF	Child, Youth and Family. A service of the Ministry of Social Development and part of a network of agencies aiming to build an environment where child abuse is not tolerated.
CYMRC	Child and Youth Mortality Review Committee.
Data Group	Otago University staff who are contracted by the Ministry of Health (on behalf of the CYMRC) to manage a national mortality database in accordance with a formal contract between the Ministry of Health and the University of Otago.
DHB	District Health Board. DHBs are 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.
Distal	A medical term meaning farthest from the point of origin.

Estimated resident population	The denominator for mortality rates is taken from the estimated resident population (for 30 June in the year of death), as published by Statistics New Zealand. This is based on a projection of the count, including: all residents in the most recent census; and residents who were temporarily overseas at the time of the most recent census, with an adjustment up for residents who may have been missed by the census and an adjustment down for anyone who may have been counted twice. Visitors from overseas are excluded (see <a href="http://www2.stats.govt.nz">www2.stats.govt.nz</a> ).
High-risk or reckless behaviour	Deliberate behaviour (eg, butane inhalation, 'binge drinking') that would usually be avoided because of the possibility of severe injury or death, but where there appears to be no intent to self-harm.
LMC	Lead maternity carer. A health professional who is responsible for providing or organising maternity care through pregnancy, birth and the postnatal period. LMCs may be midwives, general practitioners or obstetricians.
LMRG	Local 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 CYMRC, and also to the governance section of the DHB.
NHI	National Health Index. The NHI is used to help with the planning, co-ordination and provision of health and disability support services across New Zealand. The National Health Index stores NHI numbers and demographic details. The number is a unique identifier that is assigned to every person who uses health and disability support services in New Zealand.
NZHIS	New Zealand Health Information Service. A business unit of the Ministry of Health responsible for collecting data and reporting health-related statistics.
OECD	The Organisation for Economic Co-operation and Development, which brings together the governments of 30 countries committed to democracy and the world market economy (see <a href="http://www.oecd.org">www.oecd.org</a> ).
OSH	Occupational Safety and Health. Part of the role of the Department of Labour is to provide best practice information and guidance to assist New Zealand businesses with health and safety in the workplace.
Quaternary	The level of health care above tertiary care. It usually refers to highly specialised services delivered by specialist clinicians in large teaching hospitals.
Safekids	The injury prevention service of Starship Children's Health and a member of Safekids Worldwide (see <a href="http://www.safekids.org.nz">www.safekids.org.nz</a> ).
Strengthening Families	A service that provides co-ordinated support for families who are working with more than two organisations. The organisations and the family work together to develop joint solutions, rather than each organisation dealing with one part of the problem and never seeing the bigger picture (see <a href="http://www.strengtheningfamilies.govt.nz">www.strengtheningfamilies.govt.nz</a> ).
SIDS	Sudden Infant Death Syndrome. The sudden and unexpected death of an apparently healthy infant during sleep.

SUDI	Sudden unexpected death in infancy. The definition CYMRC currently uses encompasses SIDS, infants found in adult beds where no direct evidence of overlying exists, and other similar deaths where a thorough post-mortem examination and death scene investigation are needed to determine cause of death. 'Unexpected' means that the cause was not recognised before the death.
The 'Act'	This refers to the New Zealand Public Health and Disability Act 2000.
Undetermined intent	In this report this has been given as the cause of death where the person was participating in what CYMRC has determined as 'high-risk behaviour' (see above). Although the death was accidental, there are important preventable factors associated with such deaths (eg, 'binge drinking'). CYMRC data is likely to contain a higher percentage of 'undetermined intent' deaths when compared with NZHIS data, because CYMRC's focus is on prevention. For more information on determining the cause of death, see section 2.1.
Well Child services	The publicly funded health service in New Zealand with the primary objective of supporting families/caregivers to maximise their child's developmental potential and health status between the ages of 0 and 5 years.

# Foreword

Caring for and protecting our children is a fundamental task for our families, our communities, and our society. Around 900 New Zealand children and youth aged between 4 weeks and 24 years die each year. Each of these deaths is a tragedy. Mortality rates are reducing, however many of these deaths are preventable and the extent of inequalities illustrates the potential for further reductions.

Mortality review processes ensure that important high quality data is collected and analysed, so that there is transparency and lessons are learned. This information can be used to improve policy, systems and processes to prevent further tragedy. The Child and Youth Mortality Review Committee (CYMRC) was established to review deaths, so that ways are found to reduce preventable deaths.

This government has made children and youth a priority, and there have been some notable accomplishments. A new initiative of zero fees for under six year olds was introduced in January 2008 to support and maintain free primary care to children under six. The majority of primary health organisations (PHOs) are participating in this voluntarily.

There is other dedicated work underway, including reducing smoking in pregnancy and in women of childbearing age, improving smoking cessation services and increasing public awareness of the risks of smoking before, during and after pregnancy. A comprehensive National Strategic Plan of Action for Breastfeeding is nearing completion and will guide a range of activities to protect, promote and support breastfeeding. A youth health work programme is being implemented, guided by the 2002 Youth Health Action Plan.

Efforts to improve immunisation coverage for two year-olds are paying off, with significant movement towards the target of 95% immunised in 2012. The successful Meningococcal B immunisation campaign vaccinated more than one million New Zealanders with the MeNZB vaccine, which was developed specifically to curb the New Zealand epidemic. The pneumococcal vaccine has been introduced to the national schedule to prevent pneumococcal disease in young children.

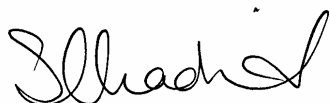
Alcohol is associated with more deaths among 15-29 year olds than any other age group in New Zealand. In October 2007, the Government announced plans to amend legislation to reduce the sale and supply of liquor to minors, and to reduce the legal blood alcohol content limit for drivers under 20 years of age on graduated licences. In March the New Zealand Suicide Prevention Action Plan 2008-2012 was launched to help guide and co-ordinate suicide prevention, and in 2007 the Lowdown website was launched. This is an interactive website for young Kiwis, providing online support and information about depression.

While these are significant achievements there is still much to do. The CYMRC Committee, together with local mortality review groups, play an essential role in this regard.

The CYMRC has existed for six years and has produced some key achievements in that time. There is now funding for local CYMRC coordinators in every DHB. Parents and families who lose a loved one can now contribute to the review into their death. This allows parents or families to share their views, in confidence, and this leads to a more complete picture of a child or youth death.

In 2006 CYMRC held a SUDI workshop with the Ministry of Health to highlight the key prevention messages of safe sleeping practices, breastfeeding, and non-smoking during pregnancy. The Ministry of Health has published a SUDI information resource for parents and is working with the Chief Coroner, Maori SIDS and others to improve the response to SUDI and improve information collection.

I wish to thank the CYMRC and all those who have contributed to the review process for their hard work. This report recognises that we still have a lot to do to prevent the tragic loss of young lives. I encourage the implementation of the recommendations and key messages of CYMRC. Together, we can lower the number of preventable deaths in New Zealand and provide a safer environment for our children any young people.

A handwritten signature in black ink, appearing to read 'Steve Chadwick', written in a cursive style.

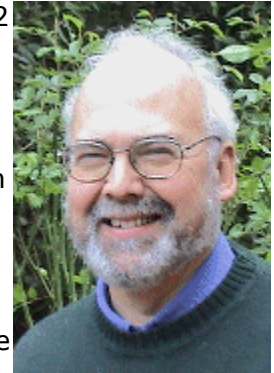
Hon Steve Chadwick  
**Associate Minister of Health**



# Chair's Introduction

This report concerns the deaths of children and youth from January 2002 to December 2005. On behalf of the Committee I extend my condolences to the families and friends of these young people and to those health professionals who provided care for them.

The Child and Youth Mortality Review Committee (CYMRC) has now been in existence for six years. Its establishment was the result of the work and advocacy of many people, but special mention should be made of Laurie O'Reilly, Commissioner for Children 1994 to 1997, who I remember saying in referring to child deaths in New Zealand: 'Everyone has a piece of the jigsaw but no-one has the full picture'. We have made substantial progress in the mortality review process in bringing many pieces of the jigsaw together.



The picture that emerges is not that pretty, and it certainly has many indistinct areas because at times it has been difficult to persuade all parties of the importance of this process. Lack of money and a questioning of the legitimacy of a new process have limited the ability of various ministries and District Health Boards to contribute to this important core quality improvement process. There have been notable exceptions to this, and I believe the Police in this country deserve credit for being thoughtfully involved in the process at all levels.

Clarifying and producing a multi-dimensional picture of the systems issues that underlie New Zealand's poor child health statistics is a high priority. This is needed to guide the changes that will improve the social, economic and health environment in which we raise our children. To this end, we now have a clear structure and process for mortality review that does not focus on individual fault finding, but rather on understanding the complex issues relating to how children and youth live and die. I believe the process that has been built is the best possible and has significant advantages over comparable overseas ones.

One such advantage is our underlying view that progress comes from local understanding and ownership of any improvements needed. The other major strength of our system is the New Zealand Public Health and Disability Act 2000, which enables the Committee to access multiple sources of information, thus enabling us to 'triangulate on the truth' – or as close to it as possible.

An amendment to the Act to enable full professional case conferencing for some of the deaths that are reviewed would be helpful, and would enable greater learning at the individual, local community and national levels.

What are the big lessons from this report?

- The overall trend of the death rate for children and youth in New Zealand is downwards and encouraging.
- International comparison suggests that we have not improved as fast as many other OECD (Organisation for Co-operation and Economic Development) countries, and in particular lag behind in providing safe environments for our babies, children and youth.
- There are disparities in mortality rates between different parts of our society, and these disparities may be growing, in particular the ethnic disparity. We have not achieved our aims with respect to equal outcomes for Māori and need to stay focused on achieving these.

- This disparity is especially evident in the two areas we have concentrated on – sudden unexpected death in infancy (SUDI) and youth suicide. In both these areas, further effort and changes are needed and should be possible with implementation of existing knowledge.
- We know that young people naturally indulge in risk-taking behaviours, but this in combination with our 'binge drinking' culture leads to many deaths. I believe that we need to acknowledge this and look to making New Zealand a more safety conscious country.

Finally, I welcome the new Coroners Act 2006 and the recent appointment of the first Chief Coroner, Judge Neil McLean. The new coronial systems to be put in place over the next few years will offer great opportunity for improving the quality of information available for mortality review and will, I hope, also feedback to the coronial system to assist coroners in the recommendations they make.

This is the last formal report to be produced under my chairmanship. It has been a privilege to serve New Zealand children and youth in this capacity and I wish my successor well. I also wish to thank the many supporters and participants in the process to date. I am especially grateful for the support of those in the Ministry of Health, in particular the wise advice and support from Gillian Bohm (Principal Advisor Quality Improvement and Audit), Faith Roberts (Senior Policy Analyst) and Pat Tuohy (Chief Advisor – Child and Youth Health).

A handwritten signature in black ink that reads "Barry Taylor". The signature is written in a cursive style with a large initial 'B' and 'T'.

Professor Barry Taylor  
**Chair**  
**Child and Youth Mortality Review Committee**

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# Executive Summary

Data collection and analysis relating to the deaths in New Zealand of four-week-old babies up to 24-year-old young adults (in this publication referred to as 'youth') forms a significant part of the CYMRC's work, and Section 2: Child and Youth Mortality outlines the methods used.

The section also provides mortality data, analysis and recommendations. It is divided into seven age groups:

- infant (birth to 12 months, which includes neonatal and postnatal)
- post-neonatal (4 weeks to 1 year)
- 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.

## Recommendations

The CYMRC has made recommendations throughout the extended discussion in section 2. Here the recommendations are gathered together and given a brief context.

Smoking in pregnancy is identified as a critical risk factor for sudden unexpected death in infancy (SUDI), especially in combination with bed-sharing or co-sleeping (ie, when, the baby sleeps in the same bed as an adult or older child).

The CYMRC recommends to the Minister of Health that:

1. all lead maternity carers (LMCs) and providers of Well Child services focus on clarifying with parents what is known about safe sleeping environments for infants
2. culturally appropriate and safe places for sleeping babies need developing and promoting
3. smoking in pregnancy needs to be a key focus of the Ministry of Health's smoking cessation programme
4. national monitoring of known risks should be considered as part of the Well Child contract to measure the effectiveness of prevention work.

The CYMRC has noted that problems can arise at the transition between different providers of care (eg, the provider of Well Child services may not continue to see a baby after the six weeks care by the LMC); between child-focused services and adult-focused services; or between different organisations working with children and youth at the same time.

The CYMRC recommends to the Minister of Health that:

5. (as we have previously recommended) there needs to be improved communication between providers, including confirmation that referrals have been received
6. all District Health Boards develop or review their policy and practice on the transition of care to adult services for children and youth with complex health (including mental health) needs
7. government (particularly the Ministries of Education, Justice, Social Development and Health) and those working with children and youth, as a priority, actively identify and address barriers to inter-agency communication and working together
8. the current work to develop and establish a child health information system accessible to all those in New Zealand providing health services to a child be given a high priority.

There are many and varied responses of health services across the country in the event of a SUDI.

The CYMRC recommends to the Minister of Health that:

9. consideration be given to a co-ordinated process for follow-up of families after SUDI deaths as part of the current review of Well Child services.

There are issues related to the safety of children in rural environments – especially farms.

The CYMRC recommends that the Minister of Health:

10. suggests to the relevant Minister that there is a need for leadership on these matters from the Accident Compensation Corporation (ACC) and Occupational Safety and Health, Department of Labour (OSH), and in particular from the recently appointed Director of Injury Prevention at ACC.

Youth health services in some areas have been inadequate or disconnected from each other.

The CYMRC recommends to the Minister of Health that:

11. Encourage all DHBs to institute the recommendations of the Youth Health Action Plan (Ministry of Health. 2002. *Youth Health: A Guide to Action*. Wellington: Ministry of Health). Available under publications on [www.moh.govt.nz](http://www.moh.govt.nz).

The CYMRC notes the strong association in reviewed deaths between alcohol use and deaths from injury relating to fights, motor vehicle crashes and suicide.



The CYMRC recommends that the Minister of Health:

12. requests the Ministry of Health to undertake further work related to alcohol, with a focus on effective methods of altering our current youth 'alcohol bingeing' culture.

There are 11 District Health Boards that do not have CYMRC local mortality review groups. The CYMRC believes that this local process is a core quality improvement activity that benefits local child and youth services. In addition, local groups assist inter-agency communication, as mentioned in recommendations 5 to 8 above.

The CYMRC recommends that the Minister of Health:

13. requests the Ministry of Health to develop further incentives for District Health Boards to support the evolving of local and national processes for mortality review.



# **1 Activities and Highlights of the CYMRC in 2006**

## **1.1 SUDI workshop**

The CYMRC held a workshop in May 2006 in association with Pat Tuohy, Chief Advisor Child and Youth Health, Ministry of Health. The aims were to update all relevant parties on the current number of SUDI deaths in New Zealand, review current prevention messages, and make recommendations on what can be done to further improve the situation for New Zealand.

The workshop was well attended, with representation from all the relevant groups who work in the area of SUDI in New Zealand. Presentations can be viewed on the CYMRC website ([www.cymrc.health.govt.nz](http://www.cymrc.health.govt.nz)).

Those at the workshop decided that the main action should be to send out a reminder of the key prevention messages to health professionals and the public (see Appendix D).

Those attending also thought this kind of workshop should be planned every three years to ensure momentum is maintained in this important area.

## **1.2 Presentation to the chief medical officers**

In July 2007 the Chair presented the process and outcomes of the child and youth mortality review process to the chief medical officers. The chief medical officers were encouraging and very supportive of the process.

## **1.3 Introductory workshop on local child and youth mortality review groups**

CYMRC held a workshop following directly after the Paediatric Society Conference in Nelson in November 2006. The intention was to encourage interested parties around the country to support the establishment of local mortality review groups (aligned with the CYMRC) in their regions.

Twenty people attended the workshop, including both clinicians and District Health Board management staff. Two chairs and two co-ordinators from local groups were present, and they described the purpose of the local groups, the process of local community-based review, and the nature of the information on the national mortality database.

Those who had been involved in local review gave examples of local benefits as a result of the local mortality review group (LMRG). Two of these examples were: a meeting that led to the building of better relationships and communication between the local ambulance service staff and the clinicians in the emergency department, and another meeting where one group member, a clinical specialist, provided advice to others on defibrillation in children.

## **1.4 Parent and family reporting**

From December 2006 it has been possible for parents and family of children who have died to report comments directly to the national committee. Either web or paper based reporting is possible. Access is via our public website ([www.cymrc.health.govt.nz](http://www.cymrc.health.govt.nz)).

We believe this is the first time anywhere in the world that parents and family have been able to have direct input into a mortality review system in this way, enabling them to contribute to improving the systems affecting children and youth.

We will review the information from parents and families and evaluate the need for any changes to the process.

## 2 Child and Youth Mortality

### 2.1 Introduction

#### Historical data prior to 2002

The CYMRC has reviewed available child and youth mortality figures and historical trends in New Zealand before its own data collection started in 2002. The source of data was the New Zealand Health Information Service (NZHIS) for mortality data and population data by ethnicity and age group.

It should be borne in mind that the historical data in this report (ie, any figures before 2002) is not from the mortality database and may therefore not be directly comparable. For instance, NZHIS official death statistics are based on the year of registration of death, in contrast with the CYMRC data, which is based on the actual date of death.

#### CYMRC data from 2002

It is important to note when interpreting the CYMRC data that this data is derived from a database that is continually being updated. This may be perceived as a limitation, but there will only be a very few deaths (if any) that are notified to the data group for the first time, more than one year after the death, and so the numbers will be comparable with published NZHIS figures. The continual update of the database is such that if new information relating to a death is submitted that changes the classification of the cause of death, then the subsequent report may report that death as due to a different cause than in previous reports. This means that consecutive annual reports may have very slightly different numbers in any one category, but the most recent report should be the most accurate in terms of causes of death.

The CYMRC collects mortality data from 1 January 2002. This data comes from a variety of sources, including:

- Statistics New Zealand (for live births and the mean resident population estimates for 2002, 2003, 2004 and 2005 for the total child and youth population, and by age group (population data estimates for all ethnic groups are not available for between-census years)
- Births, Deaths and Marriages (Department of Internal Affairs)
- NZHIS
- Child, Youth and Family Service (Ministry of Social Development)
- Water Safety New Zealand
- Coronial Services (Ministry of Justice)
- Ministry of Transport
- co-ordinators of LMRGs
- CYMRC agents as members of LMRGs
- families of the deceased.

The Committee also continues to consider other suitable data sources and liaise with other organisations.

Data from the various sources is linked using the National Health Index (NHI). However, linking the 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 from those recorded with the NHI or by organisations such as the police
- the delay in registration of some deaths.

Based on the information obtained, the data is coded across a range of variables. These include NHI number, age group, ethnicity, the underlying cause of death, and the District Health Board 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.

## Determining the cause of death

The rule followed by members of the Data Group is to designate the cause as 'the single underlying cause most likely to be considered preventable'. Often this is the most 'distal' (furthest from the point of origin) of the identifiable causes that led to death. For example, where the child or youth dies because they drown, but the drowning is directly due to a transport incident, the CYMRC will record the cause of death as transport. This may be different from systems with different purposes, such as a post-mortem or coroner's inquiry, which are likely to identify the cause of death as drowning.

Because the CYMRC focus is prevention, an 'undetermined intent' code has been assigned to deaths where the person was participating in what the CYMRC has determined to be 'high-risk or reckless' behaviour (eg, butane inhalation, heavy alcohol consumption). Although the death was accidental, there are important preventable factors associated with such deaths; for example, 'binge drinking'. Our data is likely to contain a higher percentage of 'undetermined intent' deaths when compared with published NZHIS data because the CYMRC's focus is prevention.

## Method and definitions used to produce the data

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

- The data was extracted from the national mortality database on 29 December 2006.
- The *year of death* refers to the 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 determining the exact cause of death has been received from other sources.
- The cause *transport* includes deaths involving on- and off-road vehicles as well as trains, planes and watercraft where the deceased may have been the passenger, driver or a pedestrian.
- The denominator for mortality rates is taken from the estimated resident population (for 30 June in the year of death), as published by Statistics New Zealand. This is based on a projection on the count, including: all residents in the most recent census; and residents who were temporarily overseas at the time of the most recent census, with an adjustment up for residents who may have been missed by the census and an adjustment down for anyone who may have been counted twice.
- The denominator for mortality rates, broken down by ethnicity, was provided by NZHIS and is based on 2001 Census figures.

- We have excluded deaths of non-New Zealand residents from the main sections of our report because the denominator in rate calculations (estimated resident population from Statistics New Zealand) excludes visitors from overseas. A separate section (2.8) on deaths of overseas visitors is included so that we do not lose information on this group of deaths.

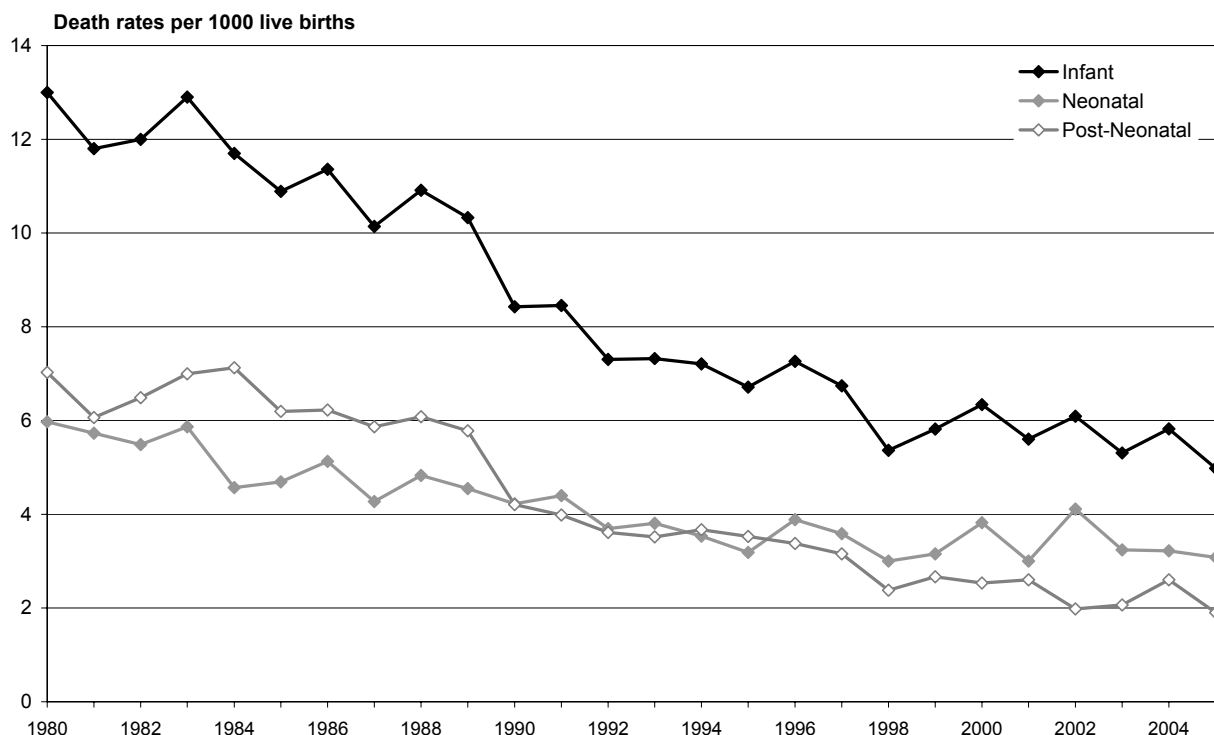
## 2.2 Infant mortality (deaths in the first year of life: birth to one year old)

### Infant mortality: trends over time

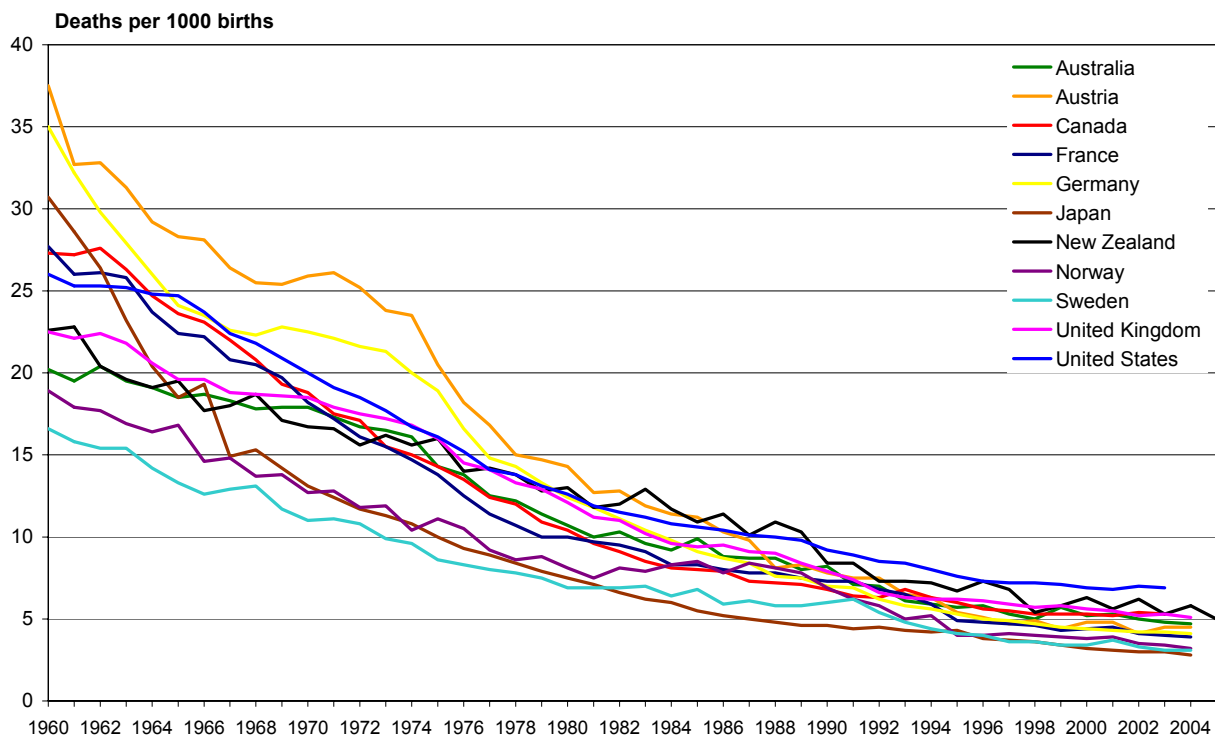
Figure 1 shows trends over time from 1980 to 2005 for infant mortality, neonatal mortality and post-neonatal mortality. Infant mortality includes both neonatal (under four weeks – the jurisdiction of the Perinatal and Maternal Mortality Review Committee) and post-neonatal (over four weeks but less than one year – the jurisdiction of CYMRC) mortality. Rates are calculated as the number of deaths per 1000 live births in the respective year.

Overall, infant mortality rates continue to decline. For the first time in New Zealand, rates have dropped below 5 per 1000 live births. However, other countries have had rates below 5 per 1000 for many years (Australia since 2003 and Japan since 1988). Infant mortality in some comparable OECD countries is shown in Figure 2. The Committee’s brief is to examine deaths from four weeks of age (ie, the post-neonatal phase), and causes of mortality for this age group are shown in Figure 3.

**Figure 1:** Infant (birth to one year old) mortality rate (per 1000 live births), by year, 1980–2005



**Figure 2:** Infant mortality rate (per 1000 live births), selected OECD countries since 1960



Source: OECD website: <http://www.ecosante.org/>. Accessed 18 February 2007.



## 2.3 Post-neonatal mortality (four weeks to one year)

Deaths in babies in the post-neonatal period are more closely connected to their time as a fetus in the womb and the home environment in which the babies live than is the case for deaths in older age groups. Maternal smoking during pregnancy is the major factor that makes New Zealand babies vulnerable. An unsafe sleeping environment and/or infection are the major environmental stresses on them.

Figure 1 shows the significant drop in post-neonatal deaths that occurred in 1989 in response to widespread health promotion messages that babies should be put to sleep on their backs not fronts. The post-neonatal death rate has continued to decrease more gradually since 1997, but the reasons for this are unclear.

Figure 4 shows Māori versus non-Māori rates for post-neonatal mortality. The figure shows mortality review data, which uses a consistent definition such that if a person has been identified as Māori in any of the data sources used (eg, birth certificate, death certificate, coroner's report), then they are classified as Māori. Figure 5 needs to be interpreted with some caution because there was a change in the definition of 'Māori' during the time period. This is illustrated by the change around the missing data year of 1995. Before 1995 the definition of 'Māori' was based on an identified 'Māori blood relative'. After this date self (or parental) identification was used for both numerator and denominator in determining rates.

The risk ratio, indicated on the graph as the solid black line, shows that although the rates are dropping, the disparity between Māori and non-Māori death rates is increasing.

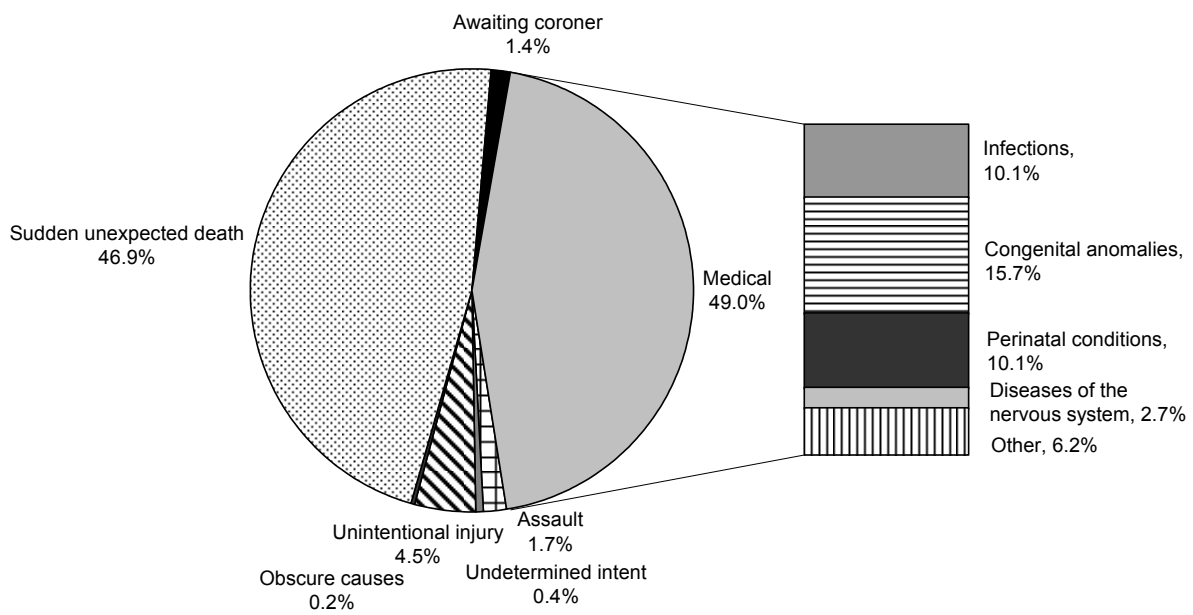
Figure 3 shows the main causes of death in this age group, with Table 1 providing more detail. Over the last five years sudden unexpected death in infancy (SUDI) has caused 47% of the deaths in this age group. There has been an increasing tendency among forensic pathologists and coroners to use the term 'SUDI' instead of 'SIDS' (sudden infant death syndrome) when:

- deaths occur during bed-sharing/co-sleeping
- the post-mortem examination does not show any obvious cause of death
- the death was unexpected and presumed to be during sleep
- there was no prior indication of symptoms of serious illness.

The majority will have previously been formally classified as SIDS.

In 2004 there were a large number of these deaths (72), leading to some concern that we were going backwards in preventive efforts. However, there were 46 SUDI deaths in 2005, so we can now see that this increase in deaths has not been sustained, and in fact this is the lowest number of SUDI that we have recorded since 2002.

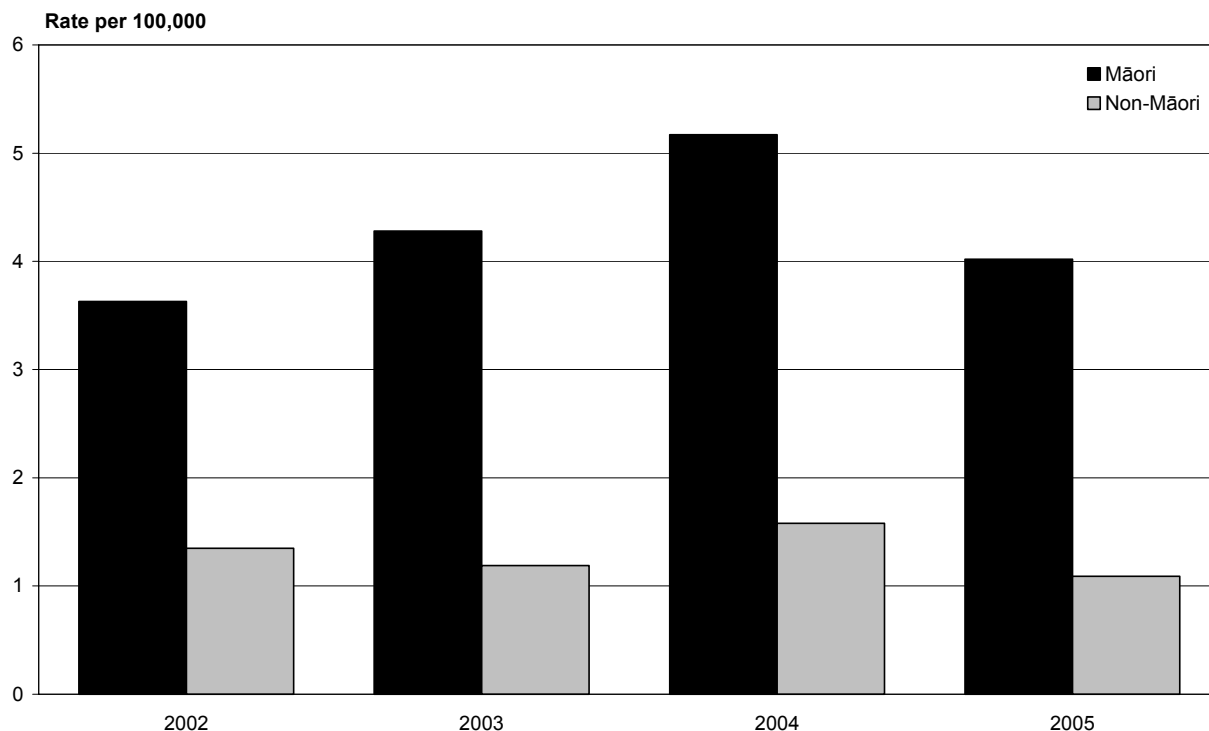
**Figure 3:** Causes of post-neonatal mortality (%), by category, for 2002–2005 combined (484 deaths in total)



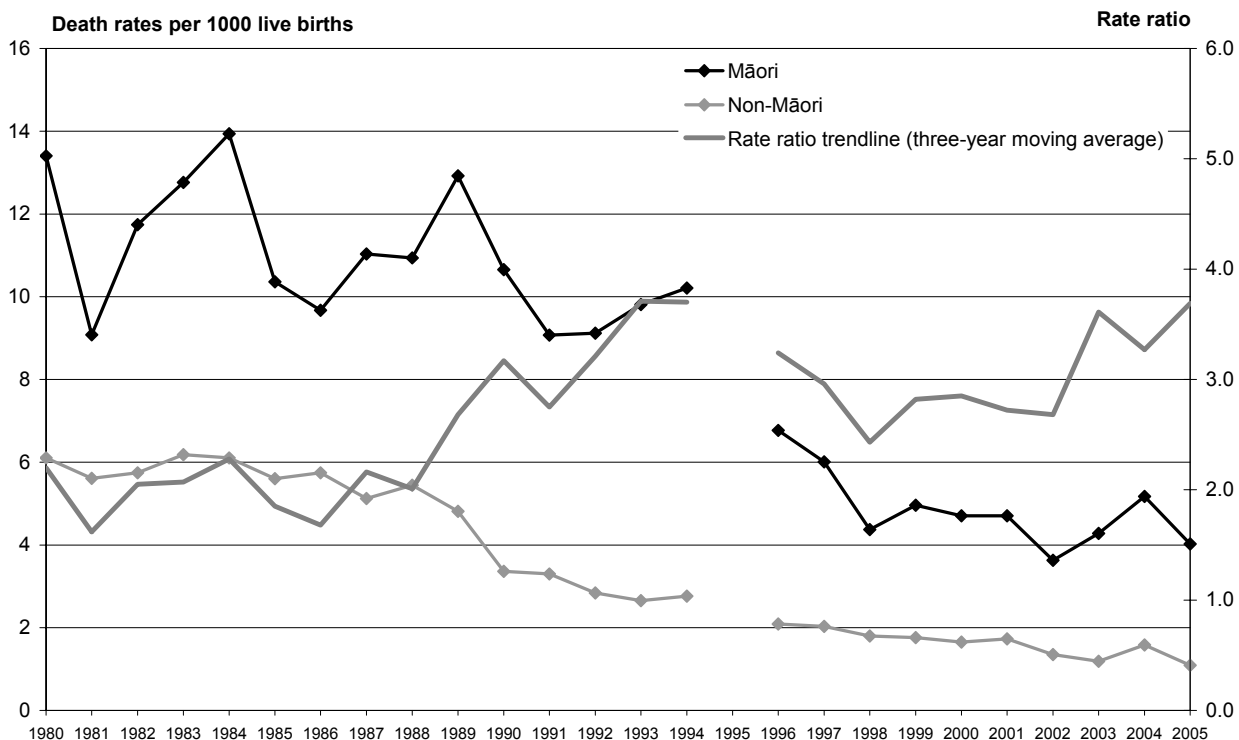
**Table 1:** Post-neonatal mortality (number and age-specific rate per 1000 live births), by cause and by year, 2002–2005

Category	Cause	Deaths					Total	%	Rate (per 1000 live births)			
		2002	2003	2004	2005	2002			2003	2004	2005	
Medical	Infections	10	10	22	7	49	10.1	0.19	0.18	0.38	0.12	
	Neoplasms	1	2	1	3	6	1.2	0.00	0.04	0.02	0.05	
	Endocrine, nutritional and metabolic diseases		1	2	2	6	1.2	0.02	0.02	0.03	0.03	
	Diseases of nervous system		6	5	2	13	2.7	0.00	0.11	0.09	0.03	
	Diseases of circulatory system	4	2	1	3	10	2.1	0.07	0.04	0.02	0.05	
	Diseases of respiratory system		1		1	2	0.4	0.00	0.02	0.00	0.02	
	Diseases of digestive system		1	3	1	5	1.0	0.00	0.02	0.05	0.02	
	Diseases of genitourinary system			1		1	0.2	0.00	0.00	0.02	0.00	
	Perinatal conditions	15	10	12	12	49	10.1	0.28	0.18	0.21	0.21	
	Congenital anomalies	20	17	17	22	76	15.7	0.37	0.30	0.29	0.38	
	<b>Total medical</b>	<b>50</b>	<b>50</b>	<b>64</b>	<b>53</b>	<b>217</b>	<b>44.8</b>	<b>0.93</b>	<b>0.89</b>	<b>1.10</b>	<b>0.92</b>	
Unintentional injury	Drowning/submersion	1	1	1	1	4	0.8	0.02	0.02	0.02	0.02	
	Fire/burn/heat/smoke			1		1	0.2	0.00	0.00	0.02	0.00	
	Transport	2		4		6	1.2	0.04	0.00	0.07	0.00	
	Struck by, against			1		1	0.2	0.00	0.00	0.02	0.00	
	Suffocation	2	2	2	4	10	2.1	0.04	0.04	0.03	0.07	
	<b>Total unintentional injury</b>	<b>5</b>	<b>3</b>	<b>9</b>	<b>5</b>	<b>22</b>	<b>4.5</b>	<b>0.09</b>	<b>0.05</b>	<b>0.15</b>	<b>0.09</b>	
Assault	Cut/pierce			1		1	0.2	0.00	0.00	0.02	0.00	
	Struck by, against	1		2	1	4	0.8	0.02	0.00	0.03	0.02	
	Suffocation	1		2		3	0.6	0.02	0.00	0.03	0.00	
	<b>Total assault</b>	<b>2</b>		<b>5</b>	<b>1</b>	<b>8</b>	<b>1.7</b>	<b>0.04</b>	<b>0.00</b>	<b>0.09</b>	<b>0.02</b>	
Undetermined intent	Firearm	1				1	0.2	0.02	0.00	0.00	0.00	
	Struck by, against			1		1	0.2	0.00	0.00	0.02	0.00	
	<b>Total undetermined intent</b>	<b>1</b>		<b>1</b>		<b>2</b>	<b>0.4</b>	<b>0.02</b>	<b>0.00</b>	<b>0.02</b>	<b>0.00</b>	
Sudden unexpected death	<b>Total sudden unexpected death</b>	<b>48</b>	<b>61</b>	<b>72</b>	<b>46</b>	<b>227</b>	<b>46.9</b>	<b>0.89</b>	<b>1.09</b>	<b>1.24</b>	<b>0.80</b>	
Obscure cause	<b>Total obscure</b>				<b>1</b>	<b>1</b>	<b>0.2</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.02</b>	
Awaiting coroner	<b>Total awaiting coroner</b>	<b>2</b>	<b>2</b>		<b>3</b>	<b>7</b>	<b>1.4</b>	<b>0.04</b>	<b>0.04</b>	<b>0.00</b>	<b>0.05</b>	
<b>Total</b>		<b>108</b>	<b>116</b>	<b>151</b>	<b>109</b>	<b>484</b>	<b>100.0</b>	<b>2.00</b>	<b>2.07</b>	<b>2.60</b>	<b>1.89</b>	

**Figure 4:** Post-neonatal mortality (age-specific rate per 1000 live births), Māori and non-Māori, by year, 2002–2005



**Figure 5:** Māori postnatal mortality rate, 1980–2005



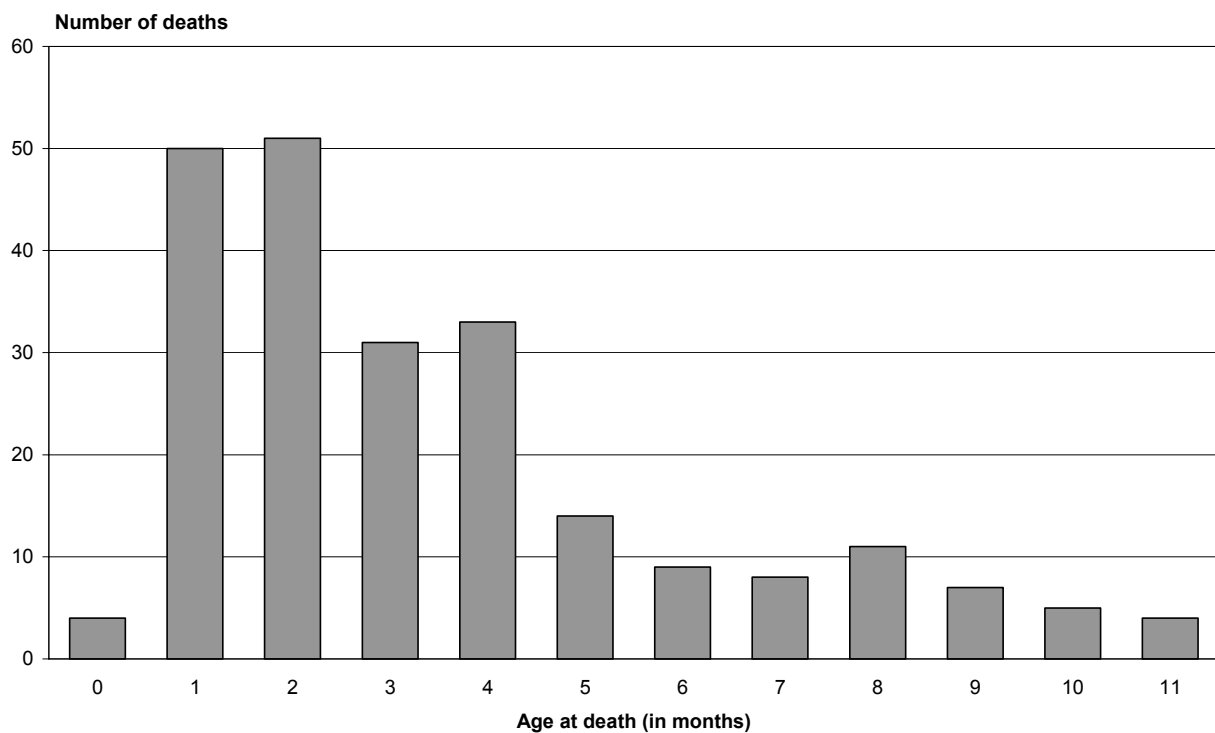
\* As a result of new birth and death registration forms introduced in September 1995, ethnicity data for 1996 and later years is not comparable with data from previous years.

**Table 2:** SUDI deaths (number of deaths), by ethnicity, age and gender, 2002–2005 combined

Ethnicity	Female			Male			Total
	4–52 weeks	1–4 years	Total	4–52 weeks	1–4 years	Total	
Māori	83	1	84	81	5	86	170
Non-Māori	24	3	27	39	5	44	71
<b>Total</b>	<b>107</b>	<b>4</b>	<b>111</b>	<b>120</b>	<b>10</b>	<b>130</b>	<b>241</b>

**Table 3:** SUDI deaths (numbers and rates per 1000 live births), by ethnicity and year, 2002–2005

Ethnicity	4–52 weeks									1–4 years (No. only)				
	2002		2003		2004		2005		Total	2002	2003	2004	2005	Total
	No.	Rate	No.	Rate	No.	Rate	No.	Rate						
Māori	34	2.29	47	3.00	49	3.01	34	2.07	164	1	2	2	1	6
Non-Māori	14	0.36	14	0.35	23	0.55	12	0.29	63	3	3	2	0	8
<b>Total</b>	<b>48</b>	<b>0.89</b>	<b>61</b>	<b>1.09</b>	<b>72</b>	<b>1.24</b>	<b>46</b>	<b>0.80</b>	<b>227</b>	<b>4</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>14</b>

**Figure 6:** SUDI deaths (numbers), by age at death (months), 2002–2005 combined

## Discussion

It is very pleasing that overall infant mortality and post-neonatal mortality are at an all-time low. However, it remains of concern that many countries are doing considerably better than us (see Figure 2). Also of concern is the fact that even though there has been a significant decrease in the number of deaths of Māori infants, the disparity in post-neonatal death rates is getting larger.

Looking at the main causes of death in this age group (shown in Figure 3), we see many types of death that are potentially preventable – mainly deaths related to SUDI (see below), infection, and injury from assault.

The majority of SUDI deaths reviewed seem to have one or more contributing risk factors that should be preventable. Current evidence is clear that smoking in pregnancy makes babies very vulnerable, and bed-sharing in combination with maternal smoking multiplies the risk. In practice all babies need to have a safe environment when they are asleep, because we cannot always predict which babies are especially vulnerable.

It is especially dangerous for babies to sleep on couches, chairs or other furniture because they do not have the safety features of cots or bassinets. It appears that many people are not aware of this. It is also important that babies' faces are not covered, that babies cannot get stuck, and that they cannot roll off the sleeping surface.

More recently it has been appreciated that there are specific protective factors, such as breastfeeding and sharing a room (but not in the same bed) with an adult. The use of a dummy (pacifier) can be protective in some circumstances (mainly when there are other risk factors present), although this needs to be used carefully so that it does not inhibit breastfeeding or lead to otitis media (ear infections), for further information please refer to Appendix D.

### **Child and Youth Mortality Review Committee (CYMRC) feedback on post-neonatal issues**

Mothers smoking in pregnancy is identified as a critical risk factor for SUDI, especially in combination with bed-sharing or co-sleeping (ie, when the baby sleeps in the same bed as an adult). Some families are not able to afford a bed let alone a separate bassinet or cot for the baby.

The CYMRC recommends to the Minister of Health that:

1. all lead maternity carers (LMCs) and providers of Well Child services focus on clarifying with parents what is known about safe sleeping environments for infants
2. culturally appropriate and safe places for sleeping babies need developing and promoting
3. smoking in pregnancy needs to be a key focus of the Ministry of Health's smoking cessation programme
4. national monitoring of known risks should be considered as part of the Well Child contract to measure the effectiveness of prevention work.

## 2.4 Child mortality

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

- 1–4 years (Figures 7, 8 and 9, and Table 4)
- 5–9 years (Figures 10, 11 and 12, and Table 5)
- 10–14 years (Figures 13, 14 and 15, and Table 6).

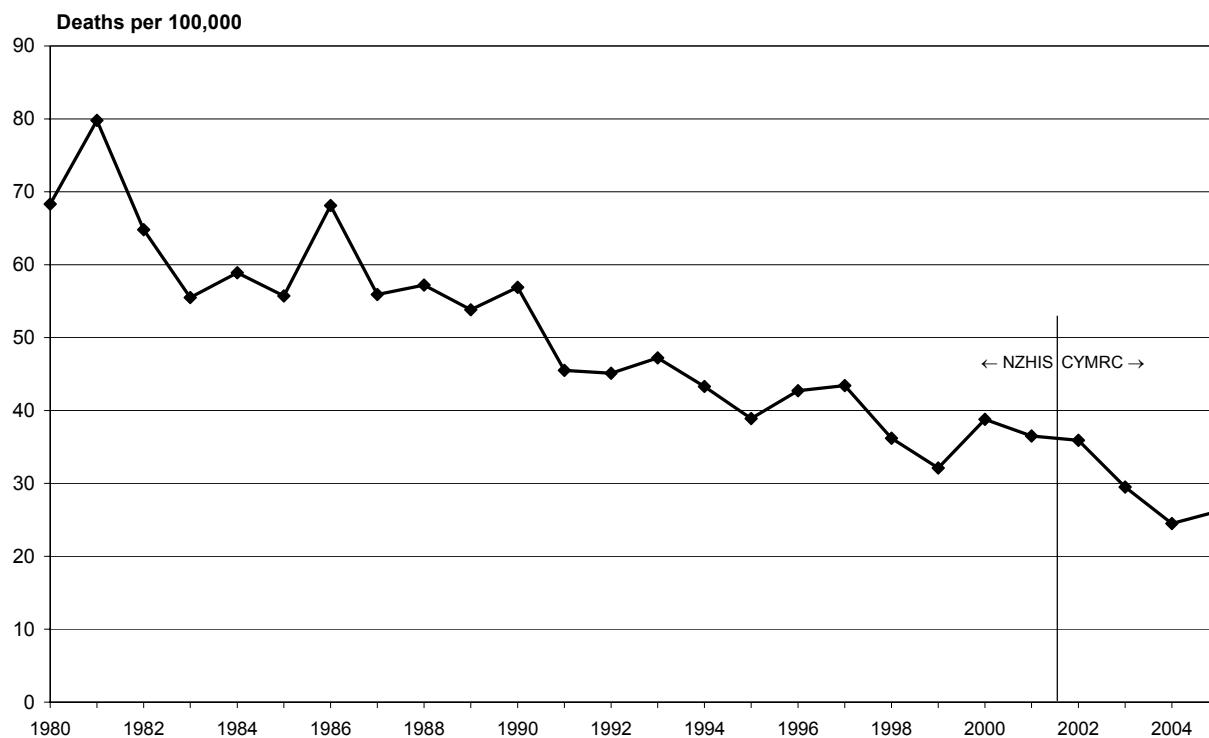
The mortality rates for overall findings are calculated as the number of deaths per 100,000 estimated mean resident population of the respective age group.

The notable patterns that emerge in child mortality are:

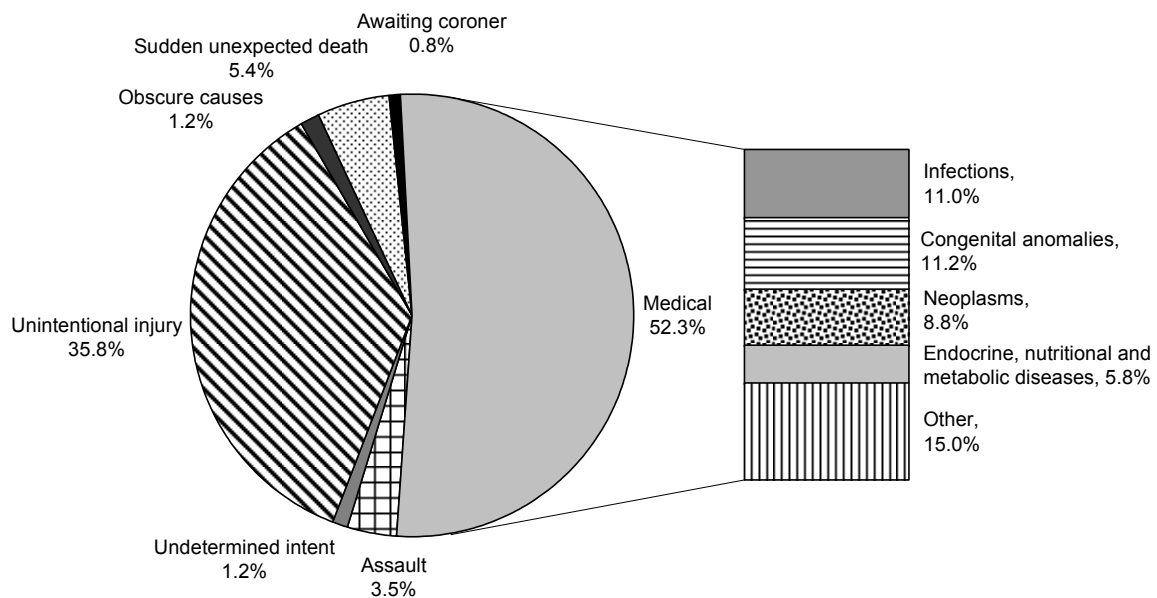
- a halving in death rate of our 1–4-year-olds over the last 25 years
- the emergence in 1–4-year-olds of unintentional injury as an important cause of death (mainly transport, drowning and fire)
- less ethnic disparity than in the post-neonatal period
- suicide emerging as a cause of death in the nine-year-old age group, and being the cause of 10.5% of the deaths in the 10–14-year-old age group (22 deaths over four years).

### 2.4.1 Children aged 1–4 years

**Figure 7:** Mortality (age-specific rate per 100,000) in children aged 1–4 years, by year, 1980–2005



**Figure 8:** Cause of mortality in children aged 1–4 years (%), by category of death, 2002–2005 combined (261 deaths)

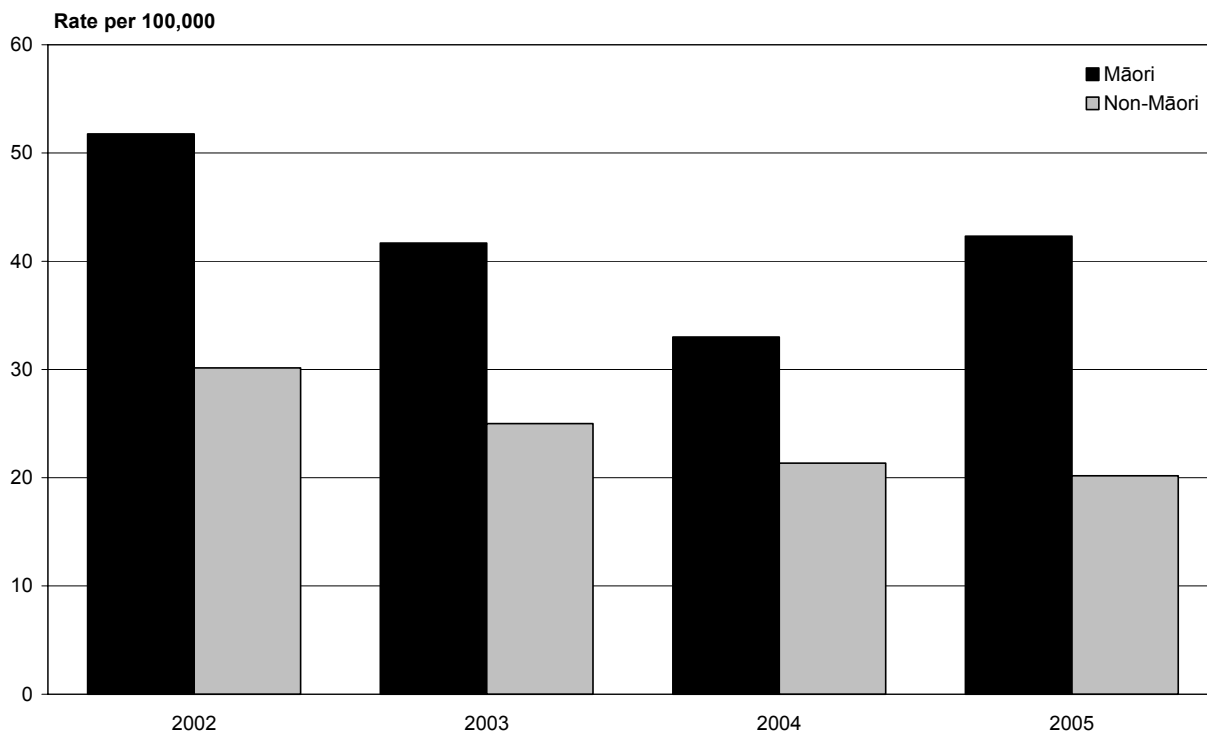




**Table 4:** Mortality in children aged 1-4 years (number of deaths and age-specific rate per 100,000), by cause and year, 2002-2005

Category	Cause	Deaths					Rate (per 100,000)				
		2002	2003	2004	2005	Total	%	2002	2003	2004	2005
Medical	Infections	10	6	5	9	30	11.5	4.43	2.68	2.23	4.00
	Neoplasms	8	6	4	5	23	8.8	3.54	2.68	1.78	2.22
	Endocrine, nutritional and metabolic diseases	7	4	2	2	15	5.7	3.10	1.79	0.89	0.89
	Diseases of nervous system	4	4	1	4	13	5.0	1.77	1.79	0.45	1.78
	Diseases of circulatory system		1	2	1	4	1.5	0.00	0.45	0.89	0.44
	Diseases of respiratory system		1	1	1	2	0.8	0.00	0.45	0.45	0.00
	Diseases of digestive system	1	1	3	1	6	2.3	0.44	0.45	1.34	0.44
	Perinatal conditions	6	4	2	2	14	5.4	2.66	1.79	0.89	0.89
	Congenital anomalies	3	10	10	6	29	11.1	1.33	4.46	4.45	2.67
	<b>Total medical</b>	<b>39</b>	<b>37</b>	<b>30</b>	<b>30</b>	<b>136</b>	<b>52.1</b>	<b>17.27</b>	<b>16.51</b>	<b>13.36</b>	<b>13.33</b>
	Unintentional injury	Drowning/submersion	12	8	3	6	29	11.1	5.31	3.57	1.34
Fall			1	1		2	0.8	0.00	0.45	0.45	0.00
Fire/burn/heat/smoke		6	1	1	2	10	3.8	2.66	0.45	0.45	0.89
Transport		9	10	8	13	40	15.3	3.99	4.46	3.56	5.78
Natural/environmental/animal					1	1	0.4	0.00	0.00	0.00	0.44
Poisoning		1		1		2	0.8	0.44	0.00	0.45	0.00
Struck by, against		1				1	0.4	0.44	0.00	0.00	0.00
Suffocation		2	2	1	2	7	2.7	0.89	0.89	0.45	0.89
Electrocution		1				1	0.4	0.44	0.00	0.00	0.00
<b>Total unintentional injury</b>		<b>32</b>	<b>22</b>	<b>15</b>	<b>24</b>	<b>93</b>	<b>35.6</b>	<b>14.17</b>	<b>9.82</b>	<b>6.68</b>	<b>10.66</b>
Assault		Unspecified cause	1				1	0.4	0.44	0.00	0.00
	Cut/pierce			2		2	0.8	0.00	0.00	0.89	0.00
	Struck by, against	3	1	1	1	6	2.3	1.33	0.45	0.45	0.44
	<b>Total assault</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>9</b>	<b>3.4</b>	<b>1.77</b>	<b>0.45</b>	<b>1.34</b>	<b>0.44</b>
Undetermined intent	Transport			1	1	2	0.8	0.00	0.00	0.45	0.44
	Suffocation			1		1	0.4	0.00	0.00	0.45	0.00
	<b>Total undetermined intent</b>			<b>2</b>	<b>1</b>	<b>3</b>	<b>1.1</b>	<b>0.00</b>	<b>0.00</b>	<b>0.89</b>	<b>0.44</b>
Health systems error	<b>Total health system error</b>				<b>1</b>	<b>1</b>	<b>0.4</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.44</b>
Sudden unexpected death	<b>Total sudden unexpected death</b>	<b>4</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>14</b>	<b>5.4</b>	<b>1.77</b>	<b>2.23</b>	<b>1.78</b>	<b>0.44</b>
Obscure cause	<b>Total obscure cause</b>	<b>2</b>		<b>1</b>		<b>3</b>	<b>1.1</b>	<b>0.89</b>	<b>0.00</b>	<b>0.45</b>	<b>0.00</b>
Awaiting coroner	<b>Total awaiting coroner</b>		<b>1</b>		<b>1</b>	<b>2</b>	<b>0.8</b>	<b>0.00</b>	<b>0.45</b>	<b>0.00</b>	<b>0.44</b>
<b>Total</b>		<b>81</b>	<b>66</b>	<b>55</b>	<b>59</b>	<b>261</b>	<b>100.0</b>	<b>35.88</b>	<b>29.46</b>	<b>24.50</b>	<b>26.22</b>

**Figure 9:** Mortality (age-specific rate per 100,000) in Māori and non-Māori children aged 1–4 years, by year, 2002–2005

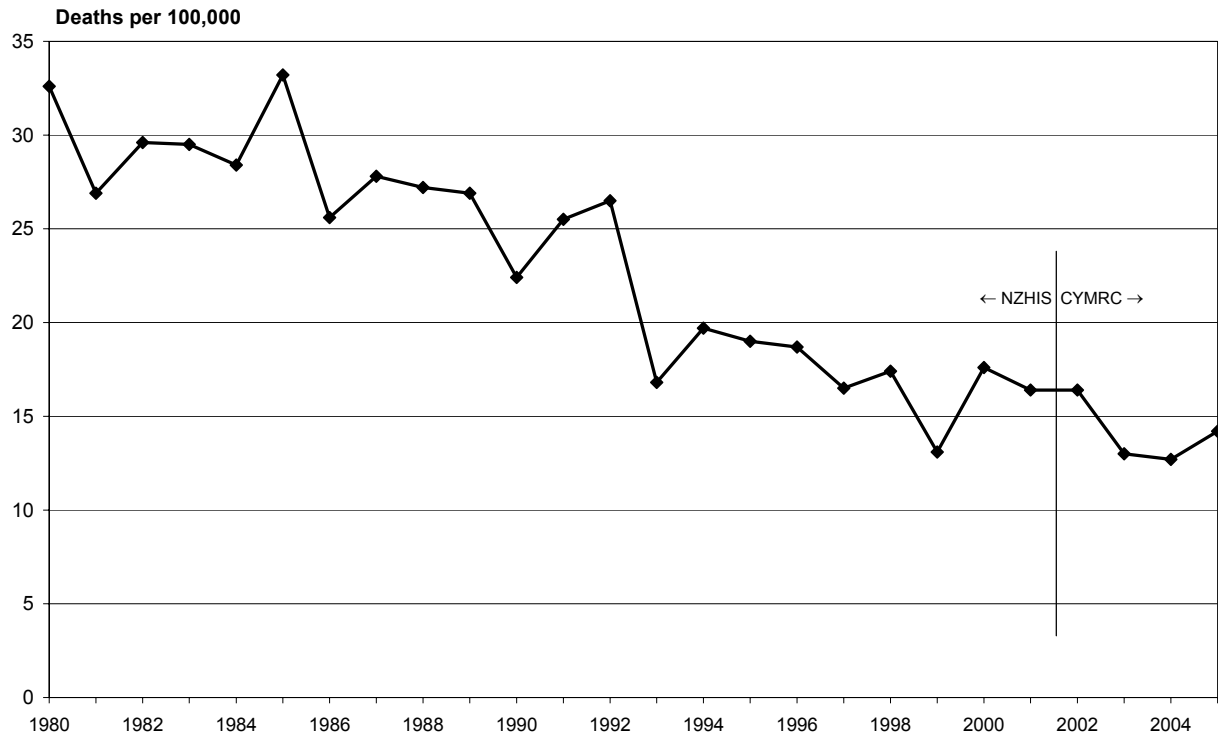


### Discussion

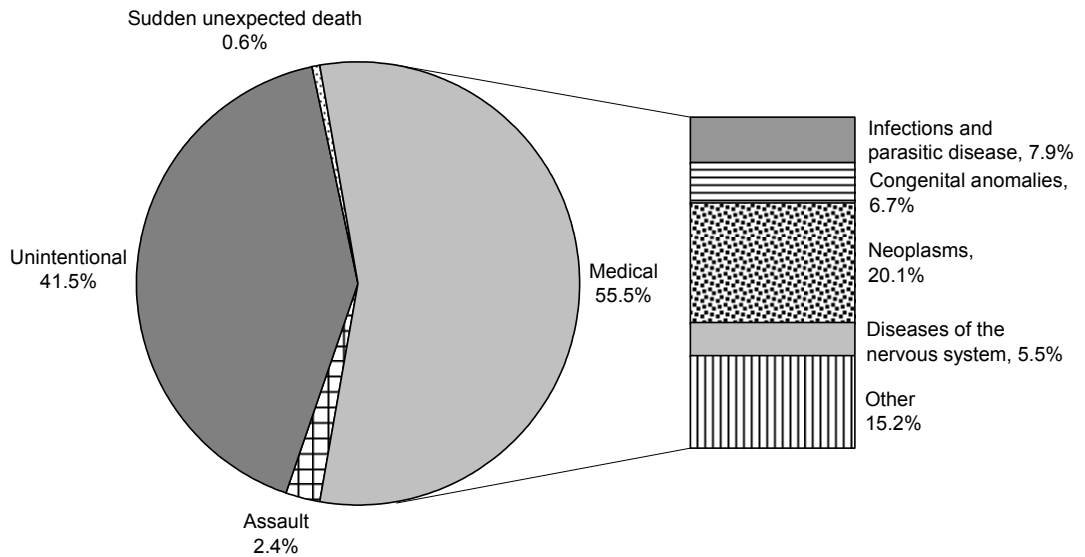
Although our data would suggest this is the safest age range in the lives of New Zealand children and youth, we still have many deaths that are potentially preventable. In 2005 data there were concerns relating to the safety of children in rural environments – especially farms.

### 2.4.2 Children aged 5–9 years

**Figure 10:** Mortality (age-specific rate per 100,000) in children aged 5–9 years, by year, 1980–2005



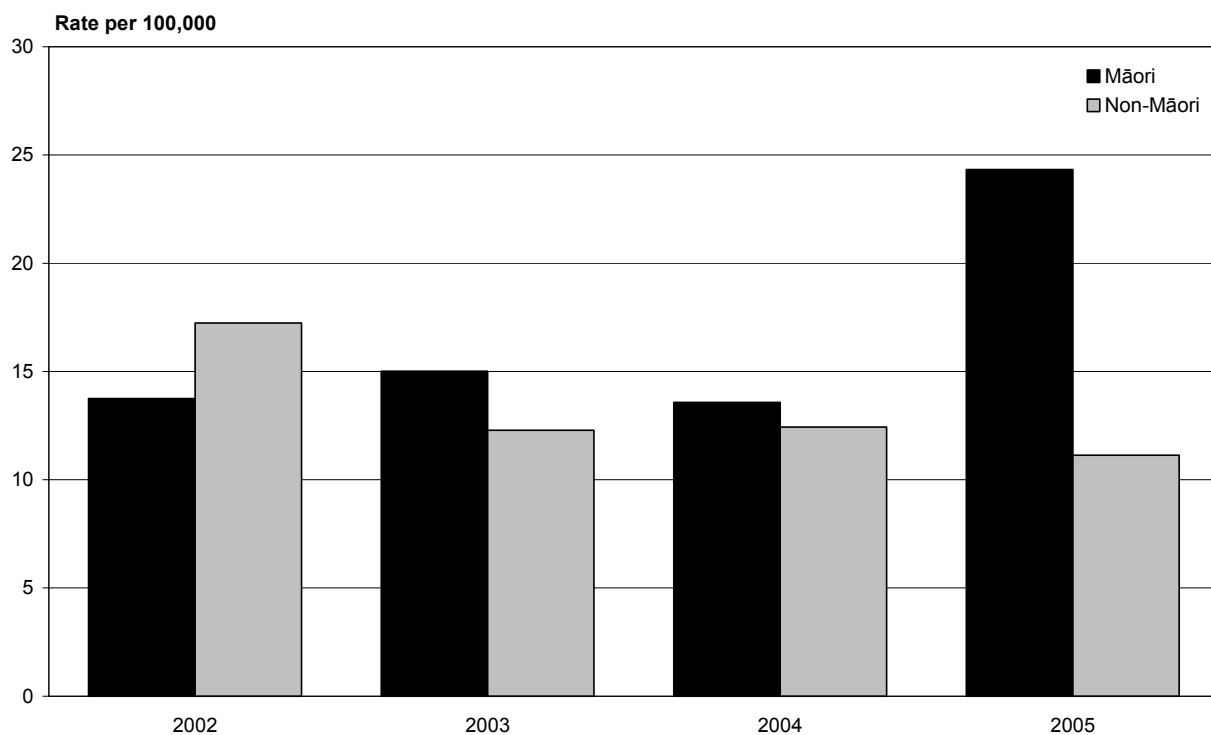
**Figure 11:** Cause of mortality in children aged 5–9 years (%), by category of death, 2002–2005 combined (164 deaths)



**Table 5:** Mortality in children aged 5-9 years (number of deaths and age-specific rate per 100,000), by cause and year, 2002-2005

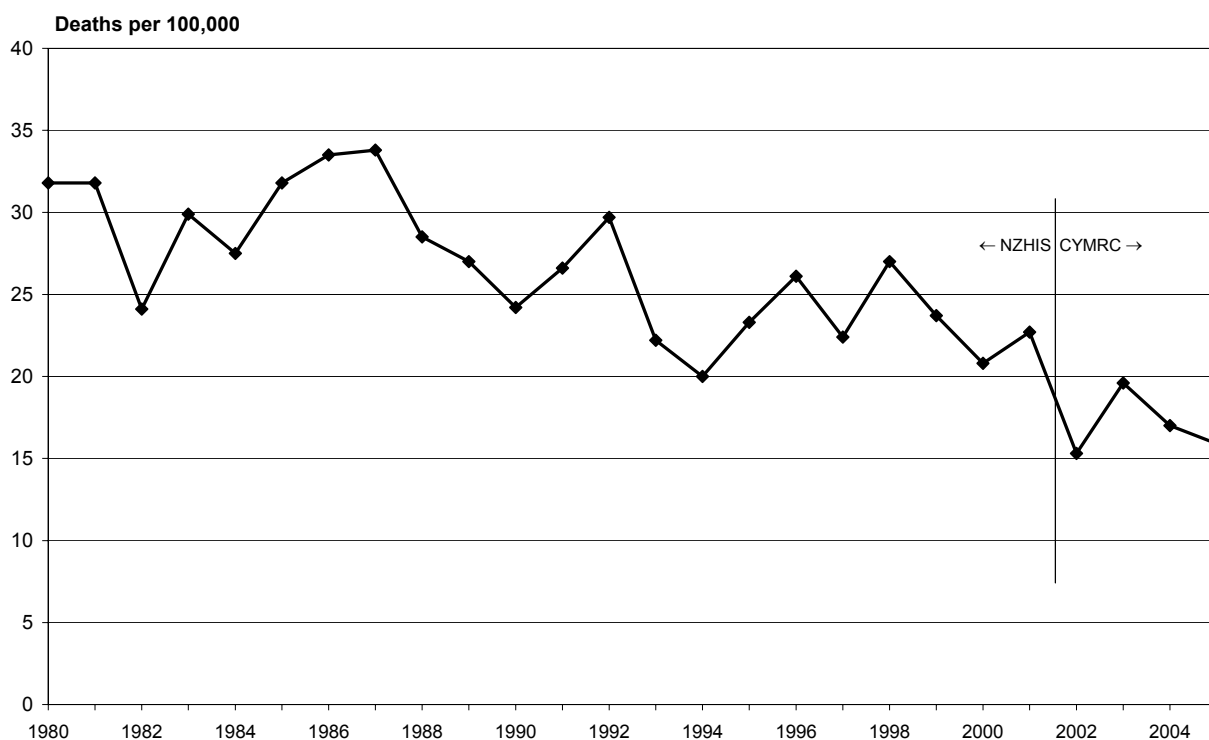
Category	Cause	Deaths					Rate (per 100,000)				
		2002	2003	2004	2005	Total	%	2002	2003	2004	2005
Medical	Infections	5	3		5	13	7.9	1.71	1.02	0.00	1.73
	Neoplasms	12	6	5	10	33	20.1	4.09	2.05	1.72	3.45
	Endocrine, nutritional and metabolic diseases		1	2		3	1.8	0.00	0.34	0.69	0.00
	Diseases of nervous system	1	1	3	4	9	5.5	0.34	0.34	1.03	1.38
	Diseases of circulatory system	3	4			7	4.3	1.02	1.36	0.00	0.00
	Diseases of respiratory system	2	1	1		4	2.4	0.68	0.34	0.34	0.00
	Diseases of digestive system	1				1	0.6	0.34	0.00	0.00	0.00
	Diseases of genitourinary system		1			1	0.6	0.00	0.34	0.00	0.00
	Perinatal conditions	2	1	5	1	9	5.5	0.68	0.34	1.72	0.35
	Congenital anomalies	4	1	2	4	11	6.7	1.36	0.34	0.69	1.38
	<b>Total medical</b>		<b>30</b>	<b>19</b>	<b>18</b>	<b>24</b>	<b>55.5</b>	<b>10.23</b>	<b>6.48</b>	<b>6.19</b>	<b>8.29</b>
Unintentional injury	Drowning/submersion	4	2	5	2	13	7.9	1.36	0.68	1.72	0.69
	Fire/burn/heat/smoke		5		1	6	3.7	0.00	1.71	0.00	0.35
	Transport	14	9	11	9	42	25.6	4.77	3.07	3.78	3.11
	Struck by, against		1		1	2	1.2	0.00	0.34	0.00	0.35
	Suffocation		1	1	2	4	2.4	0.00	0.34	0.34	0.69
	<b>Total unintentional injury</b>		<b>18</b>	<b>18</b>	<b>17</b>	<b>15</b>	<b>41.5</b>	<b>6.14</b>	<b>6.14</b>	<b>5.84</b>	<b>5.18</b>
Suicide	Suffocation				1	1	0.6	0.00	0.00	0.00	0.35
	<b>Total suicide</b>				<b>1</b>	<b>1</b>	<b>0.6</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.35</b>
Assault	Cut/pierce			1		1	0.6	0.00	0.00	0.34	0.00
	Transport				1	1	0.6	0.00	0.00	0.00	0.35
	Struck by, against		1	1		2	1.2	0.00	0.34	0.34	0.00
	<b>Total assault</b>		<b>1</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>2.4</b>	<b>0.00</b>	<b>0.34</b>	<b>0.69</b>	<b>0.35</b>
<b>Total</b>		<b>48</b>	<b>38</b>	<b>37</b>	<b>41</b>	<b>100.0</b>	<b>16.37</b>	<b>12.96</b>	<b>12.72</b>	<b>14.16</b>	

**Figure 12:** Mortality (age-specific rate per 100,000) in Māori and non-Māori children aged 5–9 years, by year, 2002–2005

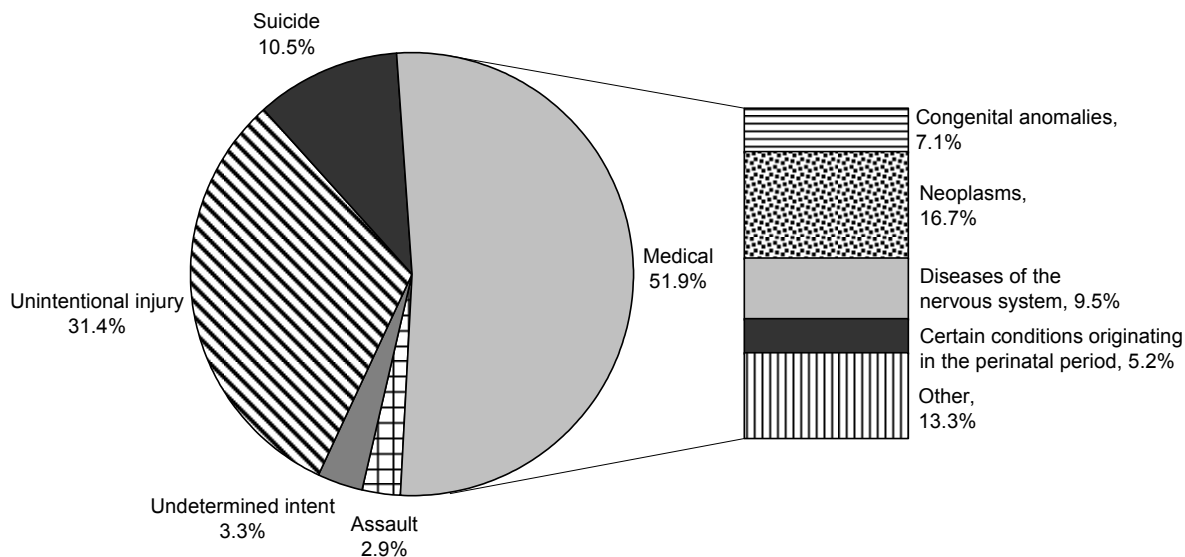


### 2.4.3 Children aged 10–14 years

**Figure 13:** Mortality (age-specific rate per 100,000) in children aged 10–14 years, by year, 1980–2005

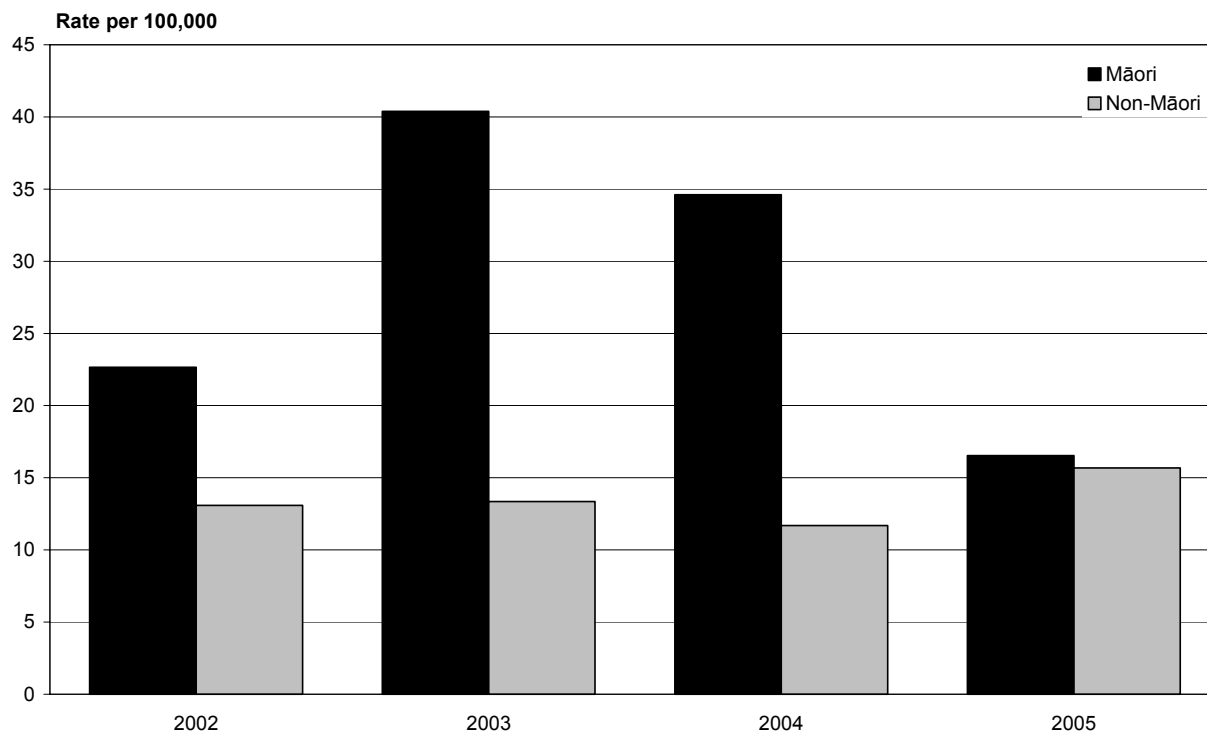


**Figure 14:** Cause of mortality in children aged 10–14 years (%), by category of death, 2002–2005 combined (210 deaths)



**Table 6:** Mortality in children aged 10–14 years (number of deaths and age-specific rate per 100,000), by cause and year, 2002–2005

Category	Intent	Deaths					Rate (per 100,000)				
		2002	2003	2004	2005	Total	%	2002	2003	2004	2005
Medical	Infections	9	3	1	3	7	3.3	0.00	0.96	0.32	0.97
	Neoplasms	2	9	13	4	35	16.7	2.93	2.89	4.17	1.30
	Endocrine, nutritional and metabolic diseases	3	1	2	2	5	2.4	0.65	0.32	0.64	0.00
	Diseases of nervous system	2	7	5	5	20	9.5	0.98	2.25	1.60	1.62
	Diseases of circulatory system	1	2	4	1	9	4.3	0.65	0.64	1.28	0.32
	Diseases of respiratory system	2	2	1	1	5	2.4	0.33	0.64	0.32	0.32
	Diseases of digestive system	1	1	1	1	1	0.5	0.00	0.00	0.32	0.00
	Diseases of genitourinary system	2	1	1	3	11	0.5	0.00	0.32	0.00	0.00
	Perinatal conditions	2	5	1	1	16	5.2	0.65	1.60	0.32	0.97
	Congenital anomalies	2	5	1	8	16	7.6	0.65	1.60	0.32	2.59
	<b>Total medical</b>	<b>21</b>	<b>35</b>	<b>29</b>	<b>25</b>	<b>110</b>	<b>52.4</b>	<b>6.83</b>	<b>11.23</b>	<b>9.29</b>	<b>8.10</b>
Unintentional injury	Drowning/submersion	1	3	2	1	7	3.3	0.33	0.96	0.64	0.32
	Fall	2	2	2	2	6	2.9	0.65	0.64	0.00	0.65
	Fire/burn/heat/smoke	18	1	5	1	24	1.0	0.00	0.32	0.00	0.32
	Transport	1	11	5	10	44	21.0	5.85	3.53	1.60	3.24
	Natural/environmental/animal	2	1	1	1	5	0.5	0.00	0.00	0.32	0.00
	Poisoning	2	1	1	2	6	0.5	0.00	0.32	0.00	0.00
	Struck by, against	2	1	1	1	5	1.0	0.00	0.00	0.00	0.65
	Suffocation	2	1	1	1	5	1.4	0.00	0.32	0.32	0.32
	<b>Total unintentional injury</b>	<b>21</b>	<b>19</b>	<b>9</b>	<b>17</b>	<b>66</b>	<b>31.4</b>	<b>6.83</b>	<b>6.10</b>	<b>2.88</b>	<b>5.51</b>
	Suicide	Firearm	2	2	2	2	8	1.0	0.00	0.00	0.64
Poisoning		2	6	1	4	13	0.5	0.00	0.00	0.32	0.00
Suffocation		2	6	7	4	19	9.0	0.65	1.93	2.24	1.30
<b>Total suicide</b>		<b>2</b>	<b>6</b>	<b>10</b>	<b>4</b>	<b>22</b>	<b>10.5</b>	<b>0.65</b>	<b>1.93</b>	<b>3.21</b>	<b>1.30</b>
Assault	Cut/pierce	2	1	1	1	5	0.5	0.00	0.00	0.32	0.00
	Firearm	2	1	1	1	5	0.5	0.00	0.00	0.32	0.00
	Struck by, against	2	1	1	1	5	1.9	0.65	0.00	0.32	0.32
	<b>Total assault</b>	<b>2</b>	<b>6</b>	<b>3</b>	<b>1</b>	<b>6</b>	<b>2.9</b>	<b>0.65</b>	<b>0.00</b>	<b>0.96</b>	<b>0.32</b>
Undetermined intent	Transport	1	1	1	2	5	1.9	0.00	0.32	0.32	0.65
	Poisoning	1	1	1	2	5	1.0	0.33	0.00	0.32	0.00
	<b>Total undetermined intent</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>2.9</b>	<b>0.33</b>	<b>0.32</b>	<b>0.64</b>	<b>0.65</b>
<b>Total</b>		<b>47</b>	<b>61</b>	<b>53</b>	<b>210</b>	<b>100.0</b>	<b>15.29</b>	<b>19.58</b>	<b>16.99</b>	<b>15.88</b>	

**Figure 15:** Mortality (age-specific rate per 100,000) in Māori and non-Māori children aged 10–14 years, by year, 2002–2005

## 2.5 Youth mortality

Youth mortality is divided into two age groups:

- 15–19 years (Figures 16, 17 and 18, and Table 7)
- 20–24 years (Figures 19, 20 and 21, and Table 8).

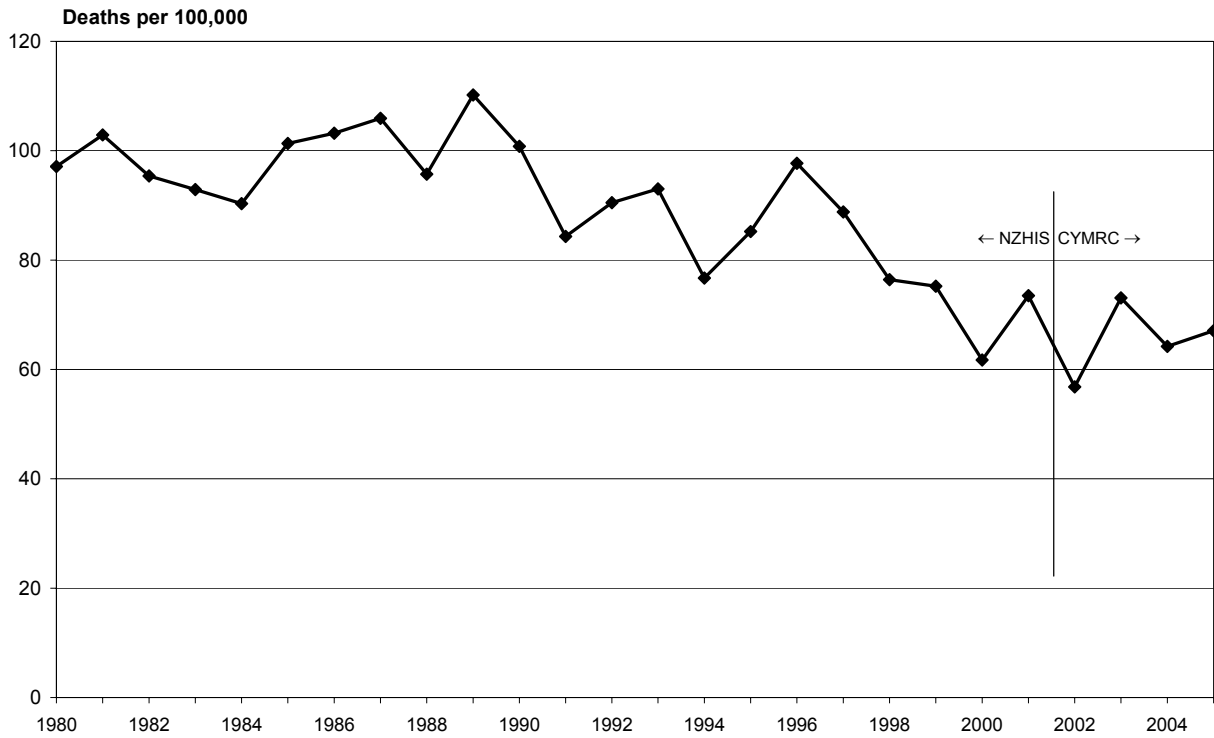
The notable patterns of death that emerge in youth in these age groups are:

- a drop in the rate of death compared to the 1980s and 1990s, but no improvement in the last five years
- deaths from cancer account for most 'medical' deaths
- 'dangerous behaviour' (undetermined intent) leads to about 12% of deaths
- there are more deaths from suicide than from all the 'medical' causes put together
- assault led to 3–4% of deaths in these age groups.

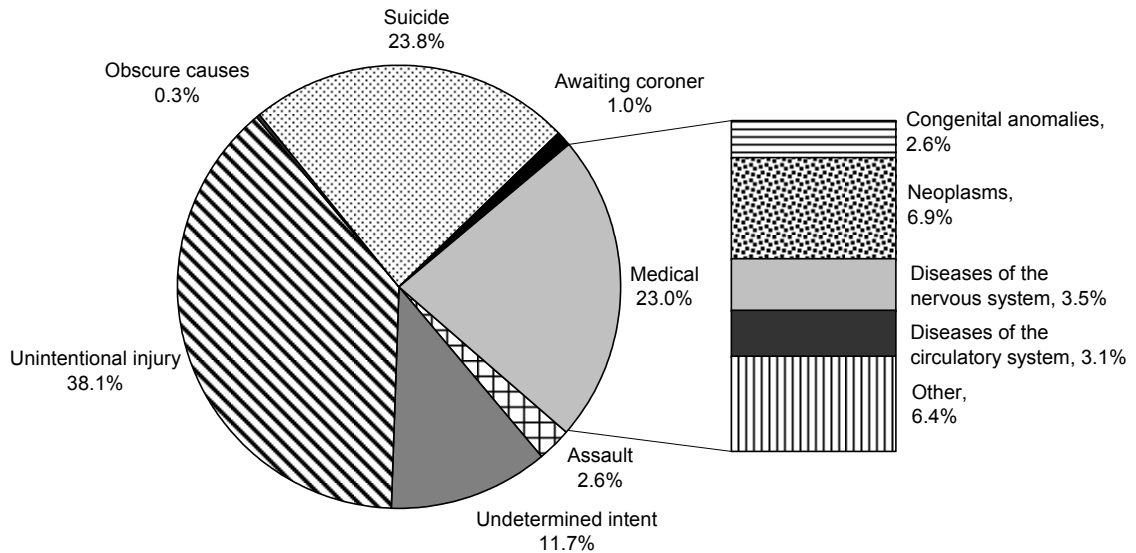


### 2.5.1 Youth aged 15–19 years

**Figure 16:** Mortality (age-specific rate per 100,000) in youth aged 15–19 years, by year, 1980–2005



**Figure 17:** Cause of mortality in youth aged 15–19 years (%), by category of death, 2002–2005 combined (777 deaths)

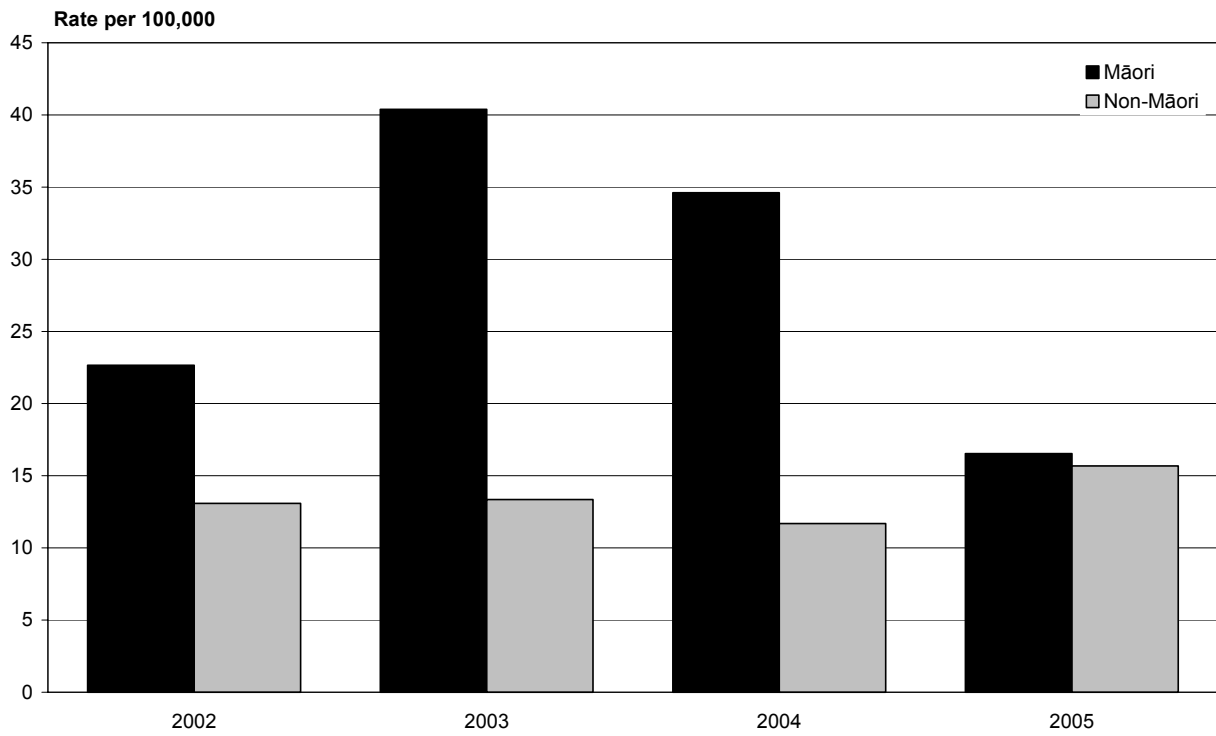


**Table 7:** Mortality in youth aged 15–19 years (number of deaths and age-specific rate per 100,000), by cause and year, 2002–2005

Category	Cause	Deaths					Rate (per 100,000)				
		2002	2003	2004	2005	Total	%	2002	2003	2004	2005
Medical	Infections	8	7		4	19	2.4	2.79	2.37	0.00	1.31
	Neoplasms	7	17	11	19	54	6.9	2.44	5.75	3.66	6.22
	Diseases of the blood and blood-forming organs and disorders of immune system		1			1	0.1	0.00	0.34	0.00	0.00
	Endocrine, nutritional and metabolic diseases	1		1		1	0.1	0.00	0.00	0.33	0.00
	Mental and behavioural disorders					1	0.1	0.35	0.00	0.00	0.00
	Diseases of nervous system	8	5	7	7	27	3.5	2.79	1.69	2.33	2.29
	Diseases of circulatory system	7	5	8	4	24	3.1	2.44	1.69	2.66	1.31
	Diseases of respiratory system	2	3	6	4	15	1.9	0.70	1.02	2.00	1.31
	Diseases of digestive system		2			2	0.3	0.00	0.68	0.00	0.00
	Diseases of musculoskeletal system and connective tissue	1				1	0.1	0.35	0.00	0.00	0.00
	Diseases of genitourinary system		3			3	0.4	0.00	1.02	0.00	0.00
	Perinatal conditions	2	1	1	3	7	0.9	0.70	0.34	0.33	0.98
	Congenital anomalies	3	8	5	4	20	2.6	1.05	2.71	1.66	1.31
	<b>Total medical</b>		<b>39</b>	<b>52</b>	<b>39</b>	<b>45</b>	<b>175</b>	<b>22.5</b>	<b>13.60</b>	<b>17.60</b>	<b>12.98</b>
Unintentional injury	Drowning/submersion	5	4	4	7	20	2.6	1.74	1.35	1.33	2.29
	Fall	2	1	2	1	6	0.8	0.70	0.34	0.67	0.33
	Fire/burn/heat/smoke	3	1			4	0.5	1.05	0.34	0.00	0.00
	Firearm		1			1	0.1	0.00	0.34	0.00	0.00
	Machinery	1				1	0.1	0.35	0.00	0.00	0.00
	Transport	50	65	74	65	254	32.7	17.43	22.00	24.63	21.27
	Natural/environmental/animal				1	1	0.1	0.00	0.00	0.00	0.33
	Poisoning				1	1	0.1	0.00	0.00	0.00	0.33
	Struck by, against		2			2	0.3	0.00	0.68	0.00	0.00
	Suffocation	1	3	1	1	6	0.8	0.35	1.02	0.33	0.33
<b>Total unintentional injury</b>		<b>62</b>	<b>77</b>	<b>81</b>	<b>76</b>	<b>296</b>	<b>38.1</b>	<b>21.61</b>	<b>26.06</b>	<b>26.96</b>	<b>24.87</b>

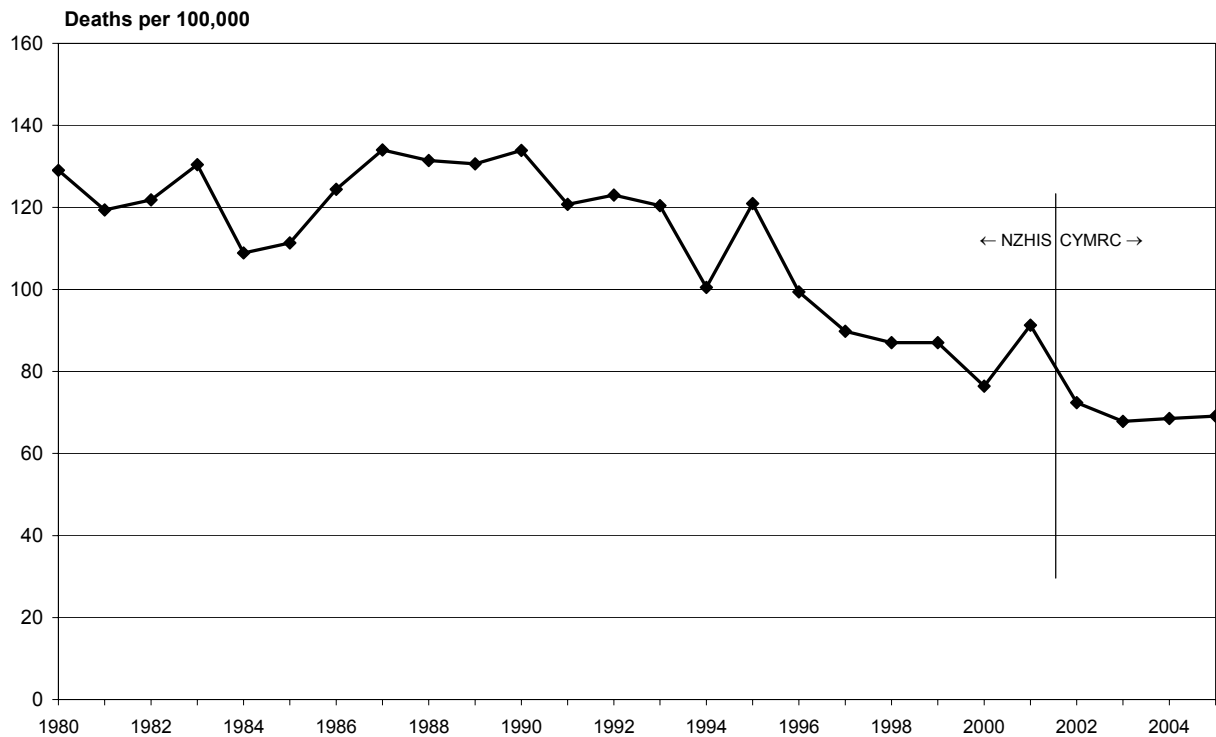
Category	Cause	Deaths						Rate (per 100,000)				
		2002	2003	2004	2005	Total	%	2002	2003	2004	2005	
Suicide	Drowning/submersion			1		1	0.1	0.00	0.00	0.33	0.00	
	Fall	1	2			3	0.4	0.35	0.00	0.00		
	Firearm	4	2	1	6	13	1.7	1.39	0.68	0.33		
	Transport	1	1		1	3	0.4	0.35	0.00	0.33		
	Poisoning	4	5	5	3	17	2.2	1.39	1.69	0.98		
	Suffocation	30	41	40	37	148	19.0	10.46	13.88	13.32		
	<b>Total suicide</b>	<b>40</b>	<b>51</b>	<b>47</b>	<b>47</b>	<b>185</b>	<b>23.8</b>	<b>13.94</b>	<b>17.26</b>	<b>15.65</b>	<b>15.38</b>	
Assault	Cut/pierce	1	1	2	2	6	0.8	0.35	0.34	0.67	0.65	
	Transport	1	3	1		5	0.6	0.35	1.02	0.33	0.00	
	Struck by, against	4	3		2	9	1.2	1.39	1.02	0.00	0.65	
	<b>Total assault</b>	<b>6</b>	<b>7</b>	<b>3</b>	<b>4</b>	<b>20</b>	<b>2.6</b>	<b>2.09</b>	<b>2.37</b>	<b>1.00</b>	<b>1.31</b>	
	Adverse effect of drug or treatment	1				1	0.1	0.35	0.00	0.00	0.00	
Undetermined intent	Cut/pierce		1			1	0.1	0.00	0.34	0.00	0.00	
	Drowning/submersion		1			1	0.1	0.00	0.34	0.00	0.00	
	Fall	1	1	3		5	0.6	0.35	0.34	1.00	0.00	
	Fire/burn/heat/smoke			1		1	0.1	0.00	0.00	0.33	0.00	
	Firearm	1				1	0.1	0.35	0.00	0.00	0.00	
	Transport	5	14	11	24	54	6.9	1.74	4.74	3.66	7.85	
	Poisoning	6	10	4	4	24	3.1	2.09	3.38	1.33	1.31	
	Struck by, against		1			1	0.1	0.00	0.34	0.00	0.00	
	Suffocation		1			1	0.1	0.00	0.34	0.00	0.00	
	Electrocution			1		1	0.1	0.00	0.00	0.33	0.00	
<b>Total undetermined intent</b>	<b>14</b>	<b>29</b>	<b>20</b>	<b>28</b>	<b>91</b>	<b>11.7</b>	<b>4.88</b>	<b>9.81</b>	<b>6.66</b>	<b>9.16</b>		
Obscure cause	2				2	0.3	0.70	0.00	0.00	0.00		
Awaiting coroner			3	5	8	1.0	0.00	0.00	1.00	1.64		
<b>Total</b>	<b>163</b>	<b>216</b>	<b>193</b>	<b>205</b>	<b>777</b>	<b>100.0</b>	<b>56.82</b>	<b>73.10</b>	<b>64.25</b>	<b>67.07</b>		

**Figure 18:** Mortality (age-specific rate per 100,000) in Māori and non-Māori youth aged 15–19 years, by year, 2002–2005

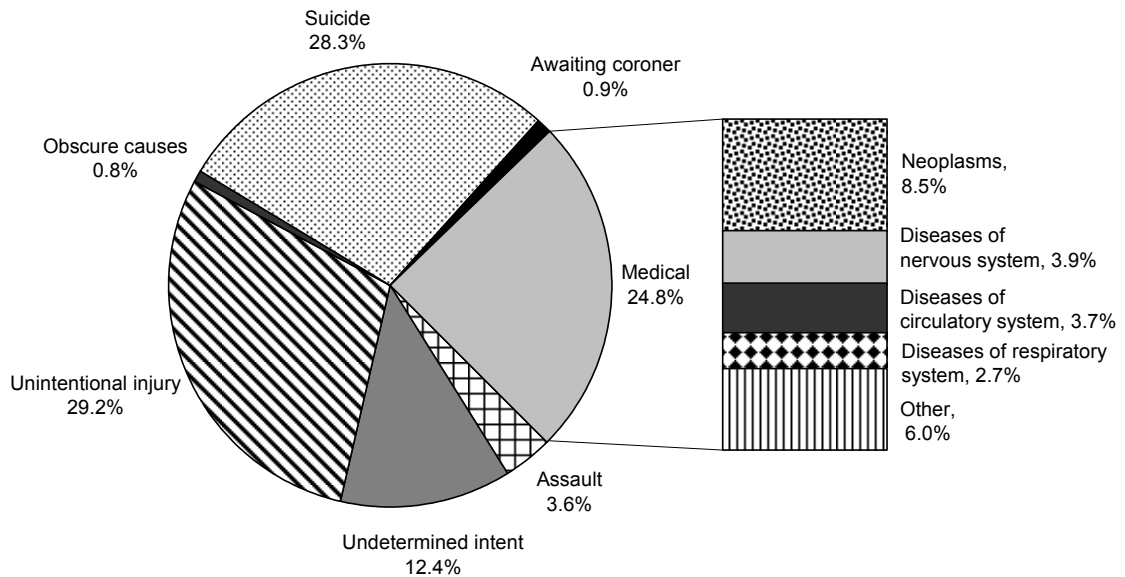


### 2.5.2 Young people aged 20–24 years

**Figure 19:** Mortality (age-specific rate per 100,000) in 20–24-year-olds, by year, 1980-2005



**Figure 20:** Cause of mortality in 20–24-year-olds (%), by category of death, 2002–2005, combined (777 deaths)

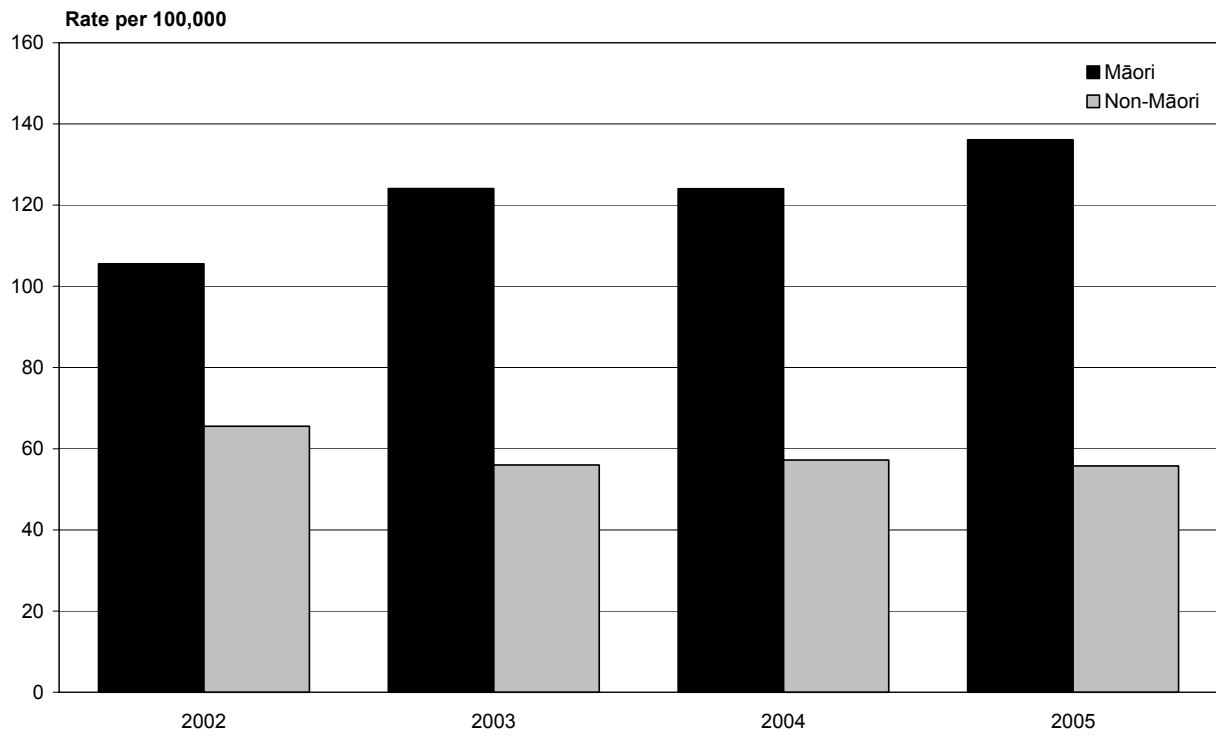


**Table 8:** Mortality in youth aged 20–24 years (number of deaths and age-specific rate per 100,000), by cause and year, 2002–2005

Category	Cause	Deaths					Rate (per 100,000)					
		2002	2003	2004	2005	Total	%	2002	2003	2004	2005	
Medical	Infections	16	5	6	5	16	2.1	0.00	1.79	2.10	1.73	
	Neoplasms	1	16	13	21	66	8.5	6.03	5.74	4.54	7.25	
	Diseases of the blood and blood-forming organs and disorders of immune system			1	2	4	0.5	0.38	0.00	0.35	0.69	
	Endocrine, nutritional and metabolic diseases			1	3	4	0.5	0.00	0.00	0.35	1.04	
	Mental and behavioural disorders	1	1		1	3	0.4	0.38	0.36	0.00	0.35	
	Diseases of nervous system	7	7	9	7	30	3.9	2.64	2.51	3.15	2.42	
	Diseases of circulatory system	8	8	6	7	29	3.7	3.02	2.87	2.10	2.42	
	Diseases of respiratory system	9	3	6	3	21	2.7	3.39	1.08	2.10	1.04	
	Diseases of genitourinary system		1		1	2	0.3	0.00	0.36	0.00	0.35	
	Perinatal conditions	2	2			4	0.5	0.75	0.72	0.00	0.00	
	Congenital anomalies	4	2	2	6	14	1.8	1.51	0.72	0.70	2.07	
	<b>Total medical</b>	<b>48</b>	<b>45</b>	<b>44</b>	<b>56</b>	<b>193</b>	<b>24.8</b>	<b>18.10</b>	<b>16.13</b>	<b>15.38</b>	<b>19.34</b>	
	Unintentional injury	Adverse effect of drug or treatment		1		1	2	0.3	0.00	0.36	0.00	0.35
		Cut/pierce				1	1	0.1	0.00	0.00	0.00	0.35
Drowning/submersion		6	6	8	5	25	3.2	2.26	2.15	2.80	1.73	
Fall		2	1	4	1	8	1.0	0.75	0.36	1.40	0.35	
Fire/burn/heat/smoke		2		1	1	4	0.5	0.75	0.00	0.35	0.35	
Firearm			1			1	0.1	0.00	0.36	0.00	0.00	
Machinery				1	1	2	0.3	0.00	0.00	0.35	0.35	
Transport		45	43	42	42	172	22.1	16.97	15.42	14.68	14.50	
Natural/environmental/animal		3	1			4	0.5	1.13	0.36	0.00	0.00	
Poisoning					1	1	0.1	0.00	0.00	0.00	0.35	
Struck by, against		2	1			3	0.4	0.75	0.36	0.00	0.00	
Suffocation				1	2	3	0.4	0.00	0.00	0.35	0.69	
Electrocution			1			1	0.1	0.00	0.36	0.00	0.00	
<b>Total unintentional injury</b>		<b>60</b>	<b>55</b>	<b>57</b>	<b>55</b>	<b>227</b>	<b>29.2</b>	<b>22.63</b>	<b>19.72</b>	<b>19.93</b>	<b>18.99</b>	

Category	Cause	Deaths					Rate (per 100,000)				
		2002	2003	2004	2005	Total	%	2002	2003	2004	2005
Suicide	Cut/pierce	1	1			2	0.3	0.38	0.36	0.00	0.00
	Drowning/submersion	2	1	1		4	0.5	0.75	0.36	0.35	0.00
	Fall	2	2	1	3	8	1.0	0.75	0.72	0.35	1.04
	Fire/burn/heat/smoke	1				1	0.1	0.38	0.00	0.00	0.00
	Firearm	2	1	1	4	8	1.0	0.75	0.36	0.35	1.38
	Transport	2		2	1	5	0.6	0.75	0.00	0.70	0.35
	Poisoning	14	11	15	11	51	6.6	5.28	3.94	5.24	3.80
	Suffocation	30	29	41	40	140	18.0	11.31	10.40	14.33	13.81
	Electrocution		1			1	0.1	0.00	0.36	0.00	0.00
	<b>Total suicide</b>		<b>54</b>	<b>46</b>	<b>61</b>	<b>59</b>	<b>28.3</b>	<b>20.36</b>	<b>16.49</b>	<b>21.32</b>	<b>20.37</b>
Assault	Unspecified cause				2	2	0.3	0.00	0.00	0.00	0.69
	Cut/pierce	4	6	2	1	13	1.7	1.51	2.15	0.70	0.35
	Fire/burn/heat/smoke		1			1	0.1	0.00	0.36	0.00	0.00
	Firearm	1	1			2	0.3	0.38	0.36	0.00	0.00
	Transport	2	1	1		4	0.5	0.75	0.36	0.35	0.00
	Struck by, against		1		3	4	0.5	0.00	0.36	0.00	1.04
	Suffocation		1		1	2	0.3	0.00	0.36	0.00	0.35
	<b>Total assault</b>	<b>7</b>	<b>11</b>	<b>3</b>	<b>7</b>	<b>28</b>	<b>3.6</b>	<b>2.64</b>	<b>3.94</b>	<b>1.05</b>	<b>2.42</b>
Undetermined intent	Adverse effect of drug or treatment					1	0.1	0.00	0.00	0.35	0.00
	Cut/pierce	1		1		2	0.3	0.38	0.00	0.35	0.00
	Drowning/submersion	1		2		3	0.4	0.38	0.00	0.70	0.00
	Fall	3	2	4	2	11	1.4	1.13	0.72	1.40	0.69
	Fire/burn/heat/smoke	1				1	0.1	0.38	0.00	0.00	0.00
	Transport	8	19	12	10	49	6.3	3.02	6.81	4.19	3.45
	Poisoning	5	9	7	5	26	3.3	1.89	3.23	2.45	1.73
	Suffocation			1	1	2	0.3	0.00	0.00	0.35	0.35
	Electrocution			1	1	1	0.1	0.00	0.00	0.35	0.00
	<b>Total undetermined intent</b>	<b>19</b>	<b>30</b>	<b>29</b>	<b>18</b>	<b>96</b>	<b>12.4</b>	<b>7.17</b>	<b>10.76</b>	<b>10.14</b>	<b>6.22</b>
Obscure cause					6	0.8	1.13	0.36	0.35	0.35	
Coroner					7	0.9	0.38	0.36	0.35	1.38	
<b>Total</b>		<b>192</b>	<b>189</b>	<b>196</b>	<b>777</b>	<b>100.0</b>	<b>72.41</b>	<b>67.77</b>	<b>68.51</b>	<b>69.06</b>	

**Figure 21:** Mortality (age-specific rate per 100,000) in Māori and non-Māori aged 20–24 years, by year, 2002–2005

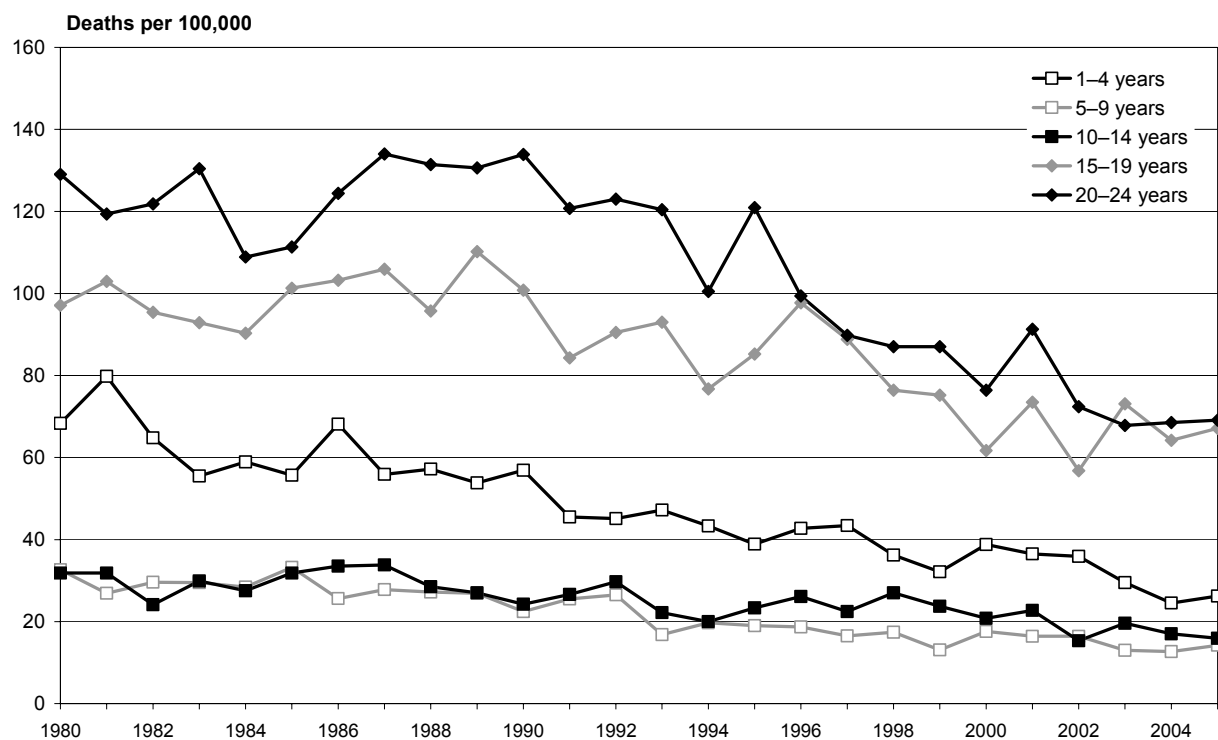




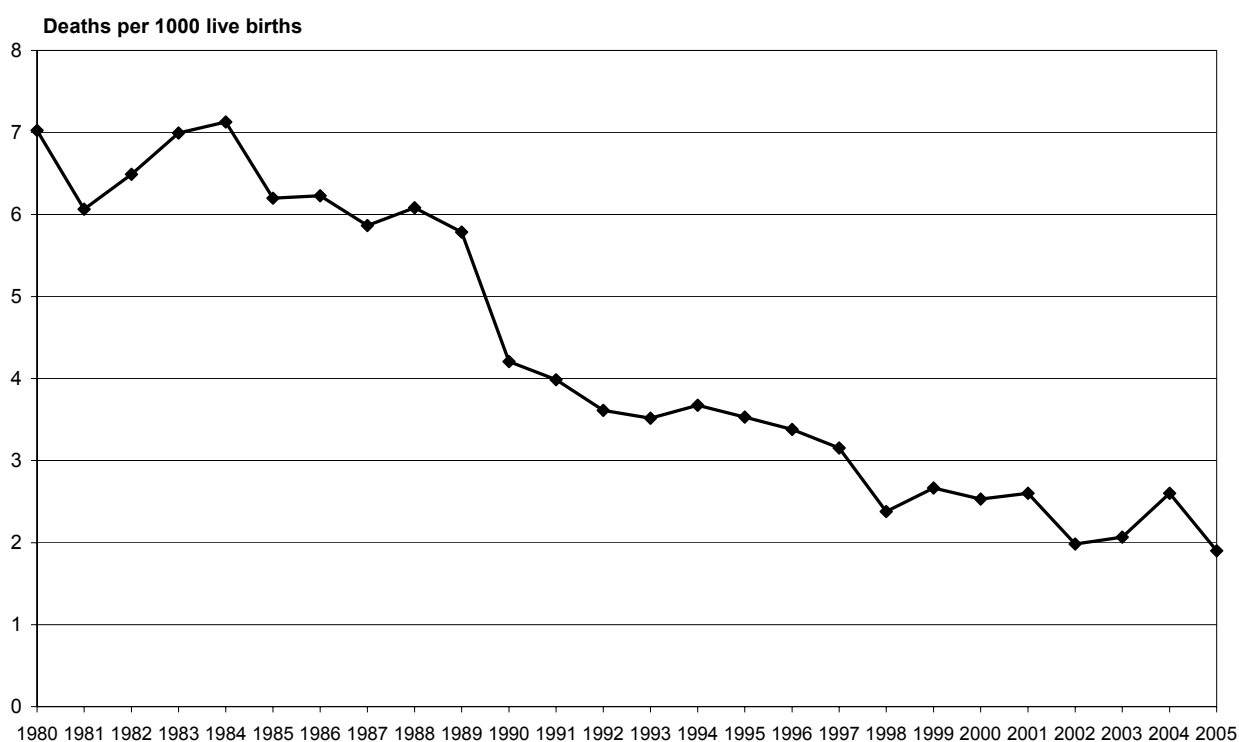
## 2.6 All age groups (28 days to 24 years) mortality

Over all the deaths reviewed by the CYMRC, there is no age category in which the death rate is increasing. The lowest death rate is in the age range 5–14 years. Most deaths occur in the first year of life, but this is also the age range where the biggest drop in mortality rates has occurred in the last 25 years.

**Figure 22:** Mortality (age-specific rates per 100,000), by age group (excluding post-neonatal mortality), by year, 1980–2005



**Figure 23:** Post-neonatal mortality rate (per 1000 live births), by year, 1980–2005



**Table 9:** Mortality (number of deaths), by age group and year, 1980–2005

Year	4–52 weeks	1–4	5–9	10–14	15–19	20–24	Total
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	108	81	48	47	163	192	639
2003	116	66	38	61	216	189	686
2004	151	55	37	53	193	196	685
2005	109	59	41	49	205	200	663

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

Category	Cause	0-52 weeks	1-4 years	5-9 years	10-14 years	15-19 years	20-24 years	Total	%	
Medical	Infectious and parasitic disease	49	30	13	7	19	16	134	5.0	
	Neoplasms	6	23	33	35	54	66	217	8.1	
	Diseases of the blood and blood-forming organs and disorders of immune system					1	4	5	0.2	
	Endocrine, nutritional and metabolic diseases	6	15	3	5	1	4	34	1.3	
	Mental and behavioural disorders					1	3	4	0.1	
	Diseases of nervous system	13	13	9	20	27	30	112	4.2	
	Diseases of circulatory system	10	4	7	9	24	29	83	3.1	
	Diseases of respiratory system	2	2	4	5	15	21	49	1.8	
	Diseases of digestive system	5	6	1	1	2		15	0.6	
	Diseases of musculoskeletal system and connective tissue					1		1	0.0	
	Diseases of genitourinary system	1		1	1	3	2	8	0.3	
	Certain conditions originating in the perinatal period	49	14	9	11	7	4	94	3.5	
	Congenital anomalies	76	29	11	16	20	14	166	6.2	
	<b>Total medical</b>		<b>217</b>	<b>136</b>	<b>91</b>	<b>110</b>	<b>175</b>	<b>193</b>	<b>922</b>	<b>34.5</b>
	Unintentional injury	Adverse effect of drug or medicament (or treatment?)						2	2	0.1
Cut/pierce							1	1	0.0	
Drowning/submersion		4	29	13	7	20	25	98	3.7	
Fall			2		6	6	8	22	0.8	
Fire/burn/heat/smoke		1	10	6	2	4	4	27	1.0	
Firearm						1	1	2	0.1	
Machinery						1	2	3	0.1	
Transport		6	40	43	44	254	172	559	20.9	
Natural/environmental/animal			1		1	1	4	7	0.3	
Poisoning			2		1	1	1	5	0.2	
Struck by, against		1	1	2	2	2	3	11	0.4	
Suffocation		10	7	4	3	6	3	33	1.2	
Electrocution			1				1	2	0.1	
<b>Total unintentional injury</b>		<b>22</b>	<b>93</b>	<b>68</b>	<b>66</b>	<b>296</b>	<b>227</b>	<b>772</b>	<b>28.9</b>	

Category	Cause	0-52 weeks	1-4 years	5-9 years	10-14 years	15-19 years	20-24 years	Total	%	
Suicide	Cut/pierce						2	2	0.1	
	Drowning/submersion					1	4	5	0.2	
	Fall					3	8	11	0.4	
	Fire/burn/heat/smoke						1	1	0.0	
	Firearm				2	13	8	23	0.9	
	Transport					3	5	8	0.3	
	Poisoning				1	17	51	69	2.6	
	Suffocation			1	19	148	140	308	11.5	
	Electrocution			<b>1</b>	<b>22</b>	<b>185</b>	<b>220</b>	<b>428</b>	<b>16.0</b>	
	<b>Total suicide</b>									
Assault	Unspecified cause		1				2	3	0.1	
	Cut/pierce	1	2	1	1	6	13	24	0.9	
	Fire/burn/heat/smoke						1	1	0.0	
	Firearm				1		2	3	0.1	
	Transport			1		5	4	10	0.4	
	Struck by, against	4	6	2	4	9	4	29	1.1	
	Suffocation	3					2	5	0.2	
	<b>Total assault</b>	<b>8</b>	<b>9</b>	<b>4</b>	<b>6</b>	<b>20</b>	<b>28</b>	<b>75</b>	<b>2.8</b>	
	Undetermined intent	Adverse effect of drug or medicament (or treatment?)						1	2	0.1
		Cut/pierce					1	2	3	0.1
Drowning/submersion						1	3	4	0.1	
Fall						5	11	16	0.6	
Fire/burn/heat/smoke						1	1	2	0.1	
Firearm		1				1		2	0.1	
Transport			2		4	54	49	109	4.1	
Poisoning					2	24	26	52	1.9	
Struck by, against		1				1	2	2	0.1	
Suffocation			1			1	1	4	0.1	
Electrocution					1	1	2	0.1		
<b>Total undetermined intent</b>	<b>2</b>	<b>3</b>		<b>6</b>	<b>91</b>	<b>96</b>	<b>198</b>	<b>7.4</b>		
Health system error								<b>1</b>	<b>0.0</b>	
Sudden unexpected death								<b>241</b>	<b>9.0</b>	
Obscure cause								<b>12</b>	<b>0.4</b>	
Awaiting coroner								<b>24</b>	<b>0.9</b>	
<b>Total</b>		<b>484</b>	<b>261</b>	<b>164</b>	<b>210</b>	<b>777</b>	<b>777</b>	<b>2673</b>	<b>100</b>	

**Table 11:** Mortality (number of deaths), by gender and cause, 2002–2005 combined

Category	Cause	Female	Male	Total
Medical	Infections	59	75	134
	Neoplasms	96	121	217
	Diseases of the blood and blood-forming organs and disorders of immune system	3	2	5
	Endocrine, nutritional and metabolic diseases	14	20	34
	Mental and behavioural disorders	2	2	4
	Diseases of nervous system	42	70	112
	Diseases of circulatory system	23	60	83
	Diseases of respiratory system	27	22	49
	Diseases of digestive system	8	7	15
	Diseases of musculoskeletal system and connective tissue		1	1
	Diseases of genitourinary system	5	3	8
	Perinatal conditions	46	48	94
	Congenital anomalies	77	88	165
	<b>Total medical</b>		<b>402</b>	<b>519</b>
Unintentional injury	Adverse effect of drug or treatment	1	1	2
	Cut/pierce	1		1
	Drowning/submersion	28	69	97
	Fall	7	15	22
	Fire/burn/heat/smoke	10	17	27
	Firearm		2	2
	Machinery		3	3
	Transport	165	390	555
	Natural/environmental/animal	2	5	7
	Poisoning	1	4	5
	Struck by, against	5	6	11
	Suffocation	7	26	33
	Electrocution		2	2
	<b>Total unintentional injury</b>		<b>227</b>	<b>540</b>
Suicide	Cut/pierce		2	2
	Drowning/submersion	1	4	5
	Fall	4	7	11
	Fire/burn/heat/smoke	1		1
	Firearm	3	20	23
	Transport		8	8
	Poisoning	25	44	69
	Suffocation	86	221	307
	Electrocution		1	1
<b>Total suicide</b>		<b>120</b>	<b>307</b>	<b>427</b>

Category	Cause	Female	Male	Total
Assault	Unspecified cause	3		3
	Cut/pierce	8	16	24
	Fire/burn/heat/smoke	1		1
	Firearm		2	2
	Transport	7	3	10
	Struck by, against	14	15	29
	Suffocation	4	1	5
	<b>Total assault</b>	<b>37</b>	<b>37</b>	<b>74</b>
Undetermined intent	Adverse effect of drug or treatment	1	1	2
	Cut/pierce		3	3
	Drowning/submersion	2	3	5
	Fall	1	15	16
	Fire/burn/heat/smoke		2	2
	Firearm	1	2	3
	Transport	26	87	113
	Poisoning	17	35	52
	Struck by, against	1	1	2
	Suffocation	1	4	5
	Electrocution		2	2
	<b>Total undetermined intent</b>	<b>50</b>	<b>155</b>	<b>205</b>
Health system error	<b>Total health system error</b>	<b>2</b>		<b>2</b>
Sudden unexpected death	<b>Total sudden unexpected death</b>	<b>111</b>	<b>130</b>	<b>241</b>
Obscure cause	<b>Total obscure cause</b>	<b>5</b>	<b>7</b>	<b>12</b>
Awaiting coroner	<b>Total awaiting coroner</b>	<b>5</b>	<b>19</b>	<b>24</b>
<b>Total</b>		<b>959</b>	<b>1714</b>	<b>2673</b>

**Table 12:** Leading causes of mortality (numbers and rates per 100,000 in 0–24 years age group, per year), 2002–2005 combined

Category	Sub-type	Deaths
Unintentional injury	Transport	559
	Drowning/submersion	98
	Other	115
	<b>Total</b>	<b>772</b>
Suicide	Suffocation	308
	Poisoning	69
	Other	51
	<b>Total</b>	<b>428</b>
SUDI		241
Neoplasms		217
Undetermined/high risk behaviours		198
Congenital anomalies		166
Infections		134
Diseases of nervous system		112
Perinatal conditions		94
Diseases of circulatory system		83
Assault		75
Diseases of respiratory system		49
Endocrine, nutritional and metabolic diseases		34

## Discussion

Figure 21 shows a relatively stable pattern of death in the different age groups over the last four years. Table 9 shows the actual number of deaths in each age group since 1980. There was a halving of the numbers of deaths over this 25-year period (1334 in 1980 to 663 in 2005), with the biggest decreases in the youngest age groups.

The main causes of death are best seen in Table 12. Preventable causes of death dominate the top three causes. The category 'unintentional injury' – mainly transport related – caused 772 deaths of children and young people over a period of four years. (Most deaths in the transport category relate to motor vehicle crashes.) Suicide comes next, with 428 deaths over four years. The third most common cause was SUDI, which was the cause of death for 241 babies over the four-year period.

## 2.7 Mortality and DHB

**Table 13:** Mortality (numbers and age-specific rates), by age group and DHB of residence, 2002–2005 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	27	11	11	10	41	29	129	63.7	15
Waitemata	50	28	22	18	64	76	258	41.7	38
Auckland	42	18	11	14	41	69	195	37.9	18
Counties Manukau	97	41	17	23	97	92	367	59.7	25
Waikato	41	33	16	23	87	68	268	55.2	16
Bay of Plenty	20	16	14	12	41	38	141	56.3	30
Lakes	8	3	7	7	29	28	82	56.0	21
Tairāwhiti	14	7	3	5	9	12	50	71.2	24
Taranaki	15	11	8	11	41	29	115	78.0	10
Hawke's Bay	21	8	8	10	18	21	86	41.2	17
Whanganui	9	3	2	2	30	22	68	73.4	32
MidCentral	21	7	8	11	41	33	121	52.4	22
Wairarapa	1	1	5	3	8	10	28	54.1	39
Capital & Coast	24	12	6	13	32	47	134	38.4	25
Hutt	18	11	4	9	22	24	88	45.1	22
Nelson Marlborough	5	7	6	6	22	16	62	38.6	19
West Coast	1	1		2	10	7	21	53.0	33
Canterbury	28	21	10	16	77	94	246	42.4	8
South Canterbury	3	3	1	5	8	4	24	36.2	13
Otago	14	10	1	8	27	26	86	35.4	7
Southland	16	8	4	2	27	29	86	60.1	12
Unknown	9	1			5	3	18		
<b>Total</b>	<b>484</b>	<b>261</b>	<b>164</b>	<b>210</b>	<b>777</b>	<b>777</b>	<b>2673</b>	<b>49.4</b>	

\* 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 (4 weeks – 24 years) occurring in each DHB region, 2002–2005 combined

DHB	Deaths in DHB region		Deaths in DHB hospitals*		
	Number	% non-resident	Number	% deaths in DHB	% non-resident
Northland	126	13	19	15	5
Waitemata	183	14	11	6	0
Auckland	395	65	277	70	84
Counties Manukau	301	10	56	19	16
Waikato	283	21	77	27	29
Lakes	89	28	16	18	6
Bay of Plenty	115	14	15	13	13
Tairāwhiti	44	14	5	11	0
Taranaki	121	16	28	23	4
Hawke's Bay	75	5	9	12	0
MidCentral	112	16	29	26	14
Whanganui	53	13	7	13	0
Capital & Coast	149	33	69	46	52
Hutt	76	9	18	24	0
Wairarapa	23	26	2	9	50
Nelson Marlborough	58	16	11	19	9
West Coast	18	50	1	6	0
Canterbury	249	10	74	30	19
South Canterbury	24	17	1	4	0
Otago	93	22	23	25	26
Southland	83	14	17	20	0
Unknown	3				
<b>Total</b>	<b>2673</b>	<b>20</b>	<b>791</b>	<b>30</b>	<b>16</b>

\* 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 health care institutions.

## Discussion

The death rates for children and youth in different DHBs are shown in Tables 13 and 14. Comparison between DHBs is unwise because the DHB populations vary a lot. When there is five years worth of data, CYMRC will work to standardise the results across different DHBs by taking into consideration such factors as socioeconomic status and rurality. We anticipate that this analysis will be available in the fifth annual report, which will be published in 2008.

Table 14 shows that 84% of the deaths of children in Auckland DHB hospitals are of children that do not live in the region. This demonstrates the role of Starship Hospital as the only quaternary children's hospital in the country, and in particular the only dedicated children's intensive care unit in the country.

## 2.8 Deaths of non-residents (overseas visitors)<sup>1</sup>

**Table 15:** Mortality (number of deaths) among non-New Zealand residents, by cause of death and age group, 2002–2005 combined

Category	4–52 weeks	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total
Medical	7	1		3	4	3	18
Unintentional injury		2	2	1	9	19	33
Obscure causes		1				1	2
Awaiting coroner						1	1
<b>Total</b>	<b>7</b>	<b>4</b>	<b>2</b>	<b>4</b>	<b>13</b>	<b>24</b>	<b>54</b>

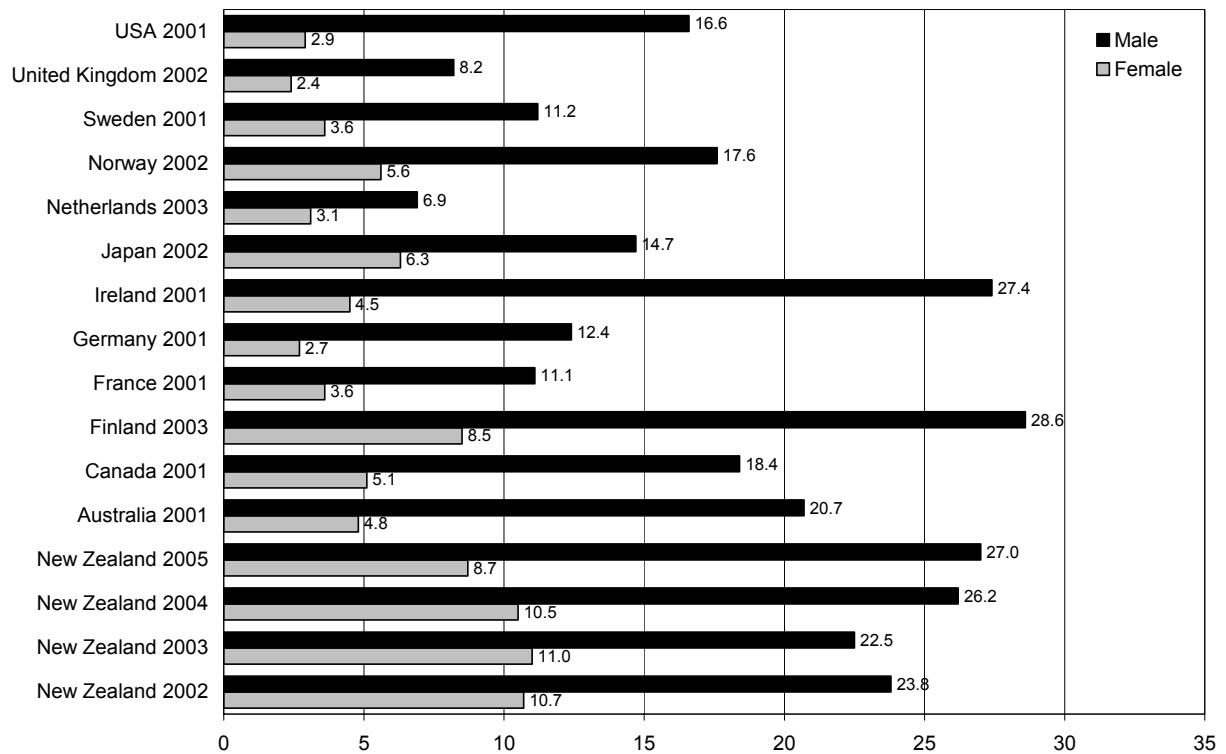
**Table 16:** Non-resident deaths (4 weeks – 24 years), by country of residence

Country	Deaths
United Kingdom	9
Australia	7
Japan	6
Cook Islands	5
French Polynesia	5
Tonga	4
Fiji	3
Samoa	2
Canada	1
Chile	1
China	1
Czech Republic	1
Denmark	1
Finland	1
Germany	1
Greece	1
India	1
Indonesia	1
Kiribati	1
Niue	1
USA	1
<b>Total</b>	<b>54</b>

<sup>1</sup> It should be noted that a number of New Zealand residents die overseas and the causes of death are unknown.

## 2.9 Youth suicide (deaths from intentional self-harm)

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



**Table 17:** Suicide deaths (number), by means of suicide, gender and year, 2002-2005

Means	Female					Male					Total		
	2002	2003	2004	2005	Total	%	2002	2003	2004	2005		Total	%
	Suffocation	18	20	29	19	86	71.1	45	56	59		62	222
Poisoning	7	9	6	3	25	20.7	11	7	15	11	44	14.3	
Firearm	1	1		1	3	2.5	5	2	4	9	20	6.5	
Fall	1	2		1	4	3.3	2	2	1	2	7	2.3	
Transport							3	1	2	2	8	2.6	
Drowning/submersion	1				1	0.8	1	1	2		4	1.3	
Cut/pierce				1	2	1.7	1	1			2	0.6	
Fire/burn/heat/smoke	1												
Electrocution								1			1	0.3	
<b>Total</b>	<b>29</b>	<b>32</b>	<b>35</b>	<b>25</b>	<b>121</b>	<b>100.0</b>	<b>68</b>	<b>71</b>	<b>83</b>	<b>86</b>	<b>308</b>	<b>100.0</b>	

**Table 18:** Suicide deaths (numbers and age-specific rates per 100,000), by age group and year, 2002-2005

Gender	Age group	Deaths					Rate					
		2002	2003	2004	2005	Total	2002	2003	2004	2005	Total	
		Female	10-14 years			5		6				
	15-19 years	14	16	16	9	55	10.0	11.1	10.9	10.9	3.3	6.0
	20-24 years	15	15	14	16	60	11.4	10.9	10.0	10.0	10.0	11.3
	15-24 years	29	31	30	25	115	10.7	11.0	10.5	10.5	10.5	8.7
	<b>Total 10-24 years</b>	<b>29</b>	<b>32</b>	<b>35</b>	<b>25</b>	<b>121</b>	<b>6.9</b>	<b>7.4</b>	<b>8.0</b>	<b>8.0</b>	<b>8.0</b>	<b>5.7</b>
Male	5-9 years				1	1						
	10-14-years	2	5	5	3	15	1.3	3.1	3.1	3.1	0.7	1.9
	15-19 years	26	35	31	38	130	17.7	23.1	20.2	23.1	20.2	24.3
	20-24 years	40	31	47	44	162	29.9	21.9	32.2	21.9	32.2	29.7
	15-24 years	66	66	78	82	292	23.8	22.5	26.2	22.5	26.2	27.0
	<b>Total 10-24 years</b>	<b>68</b>	<b>71</b>	<b>83</b>	<b>86</b>	<b>308</b>	<b>15.5</b>	<b>15.7</b>	<b>18.0</b>	<b>15.7</b>	<b>18.0</b>	<b>18.6</b>
<b>Total</b>		<b>97</b>	<b>103</b>	<b>118</b>	<b>111</b>	<b>429</b>						

**Table 19:** Suicide deaths (numbers and age-specific rates per 100,000), by ethnicity, age group and year, 2002–2005

Age group	Ethnicity	2002	2003	2004	2005	Total	Rate
5–9 years	NZ European				1	1	0.1
	<b>Total</b>				<b>1</b>	<b>1</b>	<b>0.1</b>
10–14 years	NZ European			3	2	5	0.7
	Māori	2	6	6		14	5.6
	Pacific Island			1		1	1.2
	Asian				1	1	1.4
	<b>Total</b>	<b>2</b>	<b>6</b>	<b>10</b>	<b>3</b>	<b>21</b>	<b>1.9</b>
15–19 years	NZ European	20	29	22	29	100	15.6
	Māori	15	17	18	17	67	33.8
	Pacific Island	2	5	5	1	13	17.9
	Asian	2		2		4	3.9
	Not specified	1				1	2.8
	<b>Total</b>	<b>40</b>	<b>51</b>	<b>47</b>	<b>47</b>	<b>185</b>	<b>17.6</b>
20–24 years	NZ European	24	23	38	25	110	19.0
	Māori	19	16	18	25	78	46.3
	Pacific Island	9	1	5	8	23	33.3
	Asian	3	6		2	11	12.0
	<b>Total</b>	<b>55</b>	<b>46</b>	<b>61</b>	<b>60</b>	<b>222</b>	<b>24.4</b>
15–24 years	NZ European	44	52	60	54	210	17.2
	Māori	34	33	36	42	145	39.6
	Pacific Island	11	6	10	9	36	25.4
	Asian	5	6	2	2	15	7.7
	Not specified	1				1	1.3
	<b>Total</b>	<b>95</b>	<b>97</b>	<b>108</b>	<b>107</b>	<b>407</b>	<b>20.3</b>
<b>Total</b>		<b>97</b>	<b>103</b>	<b>118</b>	<b>111</b>	<b>429</b>	

## 3 Update on Previous Recommendations to the Minister

### 3.1 First report, 2002–2003

This report covered the initial set-up year of the Committee, and in the recommendations the Minister of Health was asked to note a number of key issues the Committee was working on or was concerned about. These issues were as follows.

Recommendation	Chair's 2007 update on progress
R1.1 CYMRC's intention to collect, in a central database, complete and accurate data on every child and youth that dies in New Zealand, to provide a solid evidential base for developing preventive strategies.	This database is established and functioning (see section 2.1). The Ministry of Health, on behalf of the CYMRC, currently contracts with the University of Otago to manage the database.
R1.2 The varying nature and extent of data at the coronial level, which limits the ability to undertake robust, in-depth mortality reviews. The CYMRC supported the establishment of a coronial information system.	With the new Coroners Act 2006 and the appointment of the Chief Coroner and a network of permanent, full-time coroners, we are hopeful that a new coronial information system will now be established that can link in with the CYMRC's database.
R1.3 The need for a working group drawing members from the Ministry of Justice, Department for Courts, Police, Coroners' Council, ACC, Ministry of Health and CYMRC to develop protocols that authorise the collection of standardised and consistent data for different types of child and youth deaths.	This working group has not yet been set up. The new coronial services are just being established, and further discussion on this topic will be progressed in 2008 with some assistance from the project manager referred to under R1.4.
R1.4 The initiation of a project (for which CYMRC obtained a funding grant) to evaluate the role of a health-trained investigator to collect information for both the coroner and the mortality review process. This would involve a case-control study for SUDI and a case study of youth suicides.	There has been delay in initiating this project leading to issues retaining the allocated funding within the Ministry of Health. This project remains a very high priority for action and needs to be progressed urgently.
R1.5 The CYMRC requested senior advisors for the committee from the Police Commissioner's office, Commissioner for Children, Ministry of Education, and District Health Boards.	The role of advisor is well established (see Appendix B). Advisors attend three CYMRC meetings per year, providing invaluable information about their organisation's work relating to children and youth, and opportunities for collaboration.
R1.6 The fact that the establishing of local mortality review groups relies on the support and resourcing from District Health Boards. The necessary costs may be a significant barrier to implementation for LMRGs across the country.	At the end of 2007 10 out of the 21 DHBs have local mortality review groups. The Chair was responsible for leading a funding bid through the Quality Improvement Committee for funding LMRGs. It is hoped this will be available in 2008.

## 3.2 Second report, 2003–2004

In the second report, recommendations were made on the functioning of the review process and on measures for decreasing child and youth mortality in New Zealand.

Recommendations for the functioning of the national review process	Chair's 2007 update on progress
R2.1 A formal service level agreement should be signed between the CYMRC Chair and the Ministry of Health about the parties' mutual obligations.	The Ministry of Health has not been able to provide a consistent secretariat support to the CYMRC. Although the efforts of the individual members of the secretariat have been appreciated, there remains a need for senior management in the Ministry to demonstrate support for the CYMRC and for the funding for the Committee, its annual work plans and the mortality database being consolidated into the usual operating budget.
R2.2 The value of an interactive internet-based child and youth mortality database should be recognised and receive secure funding in the medium term.	The database has been established (see R1.1), but there is a need for the Ministry to secure ongoing funding to establish a contract for three years or more.
R2.3 Data collection and sharing protocols between the coroners, police and CYMRC should be specifically mentioned and allowed for in the Coroners Bill.	The CYMRC made a submission on the Coroners Bill and we are optimistic that when the new system described in the Coroners Act is fully functioning there will be improved data sharing between the CYMRC and coroners (see R1.2 and R1.3).
R2.4 Further policy work should be carried out, with a view to legislative change, to enable case conferences with a range of professionals and agencies to inform mortality review.	The New Zealand Public Health and Disability Act does not currently allow for this. The CYMRC intends to contribute to any future review of the Act.
R2.5 Local mortality review should be recognised as providing detailed and high-quality information that can be accessed to inform prevention strategies.	DHBs that have LMRGs recognise this, but at the time of writing there are 11 (out of 21) DHBs that do not have local groups (see R1.6 and R2.6).
R2.6 Multi-agency local review processes should be recognised as promoting networking, local system change and increasing social capital.	(See R1.6 and R2.5.)
R2.7 A project team should be funded with members from DHBs and the CYMRC to develop written protocols for local mortality review processes and for reporting at the local level to participating agencies.	No funding has been available. The secretariat made significant progress during 2006/07 on a handbook for local groups.
R2.8 DHBs should note the requirement for child and youth mortality review as part of the Provider Quality Specifications (in the Operation Policy Framework).	Although this is required of DHBs as part of the mandatory requirement in their Crown Funding Agreement with the Ministry, there appears to be no follow-up or action for non-compliant DHBs.
R2.9 All advisors and health care providers should actively promote safe sleeping practices. All services that offer care to infants and mothers should provide safe sleeping environments for infants.	The CYMRC believes that there is still work to be done to ensure that all those caring for babies know that all babies should always be put to sleep on their backs. We approached New Zealand manufacturers of disposable nappies, but they were not prepared to put safe sleeping messages on disposable nappies.
R2.10 Further work should be undertaken to make sure the 'safe environment' message effectively reaches high-risk families, and that providers of care maintain their knowledge and advice on safe sleeping environments.	The CYMRC worked with the Child and Youth Health Team in the Ministry of Health to prepare material for families and health professionals. The Child and Youth Health Team has not yet secured the funding to print and distribute this, but it is included as appendix D.

<b>Recommendations for the functioning of the national review process</b>	<b>Chair's 2007 update on progress</b>
R2.11 Earlier use should be made of the inter-agency case management for complex high-risk families with young infants or babies.	The Strengthening Families process is used with various levels of success across the country. The development of a national network of child protection officers employed by DHBs is a welcome and useful development that enables implementation of this recommendation.
R2.12 A protocol for sensitive death scene investigation should be collaboratively developed at a national level by police, coronial and health services (including pathologists) and Māori.	This will be part of the work described in R1.4.
R2.13 Leaving children less than three years of age alone in a bath presents a significant drowning risk. Therefore, parents must be given information to help them understand and manage the risk in their own homes. This information should also be in the Well Child booklet.	The <i>Well Child Health Book</i> includes in its Safety Section: 'If you need to go away from baby's bath or paddling pool take baby with you. Bath seats and other flotation aids can't be relied on to keep your baby or toddler safe' (p.47). (See R2.16 and R3.4.)
R2.14 Adult services (especially mental health services) should actively consider the safety of the children in the family of an adult mental health service consumer. In particular, parents not turning up for appointments may signal an increased risk for children in that environment. A parent or caregiver not turning up for a mental health appointment should trigger a prompt follow-up by the health service.	Work related to family violence will be the responsibility of the Family Violence Mortality Review Committee to be set up by the Ministry of Health in 2008.
R2.15 Adequate housing and a safe environment are not provided to many children who die of unintentional injuries. The CYMRC recommends continued effort by government agencies and others to improve housing quality, especially where children are living.	(See R2.14.)
R2.16 The CYMRC should share information with the Ministry of Consumer Affairs about the safety of bath seats and swimming rings for babies and infants, as in the previous two years at least two deaths were related to the unsupervised use of these products.	The CYMRC with SAFEKIDS wrote to the Ministry of Consumer Affairs, but the Ministry of Consumer Affairs does not intend to follow up on the use of bath seats. (See R2.13 and R3.4.)



### 3.3 Third report, 2002–2004

The recommendations in the third report were as follows.

Recommendation	Chair's 2007 update on progress
R3.1 The Ministry of Health should evaluate its current SUDI prevention messages and consider 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.	We have approached the Ministry of Health team responsible for the anti-smoking advertising, but as yet we feel there has not been sufficient focus on the importance of not smoking during pregnancy. (See also R2.10.)
R3.2 The Minister of Health should note the ongoing high rate of mortality among Māori children and youth, and the level of disparity between Māori and non-Māori	We know that the Ministry of Health and DHBs continue to work on disparities in health outcomes between Māori and others. The solutions are not simple, and progress will be slow.
R3.3 The Minister of Health should note the CYMRC's concern that in some cases there is poor continuity of care in the post-neonatal age group.	The more reviews of deaths we complete, the more it becomes evident that the period of transition from one health care provider to another is a vulnerable time, and it may mean that care is not continued.
R3.4 The Minister of Health should note that the 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 CYMRC has asked the Ministry of Health to liaise with SAFEKIDS to progress this matter. We still believe that bath seats for babies are dangerous. (See R2.13 and R2.16.)
R3.5 The Minister should note the emergence of suicide in the 10–14 years age group and that the CYMRC will write to other relevant groups, including the All Ages Suicide Prevention Strategy Group, about this issue.	Refer to <i>Suicide Facts</i> , published by the Ministry of Health in November 2007.
R3.6 NZHIS should discuss with the Department of Internal Affairs ways to transfer information more quickly from Births, Deaths and Marriages to NZHIS, and thus through to health organisations that use NHI numbers.	The CYMRC was pleased the NZHIS followed up on this matter, but there are still barriers to the immediate updating of systems when a child or youth dies – these problems appear to be at the DHB level.
R3.7 The Land Transport Safety Authority (LTSA) and the Government should consider the findings of recent research 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 CYMRC is pleased to have an ongoing relationship with LTSA though its advisor and the reports sent to the mortality database. The CYMRC is pleased to note the organisation's concentration on young drivers.
R3.8 The Minister of Health should note 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 the CYMRC will be having further discussions with Victim Support, coroners and the Police before making clear recommendations on this issue. The Minister should also note that the Cross Departmental Research Pool (CDRP), developed by the CYMRC and sponsored by the Ministry of Health, may have some impact on this issue.	The CYMRC has endeavoured to put useful information for families on its website. It has been pleasing to see the documents produced by the Coronial Services. (See R1.4.)

## 4 Upcoming Work of the Committee

During its establishment phase, the CYMRC identified four core functions it needed to perform to meet its purpose as outlined in the Act.<sup>2</sup> The CYMRC also listed the general activities that relate to each of the four core functions, and these are given in Appendix C.

As well as the general activities undertaken by the Committee, the CYMRC plans specific activities for each year. These planned activities are listed in the work plan the CYMRC is required to submit to the Minister of Health at the start of each financial year (June–July).

The planned activities from the CYMRC’s 2007/08 Work Plan are given in Table 20 below.

**Table 20:** CYMRC’s planned activities for 2007/08

Core functions	Planned activities for 2007/08
Analyse and understand	<ul style="list-style-type: none"> <li>• Establish the uptake of data onto the National Mortality Database from other related databases.</li> <li>• Work with the Chief Coroner to establish an aligned reporting system for coroners and the CYMRC.</li> <li>• Review reporting from family/parents.</li> <li>• Review Pacific child and youth mortality in New Zealand.</li> <li>• Review transport-related deaths of children and young people in New Zealand.</li> <li>• Continue to focus on reviews of SUDI and suicide.</li> <li>• Support the Cross Departmental Research Project.</li> <li>• Work with the Mortality Database Group to establish a taxonomy for classifying systems issues relating to causes of death.</li> </ul>
Engage and collaborate	<ul style="list-style-type: none"> <li>• Work with the Quality Improvement Committee to establish LMRGs covering the remaining 11 DHBs.</li> <li>• Attend the Australian and New Zealand Child Death Review Teams’ meeting.</li> <li>• Attend the 10th two-yearly international SIDS conference in England.</li> </ul>
Disseminate information and inform	<ul style="list-style-type: none"> <li>• Work with the Ministry of Health on SUDI prevention messages.</li> <li>• Develop the local reporting process to assist DHB planning and funding.</li> <li>• Complete a handbook for local mortality review groups.</li> <li>• Update and reprint the family information pamphlet.</li> </ul>
Monitor and evaluate	<ul style="list-style-type: none"> <li>• Develop a process for an acute response to clusters and variations in trends (eg, a localised cluster of suicide deaths).</li> </ul>

<sup>2</sup> To review and report to the Minister on deaths of people aged between four weeks and 24 years, with a view to reducing the numbers of deaths of this group, and to continuous quality improvement through the promotion of ongoing quality assurance programmes.

## **5 Further Information**

### **5.1 Website**

The CYMRC website ([www.cymrc.health.govt.nz](http://www.cymrc.health.govt.nz)) 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.cymrc.health.govt.nz> under 'Resources – Publications – Annual Reports'.

### **5.2 Information brochure for families and whānau**

The information brochure for families and whānau is available on the CYMRC website (<http://www.health.govt.nz>) under 'Resources – Publications – Information about Child and Youth Mortality Review', or by emailing [cymrc@moh.govt.nz](mailto:cymrc@moh.govt.nz).

### **5.3 Contact details**

The CYMRC can be contacted at:

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

Phone: (04) 496 2000 (ask for CYMRC Secretariat)

Email: [cymrc@moh.govt.nz](mailto:cymrc@moh.govt.nz)

# Appendix A: CYMRC Membership and Meetings 2006

## Membership

Barry Taylor (Chair)

Christopher Morris

David Tipene-Leach (term expired December 2006)

Ian Hassall (term expired December 2006)

Joanne Baxter (term expired December 2006)

Marie Connolly (nominee of the Chief Executive of Ministry of Social Development)

Pat Tuohy (nominee of the Director-General of Health)

Russell Franklin

Tracie Mafile'o (term expired December 2006)

Riana Manuel

For more information about the CYMRC and its current membership, see its website ([www.cymrc.health.govt.nz](http://www.cymrc.health.govt.nz)).

## Meetings

The CYMRC met four times in Wellington during 2006. Two updating teleconferences were held in April and July. Meetings in Wellington were held on:

- 23 and 24 February
- 5 May
- 28 and 29 September
- 24 November.

## Appendix B: Advisors to the 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:

Ministry of Education	Cathye Haddock
Ministry of Health (Mental Health Directorate)	Basia Arnold
Ministry of Transport	David Eyre
Ministry of Youth Development	Susan Wauchop
New Zealand Police	Bill Harrison, Belinda Himiona
Office of the Children's Commissioner	Nicola Atwool
Royal New Zealand Plunket Society	Erin Beatson
Te Puni Kōkiri	Donna McKenzie

## Appendix C: Summary of CYMRC's Core Functions and Activities

Purpose	Core functions	Activities
To review and report to the Minister on deaths of people aged between four weeks and 24 years, with a view to reducing the numbers of deaths of this group, and to continuous quality improvement through the promotion of ongoing quality assurance programmes	Analyse and understand	<ul style="list-style-type: none"> <li>• Collection and management of data in a national mortality database</li> <li>• Scientific group review of data</li> <li>• Local mortality review groups</li> <li>• Support of the cross departmental research project pilot of health trained investigators</li> <li>• Targeted analysis of particular categories of data</li> <li>• Parent/family reporting</li> <li>• Addition of other data sources to data base (eg, CYF, Plunket, Māori SIDS)</li> </ul>
	Engage and collaborate	<ul style="list-style-type: none"> <li>• Maintain network of advisors from key government organisations</li> <li>• Link with Australian child death review teams</li> <li>• Make presentations at relevant national conferences</li> <li>• Support the Māori committee members' group</li> <li>• Utilise any speaking/presenting opportunities</li> <li>• Make positive connections with key individuals/organisations (eg, coroner)</li> <li>• Work with other Ministerial committees, particularly the Quality Improvement Committee and the Perinatal and Maternal Mortality Review Committee</li> </ul>
	Disseminate information and inform	<ul style="list-style-type: none"> <li>• Annual report on mortality</li> <li>• Maintain committee website</li> <li>• Committee leaflet</li> <li>• Provide reports to DHBs on local data</li> <li>• Targeted projects (eg, SUDI prevention)</li> <li>• Supporting material (eg, handbook)</li> </ul>
	Monitor and evaluate	<ul style="list-style-type: none"> <li>• Acute response to clusters and variations in trends</li> <li>• Annual review of previous recommendations</li> <li>• Ongoing review of data since 2002</li> </ul>

# Appendix D: SUDI Message for Health Professionals: Preventing sudden unexpected death in infancy

The Ministry of Health and the Child and Youth Mortality Review Committee have reviewed the current Ministry of Health recommendations for preventing sudden unexpected death in infancy (SUDI).

Health practitioners are in a strong position to educate, promote and influence safe sleeping practices for infants. This leaflet is intended for health practitioners who work with parents. It provides background information about the current recommendations, and discusses the recently raised issue of dummy (pacifier) use as a potential method of reducing SUDI risk.

Parents and caregivers can reduce the risk of SUDI. The actions they can take are outlined below.

## **Information for parents and caregivers**

### **No smoking during pregnancy**

Smoking during pregnancy is an important cause of sudden unexpected death in infancy (SUDI) because it damages babies before birth. Many women find that it is easier to give up smoking when they are pregnant. It is important to stop smoking as soon as possible after a pregnancy has been confirmed. A midwife or health practitioner can help pregnant women and other household members who smoke to quit smoking. A phone call to Quitline (0800 778 778) can help people to stop smoking.

### **Sleeping position – ‘Back to sleep’**

Babies should be put down to sleep on their backs. Babies who sleep on their backs are less likely to get their faces accidentally covered by sheets or bedding.

### **Sleeping environment**

The recommended sleeping environment is having baby sleeping in a cot or bassinet near the parents’ bed.

Co-sleeping (a parent who sleeps with their baby in bed) is dangerous when:

- the baby’s mother has smoked during pregnancy, or
- the adult in bed with the baby has been drinking, or taking drugs or medicines that might reduce their awareness of the baby, or
- the co-sleeping adult is excessively tired.

A small increase in SUDI risk from co-sleeping is also present for babies less than three months old, whether or not the mother smoked during pregnancy.

### **Room sharing**

Babies who sleep in the same room as parents for the first six months are at lower risk of SUDI.

### **Breastfeeding – ‘Breast is best’**

Breastfeeding has many benefits for mothers and babies. It helps to keep babies healthy and well.

## Background information for health practitioners

SUDI means a sudden and unexpected infant death. A thorough clinical history, a review of details of the circumstances of death, and an adequate post-mortem examination may provide a contributory or causative diagnosis. The term 'SUDI' is now often used instead of Sudden Infant Death Syndrome (SIDS) because some coroners prefer to use the term 'undetermined' for a death previously considered to be SIDS. This change is causing a diagnostic shift in the mortality data. The terms SUDI and SIDS are both used in this document to show the transitional nature of the terminology.

The recognition of high rates of sudden unexplained infant deaths towards the end of the 1980s resulted in large-scale case control studies worldwide. The 1987–1990 New Zealand cot death study aimed to identify risk factors related to particular infant care practices (Mitchell et al 1992). Avoidance of the prone sleep position for infants, maternal smoking in pregnancy, and not breastfeeding were identified as important prevention factors and led to a successful New Zealand intervention programme. The study found Māori infants had a 3.8 times higher risk of dying than non-Māori infants. Maternal smoking accounted for 50 percent of the higher rate, and bed sharing another 22 percent. They were both considered modifiable factors.

Since 1990 there has been a worldwide reduction in the incidence of SUDI/SIDS. 'Back to Sleep' campaigns were undertaken in many countries, and the resulting reductions in the incidence of SUDI/SIDS have shown that the infant's sleep environment strongly influences the risk of SUDI/SIDS (Li et al 2003).

The European Concerted Action on SUDI/SIDS (ECAS) study combined data from 20 regions in Europe and identified avoidable risk factors such as infant sleeping position, type of bedding used and sleeping arrangements (Carpenter et al 2004). The main risk factors were largely independent. For example, a prone sleeping position was found to carry highly significant risks of SUDI (odds ratio 13.1 [CI 8.51–20.2]). If the mother smoked, there were significant risks associated with bed sharing, especially during the first two weeks of life. The odds ratios for bed sharing when the mother smoked were 27 (13.3–54.9), compared with 2.4 (1.2–4.6) for non-smoking mothers. The bed-sharing risk decreased with infant age and was not significant for non-smoking mothers after babies were three months old.

Sleeping a baby on his or her back can result in flattening of the occipital area of the skull. The terms 'flat head syndrome' and 'positional plagiocephaly' both describe this condition. Mild flattening of the back of a baby's head does not cause problems for the baby. Some babies, however, especially those who may have tightness of one of their neck muscles, may prefer to hold their head in one position. This can lead to flattening of one side of the head. This flattening can be prevented in most cases by alternating the baby's head position when they are put to sleep on their backs and by giving the baby plenty of 'tummy time' when they are awake. Occasionally the baby develops a preferred head position while sleeping, and parents may need to get advice from a physiotherapist or a paediatrician.



## Bed sharing and co-sleeping

*Bed sharing* is when a baby is brought into an adult bed for feeding or settling without the intention of sleeping. *Co-sleeping* is where an adult and baby sleep together in bed.

Mothers and babies sleeping in close proximity is a widespread historical and cultural practice, and has been shown to improve breastfeeding outcomes. Bed sharing is advocated for promoting breastfeeding.<sup>3</sup> There is substantial evidence that breastfeeding promotes an infant's health and wellbeing, and it is strongly recommended. Bed sharing is fine for breastfeeding and cuddles, but babies should be in their own bed when parents go to sleep, preferably in a cot or bassinet beside the parents' bed until the baby is six months old.

## Dummies (pacifiers)

Literature about dummies shows that this is a complex and often controversial topic of research. In 1979, Cozzi et al claimed that dummies might protect against SUDI/SIDS. Support for this hypothesis was first reported by Mitchell et al (1993). Since then, there have been other studies that have supported this observation, although evidence is lacking for a biological underlying mechanism and, outside this field, dummy use has mainly been associated with detrimental effects (Mitchell et al 2006).

A recent meta-analysis to identify whether dummies reduce the risk of SUDI/SIDS showed a strong correlation between giving an infant a dummy when placing them to sleep and reducing their risk of dying from SUDI/SIDS (Hauck et al 2005). The results indicate that the effect is strongest when the dummy is given at the infant's night-time sleep.

These results were all part of larger studies examining potential risk and protective factors for SUDI/SIDS. A California study (Li et al 2006) that interviewed the mothers of 185 infants who were victims of SUDI/SIDS and 312 randomly selected controls identified that after adjusting for known risk factors the use of a dummy during sleep was associated with a 90% reduced risk of SUDI/SIDS, compared with infants who did not use a dummy. The study also suggested that using a dummy may reduce the impact of other risk factors, especially those related to other adverse sleep conditions.

How dummies may reduce the risk of SUDI/SIDS is unknown, but there are several hypotheses. These include avoidance of the prone position, protecting the oropharyngeal airway, reducing the gastro-oesophageal reflux through non-nutritive sucking, and lowering the arousal threshold.

Concerns about recommending dummies have focused on breastfeeding, otitis media and other infections, and dental malocclusion.

More research is needed to understand what may influence the use and non-use of dummies, including parenting behaviours and infant factors. Ongoing monitoring of SUDI/SIDS rates using population-based infant mortality statistics, as well as infants' dummy use, will be needed to help evaluate the impact of this practice.

## Breastfeeding and dummies

Professor Ed Mitchell has recently published a review article in which he notes that observational studies have shown a clear relationship between frequent or continuous

<sup>3</sup> The Baby Friendly Initiative: [www.babyfriendly.org.uk/sharing/bedleaflet.pdf](http://www.babyfriendly.org.uk/sharing/bedleaflet.pdf) (last accessed March 2007).

dummy use and a reduction in breastfeeding. In one study, introducing a dummy after one month of age was not detrimental to breastfeeding duration.

Dummy use has also been associated with a significantly higher risk of infective symptoms. There is a 1.2 to 2 times increased risk of otitis media associated with dummy use. Although some dental malocclusions, notably cross bite, have more commonly been found among dummy users than non-users, the differences generally disappear after cessation of dummy use.

The American Academy of Pediatrics Task Force (2005) recommends using a pacifier (dummy) to reduce SUDI/SIDS risk throughout the first year of life, as follows.

- Pacifiers should be used when putting infants down for sleep and should not be reinserted once the infant falls asleep.
- If the infant refuses the pacifier, he/she should not be forced to take it.
- Pacifiers should not be coated in any sweet solution.
- They should be cleaned often and replaced regularly.
- For breastfed infants, delay introduction until one month of age to ensure breastfeeding is established.

At this stage, the Ministry of Health and Child and Youth Mortality Review Committee do not recommend dummy use in infants, although it seems appropriate to stop actively discouraging their use. Any possible reduction in SUDI/SIDS needs to be balanced against the established risks, especially the reduction of breastfeeding duration, with the attendant reduction in health benefits to the infant.

If breastfeeding mothers want to give their baby a dummy, advise them to offer it only after breastfeeding is well established.

#### **Advice for using dummies to reduce SUDI/SIDS risk**

The Ministry of Health and the Child and Youth Mortality Review Committee do not recommend the routine use of dummies for all babies.

If an infant is already being bottle fed, it is reasonable to discuss the use of dummies with the parents, especially if SUDI risk factors are present.

For mothers breastfeeding their infants, discuss the benefits of breastfeeding and risks of dummy use.

If breastfeeding mothers want to give their baby a dummy, recommend waiting until breastfeeding is well established.

## **Baby friendly hospital initiative**

In New Zealand, the Ministry of Health expects every facility providing maternity services and care for newborn infants to become 'Baby Friendly', which means they should practise the 10 steps to successful breastfeeding.

### **The 10 steps to successful breastfeeding**

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in the skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within half an hour of birth.
5. Show mothers how to breastfeed and maintain lactation, even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.
7. Practise rooming-in – that is, allow mothers and infants to remain together – 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

## References

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