

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.

This indicator uses information from the National Mortality Collection to review neonatal, post neonatal and 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 prior to 29 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 **Error! Reference source not found.** 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).

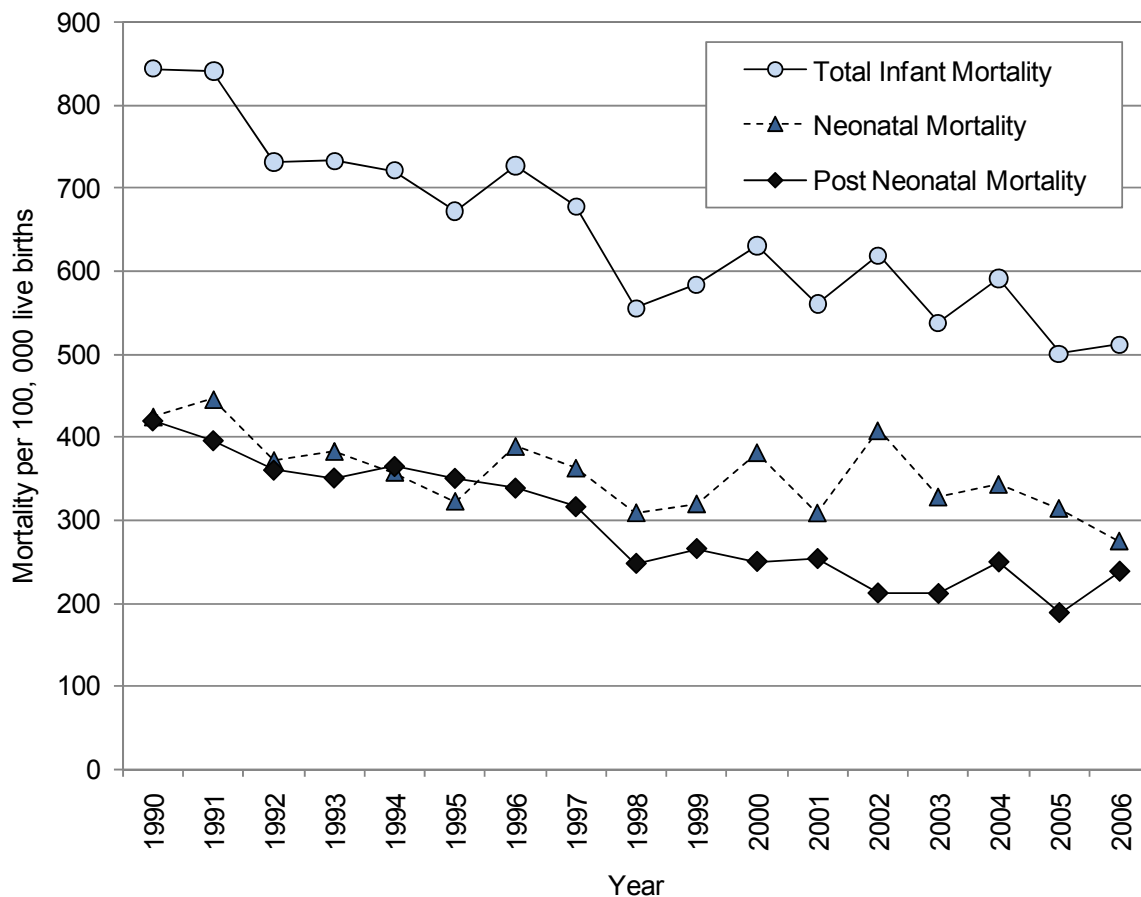
New Zealand Distribution and Trends

New Zealand Trends

In New Zealand, while neonatal and post neonatal mortality both declined during the early-mid 1990s, declines during the 2000s were less marked. During the 2000s, neonatal mortality exceeded post neonatal mortality (**Figure 1**).

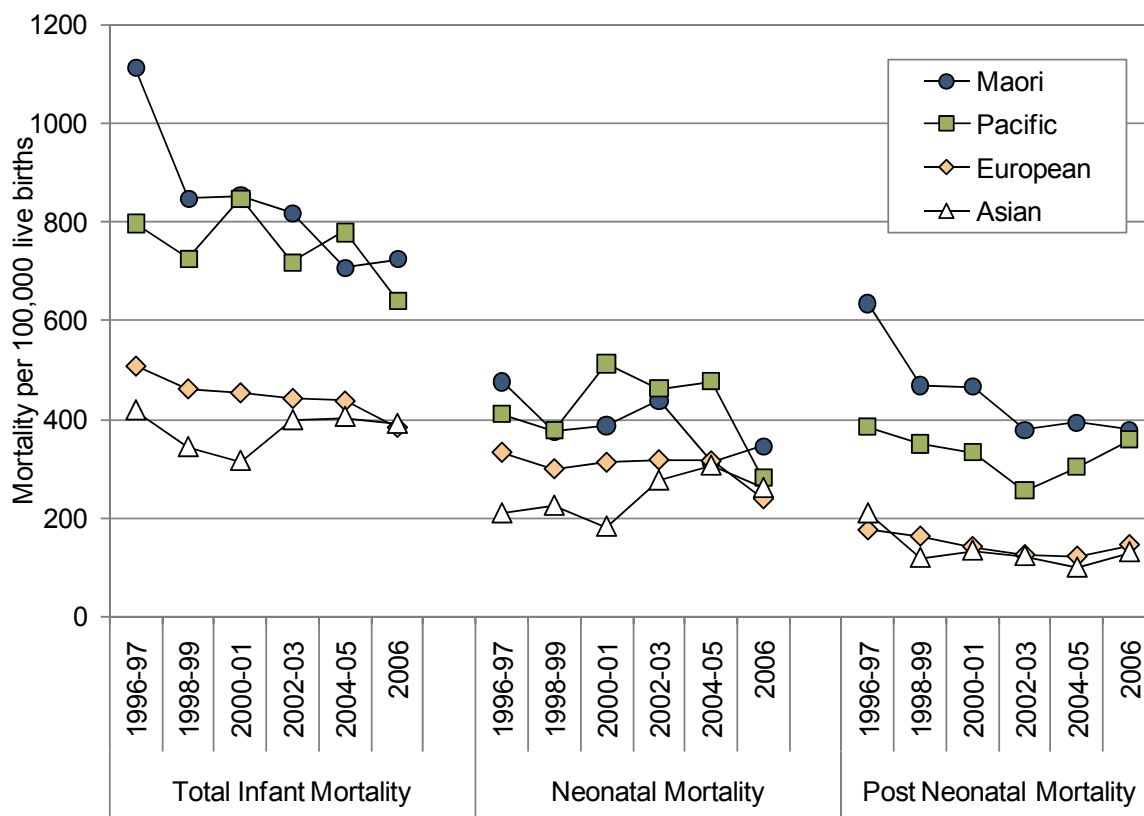


Figure 1. Total, Neonatal and Post Neonatal Mortality, New Zealand 1990-2006



Source: Numerator National Mortality Collection; Denominator Birth Registration Dataset

Figure 2. Total, Neonatal and Post Neonatal Mortality by Ethnicity, New Zealand 1996-06



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



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 1996-2006 (**Figure 2**).

Distribution by Cause

In New Zealand during 2002-2006, 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 2002-2006

Cause of Death	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	Percent of Deaths
Neonatal Mortality				
Extreme Prematurity	232	46.4	80.3	24.2
Congenital Anomalies: CVS	64	12.8	22.2	6.7
Congenital Anomalies: CNS	32	6.4	11.1	3.3
Congenital Anomalies: Other	140	28.0	48.5	14.6
Intrauterine / Birth Asphyxia	52	10.4	18.0	5.4
Other Perinatal Conditions	369	73.8	127.8	38.6
SUDI: SIDS	15	3.0	5.2	1.6
SUDI: Suffocation / Strangulation in Bed	13	2.6	4.5	1.4
SUDI: Unspecified	4	0.8	1.4	0.4
Injury / Poisoning	7	1.4	2.4	0.7
Other Causes	29	5.8	10.0	3.0
Total Neonatal Mortality	957	191.4	331.4	100.0
Post Neonatal Mortality				
SUDI: SIDS	187	37.4	64.7	29.5
SUDI: Suffocation / Strangulation in Bed	60	12.0	20.8	9.5
SUDI: Unspecified	21	4.2	7.3	3.3
Congenital Anomalies: CVS	50	10.0	17.3	7.9
Congenital Anomalies: CNS	16	3.2	5.5	2.5
Congenital Anomalies: Other	58	11.6	20.1	9.2
Other Perinatal Conditions	56	11.2	19.4	8.8
Injury / Poisoning	29	5.8	10.0	4.6
All Other Causes	156	31.2	54.0	24.6
Total Post Neonatal Mortality	633	126.6	219.2	100.0

Source: Numerator National Mortality Collection; Denominator Birth Registration Dataset

Distribution by Ethnicity, Gender and NZDep Deprivation

In New Zealand during 2002-2006, neonatal and post neonatal mortality were both *significantly* higher for Pacific and Māori > European and Asian infants, males and those in more deprived areas, while SUDI was *significantly* higher for Māori > Pacific > European and 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 2002-2006

Neonatal Mortality							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Ethnicity			
Decile 1-2	251.2	1.00		Asian	284.6	0.95	0.74 - 1.21
Decile 3-4	258.1	1.03	0.80 - 1.32	European	300.1	1.00	
Decile 5-6	314.5	1.25	0.99 - 1.59	Māori	366.9	1.22	1.06 - 1.42
Decile 7-8	330.6	1.32	1.05 - 1.65	Pacific	430.7	1.44	1.18 - 1.74
Decile 9-10	438.8	1.75	1.41 - 2.16	Gender			
				Female	302.2	1.00	
				Male	358.5	1.19	1.04 - 1.35
Post Neonatal Mortality							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Ethnicity			
Decile 1-2	106.7	1.00		Asian	113.8	0.89	0.61 - 1.32
Decile 3-4	131.1	1.23	0.84 - 1.79	European	127.2	1.00	
Decile 5-6	167.6	1.57	1.11 - 2.23	Māori	385.2	3.03	2.52 - 3.63
Decile 7-8	217.7	2.04	1.47 - 2.83	Pacific	295.7	2.32	1.81 - 2.98
Decile 9-10	375.0	3.51	2.59 - 4.77	Gender			
				Female	194.4	1.00	
				Male	242.8	1.25	1.07 - 1.46
Sudden Unexpected Death in Infancy (SUDI)							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Ethnicity			
Decile 1-2	24.5	1.00		Asian	19.0	0.44	0.18 - 1.10
Decile 3-4	65.5	2.68	1.35 - 5.32	European	42.9	1.00	
Decile 5-6	71.6	2.93	1.50 - 5.72	Māori	246.2	5.74	4.32 - 7.63
Decile 7-8	98.5	4.03	2.12 - 7.65	Pacific	93.2	2.17	1.40 - 3.38
Decile 9-10	204.4	8.36	4.54 - 15.4	Gender			
				Female	100.7	1.00	
				Male	106.9	1.06	0.85 - 1.33

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, while neonatal and post neonatal mortality both declined during the early-mid 1990s, declines during the 2000s were less marked. 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 1996-2006.

When broken down by cause, extreme prematurity and congenital anomalies were the leading causes of neonatal mortality in New Zealand during 2002-2006. In contrast, SUDI was the leading cause of post-neonatal mortality, followed by congenital anomalies. During this period, neonatal and post neonatal mortality were both *significantly* higher for Pacific and Māori > European and Asian infants, males and those in more deprived areas, while SUDI was *significantly* higher for Māori > Pacific > European and Asian infants, and those in average to more deprived areas.



References

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