

# INFANT MORTALITY

## Introduction

Infant mortality is often used as a barometer of the social wellbeing of a country [1]. New Zealand's infant mortality rates are middling by international standards, being lower than those of the USA and some Eastern European countries, but higher than those of Central and Northern Europe [2]. Despite this, mortality during the first year of life in New Zealand remains much higher than at any other point during childhood or adolescence. In the year to March 2008, a total of 330 New Zealand infants died prior to their first birthday [3].

Despite these relatively high numbers, New Zealand's infant mortality rates have declined during the past 40 years, with rates falling from 18.2 per 1,000 in 1968, to 5.3 per 1,000 in March 2008 [3]. While infant mortality rates are generally higher for Pacific > Māori > European / Other babies, males, and those in the most deprived areas [4], total infant mortality rates are of limited utility in guiding population health interventions, as the causes of mortality differ markedly with the age of the infant. During the neonatal period (birth-28 days) extreme prematurity, congenital anomalies and intrauterine / birth asphyxia are the leading causes of mortality, while in the post neonatal period (29-364 days) SIDS and congenital anomalies make the greatest contribution [5]. Thus any interventions aimed at reducing New Zealand's infant mortality rates must, in the first instance, be based on an understanding of their component causes.

The following section uses information from the National Mortality Collection to review neonatal, post neonatal and total infant mortality since 1990.

### Data Source and Methods

#### Definition

1. Total Infant Mortality: Death of a live born infant prior to 365 days of life
2. Neonatal Mortality: Death of a live born infant in the first 28 days of life
3. Post-Neonatal Mortality: Death of a live born infant after 28 days but prior to 365 days of life
4. Sudden Unexpected Death in Infancy (SUDI): Death of a live born infant <365 days of life, where the cause of death is attributed to SIDS, Accidental Suffocation / Strangulation in Bed or Ill-Defined/Unspecified Causes

#### Data Sources

**Numerator:** National Mortality Collection: All deaths in the first year of life, using the definitions for total, neonatal and post neonatal mortality outlined above. Cause of death was derived from the main underlying cause of death (clinical code) as follows: Extreme Prematurity (ICD-10 P072), Congenital Anomalies (ICD-10 Q00-Q99), Perinatal Conditions (ICD-10 P00-P96); SIDS (ICD-10 R95); SUDI (ICD-10 R95, W75, R99).

**Denominator:** Birth Registration Dataset: All live births 20+ weeks gestation.

#### Notes on Interpretation

**Note 1:** See **Appendix 5** for an overview of the dataset used.

**Note 2:** 95% confidence intervals have been provided for the rate ratios in this section and where appropriate, the terms significant or not significant have been used to communicate the significance of the observed associations. Tests of statistical significance have not been applied to other data in this section, and thus (unless the terms *significant* or *non-significant* are specifically used) the associations described do not imply statistical significance or non-significance (see **Appendix 1** for further discussion of this issue).

**Indicator Category** Ideal B

## New Zealand Distribution and Trends

### New Zealand Trends

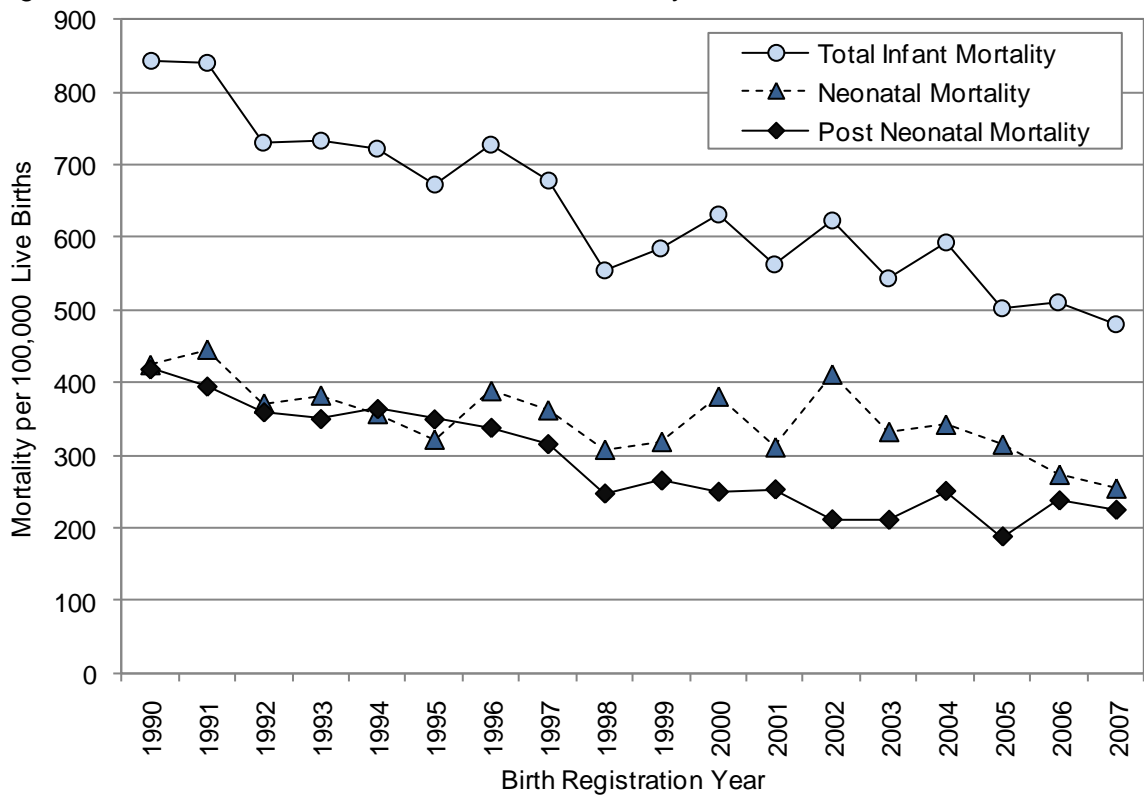
In New Zealand during 1990-2007, neonatal and post neonatal mortality both declined, with neonatal mortality exceeding post neonatal mortality during the 2000s (**Figure 1**).

### New Zealand Trends by Ethnicity

In New Zealand during the late 1990s, neonatal mortality was generally higher for Pacific and Māori > European > Asian infants, although ethnic differences were less consistent during the 2000s. In contrast, post neonatal mortality was higher for Māori > Pacific > European and Asian infants throughout 1996-2007 (**Figure 2**).

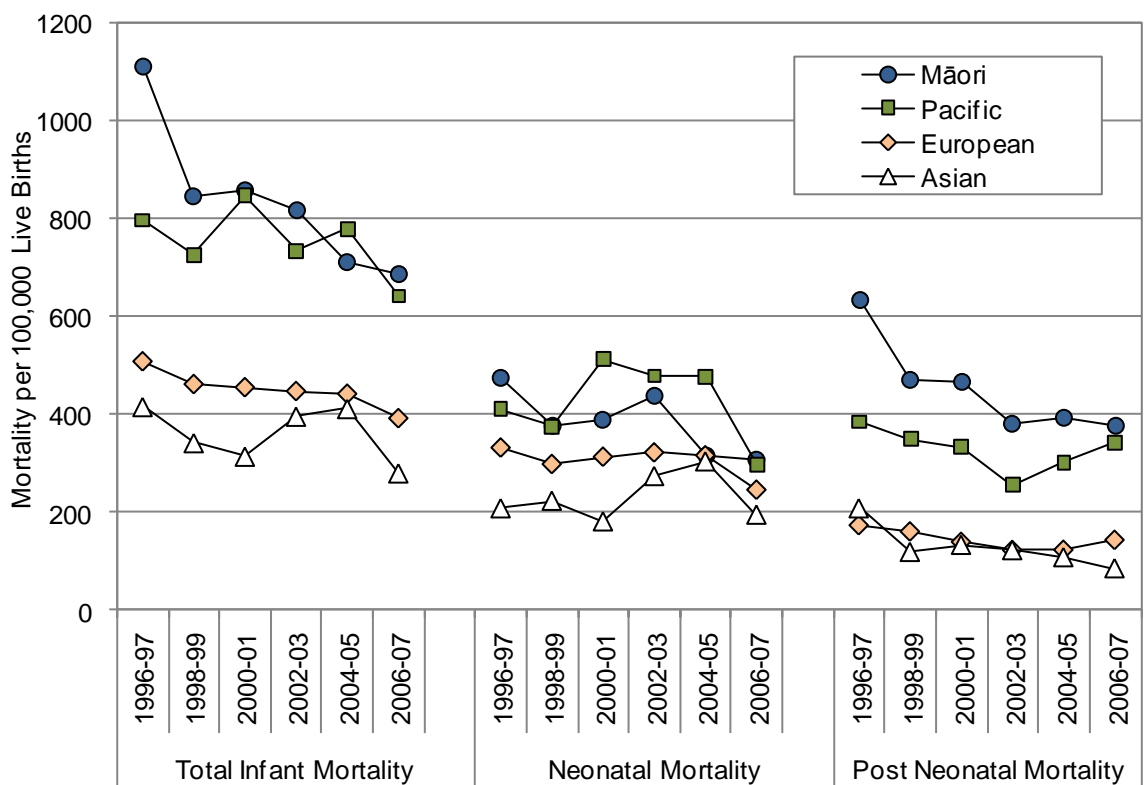


Figure 1. Total, Neonatal and Post Neonatal Mortality, New Zealand 1990-2007



Source: Numerator: National Mortality Collection; Denominator: Birth Registration Dataset

Figure 2. Total, Neonatal and Post Neonatal Mortality by Ethnicity, New Zealand 1996-2007



Source: Numerator: National Mortality Collection; Denominator: Birth Registration Dataset. Ethnicity is Level 1 Prioritised



## Distribution by Cause

In New Zealand during 2003-2007, extreme prematurity and congenital anomalies were the leading causes of neonatal mortality, although intrauterine / birth asphyxia also made a significant contribution. In contrast, SUDI was the leading cause of post-neonatal mortality, followed by congenital anomalies (**Table 1**).

Table 1. Neonatal and Post Neonatal Mortality by Cause, New Zealand 2003–2007

Cause of Death	Number: Total 2003-2007	Number: Annual Average	Rate per 100,000	Percent of Deaths
<b>Neonatal Mortality</b>				
Extreme Prematurity	215	43.0	71.8	23.8
Congenital Anomalies: CVS	56	11.2	18.7	6.2
Congenital Anomalies: CNS	31	6.2	10.4	3.4
Congenital Anomalies: Other	135	27.0	45.1	14.9
Intrauterine / Birth Asphyxia	47	9.4	15.7	5.2
Other Perinatal Conditions	342	68.4	114.2	37.8
SUDI: Suffocation / Strangulation in Bed	20	4.0	6.7	2.2
SUDI: SIDS or Unspecified	18	3.6	6.0	2.0
Injury / Poisoning	9	1.8	3.0	1.0
Other Causes	32	6.4	10.7	3.5
<b>Total Neonatal Mortality</b>	<b>905</b>	<b>181.0</b>	<b>302.3</b>	<b>100.0</b>
<b>Post Neonatal Mortality</b>				
SUDI: SIDS	189	37.8	63.1	28.4
SUDI: Suffocation / Strangulation in Bed	68	13.6	22.7	10.2
SUDI: Unspecified	10	2.0	3.3	1.5
Congenital Anomalies: CVS	52	10.4	17.4	7.8
Congenital Anomalies: CNS	10	2.0	3.3	1.5
Congenital Anomalies: Other	63	12.6	21.0	9.5
Other Perinatal Conditions	56	11.2	18.7	8.4
Injury / Poisoning	30	6.0	10.0	4.5
Other Causes	187	37.4	62.5	28.1
<b>Total Post Neonatal Mortality</b>	<b>665</b>	<b>133.0</b>	<b>222.1</b>	<b>100.0</b>
<b>New Zealand Total</b>	<b>1,570</b>	<b>314.0</b>	<b>524.3</b>	<b>100.0</b>

Source: Numerator: National Mortality Collection; Denominator: Birth Registration Dataset

## Distribution by Ethnicity, Gender and NZDep Deprivation

In New Zealand during 2003-2007, neonatal mortality was *significantly* higher for Pacific > Māori, European and Asian infants, males and those in more deprived areas, while post neonatal mortality was *significantly* higher for Māori and Pacific > European and Asian infants, males and those in more deprived areas. SUDI was *significantly* higher for Māori > Pacific > European > Asian infants, and those in average to more deprived areas (**Table 2**).



Table 2. Risk Factors for Neonatal and Post Neonatal Mortality, and Sudden Unexpected Death in Infancy (SUDI), New Zealand 2003–2007

Neonatal Mortality							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Ethnicity			
Decile 1-2	225.9	1.00		Asian	255.9	0.90	0.70 - 1.16
Decile 3-4	227.3	1.01	0.77 - 1.31	European	283.8	1.00	
Decile 5-6	270.1	1.20	0.93 - 1.53	Māori	319.2	1.12	0.97 - 1.31
Decile 7-8	329.1	1.46	1.15 - 1.84	Pacific	404.5	1.42	1.17 - 1.73
Decile 9-10	396.2	1.75	1.41 - 2.19	Gender			
				Female	277.0	1.00	
				Male	326.2	1.18	1.03 - 1.34
Post Neonatal Mortality							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Ethnicity			
Decile 1-2	107.6	1.00		Asian	106.6	0.80	0.54 - 1.17
Decile 3-4	130.5	1.21	0.84 - 1.75	European	133.8	1.00	
Decile 5-6	166.8	1.55	1.10 - 2.19	Māori	388.5	2.90	2.44 - 3.46
Decile 7-8	219.4	2.04	1.48 - 2.81	Pacific	295.6	2.21	1.73 - 2.82
Decile 9-10	386.1	3.59	2.66 - 4.84	Gender			
				Female	190.6	1.00	
				Male	252.0	1.32	1.13 - 1.54
Sudden Unexpected Death in Infancy (SUDI)							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Ethnicity			
Decile 1-2	32.3	1.00		Asian	14.2	0.29	0.11 - 0.80
Decile 3-4	69.2	2.14	1.17 - 3.93	European	48.9	1.00	
Decile 5-6	68.9	2.14	1.17 - 3.88	Māori	227.8	4.66	3.56 - 6.10
Decile 7-8	88.4	2.74	1.55 - 4.83	Pacific	96.4	1.97	1.30 - 3.01
Decile 9-10	200.0	6.20	3.65 - 10.52	Gender			
				Female	93.3	1.00	
				Male	110.0	1.18	0.94 - 1.48

Source: Numerator: National Mortality Collection; Denominator: Birth Registration Dataset; Rates are per 100,000, Rate Ratios are Unadjusted, Ethnicity is Level 1 Prioritised. SUDI is neonatal AND post neonatal.

## Summary

In New Zealand during 1990-2007, neonatal and post neonatal mortality both declined, with neonatal mortality exceeding post neonatal mortality during the 2000s. When broken down by ethnicity, neonatal mortality was higher for Pacific and Māori > European > Asian infants during the late 1990s, although ethnic differences were less consistent during the 2000s. In contrast, post neonatal mortality was higher for Māori > Pacific > European and Asian infants throughout 1996-2007.

When broken down by cause, extreme prematurity and congenital anomalies were the leading causes of neonatal mortality in New Zealand during 2003-2007. In contrast, SUDI was the leading cause of post-neonatal mortality, followed by congenital anomalies. During this period, neonatal mortality was *significantly* higher for Pacific > Māori, European and Asian infants, males and those in more deprived areas, while post neonatal mortality was *significantly* higher for Māori and Pacific > European and Asian infants, males and those in more deprived areas. SUDI was *significantly* higher for Māori > Pacific > European > Asian infants, and those in average to more deprived areas.



## References

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