

# **Fetal and Infant Deaths 2007**

## Copyright

The copyright owner of this publication is the Ministry of Health, which is part of the New Zealand Crown.

The Ministry of Health permits the reproduction of material from this publication without prior notification, provided that all following conditions are met:

- the content is not distorted or changed
- the information is not sold
- the material is not used to promote or endorse any product or service
- the material is not used in an inappropriate or misleading context having regard to the nature of the material
- any relevant disclaimers, qualifications or caveats included in the publication are reproduced
- the New Zealand Ministry of Health is acknowledged as the source.

## Disclaimer

The purpose of this publication is to inform discussion and assist policy development. The opinions expressed in the publication do not necessarily reflect the official views of the Ministry of Health.

All care has been taken in the production of this publication; the data was deemed to be accurate at the time of publication, but may be subject to slight changes over time as further information is received. It is advisable to check the current status of figures given here with the Ministry of Health before quoting or using them in further analysis.

The Ministry of Health makes no warranty, expressed or implied, nor assumes any legal liability or responsibility for the accuracy, correctness, completeness or use of the information or data in this publication. Further, the Ministry of Health shall not be liable for any loss or damage arising directly or indirectly from the information or data presented in this publication.

The Ministry of Health welcomes comments and suggestions about this publication.

Citation: Ministry of Health. 2010. *Fetal and Infant Deaths 2007*. Wellington: Ministry of Health.

Published in December 2010 by the  
Ministry of Health  
PO Box 5013, Wellington 6145, New Zealand

ISBN: 978-0-478-37418-6 (print)  
ISBN: 978-0-478-37419-3 (online)  
HP 5276

This document is available on the Ministry of Health's website:  
<http://www.moh.govt.nz>



MANATŪ HAUORA

## Acknowledgements

Many people have assisted in the production of this publication. In particular, the National Health Board thanks the peer reviewers for their valuable contribution.

We would like to thank the following organisations for supplying us with cause of death data:

- Department of Internal Affairs: Births, Deaths and Marriages
- Ministry of Justice, Coronial Services Unit
- Land Transport New Zealand
- Water Safety New Zealand
- District Health Boards.



# Contents

Fetal and Infant Deaths 2007: Key facts	ix
Introduction	1
Purpose	1
Key data sources, data quality and timing issues	1
Definitions	3
Live births	3
Fetal and infant death periods	3
Numbers and rates	3
International comparisons of fetal and infant mortality	4
Sudden Infant Death Syndrome	4
Confidence intervals	5
Commentary	6
Total fetal and infant deaths	6
Perinatal deaths (fetal and early neonatal deaths)	8
Infant deaths (early neonatal, late neonatal and post-neonatal deaths)	9
Ethnicity	10
Timing of death	13
Causes of death	16
Potential risk factors associated with fetal and infant deaths	22
Variation in mortality by DHB	37
Sudden Infant Death Syndrome	39
International comparisons of fetal and infant mortality	44
Explanatory notes	46
Ethnicity	46
New Zealand Index of Deprivation 2001 (NZDep2001)	46
ICD-10-AM-II codes used in this publication	48
Glossary	50
References	54
Statistical tables	55

## List of Figures

Figure 1:	Fetal and infant deaths, numbers, total population, 2007	7
Figure 2:	Perinatal death rates, by death type and year, 1996–2007	8
Figure 3:	Infant death rates per 1000 live births, by death type and year, 1996–2007	9
Figure 4:	Percentage distribution of fetal and infant deaths, by ethnicity, 2007	11
Figure 5:	Perinatal death rates, by ethnicity, 1996–2007	12
Figure 6:	Infant death rates, by ethnicity, 1996–2007	13
Figure 7:	Timing of fetal death, by birthweight, 2007	14
Figure 8:	Timing of fetal death, by gestational age, 2007	15
Figure 9:	Infant deaths, by age at death, percentages, 1996–2007	16
Figure 10:	Fetal deaths, causes by ICD-10-AM-II chapter, 2007	17
Figure 11:	Fetal deaths, causes by ICD-10-AM-II sub-group, 2007	18
Figure 12:	Neonatal deaths, causes by ICD-10-AM-II chapter, 2007	18
Figure 13:	Neonatal deaths, causes by ICD-10-AM-II sub-group, 2007	19
Figure 14:	Post-neonatal deaths, causes by ICD-10-AM-II chapter, 2007	20
Figure 15:	Post-neonatal deaths, causes by ICD-10-AM-II sub-group, 2007	20
Figure 16:	Perinatal death rates, by maternal age, 2007	23
Figure 17:	Infant death rates, by maternal age, 2007	24
Figure 18:	Perinatal death rates by quintile of deprivation (NZDep2001), three-year moving averages, 1996–2007	25
Figure 19:	Infant death rates by quintile of deprivation (NZDep2001), three-year moving averages 1996–2007	26
Figure 20:	Perinatal death rates by urban/rural status, three-year moving averages, 1996–2007	28
Figure 21:	Infant death rates by urban/rural status, three-year moving averages, 1996–2007	29
Figure 22:	Neonatal deaths, by gestation and birthweight, by percentage, 2007	32
Figure 23:	Post-neonatal deaths, by gestation and birthweight, percentage, 2007	33
Figure 24:	Fetal and infant mortality rates, by sex, 2007	34
Figure 25:	Fetal deaths, by sex and cause of death, 2007	35
Figure 26:	Neonatal deaths, by sex and cause of death, 2007	36
Figure 27:	Post-neonatal deaths, by sex and cause of death, 2007	37
Figure 28:	Perinatal death rates and 95 percent confidence intervals, by DHB region of usual place of residence, 2003–2007	38
Figure 29:	Infant death rates and 95 percent confidence intervals, by DHB region of usual place of residence, 2003–2007	38
Figure 30:	Sudden Infant Death Syndrome death rates, 1988–2007	40
Figure 31:	Sudden Infant Death Syndrome death rates, by ethnicity, 1996–2007	41
Figure 32:	Sudden Infant Death Syndrome deaths, by age at death and ethnicity, 1999–2007	42
Figure 33:	Sudden Infant Death Syndrome deaths, by age of mother, 1996–2007	43
Figure 34:	Sudden Infant Death Syndrome deaths, by deprivation quintile, three-year moving average, 1996–2007	44

## List of Tables

Table 1:	Fetal and infant deaths: numbers and rates, total population, 2007	6
Table 2:	Fetal and infant deaths by ethnicity: numbers and rates per 1000 births, 2007	10
Table 3:	Timing of fetal death, by birthweight, 2007	14
Table 4:	Timing of fetal death, by gestational age, 2007	15
Table 5:	Perinatal and infant deaths, numbers and rates, by deprivation quintiles, 2007	25
Table 6:	Total babies registered from single and multiple births, by year, 1996–2007	30
Table 7:	Single and multiple births, by death type, 2007	31
Table 8:	Neonatal deaths, by gestation and birthweight, number and percentage, 2007	31
Table 9:	Post-neonatal deaths, by gestation and birthweight, number and percentage, 2007	32
Table 10:	Sudden Infant Death Syndrome <sup>†</sup> deaths: numbers and rates, 1996–2007	40
Table 11:	New Zealand fetal and infant deaths for international comparison purposes, numbers and rates, 2000–2007	45





# Fetal and Infant Deaths 2007: Key facts

## Deaths

- There were a total of 783 fetal and infant deaths registered in 2007.
- In 2007, 312 infant deaths were registered (4.8 deaths per 1000 live births), and 471 fetal deaths (7.2 deaths per 1000 total births).
- The infant death rate for the total population declined from 7.3 deaths per 1000 live births in 1996 to 4.8 deaths per 1000 live births in 2007.
- In 32.4 percent of 2007 infant deaths, the baby died within the first 24 hours of life.

## Ethnicity

- Māori infant deaths in 2007 (126 deaths) accounted for 40.4 percent of all infant deaths.
- Overall, the Māori infant death rate decreased between 1996 and 2007, declining from 11.6 deaths per 1000 live births in 1996 to 6.5 deaths per 1000 live births in 2007.
- The Māori infant death rate was 79.2 percent higher than that of the non-Māori, non-Pacific ethnic group in 2007.
- The Pacific infant death rate was 76.7 percent higher than that of the non-Māori, non-Pacific ethnic group in 2007.

## Risk factors

- Babies born in multiple births accounted for 14.2 percent of early neonatal deaths in 2007.
- The most deprived areas in New Zealand (that is, areas classed as quintile 5 on the New Zealand Index of Deprivation (NZDep 2001) scale) had high, but decreasing, rates of perinatal deaths compared with other quintiles.
- The most deprived areas in New Zealand had rates of infant deaths more than two-and-a-half times that of the least deprived areas (that is, quintile 1 areas).
- Babies with a birthweight of less than 1000 g and a gestation of less than 32 completed weeks made up 50.6 percent of all neonatal deaths and 6.2 percent of all post-neonatal deaths in 2007.

## Sudden Infant Death Syndrome

- Fifty-six infant deaths were attributed to Sudden Infant Death Syndrome (SIDS) in 2007.
- The SIDS rate of 0.9 deaths per 1000 live births in 2007 was similar to the 2006 SIDS figure of 0.8 deaths per 1000 live births.
- Ten SIDS deaths occurred in the neonatal period (less than 28 completed days after birth) and 46 SIDS deaths occurred in the post-neonatal period.



# Introduction

## Purpose

The purpose of the Fetal and Infant Deaths publication series is to inform discussion and assist in future policy development. Readership of this publication is wide-ranging, and its contents reflect this, aiming to meet the needs of all interested parties.

The Fetal and Infant Deaths series presents data on deaths that occur before one completed year of life. This edition presents information on the underlying causes of these deaths registered in New Zealand for the calendar year 2007.

## Key data sources, data quality and timing issues

### The Births, Deaths and Marriages registry

The Registrar-General of Births, Deaths and Marriages is required to maintain a register of causes of death as recorded on each medical certificate of cause of death or coroner's finding. This information is then supplied to the Ministry of Health, which matches death registrations from the registry with individuals' National Health Index numbers. This combined information comprises the death registration data held in the National Mortality Collection.

Birth registration data, including stillbirths (fetal deaths), is also provided by the Births, Deaths and Marriages registry. This data has been used to calculate the death rates presented in this publication.

### The National Mortality Collection

The Ministry of Health is responsible for compiling and publishing cause of death statistics for New Zealand. Using the information provided by the Births, Deaths and Marriages registry, the Ministry of Health assigns underlying cause of death codes in accordance with the guidelines contained in the World Health Organization (WHO)'s *International Statistical Classification of Diseases and Related Health Problems, 10th revision*. In this publication, the *10th Revision, Australian Modification, 2nd Edition* (ICD-10-AM-II) was used for coding purposes (National Centre for Classification in Health 2000).

Underlying cause of death is defined by WHO as: 'the disease or injury which initiated the train of morbid events leading directly to death, or ... the circumstances of the accident or violence which produced the fatal injury' (WHO 1977).

Post-mortem reports are an additional source of cause-of-death information. Copies of these reports are sent to the Ministry of Health by hospitals and private pathologists, and matched with corresponding medical certificates or coroners' findings. Results are taken into consideration in assigning an underlying cause of death. Access to this additional information ensures the high quality of data held in the National Mortality Collection.

## **Late data**

The National Mortality Collection is a dynamic collection, which continues to be updated as new information is received. There may be small differences between future extracts of mortality data for 2007 and the data contained in this publication.

The extended length of time that some coronial inquiries take means there is always a small number of deaths for which the Ministry of Health has been unable to assign provisional causes of death at the time mortality data is published. These deaths are included in the statistics under the ICD codes R98 and R99 ('unattended death' and 'unspecified causes of mortality'), and X59 ('exposure to unspecified factor'). The records for these deaths are provisionally coded and then updated in the National Mortality Collection database with final underlying cause of death codes when coroners' findings are received.

## **Differences between numbers and rates published by the Ministry of Health and Statistics New Zealand**

Statistics New Zealand also publishes numbers of live births, stillbirths (fetal deaths) and infant deaths (see the 'Definitions' section for a discussion of these death classifications) by date of registration.

The live birth numbers used to calculate the rates presented in this publication differ from those published by Statistics New Zealand. Unlike the Ministry of Health, Statistics New Zealand excludes as a matter of policy late registrations (births registered more than two years after the date of birth) and births to mothers resident overseas. Fetal or infant deaths for which the mother's usual residence is overseas are also excluded from Statistics New Zealand numbers.

The Ministry of Health receives detailed medical information for deaths from medical certificates of causes of death post-mortem reports and the National Minimum Dataset.<sup>1</sup> As a consequence of processing this additional information, some fetal deaths are reclassified as infant deaths and some infant deaths are reclassified as fetal deaths, in accordance with the definitions of live births and fetal deaths as described in the next section. Additional unregistered fetal deaths may also be identified by the Ministry of Health through medical certificates, post-mortems and follow-up information sought from relevant hospitals in order to confirm these deaths as registrable stillbirths.

<sup>1</sup> The National Minimum Dataset is a national collection of public and private hospital discharge information, including clinical information, for inpatients and day patients.

# Definitions

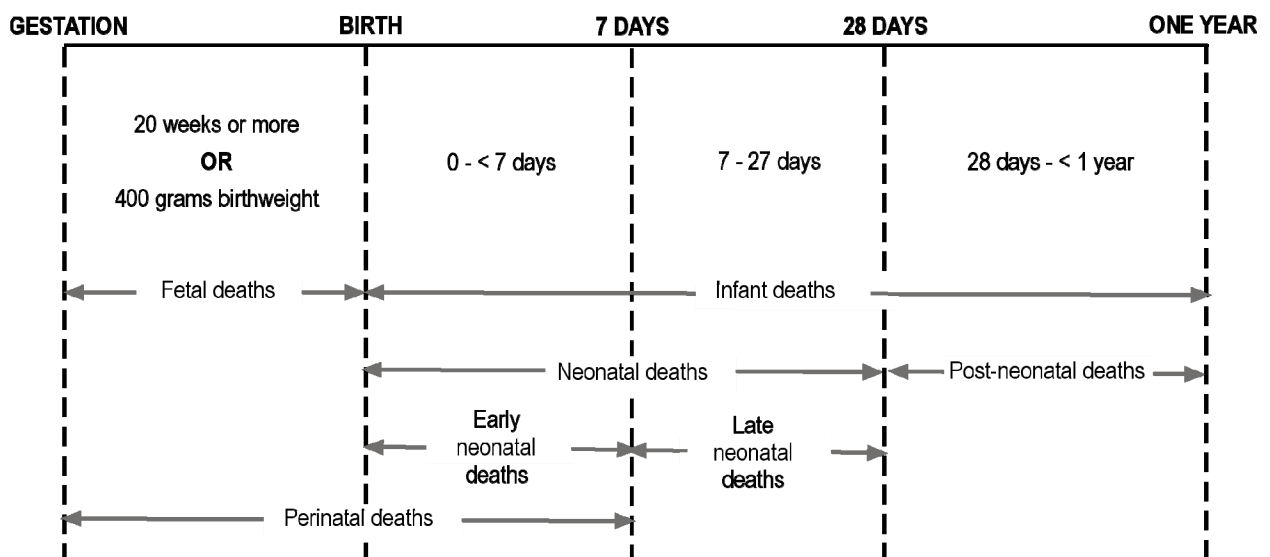
## Live births

The World Health Organization defines a live birth as follows:

Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such birth is considered liveborn (WHO 1977).

## Fetal and infant death periods

The following diagram specifies periods for the terms used for fetal and infant deaths.



## Numbers and rates

Some tables and figures in this publication present death rates by various sub-groups of the total population, defined by ethnicity, age of mother, socioeconomic deprivation, urban/rural status, sex of fetus or infant, or District Health Board (DHB). These rates have been calculated using the relevant population for each sub-group. For example, infant death rates for Māori were calculated using the number of Māori live births as the denominator.

Small numbers can affect the reliability, and therefore the interpretation, of results. It is important to note that, because the number of infant and fetal deaths in New Zealand is small, rates tend to fluctuate markedly from year to year. Rates derived from small numbers should be treated with caution.

Three-year moving average rates have been used in this publication to reduce the effects of large annual variations due to small numbers. This has the effect of smoothing trend lines, so aiding interpretation of possible changes over time.

## International comparisons of fetal and infant mortality

In order to assist in the comparison of fetal and perinatal mortality rates internationally, the Organisation for Economic Co-operation and Development (OECD) recommends calculation of age or weight-specific death rates. Weight-specific death rates are calculated for babies weighing 1000 g and over, or with a gestation of 28 or more completed weeks.

The weight-specific fetal death rate is calculated as follows:

$$\frac{\text{Fetal deaths of 28+ weeks gestation or weighing 1000 g and over} \times 1000}{\text{Total births}}$$

The weight-specific perinatal death rate is calculated as above, with the addition of early neonatal deaths weighing 1000 g and over in the numerator.

The perinatal death rate using the OECD method is calculated as above, with the addition of early neonatal deaths in the numerator.

Early neonatal, late neonatal, post-neonatal and infant death rates are calculated according to the method on page 6.

See the 'International comparisons of fetal and infant mortality' section for more detail (page 44).

## Sudden Infant Death Syndrome

World Health Organization rules for underlying cause of death selection require that specific diseases and conditions be given precedence over non-specific causes such as Sudden Infant Death Syndrome (SIDS; also known as cot death). To capture information about all deaths reported to be due to SIDS, the Ministry of Health employs a flag (called the cot death 'Y' indicator). The cot death flag identifies all of the SIDS records classified to ICD code R95 (Sudden Infant Death Syndrome) either as the underlying cause of death or as a contributing cause.

The classification of cases of SIDS used in the statistical tables is by the number of cases captured by the cot death 'Y' indicator (except statistical tables A16 to A17, which present the underlying cause of death).

The SIDS rate is calculated as follows:

$$\frac{\text{Total number of SIDS deaths} \times 1000}{\text{Number of live births}}$$

## Confidence intervals

Confidence intervals have been calculated for perinatal and infant death rates for all DHBs at the 95 percent level (Keyfitz 1966).

A confidence interval is a range of values describing the uncertainty around a single value (such as a rate) used to estimate the true value in a population, such as the underlying or true rate. Confidence intervals describe how different the estimate could have been if chance had lead to a different set of data. Confidence intervals are calculated with a stated probability (95 percent in this publication) and indicate that there is a 95 percent chance that the true value lies within the confidence intervals.

Confidence intervals may assist in comparing the rates, for example, between District Health Boards and the whole country. If two confidence intervals do not overlap, it is reasonable to assume that the difference between the rates is not because of chance. If they do overlap, it is not possible to make any conclusion about the significance of any difference between the rates.

# Commentary

## Total fetal and infant deaths

There were 65,592 births registered in the year ended December 2007, of which 65,121 were live births. The number of live births was slightly higher than that registered in the previous year (60,274).

There were 783 fetal and infant deaths registered in 2007.

**Table 1:** Fetal and infant deaths: numbers and rates, total population, 2007

Type of deaths	2007	
	Number	Rate
<b>Births</b>		
Live births	65,121	...
Total births	65,592	...
<b>Individual classifications</b>		
Fetal deaths*	471	7.2
Early neonatal deaths <sup>†</sup>	134	2.1
Late neonatal deaths <sup>†</sup>	32	0.5
Post-neonatal deaths <sup>†</sup>	146	2.2
<b>Grouped classifications</b>		
Total perinatal deaths*	605	9.2
Total neonatal deaths <sup>†</sup>	166	2.5
Total infant deaths <sup>†</sup>	312	4.8
Total fetal and infant deaths*	783	11.9
<b>Sudden infant death syndrome</b>		
Sudden infant deaths (SIDS) <sup>‡</sup>	56	0.9

... = Not applicable

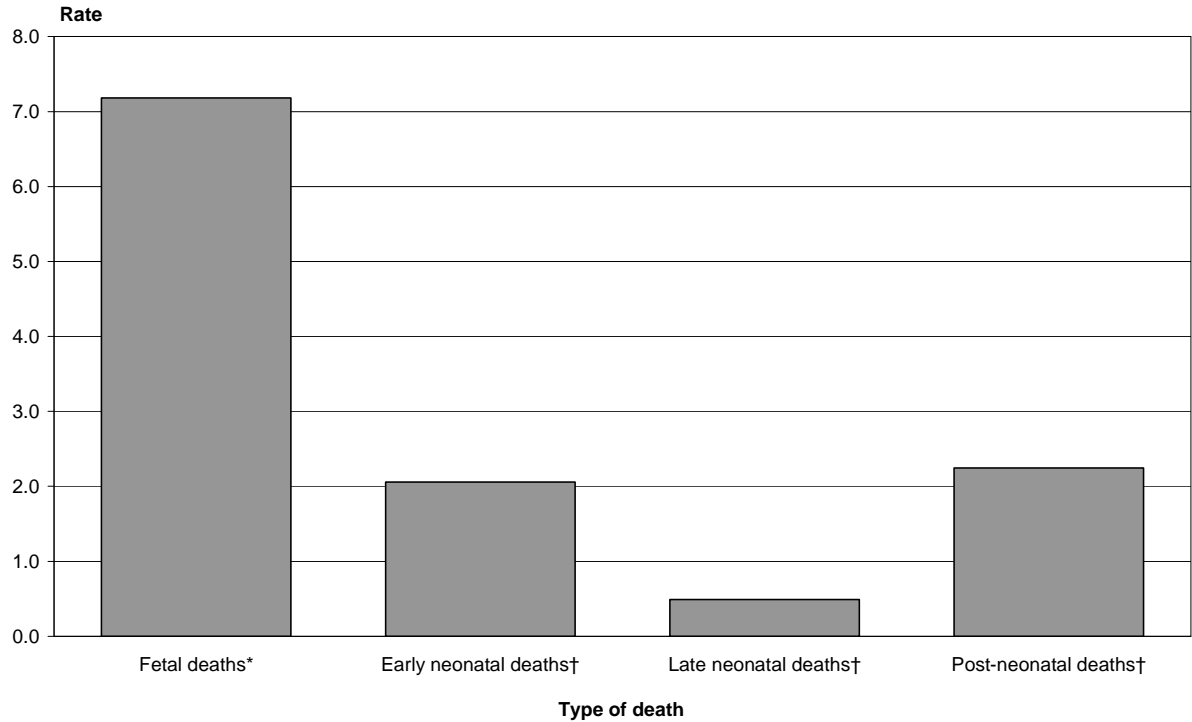
\* = Rate per 1000 total births

† = Rate per 1000 live births

‡ = SIDS includes infants older than one year; see the 'Sudden Infant Death Syndrome' section for an explanation of the cot death indicator. The SIDS rate is per 1000 live births.



**Figure 1:** Fetal and infant deaths, numbers, total population, 2007



\* = Rate per 1000 total births  
 † = Rate per 1000 live births

The World Health Organization defines fetal death as follows:

Fetal death is death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles (WHO 1977).

The statistics in this publication include only fetal deaths (known also as stillbirths) of 20 weeks' or more gestation, or 400 g or more birthweight. This is in line with the Births, Deaths, Marriages and Relationships Registration Act 1995. The 1995 legislation defines a stillborn child as 'a dead foetus that:

- (a) weighed 400 g or more when it issued from its mother; or
- (b) issued from its mother after the 20th week of pregnancy.'

The 1995 Act requires a medical certificate of causes of death and a birth registration form to be completed in respect of each stillborn child (including stillbirths resulting from terminations of pregnancy).

The fetal death rate is calculated as follows:

$$\frac{\text{Fetal deaths} \times 1000}{\text{Total births (live births plus fetal deaths)}}$$

## Perinatal deaths (fetal and early neonatal deaths)

The World Health Organization defines perinatal death as follows:

Perinatal deaths are fetal deaths (20 weeks' gestation or 400 g birthweight), plus infant deaths within less than 168 completed hours (seven days) after birth (early neonatal deaths) (WHO 1977).

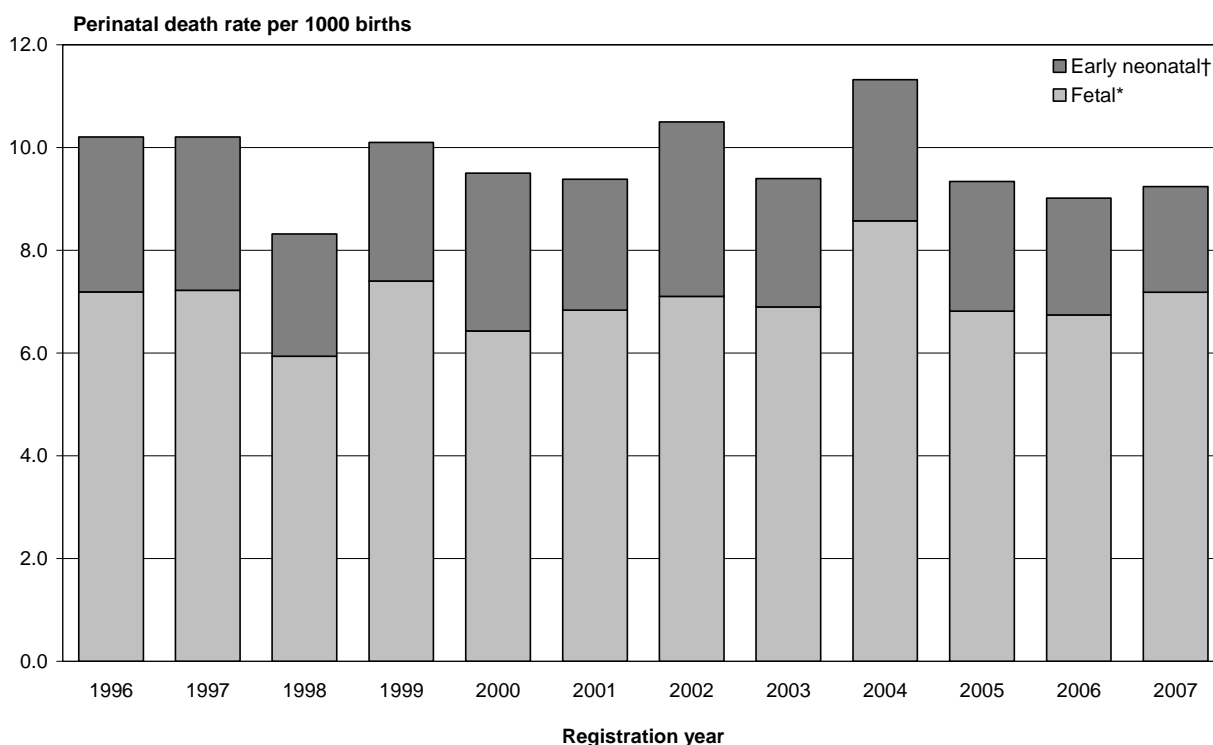
The perinatal death rate is calculated as follows:

$$\frac{\text{Fetal deaths and early neonatal deaths} \times 1000}{\text{Total births (live births plus fetal deaths)}}$$

Figure 2 shows perinatal death rates by death type from 1996 to 2007.

There were 605 perinatal deaths registered in 2007. The perinatal death rate in 2007 was 9.2 deaths per 1000 total births. This represents an increase of 0.2 deaths per 1000 total births from the 2006 figure of 9.0 deaths per 1000 total births (546 deaths). Also, 79 (13.1 percent) of the 605 perinatal deaths registered in 2007 occurred from 2004 to 2006 (0.7 percent in 2004, 1.3 percent in 2005 and 11.1 percent in 2006).

**Figure 2:** Perinatal death rates, by death type and year, 1996–2007



\* = Rate per 1000 total births (live births plus fetal deaths)

† = Rate per 1000 live births

The early neonatal death rate in 2007 was 2.1 deaths per 1000 live births (this was lower than the average rate over the 1996 to 2007 period of 2.7 per 1000 live births).

The fetal death rate in 2007 (7.2 deaths per 1000 total births), rose to be slightly higher than that of the rate in 2005 and 2006. The 2007 fetal death rate was the same as that of 1996 and 1997. The fetal death rate showed little evidence of trending up or down over the period and averaged 7.0 deaths per 1000 total births.

**Infant deaths (early neonatal, late neonatal and post-neonatal deaths)**

The World Health Organization defines infant death as follows:

An infant death is defined as a liveborn infant dying before the first year of life is completed (WHO 1977).

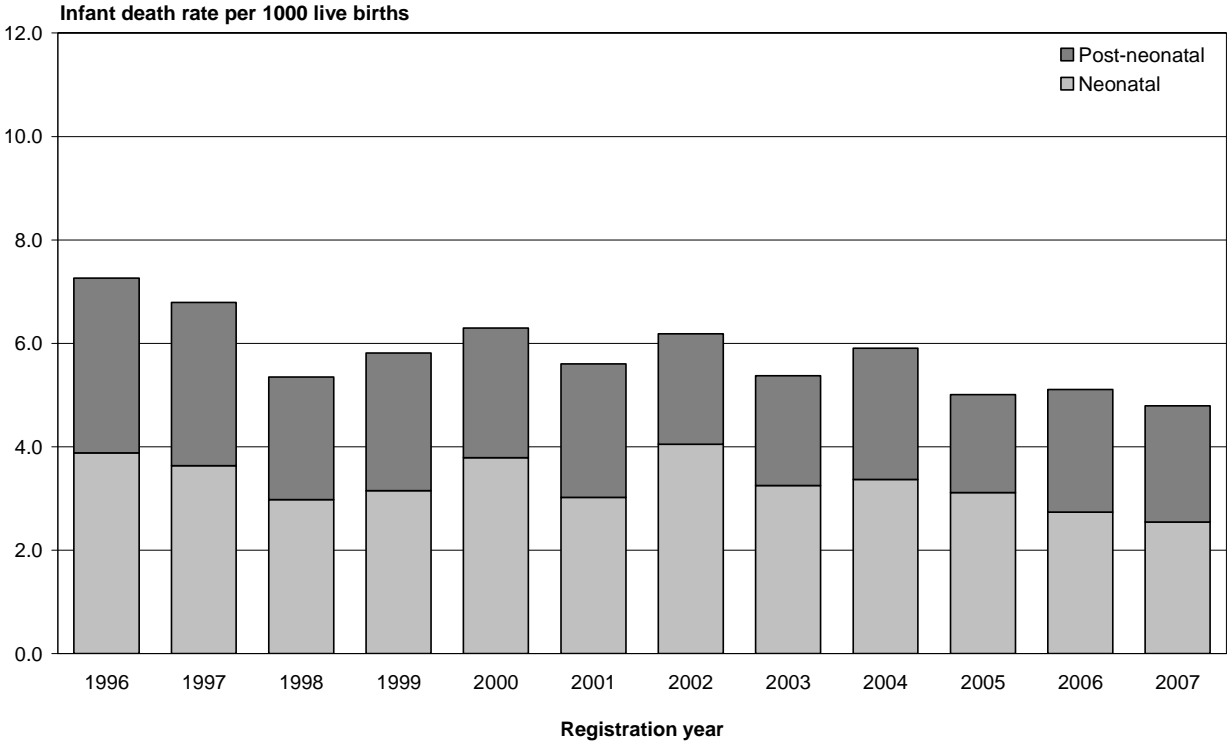
Infant deaths consist of early neonatal deaths, late neonatal deaths and post-neonatal deaths.

The infant death rate is calculated as follows:

$$\frac{\text{Early, late and post-neonatal deaths} \times 1000}{\text{Live births}}$$

Figure 3 shows infant death rates by death type from 1996 to 2007.

**Figure 3:** Infant death rates per 1000 live births, by death type and year, 1996–2007



There was a decline in the infant death rate from 1996 to 2007. Over the last four years of this period the neonatal death rate declined consistently. Before this the neonatal death rate had been inconsistent and fluctuated from year to year, with post-neonatal deaths showing more evidence for decline. The neonatal death rate varied by 0.5 deaths per 1000 live births over this period, while the post-neonatal rate varied by 0.3 deaths per 1000 live births.

Of the 312 infant deaths registered in 2007, 166 were neonatal deaths (134 early neonatal deaths and 32 late neonatal deaths) and 146 were post-neonatal deaths.

The infant death rate for 2007 was 4.8 per 1000 live births (312 deaths), which is slightly lower than the 2006 rate of 5.1 per 1000 live births (308 deaths).

## Ethnicity

Table 2 shows numbers and rates of fetal and infant deaths for 2007 by ethnic group.

**Table 2:** Fetal and infant deaths by ethnicity: numbers and rates per 1000 births, 2007

Type of deaths	Total		Māori		Pacific peoples		Other	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate
<b>Births</b>								
Live births	65,121	...	19,338	...	7,005	...	38,778	...
Total births	65,592	...	19,464	...	7,063	...	39,065	...
<b>Individual classifications</b>								
Fetal deaths*	471	7.2	126	6.5	58	8.2	287	7.2
Early neonatal deaths <sup>†</sup>	134	2.1	41	2.1	16	2.3	77	2.0
Late neonatal deaths <sup>†</sup>	32	0.5	12	0.6	6	0.9	14	0.4
Post-neonatal deaths <sup>†</sup>	146	2.2	73	3.8	23	3.3	50	1.3
<b>Grouped classifications</b>								
Total perinatal deaths*	605	9.2	167	8.6	72	10.5	364	9.3
Total neonatal deaths <sup>†</sup>	166	2.5	53	2.7	22	3.1	91	2.3
Total infant deaths <sup>†</sup>	312	4.8	126	6.5	45	6.4	141	3.6
Total fetal and infant deaths <sup>†</sup>	783	11.9	252	12.9	103	14.6	428	11.0
<b>Sudden Infant Death Syndrome (SIDS)</b>								
SIDS deaths <sup>‡</sup>	56	0.9	28	1.4	9	1.3	19	0.5

\* = Rate per 1000 total births

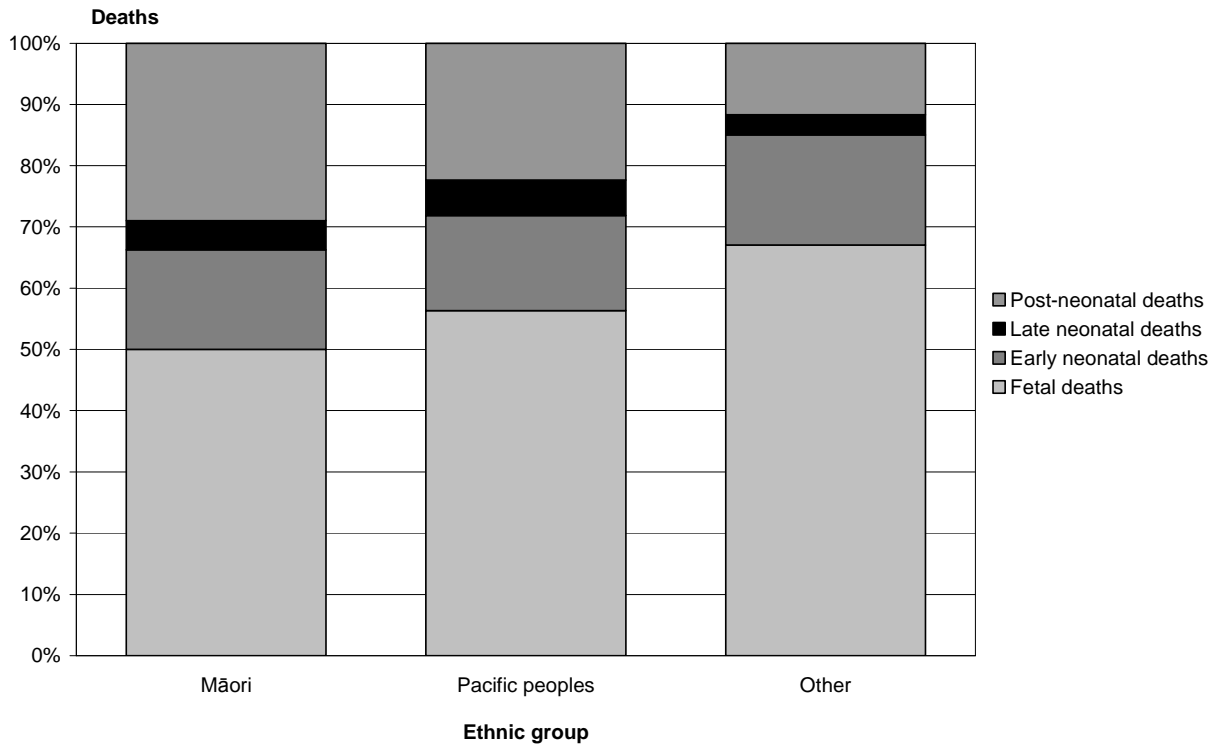
† = Rate per 1000 live births

‡ = SIDS deaths includes infants older than one year; see the 'Sudden Infant Death Syndrome' section for an explanation of the cot death indicator. The SIDS rate is per 1000 live births.

... = Not applicable

Figure 4 shows how fetal and infant deaths were distributed within the three ethnic groups.

**Figure 4:** Percentage distribution of fetal and infant deaths, by ethnicity, 2007



A larger proportion of the ‘Other’ ethnic group’s mortality occurred earlier (ie, fetal deaths), than for the other two ethnic groups. Māori fetal and infant mortality was more evenly distributed across the death classifications. Of the three ethnic groups, Māori had the largest proportion of deaths occurring in the post-neonatal period.

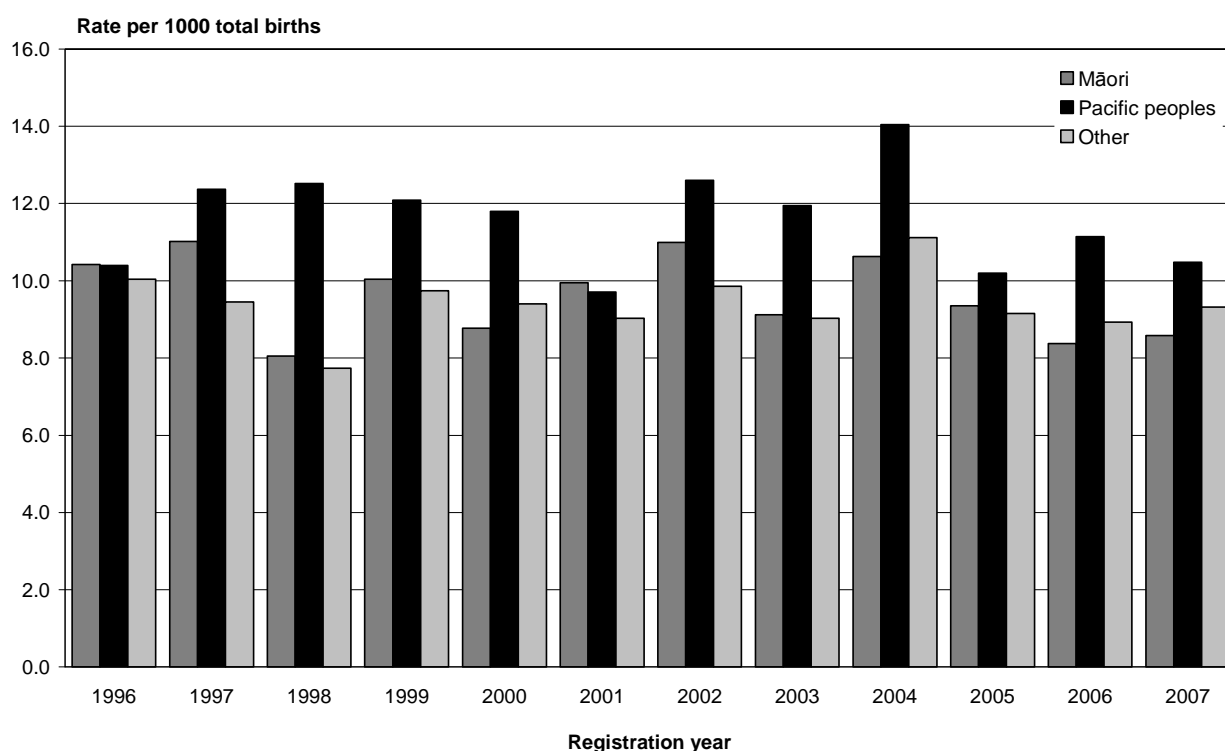
In the Pacific ethnic group the distribution of deaths, broadly speaking, lay between that of the Māori and Other populations.

**Perinatal deaths by ethnicity**

Figure 5 shows perinatal death rates for each ethnic group from 1996 to 2007.

The perinatal death rate for Pacific peoples was consistently higher than that of both the Māori and Other ethnic groups over this period. The Māori rate conformed more closely to the Other rate.

**Figure 5:** Perinatal death rates, by ethnicity, 1996–2007



The Māori perinatal death rate in 2007 was lower than the equivalent rate in 1996 (8.6 deaths per 1000 total Māori births in 2007, compared to 10.4 in 1996). The average rate of perinatal death for Māori over this period was 9.6 deaths per 1000 total births.

The perinatal death rate for the Other ethnic group in 2007 was also lower than the equivalent rate in 1996 (9.3 deaths per 1000 total Other births in 2007, compared to 10.0 in 1996). The average rate of perinatal death over the period was 9.4 deaths per 1000 total births.

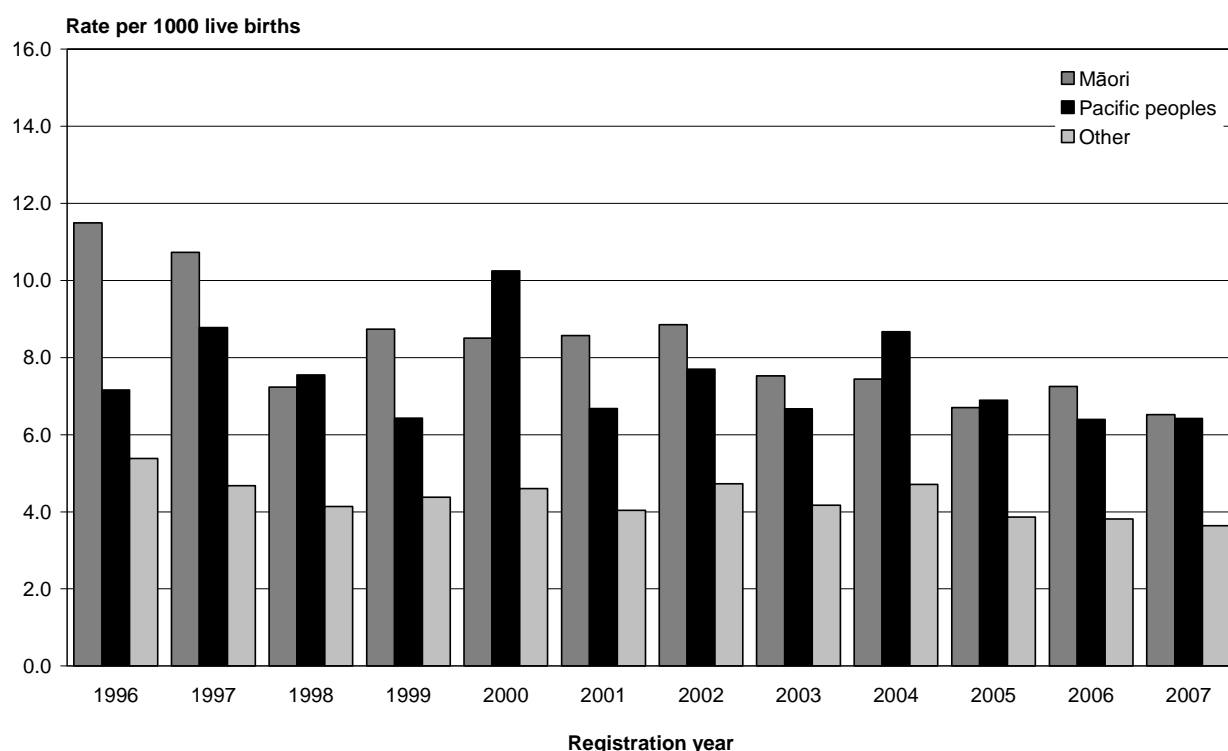
The Pacific perinatal mortality rate rose in the middle of the period and then returned to a similar rate to that of 1996 (10.5 deaths per 1000 total Pacific births in 2007, compared to 10.4 in 1996). The average rate of perinatal death for the Pacific population over the period was 11.6 deaths per 1000 total births.

Overall, there was little evidence of a systematic decline in perinatal mortality rates for any of the ethnic groups over the 1996 to 2007 period.

### Infant deaths by ethnicity

Figure 6 shows infant death rates from 1996 to 2007 by ethnic group. The infant death rates for Māori and Pacific peoples were consistently higher than those for the Other ethnic group.

**Figure 6:** Infant death rates, by ethnicity, 1996–2007



The Māori infant death rate declined from 1996 to 2007. The Other ethnic group's rate also declined, though to a lesser extent. The Pacific rate varied widely, but showed little sign of a downward trend over the period.

On average, the Māori infant death rate from 1996 to 2007 was 4.0 per 1000 live births higher than that of the Other ethnic group. This difference decreased to 2.9 deaths per 1000 live births in 2007, from the 2006 value of 3.4 per 1000 live births.

On average, the Pacific infant death rate from 1996 to 2007 was 3.1 deaths per 1000 live births higher than that of the Other ethnic group. In 2007, the difference between these two groups was 2.8 deaths per 1000 live births.

In 1996, the Māori infant death rate was 11.5 per 1000 live births. By 2007 this rate had declined to 6.5 deaths per 1000 live births.

The Pacific infant death rate in 1996 was 7.2 per 1000 live births, which had declined to 6.4 by 2007. The infant death rate for the Other population declined from 5.4 in 1996 to 3.6 in 2007.

### Timing of death

Since 2000, the Mortality Collection has included information on whether a fetal death occurred before or during labour and birth. Table 3 and Figure 7 show timing of fetal deaths by birthweight in 2007.

Note that those cases with an unknown time of death have been excluded from the percentage calculations in Tables 3 and 4.

In 2007, 84.1 percent of fetal deaths occurred prior to labour and 15.9 percent occurred during labour (163 deaths did not have a time-of-death code assigned to them).

Of normal and high birthweight fetal deaths with a known time of death, 15.6 percent occurred during labour (27 normal birthweight deaths did not have a time-of-death code assigned to them).

**Table 3:** Timing of fetal death, by birthweight, 2007

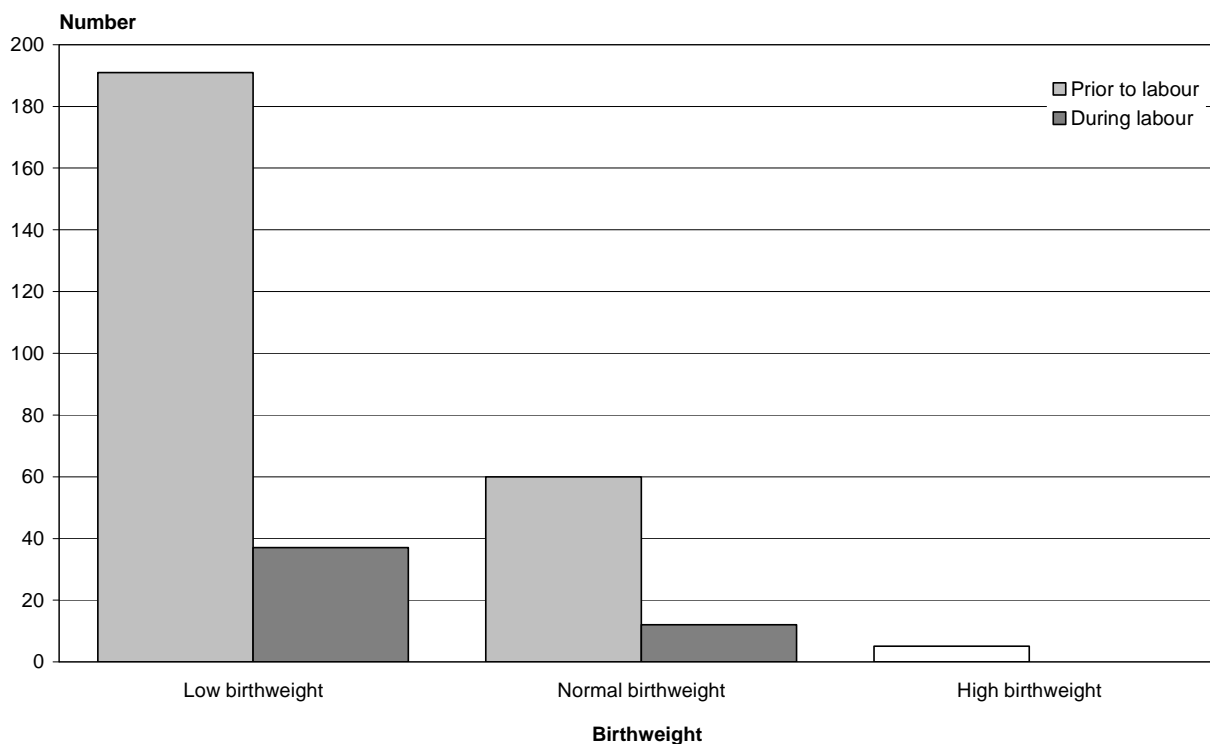
Birthweight	Prior to labour		During labour		Not known	Total
	No.	%	No.	%	No.	No.
Low birthweight*	191	73.7	37	75.5	135	363
Normal birthweight†	60	23.2	12	24.5	27	99
High birthweight‡	5	1.9	0	0.0	0	5
Not known	3	1.2	0	0.0	1	4
Total	259	100.0	49	100.0	163	471
Total percentage	84.1		15.9			100.0

\* = Less than 2500 g

† = 2500 g to 4499 g

‡ = 4500 g and over

**Figure 7:** Timing of fetal death, by birthweight, 2007





Of the total low birthweight deaths, 228 had a time-of-death code assigned to them: 191 deaths (83.8 percent) were prior to labour and 37 were during labour.

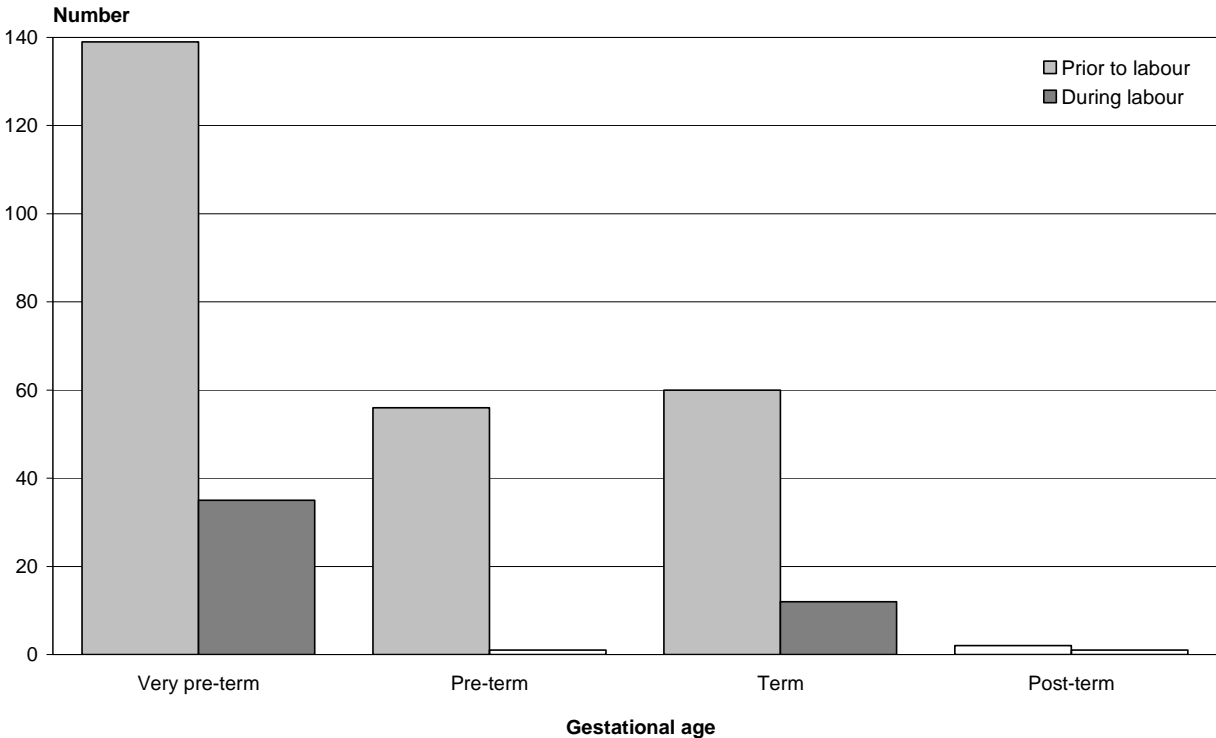
Seventy-two of the normal birthweight deaths had a time-of-death code assigned to them: 60 deaths (83.3 percent) were prior to labour and 12 were during labour.

Table 4 and Figure 8 show timing of fetal death by gestational age in 2007.

**Table 4:** Timing of fetal death, by gestational age, 2007

Gestational age	Prior to labour		During labour		Not stated	Total
	No.	%	No.	%	No.	No.
Very pre-term	139	53.7	35	71.4	121	295
Pre-term	56	21.6	1	2.0	14	71
Term	60	23.2	12	24.5	26	98
Post-term	2	0.8	1	2.0	1	4
Not known	2	0.8	0	0.0	1	3
Total	259	100.0	49	100.0	163	471
Total percentage	84.1		15.9			100.0

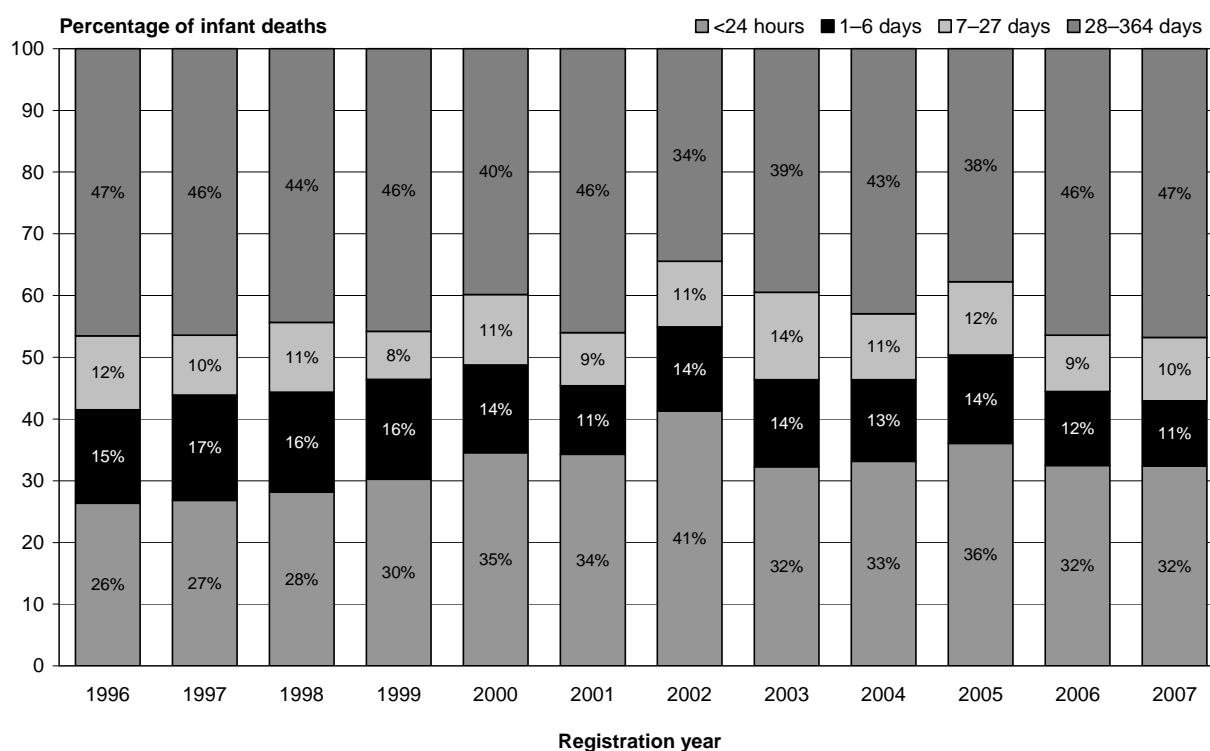
**Figure 8:** Timing of fetal death, by gestational age, 2007



'Pre-term birth' is defined as a birth occurring before 37 weeks' gestation, while 'very pre-term' applies to a birth occurring before 32 weeks' gestation.

Figure 9 shows percentages of infant deaths by age at death from 1996 to 2007.

**Figure 9:** Infant deaths, by age at death, percentages, 1996–2007



In 2007, early neonatal deaths made up 42.9 percent of all infant deaths. Three-quarters of all early neonatal deaths (101 out of 134) occurred within the first 24 hours of life.

Late neonatal deaths averaged 10.6 percent of total deaths over the period.

Post-neonatal deaths made up between 34.4 and 46.8 percent of all infant deaths during 1996 to 2007.

## Causes of death

This section discusses causes of fetal, neonatal and post-neonatal deaths registered in 2007, coded according to the ICD-10-AM-II system. Please see the Introduction’s discussion of the National Mortality Collection for information on this coding system and the method used to code underlying causes of death.

For a description of the ICD-10-AM-II codes used in this section, see the ‘ICD-10-AM-II codes used in this publication’ section in ‘Explanatory notes’.

### Fetal deaths

Figure 10 gives a high-level overview of causes of fetal death in 2007. Note that the fetal death category includes stillbirths resulting from terminations of pregnancy.

Of fetal deaths in 2007, 65.6 percent were due to 'certain conditions originating in the perinatal period' (ICD-10-AM-II codes P00–P96). Congenital malformations, deformations and chromosomal abnormalities (ICD-10-AM-II codes Q00–Q99) accounted for 33.3 percent.

**Figure 10:** Fetal deaths, causes by ICD-10-AM-II chapter, 2007

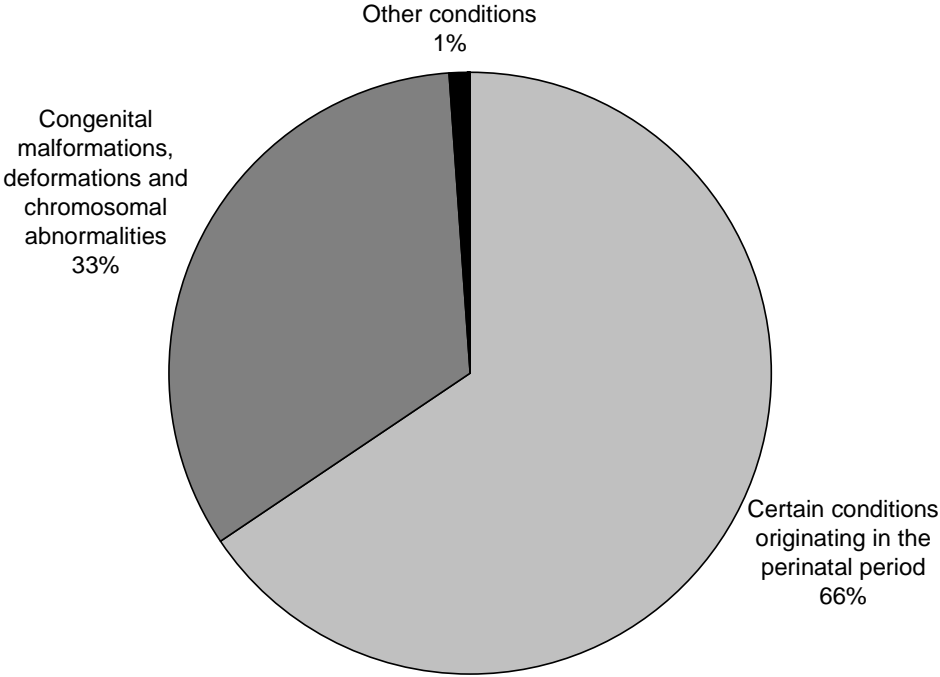
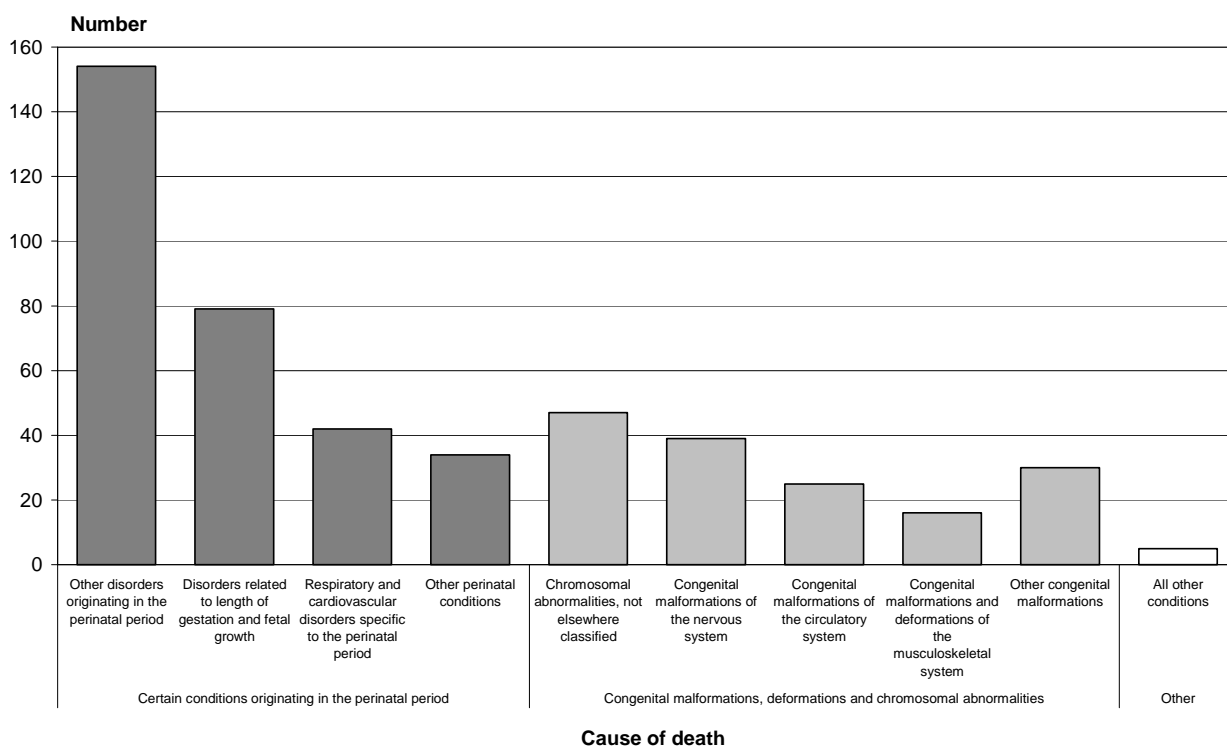


Figure 11 shows the data in the above figure in more detail. Of the 65.6 percent of fetal deaths that were classified as 'certain conditions originating in the perinatal period':

- 48.9 percent were fetal deaths of unspecified cause (P95)
- 25.6 percent were due to disorders related to length of gestation and fetal growth (P05–P08)
- 13.6 percent were due to respiratory and cardiovascular disorders specific to the perinatal period (P20–P29).

**Figure 11: Fetal deaths, causes by ICD-10-AM-II sub-group, 2007**



### Neonatal deaths

Figure 12 gives a high-level overview of causes of neonatal death in 2007. The major causes of neonatal death in 2007 were ‘certain conditions originating in the perinatal period’ (ICD-10-AM-II codes P00–P96) (65.1 percent). Congenital malformations, deformations and chromosomal abnormalities (ICD-10-AM-II codes Q00–Q99) accounted for 25.9 percent of neonatal deaths.

**Figure 12: Neonatal deaths, causes by ICD-10-AM-II chapter, 2007**

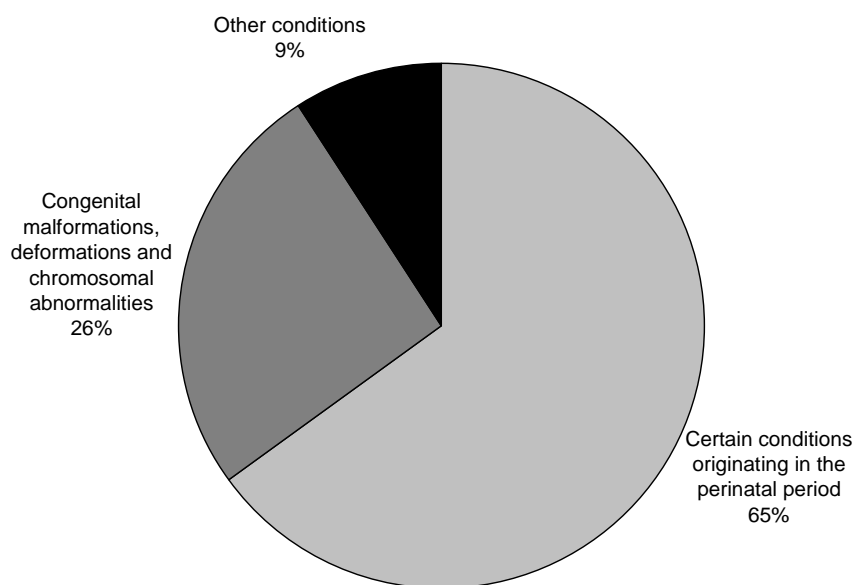
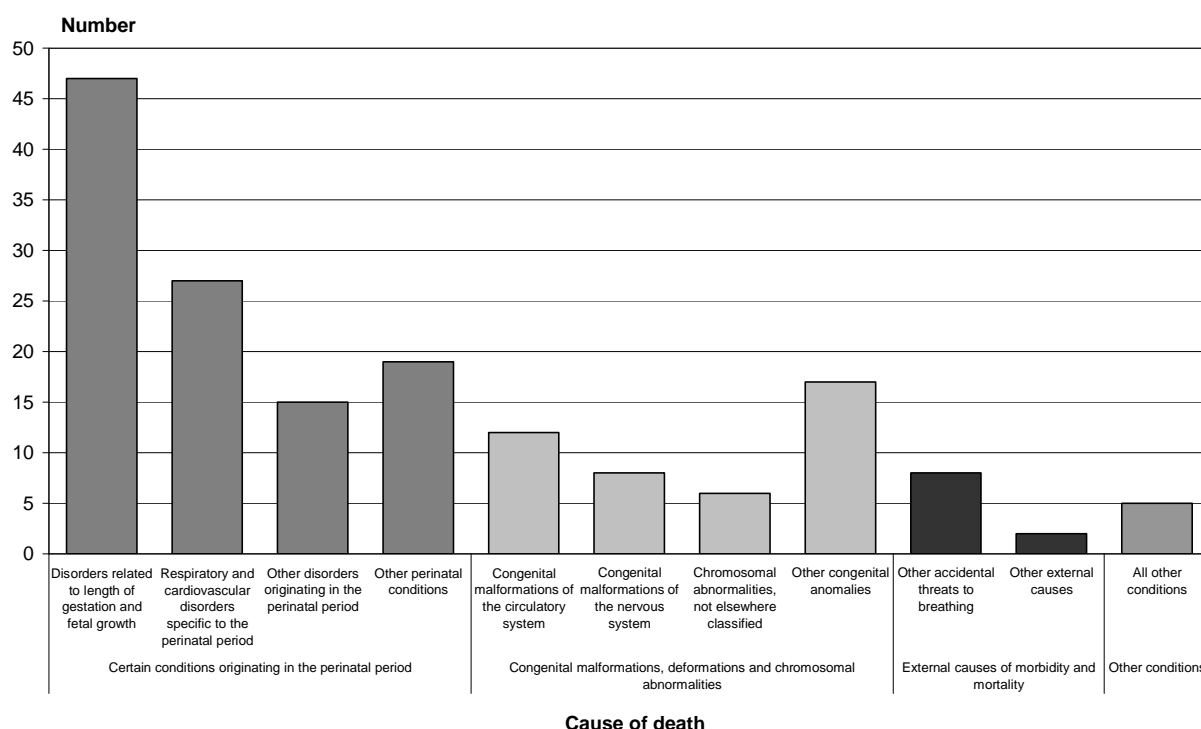


Figure 13 shows the data in the above figure in more detail. Of the 65.1 percent of neonatal deaths that were classified as ‘certain conditions originating in the perinatal period’:

- 43.5 percent were due to disorders related to length of gestation and fetal growth (P05–P08)
- 25.0 percent were due to respiratory and cardiovascular disorders specific to the perinatal period (P20–P29)
- 13.9 percent were due to other disorders originating in the perinatal period (P90–P96).

**Figure 13:** Neonatal deaths, causes by ICD-10-AM-II sub-group, 2007



## Post-neonatal deaths

Figure 14 gives a high-level overview of causes of post-neonatal death in 2007. The causes of death for post-neonates were more diverse than those for fetal and neonatal mortality.

The major causes of post-neonatal deaths in 2007 were:

- symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (ICD-10-AM-II codes R00–R99) – 25.3 percent (note that this code group includes SIDS (R95))
- congenital malformations, deformations and chromosomal abnormalities (ICD-10-AM-II codes Q00–Q99) – 19.2 percent
- external causes of morbidity and mortality (ICD-10-AM-II codes V01–Y98) – 15.8 percent. The majority of these consisted of deaths due to ‘other accidental threats to breathing’ (ICD-10-AM-II codes W75–W84).

**Figure 14:** Post-neonatal deaths, causes by ICD-10-AM-II chapter, 2007

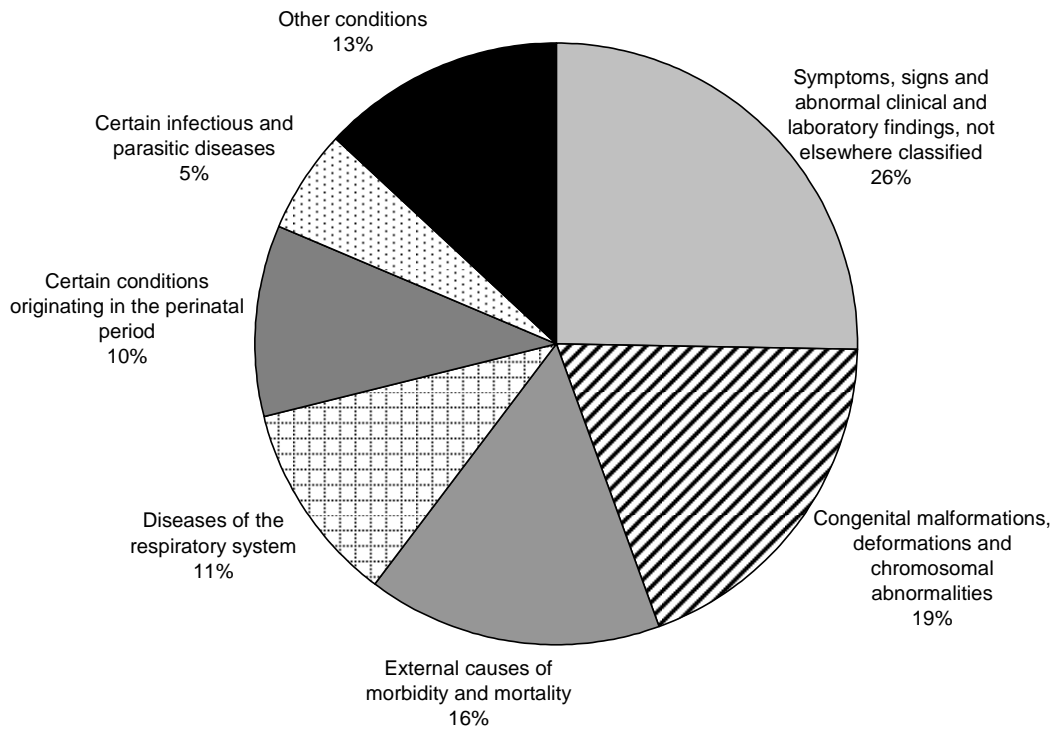
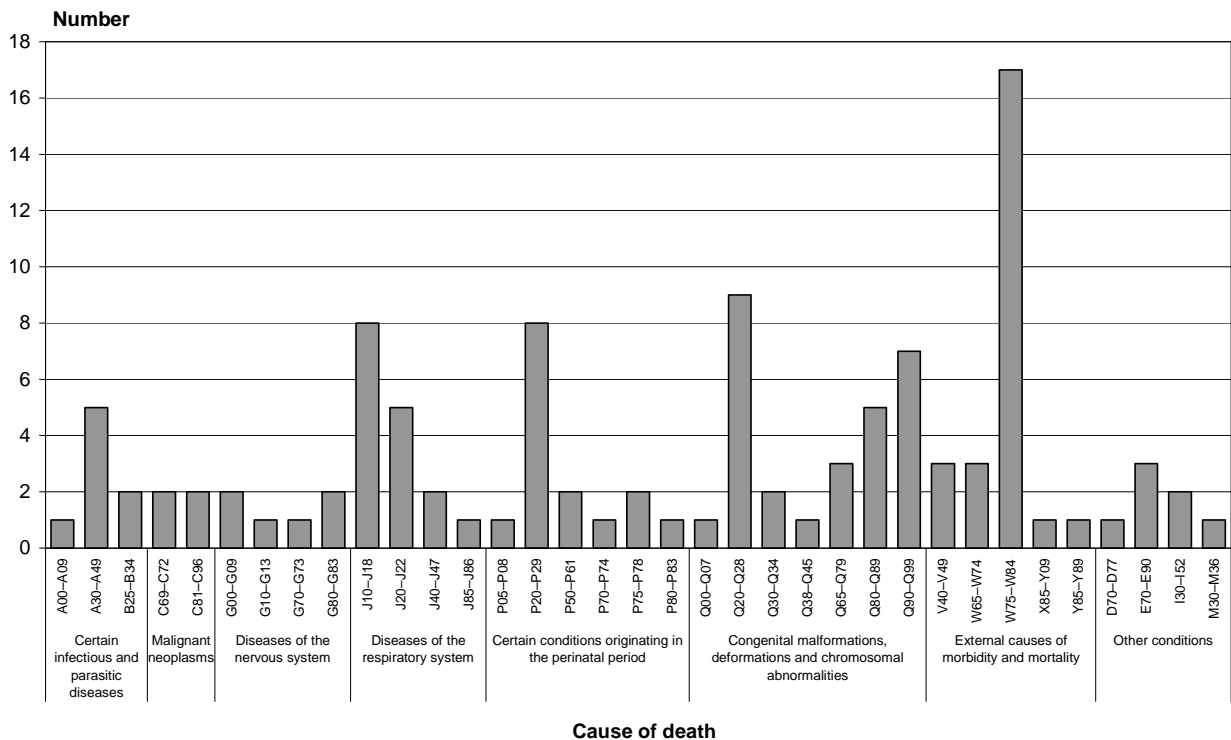


Figure 15 shows the data in the above figure in more detail. The graph uses raw mortality numbers instead of rates. Rates would be of limited use as deaths in many of the categories were low.

**Figure 15:** Post-neonatal deaths, causes by ICD-10-AM-II sub-group, 2007



The W75–W84 code group ('Other accidental threats to breathing') applied to 17 post-neonatal mortality cases, as follows:

- W75 Accidental suffocation and strangulation in bed (16)
- W83 Other specified threats to breathing (1).

The Q20–Q28 code group ('Congenital malformations of the circulatory system') applied to nine post-neonatal mortality cases, as follows:

- Q210 Ventricular septal defect (2)
- Q213 Tetralogy of Fallot (1)
- Q225 Ebstein's anomaly (1)
- Q234 Hypoplastic left heart syndrome (1)
- Q245 Malformation of coronary vessels (2)
- Q253 Stenosis of aorta (1)
- Q269 Congenital malformation of great vein, unspecified (1).

The J10–J18 code group ('Influenza and pneumonia') applied to eight post-neonatal mortality cases, as follows:

- J120 Adenoviral pneumonia (1)
- J129 Viral pneumonia, unspecified (3)
- J150 Pneumonia due to *Klebsiella pneumoniae* (1)
- J180 Bronchopneumonia, unspecified (2)
- J189 Pneumonia, unspecified (1).

The P20–P29 code group ('Respiratory and cardiovascular disorders specific to the perinatal period') applied to eight post-neonatal mortality cases, as follows:

- P243 Neonatal aspiration of milk and regurgitated food (1)
- P271 Chronic neonatal lung disease (6)
- P278 Other chronic respiratory diseases originating in the perinatal period (1).

The Q90–Q99 code group ('Chromosomal abnormalities, not elsewhere classified') applied to seven post-neonatal mortality cases, as follows:

- Q90 Down's syndrome (2)
- Q91 Edwards' syndrome and Patau's syndrome (5).

Note that Figure 15 excludes 'Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified' (ICD-10-AM-II codes R00–R99). This group includes deaths due to SIDS. SIDS accounted for 25.3 percent of all post-neonatal deaths in 2007.

## Potential risk factors associated with fetal and infant deaths

Several elements can be considered as potential fetal and infant death risk factors, as follows.

- Babies of younger mothers (those under 20 years of age) have historically had a higher rate of perinatal deaths.
- Increasing levels of deprivation have been associated with higher mortality rates and higher rates of many diseases (Salmond and Crampton 2002a, 2002b).
- Those living in rural areas may experience problems accessing health-related services, including maternity and antenatal care. Access problems may be associated with the physical accessibility, availability, affordability and appropriateness of a service (Rural Expert Advisory Group 2002).
- Multiple births are a known risk factor for fetal and neonatal deaths. Perinatal death rates are four times higher for twins and six times higher for triplets than for single births. The frequency of multiple pregnancies has increased since the availability of assisted reproductive technologies (European Society of Human Reproduction and Embryology Capri Workshop Group 2000).
- There has been a steady increase in the number of live births from assisted reproductive technology cycles in Australia and New Zealand since 1995. In these countries, approximately 16 percent of assisted reproductive technology cycles are twin deliveries (Wang et al 2006).
- Short gestation, or pre-term birth, has been shown to be the main cause of death, morbidity and disability in babies (UNICEF and WHO 2004).
- Differences in neonatal death rates between male and female babies are well known: females tend to experience lower mortality during the neonatal period (Lawn et al 2005).

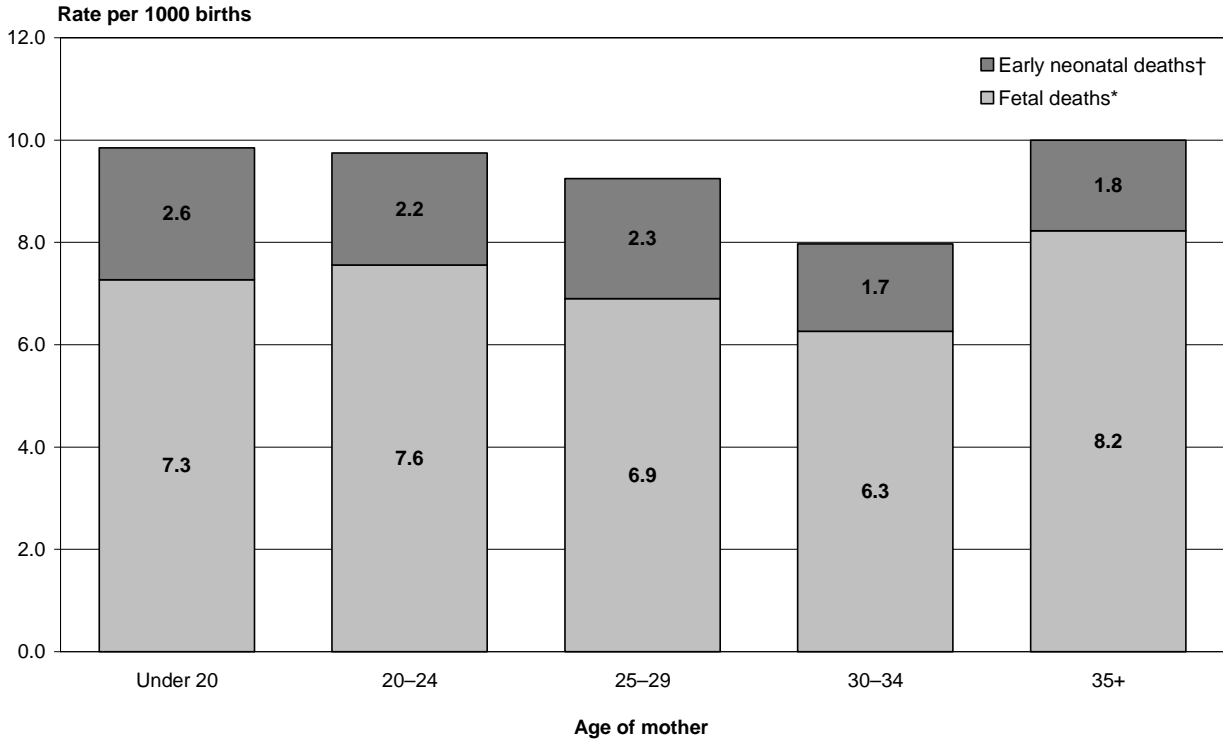
### Maternal age

The number of women over 30 years of age giving birth has steadily increased since the 1980s, while the number of younger women giving birth has slowly decreased (New Zealand Health Information Service 2008).

Figure 16 shows perinatal death rates and the sub-classifications that make up the perinatal category.



**Figure 16:** Perinatal death rates, by maternal age, 2007



\* = Rate per 1000 total births (live births plus fetal deaths)

† = Rate per 1000 live births

The perinatal death rate declined with increasing age until the 35+ year age-group, where the rate returned to a similar level to that of the under-20 group.

The major contributor to the rise in the perinatal death rate in the 35+ year age-group was the fetal death component. The fetal death rate declined from 7.3 deaths per 1000 live births for mothers under-20, to 6.3 per 1000 live births for the 30–34 year age-group. However, from 35 years of age the fetal death rate increased to 8.2 deaths per 1000 live births.

Early neonatal deaths declined in a broadly similar manner to fetal deaths up until 34 years of age. However, the early neonatal mortality rate did not show the same increase from 35 years of age and over.

**Figure 17:** Infant death rates, by maternal age, 2007

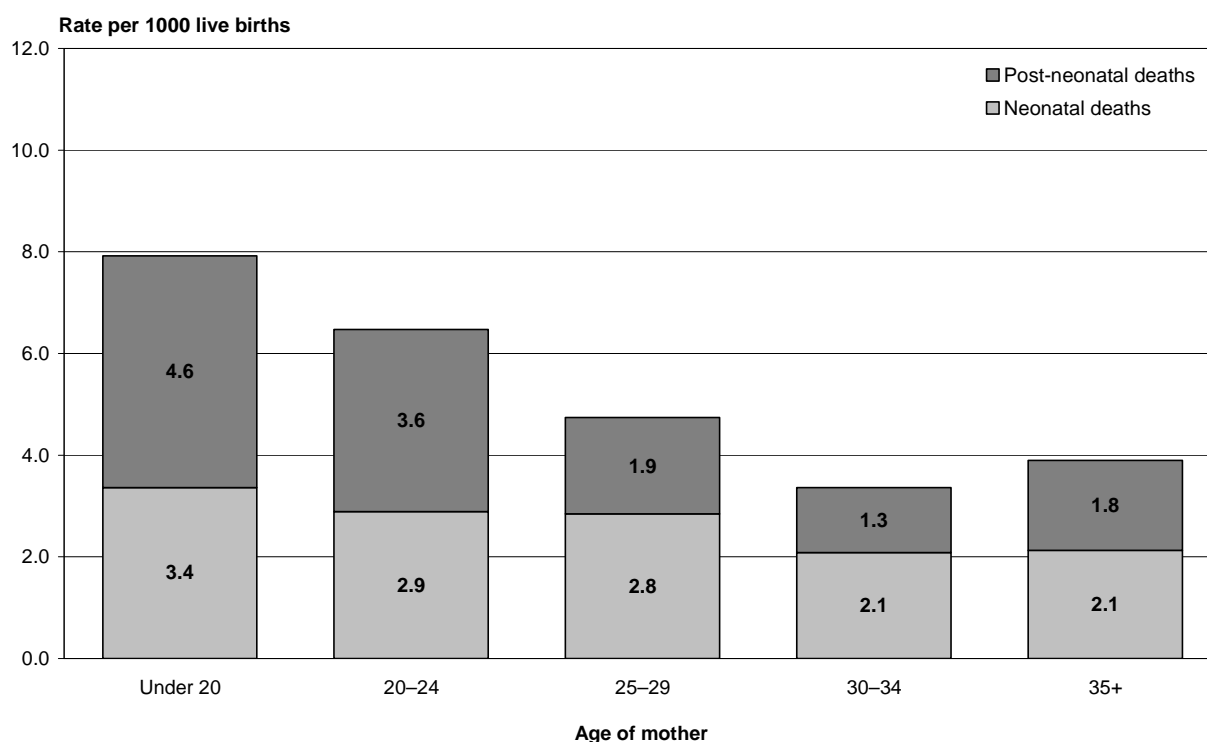


Figure 17 suggests that increasing age is associated with reduced rates of infant mortality (both neonatal and post-neonatal). This effect weakens from 35 years of age and older. There may be several variables included in this effect, some of which are associated with increasing age but are not a direct effect of it. For example, increasing age is often associated with increasing socioeconomic status (see Figure 19, showing the impacts of socioeconomic status on infant mortality).

Up until 24 years of age there was a greater proportion of post-neonatal death associated with each age group; from 25 years and above there was a greater proportion of neonatal death.

### **Socioeconomic deprivation**

Indexes of deprivation can be used to describe the relationship between socioeconomic deprivation and health outcomes.

The New Zealand Deprivation score (NZDep2001) (see 'Explanatory notes') is an index of neighbourhood socioeconomic deprivation based on variables from the Census of Population and Dwellings 2001. NZDep2001 groups neighbourhoods into five quintiles according to deprivation levels, Quintile 1 being the least deprived and Quintile 5 the most deprived.

Table 5 shows that the most deprived areas in New Zealand had an infant death rate more than two-and-a-half times that of the least deprived areas (there were 7.5 infant deaths per 1000 live births in Quintile 5 and 2.7 deaths per 1000 in Quintile 1).

**Table 5:** Perinatal and infant deaths, numbers and rates, by deprivation quintiles, 2007

Type of death	Quintile 1		Quintile 2		Quintile 3		Quintile 4		Quintile 5		Total	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Perinatal deaths*	85	8.4	84	7.6	114	9.4	138	9.5	183	10.6	605	9.2
Infant deaths†	27	2.7	39	3.6	47	3.9	70	4.8	128	7.5	312	4.8

\* = Rate per 1000 total births (live births plus fetal deaths)

† = Rate per 1000 live births

The perinatal death rate for Quintile 5 was around one-third higher than that of Quintile 1 (10.6 and 8.4 perinatal deaths per 1000 total births respectively).

Note that these rates can vary widely from year to year. For example, the equivalent figures for perinatal deaths in 2006 were 9.5 perinatal deaths per 1000 births for Quintile 5 and 6.5 for Quintile 1.

Figure 18 shows the perinatal death rate trend by deprivation quintile of mother's place of residence.

**Figure 18:** Perinatal death rates by quintile of deprivation (NZDep2001), three-year moving averages, 1996–2007

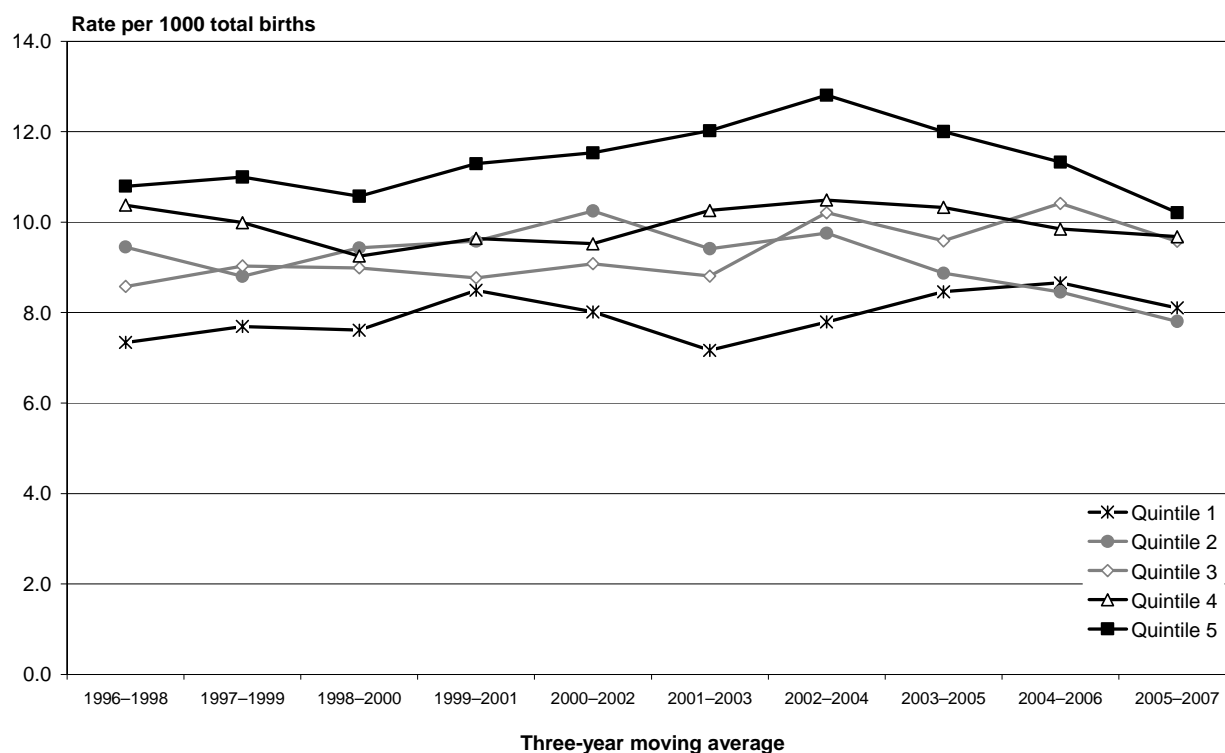


Figure 18 can be analysed from two perspectives: intra-group differences (ie, change over time) and inter-group differences (ie, stratification or layering of quintile groups).

With regard to change over time, the perinatal death rates were quite static; only small differences were evident from 1996 to 2007. For example, perinatal mortality in Quintile 5 rose slowly then, from 2004 to 2006, returned to levels similar to those near the start of the period.

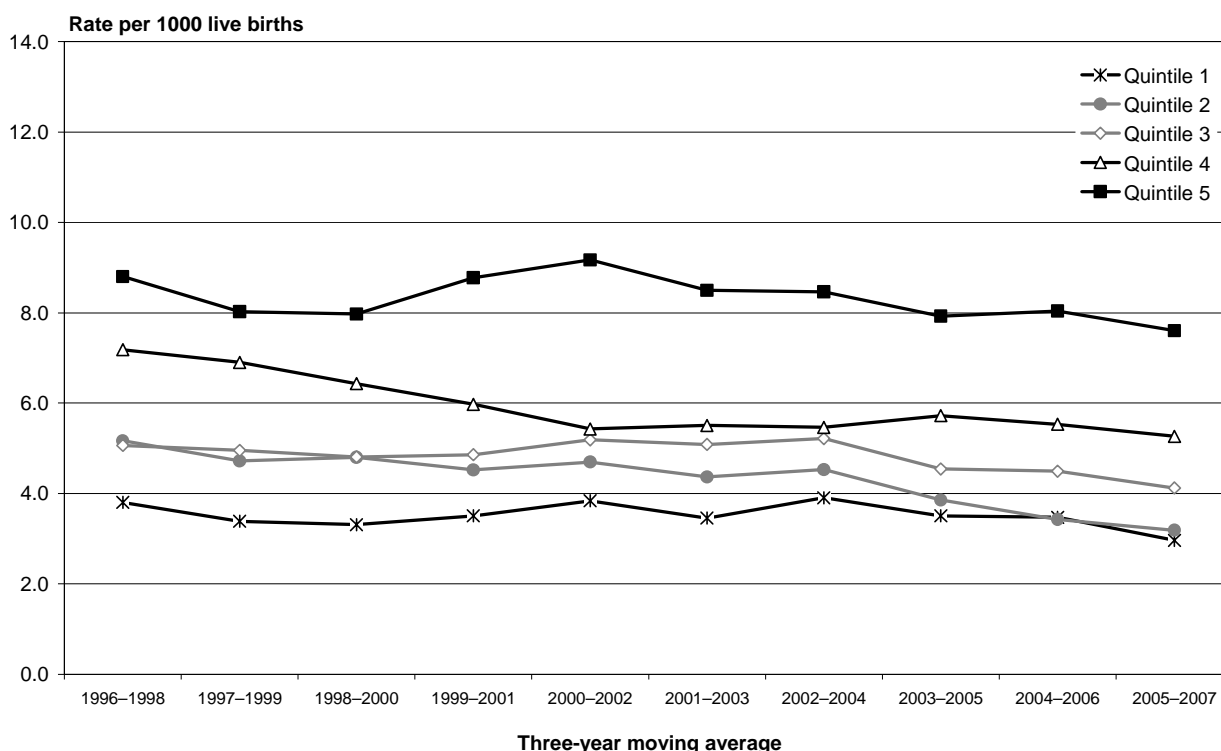
Figure 18 does show consistent bands or layers between the deprivation quintiles over time. Those in higher deprivation quintiles experienced consistently higher levels of perinatal mortality than those in lower quintiles.

The difference in the moving average rates between the most and least deprived quintiles ranged from 2.1 (in the 2005–2007 period) to 5.0 (in the 2002–2004 period).

Since 1996, the most deprived quintile (Quintile 5) has had the highest perinatal death rate and the least deprived quintile (Quintile 1) has consistently had the lowest perinatal death rate. For the 2005 to 2007 period, the difference between Quintile 1 and Quintile 5 was 2.1 deaths per 1000 total births.

Figure 19 shows the infant death rate trend by deprivation quintile of mother’s place of residence.

**Figure 19:** Infant death rates by quintile of deprivation (NZDep2001), three-year moving averages 1996–2007



In general, there was only a slight change over time in the rates from 1996 to 2007. Rates in Quintiles 1 to 3 showed little fluctuation over time. Those in Quintile 4 declined in the first half of the period, then stabilised at just under six infant deaths per 1000 live births. While the rate in Quintile 5 rose slightly in the middle part of the period, in the latter third it returned to levels similar to those at the start.

In this figure, deprivation quintiles form distinct layers. Quintile 5 always has the highest rate of infant mortality, and subsequent quintiles are arrayed in a fairly consistent pattern suggesting that the greater the deprivation, the higher the infant mortality.

Figure 18 (perinatal death rates) shows a smaller difference between least and most deprived groups than Figure 19 (infant death rates). Figure 18 also shows less overall differentiation between the deprivation groups (ie, the rates intermingle to a greater extent). This suggests that socioeconomic status is more salient with regard to infant deaths than perinatal deaths.

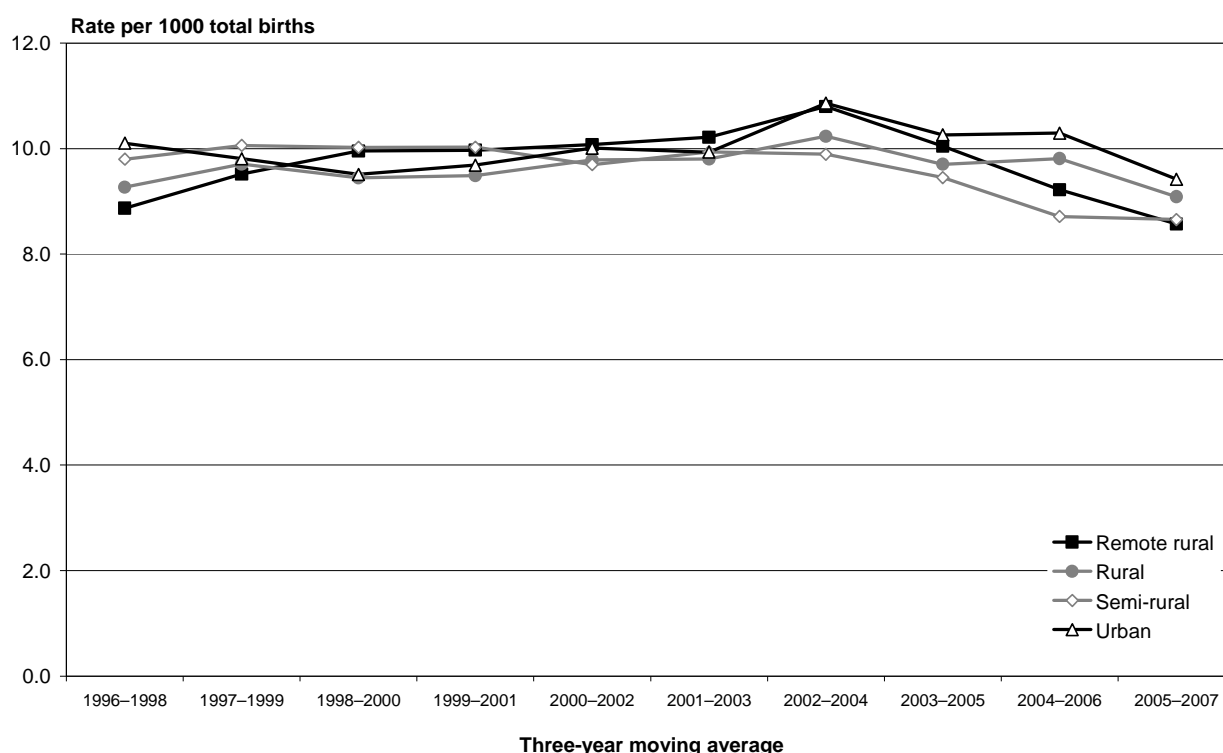
The greatest difference in rates of infant deaths between Quintile 1 and Quintile 5 was 5.3, during the 2000–2002 period. The smallest difference was 4.4, during the 2003–2005 period.

### **Urban/rural status**

'Urban/rural status' for the purposes of this publication is defined by the Census area unit of the mother's place of residence. A Census area unit is considered rural if located in an area with fewer than 10,000 people. Rural status is further classified as semi-rural, rural or remote, depending on the area's reliance on urban areas for employment. In semi-rural areas, the majority of the working population will be employed in a main urban area, while in remote rural areas the majority will not be employed in a main urban area.

Figure 20 shows the trend in fetal and early neonatal death rates by urban/rural status of mother's place of residence.

**Figure 20:** Perinatal death rates by urban/rural status, three-year moving averages, 1996–2007



Perinatal death rates were stable over the three-year periods covered in Figure 20, and differences between the geographic groups were low.

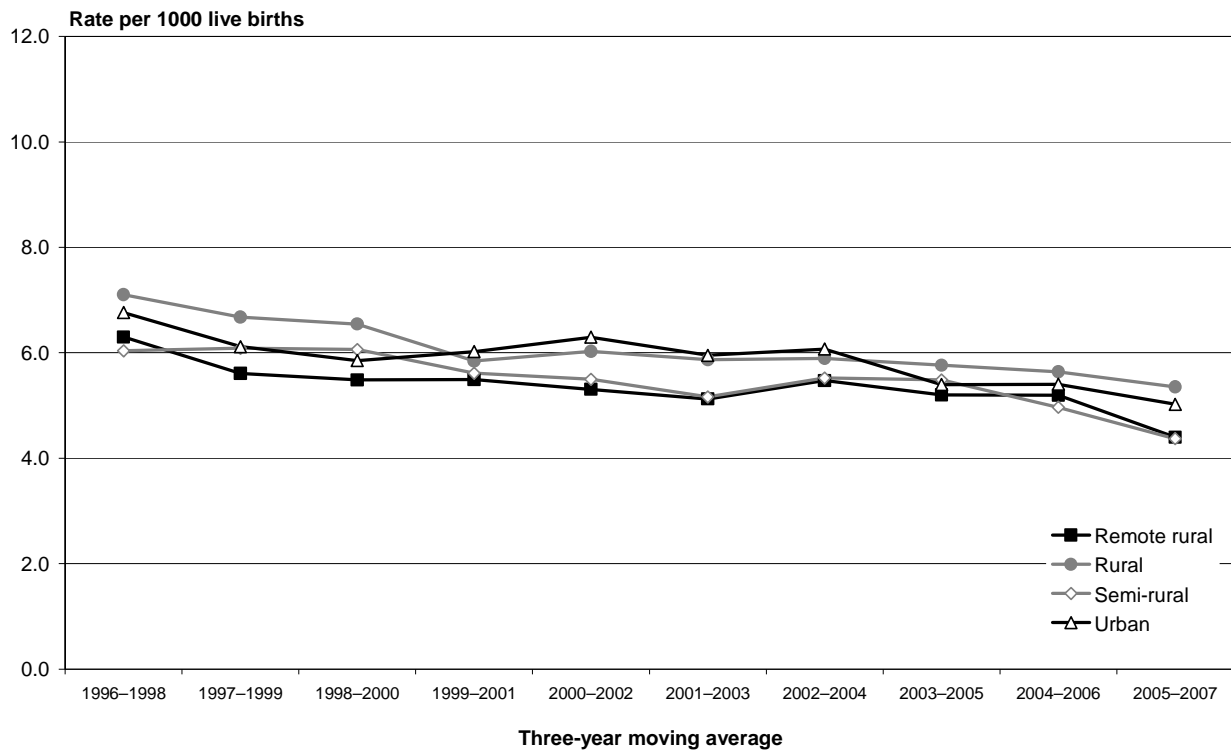
In 2007, the perinatal death rate in rural areas (9.1 per 1000 total births) was similar to that of urban areas (9.4 per 1000 total births). Remote rural and semi-rural perinatal death rates were slightly lower (8.6 and 8.7 respectively).

Perinatal deaths can be broken down into fetal and neo-natal deaths. In 2007, the fetal death rate in semi-rural areas (8.2 per 1000 total births) was slightly higher than that of urban areas (7.3 per 1000 total births). Remote rural and rural fetal death rates were slightly lower (5.1 and 6.5 respectively).

Early neonatal death rates were lowest in semi-rural areas. In 2007, the early neonatal death rate for semi-rural areas was 1.5 per 1000 live births, while the rate for rural areas was 1.8 per 1000 live births.

Figure 21 shows the infant death rate trend by urban/rural status of mother's place of residence.

**Figure 21:** Infant death rates by urban/rural status, three-year moving averages, 1996–2007



Infant death rates for all groups declined from the start of the period. Rural and urban areas generally had the highest infant death rates. Semi-rural areas had the lowest rates. However, the differences between all groups were small (the range for 2007 was from 3.8 infant deaths per 1000 live births for semi-rural areas to 5.0 per 1000 live births for urban areas).

Overall, Figures 20 and 21 show little evidence for differences in death rates by rural or urban domiciles. However, this does not mean that each geographic group does not have distinct health issues that impact on their respective mortality rates.

### Multiple births

Table 6 presents information sourced from Statistics New Zealand showing the total number of babies registered and the total number of babies born from multiple births in New Zealand from 1996 to 2007 (Statistics New Zealand 2010).<sup>2</sup>

<sup>2</sup> These numbers are based on Statistics New Zealand’s resident population concept (see discussion of differences between numbers and rates published by the Ministry of Health and Statistics New Zealand in the ‘Key data sources, data quality and timing issues’ section).

The number of babies born from multiple births accounts for about 3 percent of the total number of babies registered each year in New Zealand. There was a steady increase in the proportion of multiple births from 1996 to 2007. However, this seems to have peaked in 2002. This may have been because of a change in assisted reproductive technology practices. In particular, it became common to transfer only one or two embryos per treatment cycle (rather than three or four) (Wang et al 2006). From late 2004 a preference developed, especially in younger women, is for Single Embryo Transfer (SET), or transfer of only one embryo per cycle. Older women (those over 35 years of age) may have two embryos transferred.

**Table 6:** Total babies registered from single and multiple births, by year, 1996–2007

Year	Total babies registered	Babies registered from multiple births		Change in % since 1996
		No.	%	
1996	57,662	1523	2.6	...
1997	57,968	1681	2.9	9.8
1998	55,674	1714	3.1	16.6
1999	57,433	1736	3.0	14.4
2000	56,954	1834	3.2	21.9
2001	56,124	1791	3.2	20.8
2002	54,375	1838	3.4	28.0
2003	56,480	1874	3.3	25.6
2004	58,556	1919	3.3	24.1
2005	58,105	1807	3.1	17.7
2006	59,563	1765	3.0	12.2
2007	64,503	2009	3.1	17.9

Source: Demographic Trends 2009 – Statistics New Zealand

... = Not applicable

Since 2000, the National Mortality Collection has collected data on the number of babies born in the same delivery as one in which a fetal or neonatal death occurred.

Table 7 shows numbers and percentages of single and multiple births for fetal and neonatal deaths in 2007. Multiple births accounted for 17.4 percent of all perinatal deaths and 9.0 percent of all infant deaths.



**Table 7:** Single and multiple births, by death type, 2007

Type of birth	Type of death								Total	
	Fetal		Early neonatal		Late neonatal		Post-neonatal			
	No.	%	No.	%	No.	%	No.	%	No.	%
Single birth	385	81.7	115	85.8	31	96.9.7	138	94.5	669	85.4
Multiple birth	86	18.3	19	14.2	1	3.1	8	5.5	114	14.6
Total	471	100.0	134	100.0	32	100.0	146	100.0	717	100.0

### Gestational age and birthweight

Short gestation, or pre-term birth, is the main cause of death, morbidity and disability in babies. Low birthweight is closely associated with fetal and neonatal mortality and is a result of pre-term birth, multiple pregnancy or restricted fetal (intrauterine) growth. A short gestation (ie, a pre-term birth) will result in a low birthweight baby, and is therefore associated with an increased risk of death to the fetus or infant (UNICEF and WHO 2004).

Gestational age is measured as the duration of the pregnancy in completed weeks. 'Pre-term birth' is defined as a birth occurring before 37 weeks' gestation, while a 'very pre-term birth' is one occurring before 32 weeks' gestation.

'Low birthweight' has been defined by WHO as a weight of less than 2500 g, 'very low birthweight' as less than 1500 g and 'extremely low birthweight' as less than 1000 g (see the Glossary for a detailed breakdown of birthweight and gestation categories).

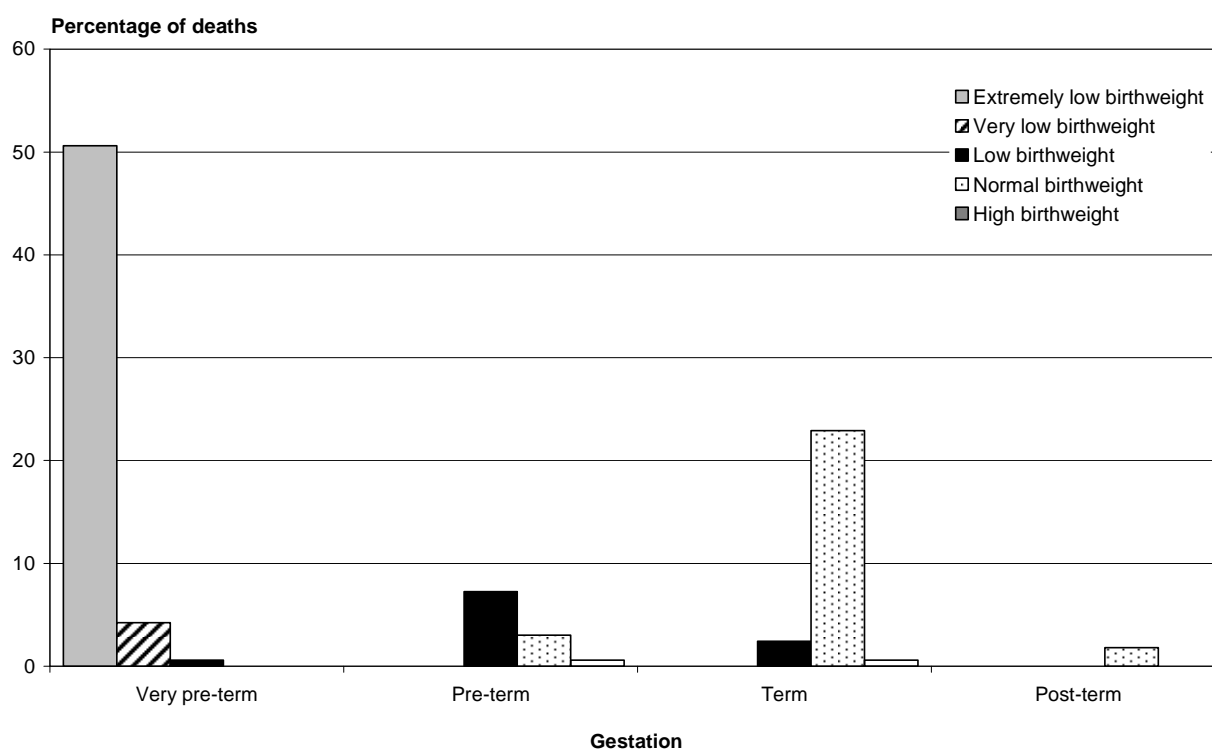
Table 8 and Figure 22 show percentages of neonatal deaths by birthweight group and gestation for 2007.

**Table 8:** Neonatal deaths, by gestation and birthweight, number and percentage, 2007

Birthweight group	Very pre-term		Pre-term		Term		Post-term		Not known		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Extremely low	84	50.6	0	0.0	0	0.0	0	0.0	2	1.2	86	51.8
Very low	7	4.2	0	0.0	0	0.0	0	0.0	0	0.0	7	4.2
Low	1	0.6	12	7.2	4	2.4	0	0.0	0	0.0	17	10.2
Normal	0	0.6	5	3.0	38	22.9	3	1.8	4	2.4	50	30.1
High	0	0.0	1	0.6	1	0.6	0	0.0	0	0.0	2	1.2
Not known	0	0.0	0	0.0	0	0.0	0	0.0	4	2.4	4	2.4
Total	92	55.4	18	10.8	43	25.9	3	1.8	10	6.0	166	100.0

Note: Because of rounding, individual figures in this table do not always sum to the stated totals.

**Figure 22:** Neonatal deaths, by gestation and birthweight, by percentage, 2007



Two-thirds of neonatal deaths were in very pre-term (92) or pre-term (18) babies.

In 2007, 50.6 percent of neonatal deaths were in babies born very pre-term and of extremely low birthweight, and 22.9 percent were in term babies of normal birthweight.

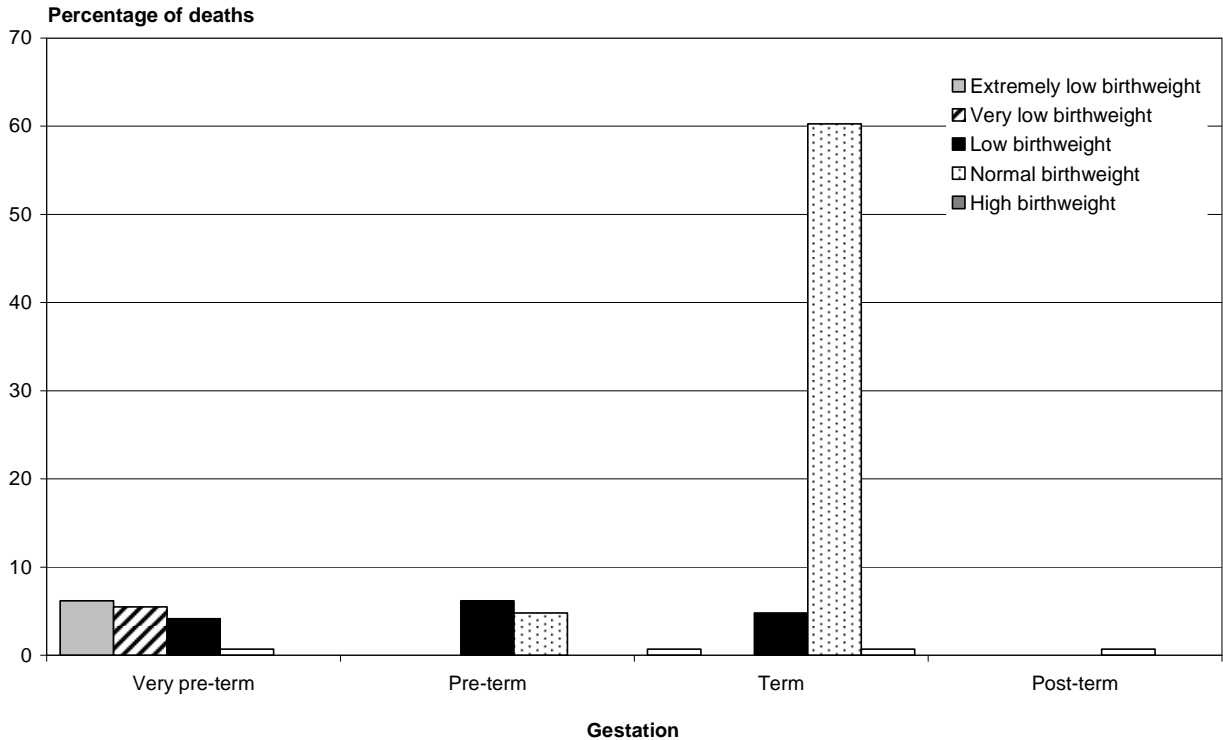
Table 9 and Figure 23 show percentages of post-neonatal deaths by birthweight and gestation for 2007.

**Table 9:** Post-neonatal deaths, by gestation and birthweight, number and percentage, 2007

Birthweight group	Very pre-term		Pre-term		Term		Post-term		Not known		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Extremely low	9	6.2	0	0.0	1	0.7	0	0.0	0	0.0	10	6.8
Very low	8	5.5	0	0.0	0	0.0	0	0.0	0	0.0	8	5.5
Low	6	4.1	9	6.2	7	4.8	0	0.0	0	0.0	22	15.1
Normal	1	0.7	7	4.8	88	60.3	1	0.7	2	1.4	99	67.8
High	0	0.0	0	0.0	1	0.7	0	0.0	0	0.0	1	0.7
Not known	0	0.7	0	0.0	0	0.0	0	0.0	6	4.1	6	4.1
<b>Total</b>	<b>24</b>	<b>16.4</b>	<b>16</b>	<b>11.0</b>	<b>97</b>	<b>66.4</b>	<b>1</b>	<b>0.7</b>	<b>8</b>	<b>5.5</b>	<b>146</b>	<b>100.0</b>

Note: Because of rounding, individual figures in this table do not always sum to the stated totals.

**Figure 23:** Post-neonatal deaths, by gestation and birthweight, percentage, 2007



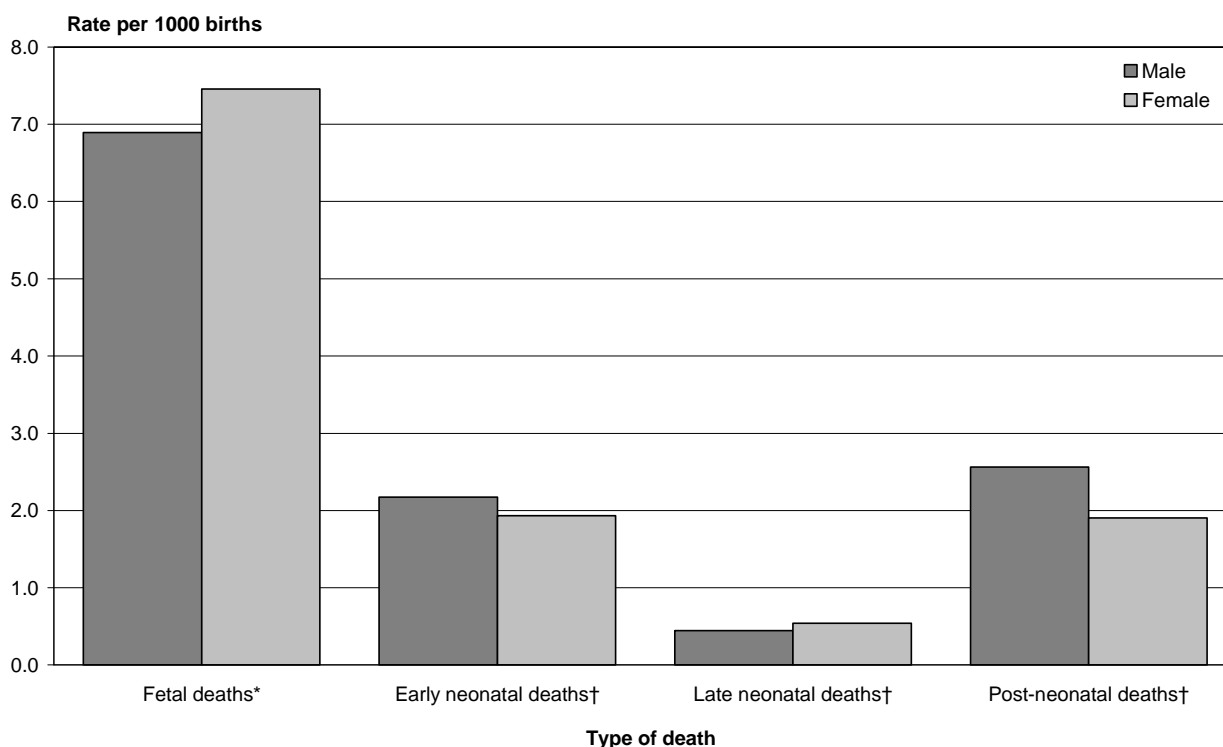
In 2007, 60.3 percent of post-neonatal deaths were in term babies of normal birthweight, and 21.9 percent were in pre-term (very pre-term or pre-term) babies of low birthweight (extremely, very low or low birthweight).

**Sex**

Differences in neonatal death rates between male and female babies are well known, females having a lower mortality rate during the neonatal period (Lawn et al 2005). Males also tend to have higher fetal and infant death rates than females.

Figure 24 compares male and female fetal and infant death rates.

**Figure 24:** Fetal and infant mortality rates, by sex, 2007



\* = Rate per 1000 total births

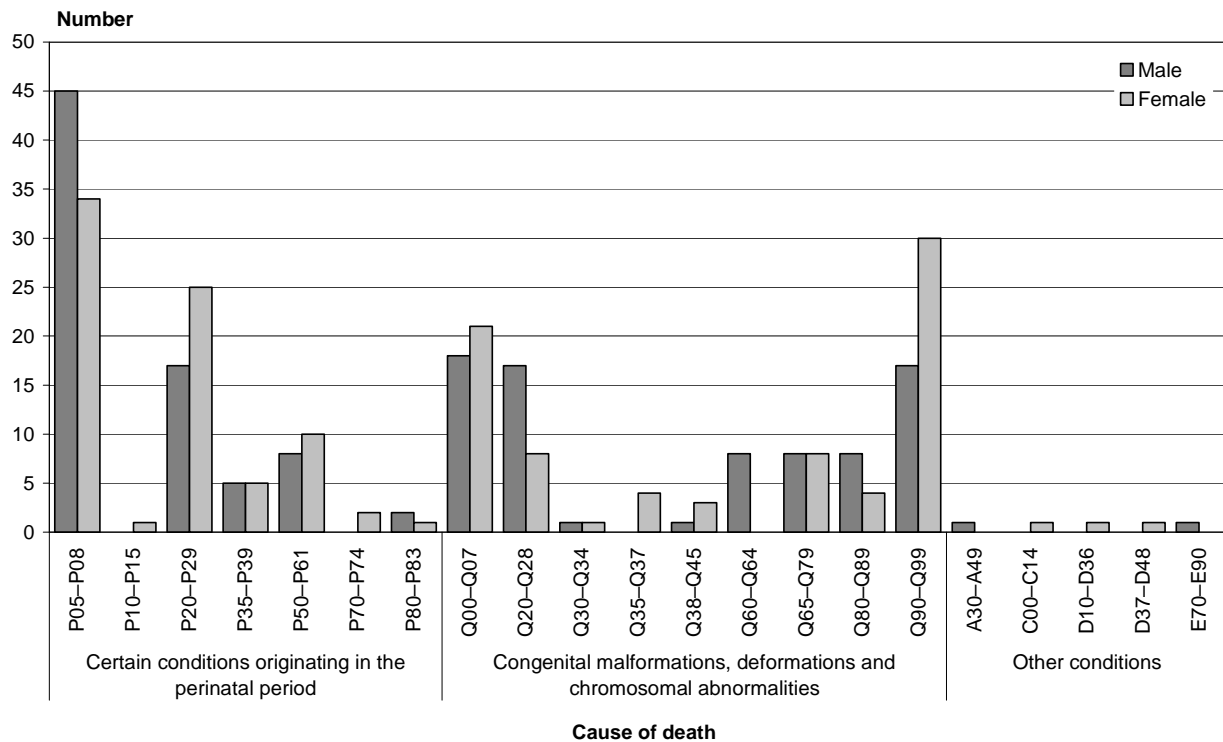
† = Rate per 1000 live births

In 2007, males had higher early and post-neonatal death rates. The male infant death rate was higher than the female rate by 0.8 per 1000 live births.

The female fetal death rate (7.5 per 1000 total births; n=237) was marginally higher than the male fetal death rate (6.9; n=233).

Figures 25 and 26 show fetal and neonatal death rates respectively by sex and cause of death. (See the 'Explanatory notes' section for an explanation of the ICD-10-AM-II codes used in these two figures.)

**Figure 25:** Fetal deaths, by sex and cause of death, 2007



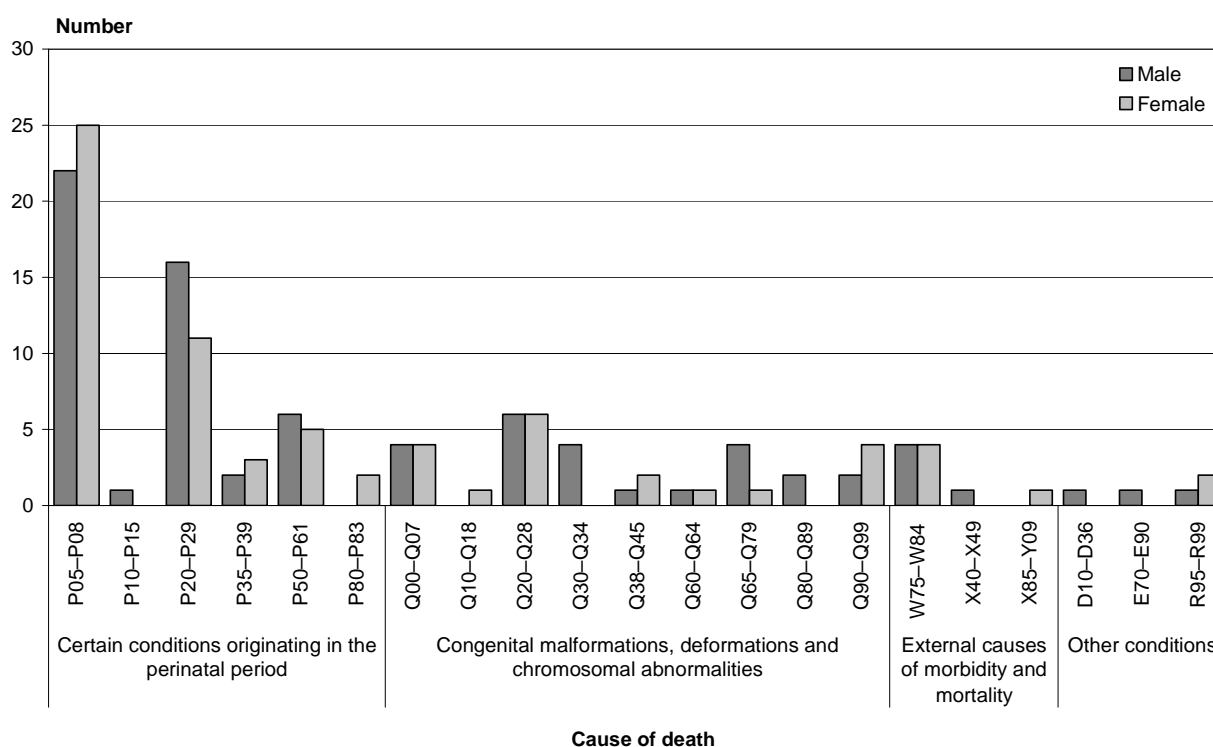
Note that sub-group P90–P96, ‘Other disorders originating in the perinatal period’, has been excluded from this figure.

There were eight conditions applicable to five or more male and female cases of fetal death; females had a higher mortality rate in six of these eight.

Male fetal death rates were higher for codes P05–P08, ‘Disorders related to length of gestation and fetal growth’ (1.3 per 1000 total births; n=45), and Q20–Q28, ‘Congenital malformations of the circulatory system’ (0.5; n=17), than females (1.1; n=34, and 0.3; n=8 respectively).

For fetal deaths attributable to codes Q90–Q99, ‘Chromosomal abnormalities, not elsewhere classified’, females had a higher rate (0.9 per 1000 total births; n=30) than males (0.5; n=17).

**Figure 26:** Neonatal deaths, by sex and cause of death, 2007



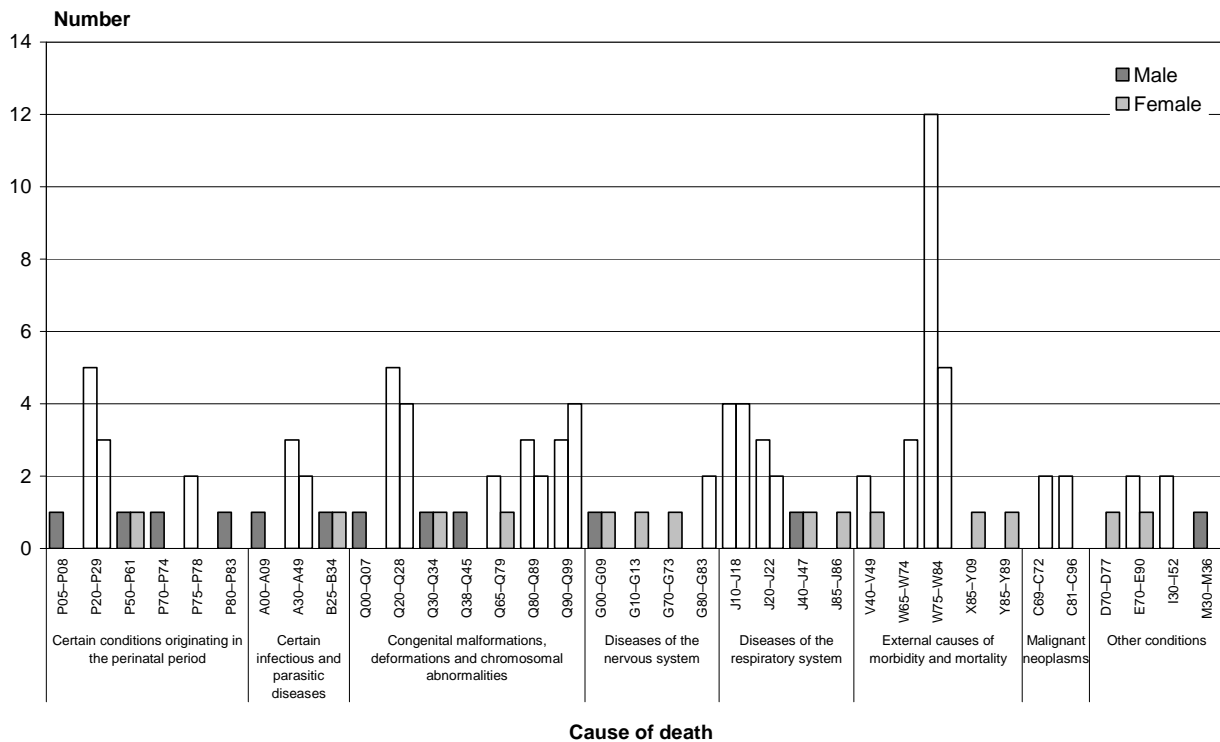
Note that sub-group P90–P96, ‘Other disorders originating in the perinatal period’, has been excluded from this figure.

The female neonatal death rate for codes P05–P08 was 0.8 deaths per 1000 total births (n=25), while the equivalent male rate was 0.7 (n=22).

Males had a higher death rate for codes P20–P29 than females (0.5 per 1000 total births; n=16 and 0.3; n=11 respectively).

Figure 27 shows post-neonatal death rates by sex and cause of death. (See the ‘Explanatory notes’ section for an explanation of the ICD-10-AM-II codes used in this figure.)

**Figure 27:** Post-neonatal deaths, by sex and cause of death, 2007



Note that sub-group R95–R99, ‘Ill-defined and unknown causes of mortality’, has been removed from this figure. This group contains deaths from SIDS and deaths where underlying cause of death is unknown or not yet available.

### Variation in mortality by DHB

Figure 28 shows perinatal mortality rates by DHB (based on usual place of residence of the mother) compared with the New Zealand national rate. Deaths from the years 2003 to 2007 have been aggregated because of the small number of deaths in some DHB regions.

Observation as to where the error bars in Figure 28 overlap or do not overlap the New Zealand perinatal mortality rate shows that nearly all DHBs had perinatal mortality rates that conformed to the national rate. Only Counties Manukau had a rate that was significantly higher than the national rate (ie, unlikely to be a product of chance).

**Figure 28:** Perinatal death rates and 95 percent confidence intervals, by DHB region of usual place of residence, 2003–2007

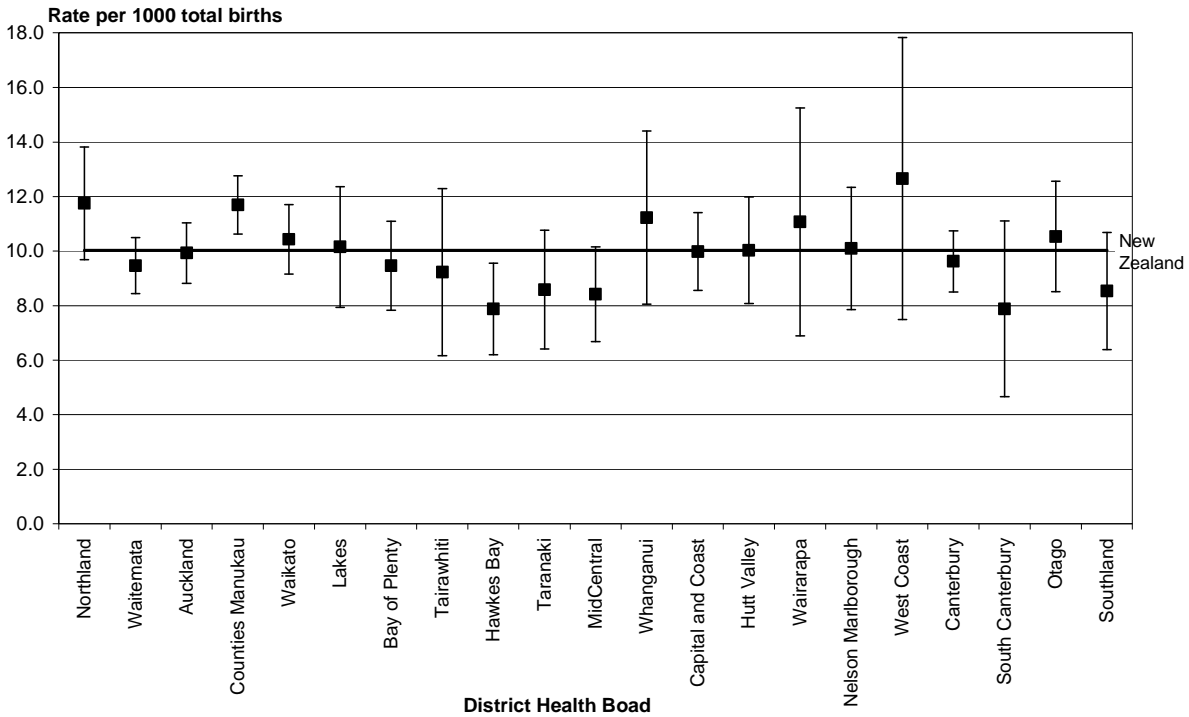
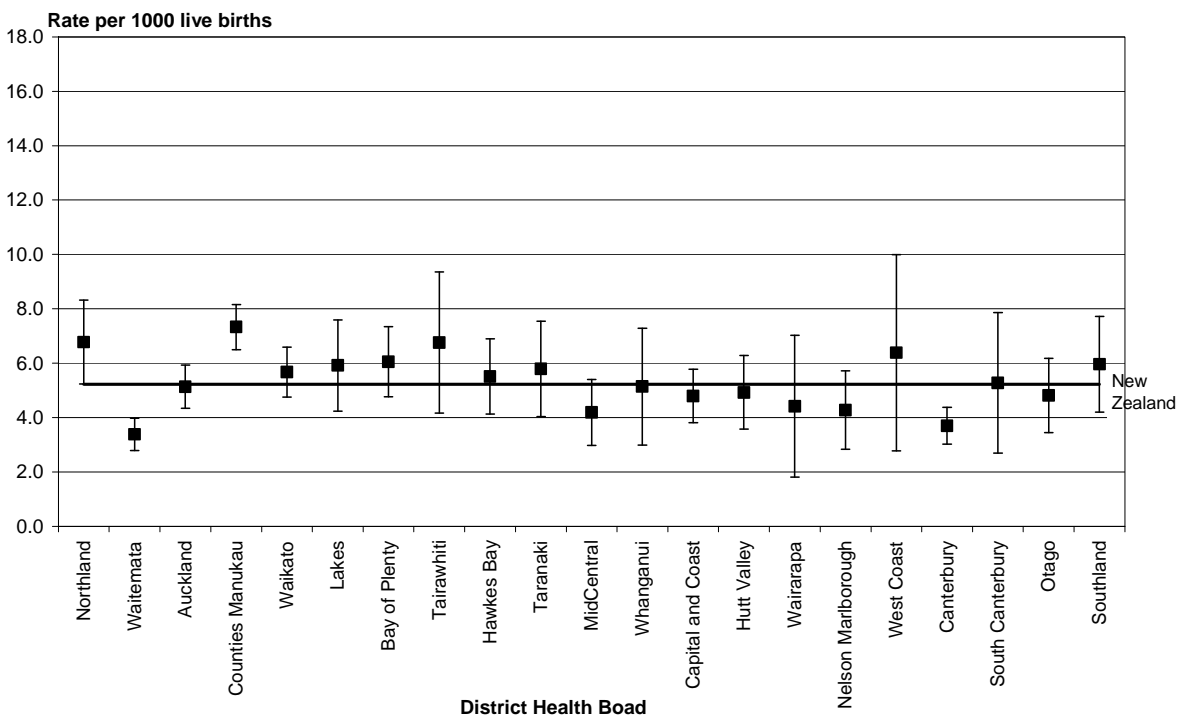


Figure 29 shows infant mortality rates by DHB (based on usual place of residence of the mother) compared with the New Zealand national rate.

**Figure 29:** Infant death rates and 95 percent confidence intervals, by DHB region of usual place of residence, 2003–2007





Over the 2003 to 2007 period, Counties Manukau had an infant death rate that was significantly greater than the overall New Zealand rate.

Waitemata and Canterbury had infant death rates that were significantly lower than the New Zealand rate.

## Sudden Infant Death Syndrome

### Classification of SIDS

World Health Organization rules for underlying cause of death selection require that specific diseases and conditions be given precedence in classification over non-specific causes such as SIDS (also known as cot death). To capture information about all deaths reported to be due to SIDS, the Ministry of Health employs a flag called the cot death 'Y' indicator. The cot death flag identifies all of the SIDS records classified to ICD code R95 (Sudden Infant Death Syndrome) either as the underlying cause of death or as a contributing cause.

Classification of cases of SIDS in the statistical tables is by the number of cases captured by the cot death 'Y' indicator (except in statistical tables A16 to A17, which present underlying cause of death).

The SIDS rate is calculated as follows:

$$\frac{\text{Total number of SIDS deaths}}{\text{Number of live births}} \times 1000$$

There were 56 cases of SIDS recorded in 2007 (Table 10). The SIDS death rate was 0.9 per 1000 live births. This rate is close to the 2006 SIDS rate of 0.8 deaths per 1000 live births.

**Table 10:** Sudden Infant Death Syndrome<sup>‡</sup> deaths: numbers and rates, 1996–2007

Year	Total		Māori		Pacific peoples		Other	
	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
1996	109	1.9	73	4.6	11	1.9	25	0.7
1997	84	1.5	59	3.6	5	0.9	20	0.6
1998	67	1.2	39	2.4	4	0.7	24	0.7
1999	69	1.2	46	2.9	5	0.8	18	0.5
2000	65	1.1	43	2.7	8	1.3	14	0.4
2001	48	0.9	32	2.0	2	0.3	14	0.4
2002	45	0.8	27	1.8	7	1.2	11	0.3
2003	51	0.9	37	2.4	2	0.3	12	0.3
2004	45	0.8	34	2.1	2	0.3	9	0.3
2005	40	0.7	28	1.6	3	0.5	9	0.3
2006	50	0.8	29	1.6	5	0.8	16	0.4
2007	56	0.9	28	1.4	9	1.3	19	0.5

\* = Rate per 1000 live births

‡ = SIDS includes infants older than one year

The SIDS death rate declined from 1.9 per 1000 live births in 1996 to 0.9 per 1000 live births in 2007.

Figure 30 shows SIDS death rates from 1988 to 2007.

**Figure 30:** Sudden Infant Death Syndrome death rates, 1988–2007

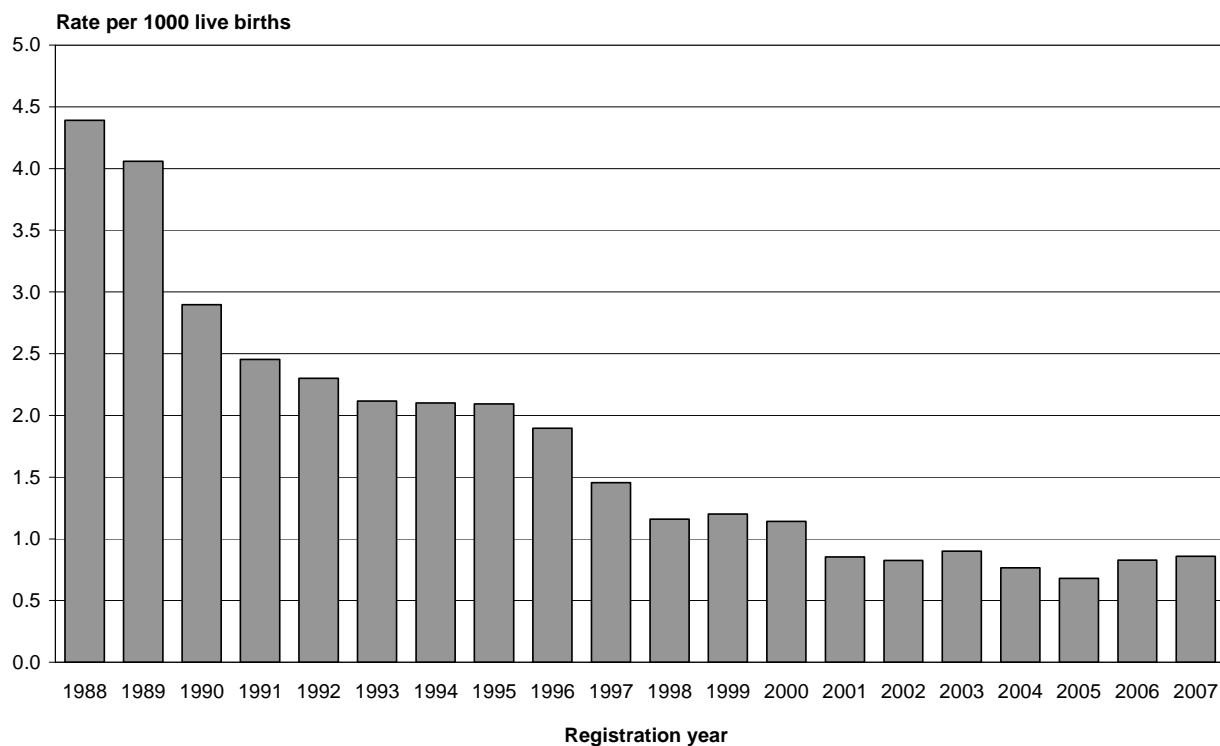
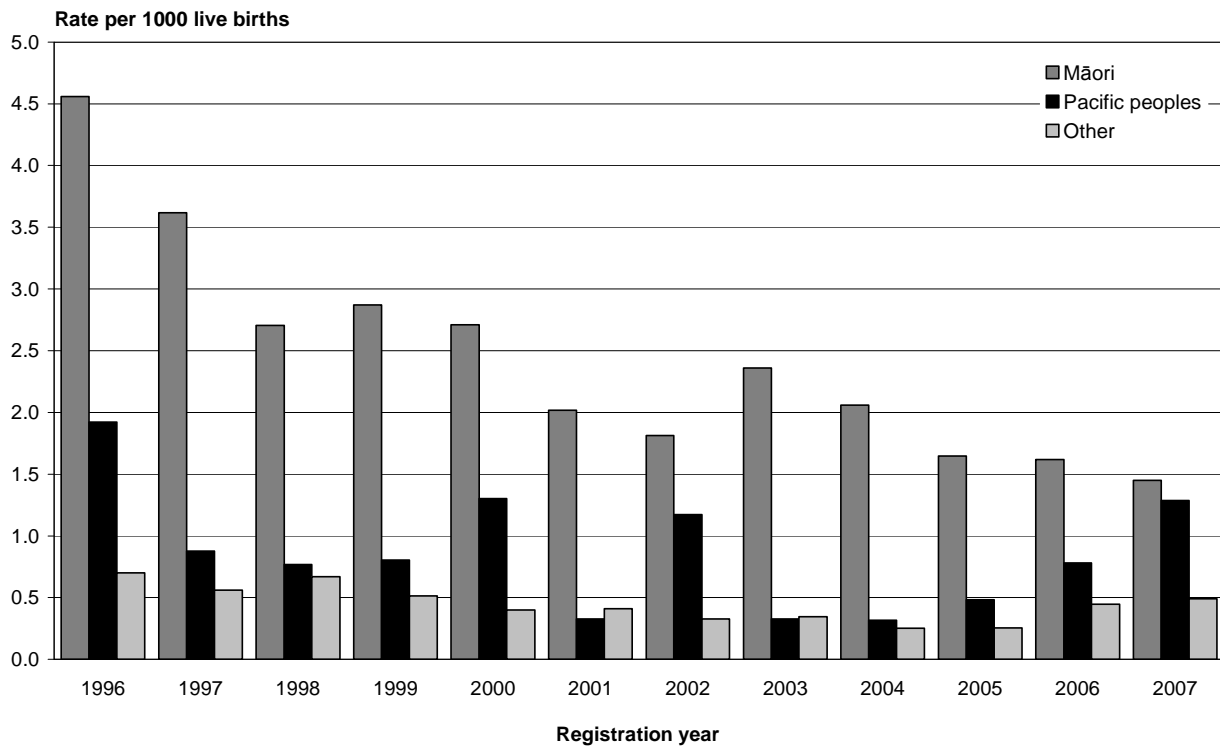


Figure 31 shows SIDS deaths by ethnicity from 1996 to 2007.

In 2007, 50 percent of all SIDS cases were Māori (a rate of 1.4 deaths per 1000 Māori live births). The Māori rate was nearly three times the Other ethnic group rate.

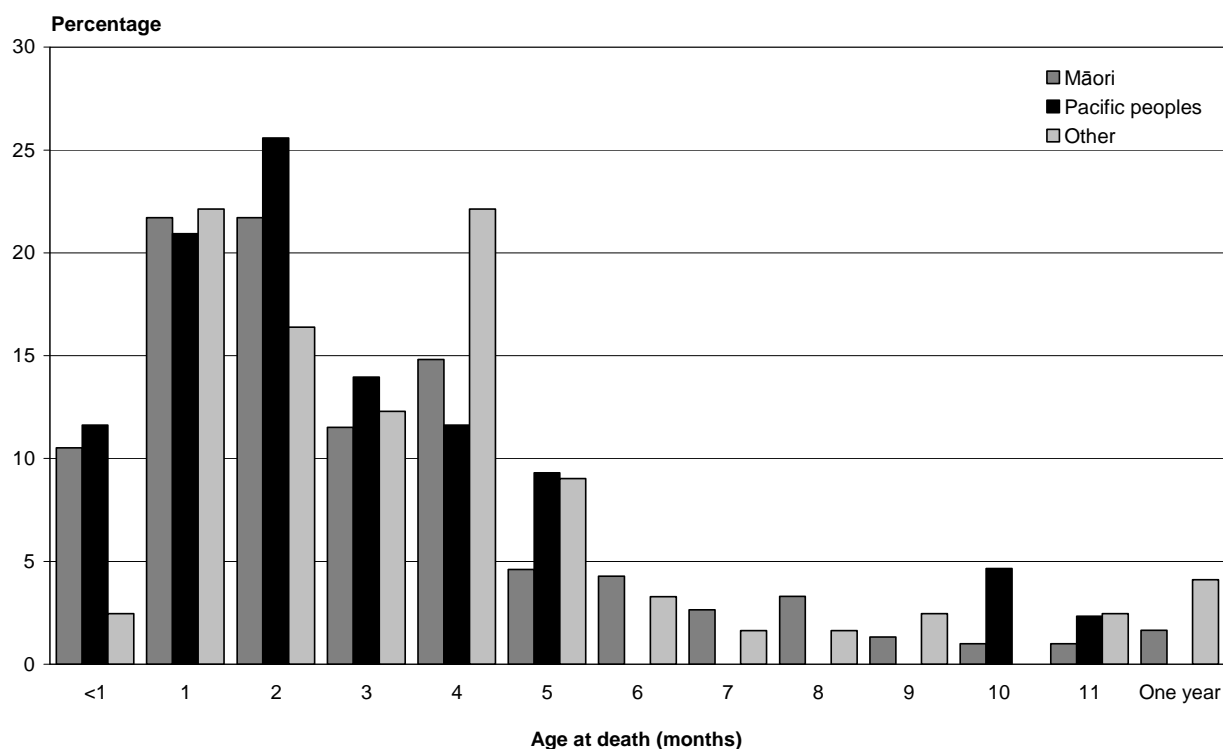
**Figure 31:** Sudden Infant Death Syndrome death rates, by ethnicity, 1996–2007



The rate of SIDS deaths declined from 1996 to 2007 for all ethnic groups. Note that, because the number of SIDS deaths is relatively small (especially with regard to the Pacific group) and tends to fluctuate over time, these figures should be interpreted with caution.

Figure 32 shows SIDS deaths by age at death and ethnicity aggregated from 1999 to 2007.

**Figure 32:** Sudden Infant Death Syndrome deaths, by age at death and ethnicity, 1999–2007



Of the 56 SIDS cases registered in 2007, 10 occurred in the neonatal period (less than 28 completed days after birth) and 46 occurred in the post-neonatal period.

In 2007, 96.4 percent of all SIDS deaths occurred before six months of age.

Previous editions of *Fetal and Infant Deaths* have shown that maternal age is inversely related to the risk of SIDS. The 2007 SIDS death rate was highest in babies of mothers under 20 years of age, followed by mothers aged from 20 to 24, and lowest in babies of for mothers aged 30 to 34 (Figure 33). This pattern is similar to that of the aggregated rates for 1996 to 2006.

**Figure 33:** Sudden Infant Death Syndrome deaths, by age of mother, 1996–2007

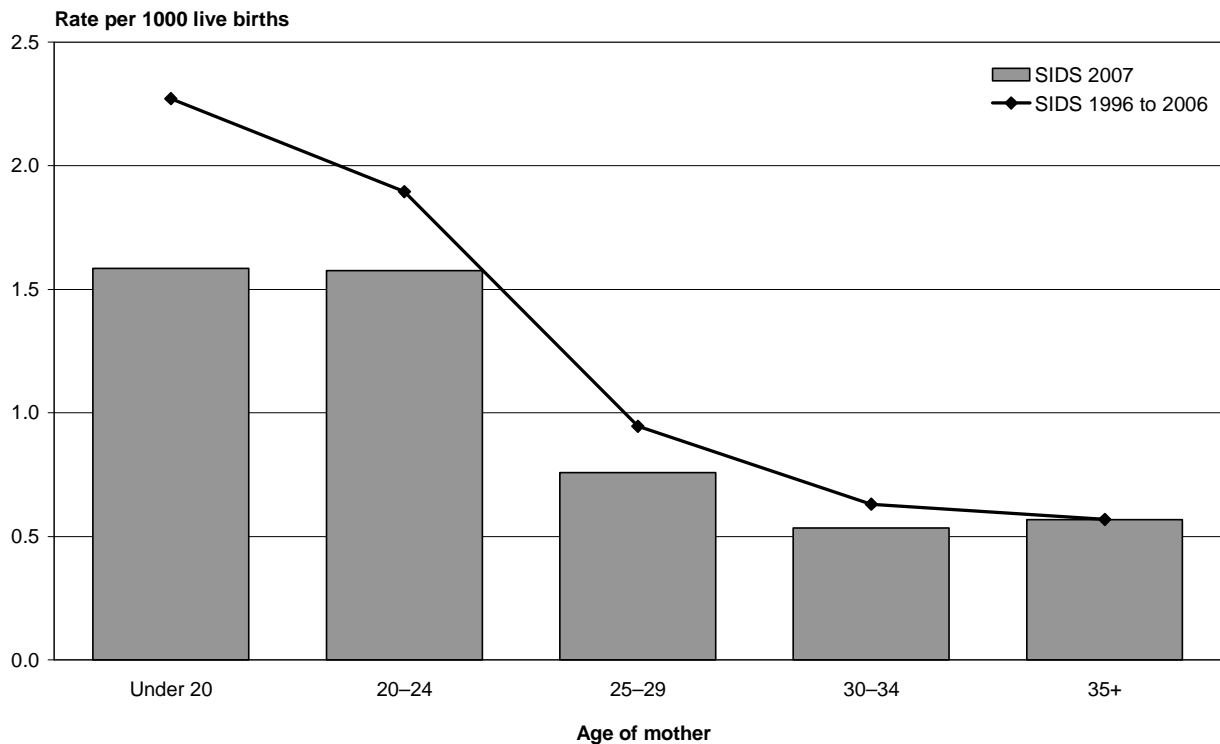
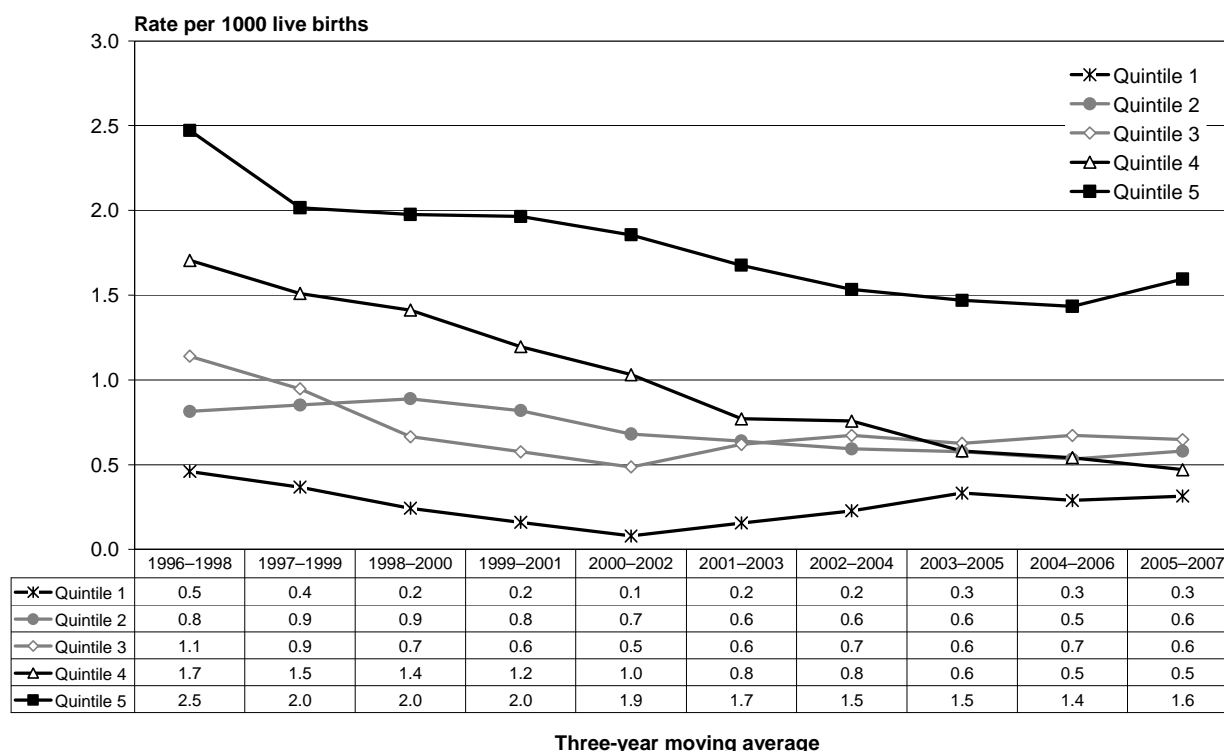


Figure 34 shows the SIDS death rate trend (three-year moving average) by NZDep2001 quintile of the mother’s usual place of residence from 1996 to 2007.

The most deprived group (Quintile 5) had the highest rate of SIDS death over the period, although this rate steadily declined over time.

Rates for the five groups represented in Figure 34 are initially ordered by their respective levels of deprivation, with noticeable separation between the groups. By the end of the period (ie, 2005–2007), Quintiles 1 to 4 are positioned in a much tighter cluster. This suggests a declining influence of socioeconomic status on SIDS mortality. Rates for Quintile 5, while declining over the period, were still distinctly higher than those in the other quintiles.

**Figure 34:** Sudden Infant Death Syndrome deaths, by deprivation quintile, three-year moving average, 1996–2007



Note that the numbers of SIDS deaths in each quintile are relatively small, making the rates sensitive to small changes in the raw death numbers, and should therefore be interpreted with caution. Three-year moving averages have been employed to smooth out this effect.

### International comparisons of fetal and infant mortality

Legal requirements for the registration of fetal deaths and live births vary between, and within, countries. This makes it difficult to compare fetal and infant death rates internationally, because differences in registration practices may cause some variation in rates. For example, in several countries, including New Zealand, very premature babies who are born alive but have a low chance of survival are registered as live births.

This section uses the OECD method of calculating perinatal and infant death rates.

The OECD definition for perinatal death rate for international comparison purposes is ‘the ratio of deaths of children within one week of birth (early neonatal deaths) plus foetal deaths of minimum gestation period 28 weeks or minimum foetal weight of 1000 g, expressed per 1000 births’.<sup>3</sup>

<sup>3</sup> See: <http://stats.oecd.org/glossary/detail.asp?ID=2038>

The weight-specific fetal death rate is calculated as follows:

$$\frac{\text{Fetal deaths of 28+ weeks gestation or weighing 1000 g and over} \times 1000}{\text{Total births}}$$

The perinatal death rate using the OECD method is calculated as above, with the addition of early neonatal deaths in the numerator.

Early neonatal, late neonatal, post-neonatal and infant death rates are calculated as per the method on page 6.

**Table 11:** New Zealand fetal and infant deaths for international comparison purposes, numbers and rates, 2000–2007

Year	Type of deaths											
	Fetal deaths*		Early neonatal deaths†		Perinatal deaths*		Late neonatal deaths†		Post-neonatal deaths†		Infant deaths†	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
2000	189	3.3	175	3.1	364	6.4	41	0.7	143	2.5	359	6.3
2001	190	3.4	143	2.5	333	5.9	27	0.5	145	2.6	315	5.6
2002	177	3.2	185	3.4	362	6.6	36	0.7	116	2.1	337	6.2
2003	196	3.5	141	2.5	337	6.0	43	0.8	120	2.1	304	5.4
2004	226	3.8	161	2.7	387	6.6	37	0.6	149	2.5	347	5.9
2005	191	3.2	148	2.5	339	5.8	35	0.6	111	1.9	294	5.0
2006	184	3.1	137	2.3	321	5.3	28	0.5	143	2.4	308	5.1
2007	229	3.5	134	2.1	363	5.6	32	0.5	146	2.2	312	4.8

\* = Rate per 1000 total births

† = Rate per 1000 live births

Rates published by other countries may be calculated using differing methodologies from those used here, so international comparisons must be made with caution.

# Explanatory notes

## Ethnicity

The National Mortality Collection records up to three different ethnicities for each individual. For ease of analysis, multiple ethnic groups recorded for individuals are prioritised as one ethnic group according to a method developed by Statistics New Zealand. There are three ethnic groups reported on in this publication: Māori, Pacific peoples and Other (non-Māori, non-Pacific peoples).

Where Māori ethnicity has been selected on a birth or death registration form, that individual has been recorded as belonging to the Māori ethnic group for the purposes of this publication, regardless of any other selection.

If one of the ethnic groups of the Pacific Islands has been selected, and Māori has not been selected, the individual has been put in the Pacific peoples group.

The 'Other' ethnic group applies where neither the Māori nor the Pacific peoples ethnic group has been selected.

Significant changes were made to the process of ethnicity classification in 1995. Information about these changes was presented in the 1995 to 1997 editions of this publication. Because of these changes, data presented by ethnicity from 1996 onwards is not comparable with that prior to 1995.

## New Zealand Index of Deprivation 2001 (NZDep2001)

The New Zealand Index of Deprivation (NZDep2001), an index of neighbourhood socioeconomic deprivation, was generated from data from the 2001 Census of Population and Dwellings. The index combines nine socioeconomic variables from the Census, reflecting eight domains of material and economic deprivation, as listed below (Salmond and Crampton 2002a, 2002b). The index scores are grouped into 10 deciles, with each decile representing equal or similar size in terms of the New Zealand population.

For the purposes of this publication the 10 deciles have been combined into five quintiles. Quintile 1 (deciles 1 and 2) is the least deprived and Quintile 5 (deciles 9 and 10) the most deprived areas. Census area units for 1996 were mapped forward to 2001 Census area units to assign the level of deprivation.

Variables included in the construction of the NZDep2001 (detailed below) have been shown in international literature to be associated with mortality, morbidity and other socioeconomic disadvantages. On the whole, neighbourhoods in high NZDep2001 deciles are more deprived and likely to demonstrate greater need for health services compared with areas in low NZDep2001 deciles (Salmond and Crampton 2002a, 2002b).



<b>Name of variable</b>	<b>Description of variable</b>
Communication	People with no access to a telephone
Income	People aged from 18 to 59 receiving a means-tested benefit
Income	Equivalised <sup>4</sup> household income below an income threshold
Transport	People with no access to a car
Living space	Equivalised household below a bedroom occupancy threshold
Owned home	People not living in their own home
Employment	Unemployed people aged from 18 to 59
Qualifications	People aged from 18 to 59 without any qualifications
Support	People aged under 60 living in a single-parent family

<sup>4</sup> Equivalisation is a method used to control for household composition.

## ICD-10-AM-II codes used in this publication

ICD code	Clinical code description
A00–A09	Intestinal infectious diseases
A30–A49	Other bacterial diseases
B00–B09	Viral infections characterised by skin and mucous membrane lesions
B25–B34	Other viral diseases
C00–C14	Malignant neoplasms of lip, oral cavity and pharynx
C69–C72	Malignant neoplasms of eye, brain and other parts of central nervous system
C81–C96	Malignant neoplasms, stated or presumed to be primary, of lymphoid, haematopoietic and related tissue
D10–D36	Benign neoplasms
D37–D48	Neoplasms of uncertain or unknown behaviour
D70–D77	Other diseases of blood and blood-forming organs
E70–E90	Metabolic disorders
G00–G09	Inflammatory diseases of the central nervous system
G10–G13	Systemic atrophies primarily affecting the central nervous system
G70–G73	Diseases of myoneural junction and muscle
G80–G83	Cerebral palsy and other paralytic syndromes
G90–G99	Other disorders of the nervous system
I30–I52	Other forms of heart disease
J10–J18	Influenza and pneumonia
J20–J22	Other acute lower respiratory infections
J40–J47	Chronic lower respiratory diseases
J60–J70	Lung diseases due to external agents
J85–J86	Suppurative and necrotic conditions of lower respiratory tract
J95–J99	Other diseases of the respiratory system
K20–K31	Diseases of the oesophagus, stomach and duodenum
M30–M36	Systemic connective tissue disorders
N10–N16	Renal tubulo-interstitial diseases
P05–P08	Disorders related to length of gestation and fetal growth
P10–P15	Birth trauma
P20–P29	Respiratory and cardiovascular disorders specific to the perinatal period
P35–P39	Infections specific to the perinatal period
P50–P61	Haemorrhagic and haematological disorders of fetus and newborn
P70–P74	Transitory endocrine and metabolic disorders specific to fetus and newborn
P75–P78	Digestive system disorders of fetus and newborn
P80–P83	Conditions involving the integument and temperature regulation of fetus and newborn
P90–P96	Other disorders originating in the perinatal period
Q00–Q07	Congenital malformations of the nervous system
Q10–Q18	Congenital malformations of eye, ear, face and neck
Q20–Q28	Congenital malformations of the circulatory system
Q30–Q34	Congenital malformations of the respiratory system
Q35–Q37	Cleft lip and cleft palate

<b>ICD code</b>	<b>Clinical code description</b>
Q38–Q45	Other congenital malformations of the digestive system
Q60–Q64	Congenital malformations of the urinary system
Q65–Q79	Congenital malformations and deformations of the musculoskeletal system
Q80–Q89	Other congenital malformations
Q90–Q99	Chromosomal abnormalities, not elsewhere classified
R95–R99	Ill-defined and unknown causes of mortality
W65–W74	Accidental drowning and submersion
W75–W84	Other accidental threats to breathing
V40–V49	Car occupant injured in transport accident
X40–X49	Accidental poisoning by and exposure to noxious substances
X85–Y09	Assault
Y85–Y89	Sequelae of external causes of morbidity and mortality

# Glossary

## **Assisted reproductive technologies**

The application of laboratory or clinical techniques to gametes (a human sperm or egg cell) and/or embryos for the purposes of reproduction.

## **Birthweight**

The first weight of the baby obtained after birth (usually measured to the nearest 5 g and obtained within one hour of birth).

- Birthweight, high: birthweight of 4500 g or over.
- Birthweight, normal: birthweight between 2500 and 4499 g.
- Birthweight, low: birthweight of less than 2500 g.
- Birthweight, very low: birthweight of less than 1500 g.
- Birthweight, extremely low: birthweight of less than 1000 g.

## **Census area unit**

See 'Domicile code'.

## **Date of birth or death**

The data presented in this publication refers to the year in which a birth or death was registered, irrespective of the actual year of birth or death.

## **District Health Board (DHB)**

An organisation established as a District Health Board by, or under, section 19 of the New Zealand Public Health and Disability Act 2000.

## **Domicile code**

A code based on the Statistics New Zealand standard area unit code used for the 2001 Census. Domicile is assigned according to usual place of residence.

## **Early neonatal death**

The death of a liveborn infant before 168 completed hours (seven days) after birth (WHO 1977).

## **Fetal death, stillbirth**

Death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of duration of pregnancy; the death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles (WHO 1977).

The statistics in this publication include only fetal deaths (known also as stillbirths) of 20 weeks' or more gestation, or 400 g or more birthweight. This is in line with the Births, Deaths, Marriages and Relationships Registration Act 1995, which defines a stillborn child as 'a dead foetus that:

- (a) weighed 400 g or more when it issued from its mother; or
- (b) issued from its mother after the 20th week of pregnancy.'

Under the 1995 Act, a medical certificate of causes of death and a birth registration form are required to be completed in respect of each stillborn child. This includes stillbirths resulting from terminations of pregnancy.

### **Full-term birth/labour**

Birth/labour at 37 or more gestational weeks.

### **Gestational age**

The duration of pregnancy in completed weeks, calculated from the date of the first day of a woman's last menstrual period and her infant's date of birth, or derived from clinical assessment during pregnancy or from examination of the infant after birth.

### ***International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification, 2nd Edition (ICD-10-AM) clinical codes***

Codes based on the official version of WHO's *International Statistical Classification of Diseases and Related Health Problems*. This is designed for classification of morbidity and mortality information for statistical purposes. ICD codes are also used for indexing hospital records by disease and operations, for data storage and retrieval. The clinical codes are used to classify the clinical description of a condition, cause of intentional or unintentional injury, underlying cause of death, operation or procedure performed, or pathological nature of a tumour.

### **Infant death**

Death of a liveborn infant before the first year of life is completed (WHO 1977). Infant deaths consist of early neonatal deaths, late neonatal deaths and post-neonatal deaths.

### **Late neonatal death**

Death of a liveborn infant after seven days and before 28 completed days after birth (WHO 1977).

**Live birth**

The complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such birth is considered liveborn (WHO 1977).

**Neonatal death**

Death of a liveborn infant before 28 completed days after birth.

**New Zealand Index of Deprivation (NZDep2001) scores**

Scores generated from the 2001 Census data in an attempt to measure special health needs. An area with a high score is, on the whole, more likely to need health services than one with a low score.

**Perinatal death**

Perinatal deaths are fetal deaths (20 weeks' gestation or 400 g birthweight), plus infant deaths within less than 168 completed hours (seven days) after birth (early neonatal deaths) (WHO 1977).

**Post-neonatal death**

Death of a liveborn infant after 28 completed days and before the first year of life is completed.

**Pre-term birth/labour**

Birth/labour before 37 completed weeks of gestation.

**Pre-term birth/labour, very**

Birth/labour before 32 completed weeks of gestation.

**Post-term birth**

Birth at 42 or more completed weeks of gestation.

**Rural area**

An area in which fewer than 10,000 people have been recorded as residing within the applicable Census area unit.

**Stillbirth**

See 'Fetal death'.

**Term birth**

Birth/labour between 37 and 41 completed weeks of gestation.

**Total births**

Total of stillbirths (fetal deaths) plus live births.

**Urban area**

An area in which more than 10,000 people have been recorded as residing within the applicable Census area unit.

## References

- Child and Youth Mortality Review Committee, Te Rōpū Arotake Auau Mate o te Hunga Tamariki, Taiohi. 2006. *Third Report to the Minister of Health: Reporting mortality 2002–2004*. Wellington: Child and Youth Mortality Review Committee.
- European Society of Human Reproduction and Embryology Capri Workshop Group. 2000. Multiple gestation pregnancy. *Human Reproduction* 15(7): 1856–64.
- Keyfitz N. 1966. Sampling variance of standardized mortality rates. *Human Biology* 38: 309–17.
- Lawn JE, Cousens S, Zupan J. 2005. 4 million neonatal deaths: When? Where? Why? *Lancet* 365(9462): 891–900.
- National Centre for Classification in Health. 2000. *The International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification, 2nd Edition*. Sydney: National Centre for Classification in Health.
- New Zealand Health Information Service. 2006a. *Fetal and Infant Deaths 2002*. Wellington: Ministry of Health.
- New Zealand Health Information Service. 2006b. *Mortality and Demographic Data 2002 and 2003*. Wellington: Ministry of Health.
- New Zealand Health Information Service. 2008. *Report on Maternity: Maternal and Newborn Information, Part 1: Hospital-based events 2007*. Wellington: Ministry of Health.
- Rural Expert Advisory Group. 2002. *Implementing the Primary Health Care Strategy in Rural New Zealand*. Wellington: Ministry of Health.
- Salmond C, Crampton P. 2002a. *NZDep2001 Index of Deprivation*. Wellington: Wellington School of Medicine and Health Sciences.
- Salmond C, Crampton P. 2002b. *NZDep2001 Index of Deprivation: User Manual*. Wellington: Wellington School of Medicine and Health Sciences.
- Statistics New Zealand. 2009. *Demographic Trends: 2010*. Wellington: Statistics New Zealand.
- UNICEF and WHO. 2004. *Low birthweight: Country, regional and global estimates*. New York: United Nations Children's Emergency Fund and World Health Organization.
- Wang YA, Dean JH, Grayson N, et al. 2006. Assisted reproductive technology in Australia and New Zealand 2004. *Assisted Reproduction Technology Series No 10*. Cat No PER 39. Sydney: Australian Institute of Health and Welfare National Perinatal Statistics Unit.
- WHO. 1977. *International Classification of Diseases, 1975 revision, Volume 1*. Geneva: World Health Organization.
- WHO. 2006. *Neonatal and Perinatal Mortality: Country, regional and global estimates*. Geneva: World Health Organization.



## Statistical tables

Electronic copies of this publication series (in PDF format) are available at:  
<http://www.moh.govt.nz/moh.nsf/indexmh/dataandstatistics>

Statistical mortality data tables are available (in Excel format) online through the above link. The Fetal and Infant Deaths 2007 Excel file contains the following data:

### Statistical tables A

- Table A1: Fetal deaths – birthweight by ethnic group and age of mother: numbers and rates per 1000 total births in each category, 2007.
- Table A2: Fetal deaths – gestation by ethnic group: numbers and total rates per 1000 total births in each category, 2007.
- Table A3: Perinatal deaths – birthweight by ethnic group and age of mother: numbers and rates per 1000 total births in each category, 2007.
- Table A4: Perinatal deaths – gestation by ethnic group: numbers and total rates per 1000 total births in each category, 2007.
- Table A5: Post-neonatal deaths – birthweight by ethnic group and age of mother: numbers and rates per 1000 live births in each category, 2007.
- Table A6: Post-neonatal deaths – gestation by ethnic group: numbers and total rates per 1000 live births in each category, 2007.
- Table A7: Infant deaths – birthweight by ethnic group and age of mother: numbers and rates per 1000 live births in each category, 2007.
- Table A8: Infant deaths – gestation by ethnic group and age of mother: numbers and total rates per 1000 live births in each category, 2007.
- Table A9: Infant deaths – all causes of death by age, sex and ethnic group: numbers, 2007.
- Table A10: Sudden Infant Death Syndrome for infants less than one year – birthweight by ethnic group and age of mother: numbers and rates per 1000 live births in each category, 2007.
- Table A11: Sudden Infant Death Syndrome for infants less than one year – gestation by ethnic group and age of mother: numbers and total rates per 1000 live births in each category, 2007.
- Table A12: Sudden Infant Death Syndrome – District Health Board by ethnic group: numbers and rates per 1000 live births in each category, 2007.
- Table A13: Sudden Infant Death Syndrome – age at death by sex and ethnic group: numbers, 2007.
- Table A14: Sudden Infant Death Syndrome – month of death by sex and ethnic group: total numbers, 2007.
- Table A15: Sudden Infant Death Syndrome – contributing cause of death by main three-character category and ethnic group: numbers, 2007.
- Table A16: Fetal and neonatal deaths – causes of death by ethnic group: numbers, 2007.
- Table A17a: Infant mortality – causes of death by age and sex: numbers, total population, 2007.

- Table A17b: Infant mortality – causes of death by age and sex: numbers, Māori population, 2007.
- Table A17c: Infant mortality – causes of death by age and sex: numbers, Pacific peoples population, 2007.
- Table A17d: Infant mortality – causes of death by age and sex: numbers, Other ethnic groups (non-Māori, non-Pacific peoples) population, 2007.
- Table A18a: Total births, live births, fetal and infant deaths – District Health Board by age at death: numbers and rates per 1000 live and total births, total population, 2007.
- Table A18b: Total births, live births, fetal and infant deaths – District Health Board by age at death: numbers and rates per 1000 live and total births, Māori population, 2007.
- Table A18c: Total births, live births, fetal and infant deaths – District Health Board by age at death: numbers and rates per 1000 live and total births, Pacific peoples population, 2007.
- Table A18d: Total births, live births, fetal and infant deaths – District Health Board by age at death: numbers and rates per 1000 live and total births, Other ethnic group (non-Māori, non-Pacific peoples) population, 2007.
- Table A19: Live births and total births – birthweight by ethnic group and age of mother: numbers, 2007.
- Table A20: Live births – gestation by ethnic group and age of mother: numbers, 2007.

### **Statistical tables B – 1996 to 2007**

- Table B1: Fetal and infant deaths by ethnic group: numbers and rates per live or total births, 1996–2007.
- Table B2: Type of birth by ethnic group: numbers, 1996–2007.

### **Statistical tables of the New Zealand Index of Deprivation 2001 data**

- Table C1: Live births, perinatal, infant and SIDS deaths by quintile of deprivation (NZDep2001), numbers 1996 to 2007.