

THE CHILDREN'S SOCIAL
HEALTH MONITOR:
HEALTH AND WELLBEING
INDICATORS

HOSPITAL ADMISSIONS AND MORTALITY WITH A SOCIAL GRADIENT IN CHILDREN

In New Zealand, there are currently large disparities in child health status, with Māori and Pacific children and those living in more deprived areas experiencing a disproportionate burden of morbidity and mortality [22]. These disparities were present even in the mid-2000s, when New Zealand experienced some of its lowest unemployment rates in recent decades. The macroeconomic environment began to change in 2008 however, with the country officially entering a recession at the end of June 2008, after two consecutive quarters of negative growth. While New Zealand technically left the recession at the end of June 2009 (when quarterly growth reached +0.1% [244]), progress since then has been variable, with unemployment rates, and the number of children reliant on benefit recipients remaining higher than in the mid-2000s.

The impact these changes might have on socially sensitive health outcomes remains unclear however, as international evidence suggests that the effects may vary, not only with the magnitude and duration of any economic downturn, but also as a result of the Government's social policy responses, and the extent to which New Zealand can maintain an effective social safety net (e.g. in housing, health, education, income support) for those most affected. Further, the adaptations families make to their economic circumstances (e.g. cutting back on heating and doctor's visits vs. reductions in cigarettes and takeaways), are also important, with the net impact of such positive / negative adaptations on health outcomes for children being difficult to predict (for a more detailed review of these issues see Craig et al's 2009 report[269]).

As predicting the impact of the economic downturn on child wellbeing is difficult, it would instead seem prudent to monitor a basket of key child health outcomes over time, in order to ensure that any impacts on child health and wellbeing can be identified early, so that proactive and co-ordinated responses can be put in place, should the need arise. The following section thus uses data from the National Minimum Dataset and the National Mortality collection to review hospital admissions for, and mortality from, the basket of socially sensitive conditions outlined in the Methods section below.

Data Source and Methods

Definition

1. Hospital Admissions for Medical Conditions with a Social Gradient in Children Aged 0–14 Years
2. Injury Admissions with a Social Gradient in Children Aged 0–14 Years
3. Mortality with a Social Gradient in Children Aged 0–14 Years

Data Source

For details of the methodology used to derive these indicators see **Appendix 9**.

Numerator:

Hospital Admissions for Medical Conditions with a Social Gradient: Acute and Arranged (Arranged= within 7 days of referral) Hospital Admissions (Waiting List, ACC cases and neonates <29 days excluded) in children aged 0–14 years with the following ICD-10-AM primary diagnoses: A00–A09, R11, K529 (Gastroenteritis); A15–A19 (Tuberculosis); A33, A34, A35, A36, A37, A80, B05, B06, B16, B26, B18.0, B18.1, P35.0 or M01.4 (Vaccine Preventable Diseases); A39 (Meningococcal Disease); B34 (Viral Infection of Unspecified Site); E40–E64 or D50–D53 (Nutritional Deficiencies / Anaemias); J00–J03 or J06 (Acute Upper Respiratory Infections); J04 (Croup/Laryngitis/Tracheitis/Epiglottitis); J12, J10.0 or J11.0 (Viral Pneumonia); J13–J16 or J18 (Bacterial / Non-Viral Pneumonia); J21 (Acute Bronchiolitis); J45–J46 (Asthma); J47 (Bronchiectasis); G00–G01 (Bacterial Meningitis); A87, G02 or G03 (Viral / Other / NOS Meningitis); G40 or G41 (Epilepsy/ Status Epilepticus); H65, H66 or H67 (Otitis Media); I00–I09 (Rheumatic Fever/Heart Disease); K40 (Inguinal Hernia); L00–L08, H00.0, H01.0, J34.0 or L98.0 (Skin Infections); L20–L30 (Dermatitis and Eczema); M86 (Osteomyelitis); N10, N12, N13.6, N30.0, N30.9 or N39.0 (Urinary Tract Infection); R56.0 (Febrile Convulsions).

Injury Admissions with a Social Gradient: Hospital admissions (emergency department cases, neonates <29 days excluded) in children 0–14 years, with a primary diagnosis of injury (ICD-10-AM S00–T79) and an ICD-10-AM primary external cause code in the following range: V01–V09 (Transport: Pedestrian); V10–V19 (Transport: Cyclist); V40–V79 (Transport: Vehicle Occupant); W00–W19 (Falls); W20–W49 (Mechanical Forces: Inanimate); W50–W64 (Mechanical Forces: Animate); W85–X19 (Electricity / Fire / Burns); X40–X49 (Accidental Poisoning); In order to ensure comparability over time, all injury cases with an Emergency Department Specialty Code (M05–M08) on discharge were excluded.



Mortality with a Social Gradient: All deaths in children 0–14 years, (neonates <29 days excluded) with a main underlying cause of death in the ICD-10-AM medical and injury categories outlined above. In addition post-neonatal Sudden Unexpected Deaths in Infancy (SUDI) were included, if the child was aged between 29 days and 1 year and their main underlying cause of death was SUDI (ICD-10-AM R95, R96, R98, R99, W75).

Denominator: NZ Statistics NZ Estimated Resident Population

Indicator Category Proxy B–C

Notes on Interpretation (for further detail see **Appendix 9**)

Note 1: Hospital admissions in neonates (<29 days) were excluded from both indicators, as these admissions are more likely to reflect issues arising prior to / at the time of birth, (e.g. preterm infants may register multiple admissions as they transition from intensive care (NICU), through special care nurseries (SCBU) to the postnatal ward), and respiratory infections / other medical conditions arising in these contexts are likely to differ in their aetiology from those arising in the community.

Note 2: For medical conditions, only acute and arranged admissions have been included, as Waiting List admissions tend to reflect service capacity, rather than actual health need (e.g. inclusion of these admissions would result in a large number of children with otitis media with effusion (OME) and chronic tonsillitis being included (for grommets and tonsillectomies), whose demographic profile is very different from children attending hospital acutely for similar diseases). For injury admissions however, filtering by admission type could not occur, as a number of DHBs admitted injury cases under (now discontinued) ACC admission codes, making it difficult to distinguish between acute and waiting list admissions in this context. As with other injury data in these reports however, all injury cases with an Emergency Department Specialty Code (M05–M08) on discharge were excluded (see **Appendix 3** for rationale).

Note 3: Hospital admissions were considered to have a social gradient if rates for those in the most deprived (NZDep Decile 9–10) areas were ≥ 1.8 times higher than for those in the least deprived (NZDep Decile 1–2) areas, or where rates for Māori, Pacific or Asian/Indian children were ≥ 1.8 times higher than for European children. In addition, a small number of conditions were included where rates were ≥ 1.5 times higher, they demonstrated a consistent social gradient, and the association was biologically plausible.

Note 4: When considering the magnitude of social gradients between medical and injury admissions, it must be remembered that these differences are not strictly comparable, as for technical reasons emergency department cases have been removed from injury admissions (and social differences in attendance at the Emergency Department vs. primary care for minor medical conditions may have accounted for some (but not all) of the social gradients in medical admission seen). No such differential filtering occurred for mortality data however, and thus the magnitude of the social differences seen is more readily comparable.

Note 5: 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 2** for further discussion of this issue).

Note 6: SUDI rates are traditionally calculated per 1,000 live births. For this analysis rates for those aged 0–14 years have been calculated, so that the relative contribution SUDI makes to mortality in this age group (as compared to other causes of death) is more readily appreciated. As a result, the SUDI rates in this section are not readily comparable to traditional SUDI mortality rates for those <1 year reported elsewhere.

Note 7: The rates presented here may differ from those reported previously due to a change in the codes used to identify gastroenteritis. Prior to 2008, a large proportion of gastroenteritis cases were coded to A09 (diarrhoea and gastroenteritis of presumed infectious origin). From 2008 however, the Ministry of Health (as the result of a move from ICD-10-AM Version 3 to 6) began to map the majority of these cases to K529 (non-infective gastroenteritis and colitis unspecified). As the original CSHM hospital admissions indicator was developed using 2003–2007 data, because K529 only accounted for a minority of cases at that point (n $\approx$ 50–60 cases per year), and because the majority of gastroenteritis cases in the paediatric population are presumed to be of infectious origin, the K529 code was not initially included in the CSHM coding algorithms. The coding change however resulted in a large reduction in the number A09 coded cases and a large increase in the number of K529 coded cases after 2008. Thus, in order to preserve time series continuity (even though the clinical appropriateness of such a coding change remains debatable) the current year's analysis includes both the A09 and K529 gastroenteritis codes (with this coding change being extended back to 2000). As a result, the results presented here may differ from those presented previously, with the greatest impact being seen after 2008.

New Zealand Distribution and Trends

New Zealand Distribution by Cause

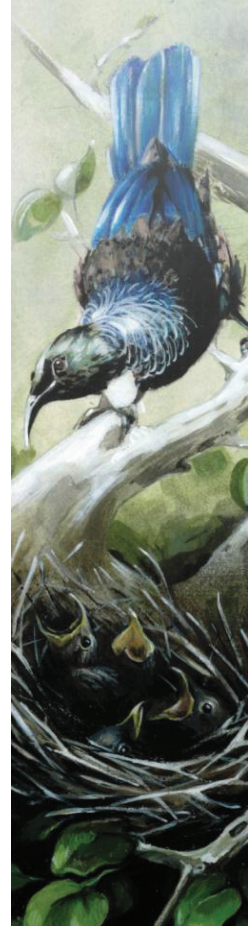
Hospital Admissions: In New Zealand during 2006–2010, gastroenteritis, bronchiolitis, and asthma made the largest individual contributions to hospitalisations for medical conditions with a social gradient, although infectious and respiratory diseases collectively were responsible for the majority of admissions. Similarly falls, followed by inanimate mechanical forces were the leading causes of injury admissions with a social gradient, although transport injuries as a group also made a significant contribution (**Table 176**).



Table 176. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years (excluding Neonates) by Primary Diagnosis, New Zealand 2006–2010

Primary Diagnosis	Number: Total 2006–2010	Number: Annual Average	Rate per 1,000	% of Total
Medical Conditions				
Gastroenteritis	26,610	5,322.0	5.96	14.9
Acute Bronchiolitis	26,228	5,245.6	5.88	14.7
Asthma	24,030	4,806.0	5.38	13.5
Acute Upper Respiratory Infections Excl Croup	18,890	3,778.0	4.23	10.6
Viral Infection of Unspecified Site	17,635	3,527.0	3.95	9.9
Skin Infections	15,198	3,039.6	3.40	8.5
Bacterial/Non-Viral Pneumonia	14,900	2,980.0	3.34	8.4
Urinary Tract Infection	6,647	1,329.4	1.49	3.7
Croup / Laryngitis / Tracheitis / Epiglottitis	5,752	1,150.4	1.29	3.2
Epilepsy / Status Epilepticus	3,982	796.4	0.89	2.2
Febrile Convulsions	3,555	711.0	0.80	2.0
Otitis Media	3,483	696.6	0.78	2.0
Dermatitis and Eczema	3,136	627.2	0.70	1.8
Viral Pneumonia	1,925	385.0	0.43	1.1
Inguinal Hernia	1,427	285.4	0.32	0.8
Osteomyelitis	1,169	233.8	0.26	0.7
Rheumatic Fever/Heart Disease	914	182.8	0.20	0.5
Viral/Other/NOS Meningitis	722	144.4	0.16	0.4
Bronchiectasis	702	140.4	0.16	0.4
Meningococcal Disease	449	89.8	0.10	0.3
Vaccine Preventable Diseases	410	82.0	0.09	0.2
Nutritional Deficiencies / Anaemias	299	59.8	0.07	0.2
Bacterial Meningitis	221	44.2	0.05	0.1
Tuberculosis	59	11.8	0.01	<0.1
New Zealand Total	178,343	35,668.6	40.0	100.0
Injury Admissions				
Falls	24,511	4,902.2	5.49	49.1
Mechanical Forces: Inanimate	12,712	2,542.4	2.85	25.5
Transport: Cyclist	2,926	585.2	0.66	5.9
Mechanical Forces: Animate	2,807	561.4	0.63	5.6
Accidental Poisoning	2,632	526.4	0.59	5.3
Electricity / Fire / Burns	1,959	391.8	0.44	3.9
Transport: Vehicle Occupant	1,179	235.8	0.26	2.4
Transport: Pedestrian	974	194.8	0.22	2.0
Drowning / Submersion	175	35.0	0.04	0.4
New Zealand Total	49,875	9,975.0	11.2	100.0

Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injury Admissions: Emergency Department cases removed.



Mortality: In New Zealand during 2004–2008, SUDI made the single largest contribution to mortality with a social gradient in children aged 0–14 years. This occurred despite the fact that, by definition, all of these deaths occurred during the first year of life. Vehicle occupant related deaths made the largest contribution to injury related deaths, followed by pedestrian injuries and drowning, while bacterial / non-viral pneumonia was the leading cause of mortality from medical conditions (**Table 177**).

Table 177. Mortality from Conditions with a Social Gradient in Children Aged 0–14 Years (excluding Neonates) by Main Underlying Cause of Death, New Zealand 2004–2008

Cause of Death	Number: Total 2004–2008	Number: Annual Average	Rate per 100,000	% of Total
Medical Conditions				
Bacterial/Non-Viral Pneumonia	49	9.8	1.10	32.5
Epilepsy/Status Epilepticus	19	3.8	0.43	12.6
Meningococcal Disease	18	3.6	0.41	11.9
Viral Pneumonia	14	2.8	0.32	9.3
Bacterial Meningitis	12	2.4	0.27	7.9
Asthma	9	1.8	0.20	6.0
Gastroenteritis	7	1.4	0.16	4.6
Acute Bronchiolitis	5	1.0	0.11	3.3
Acute Upper Respiratory Infections Excl Croup	3	0.6	0.07	2.0
Viral/Other/NOS Meningitis	3	0.6	0.07	2.0
Other Causes	12	2.4	0.27	7.9
Total Medical Conditions	151	30.2	3.40	100.0
Injuries				
Transport: Vehicle Occupant	87	17.4	1.96	36.0
Transport: Pedestrian	46	9.2	1.04	19.0
Drowning/Submersion	44	8.8	0.99	18.2
Electricity/Fire/Burns	21	4.2	0.47	8.7
Transport: Cyclist	12	2.4	0.27	5.0
Mechanical Forces: Inanimate	12	2.4	0.27	5.0
Falls	11	2.2	0.25	4.5
Accidental Poisoning	7	1.4	0.16	2.9
Other Causes	<3	s	s	s
Total Injuries	242	48.4	5.45	100.0
Post Neonatal SUDI				
SUDI (Infant)	266	53.2	5.99	100.0
New Zealand	659	131.8	14.8	100.0

Source: Numerator: National Mortality Collection (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: SUDI death numerators are for infants aged 29–364 days only; s: suppressed due to small numbers.

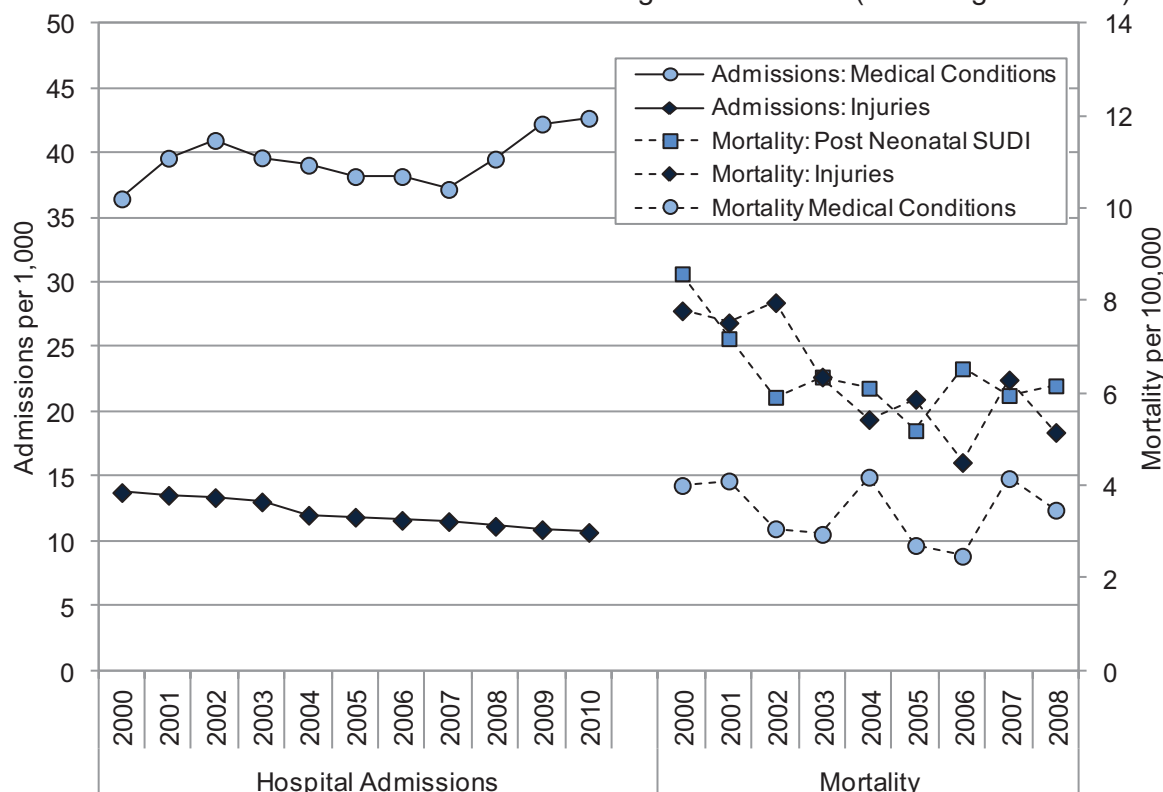
New Zealand Trends

Hospital Admissions: In New Zealand, medical admissions with a social gradient increased during the early 2000s, reached peak in 2002 and then declined, with an upswing in rates again being evident during 2007–2009. In contrast, injury admissions with a social gradient declined throughout 2000–2010 (**Figure 170**).

Mortality: In New Zealand, injury mortality with a social gradient decreased between 2000 and 2004, but fluctuated thereafter. Similarly, post-neonatal SUDI decreased between

2000 and 2002 and thereafter remained relatively static, while mortality from medical conditions with a social gradient fluctuated throughout 2000–2008 (**Figure 170**).

Figure 170. Hospital Admissions (2000–2010) and Mortality (2000–2008) from Conditions with a Social Gradient in New Zealand Children Aged 0–14 Years (excluding Neonates)



Source: Numerator Admissions: National Minimum Dataset (Neonates removed); Numerator Mortality: National Mortality Collection (Neonates Removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions Admissions: Acute and Arranged Admissions only; Injury Admissions: Emergency Department Cases removed.

New Zealand Trends by Ethnicity

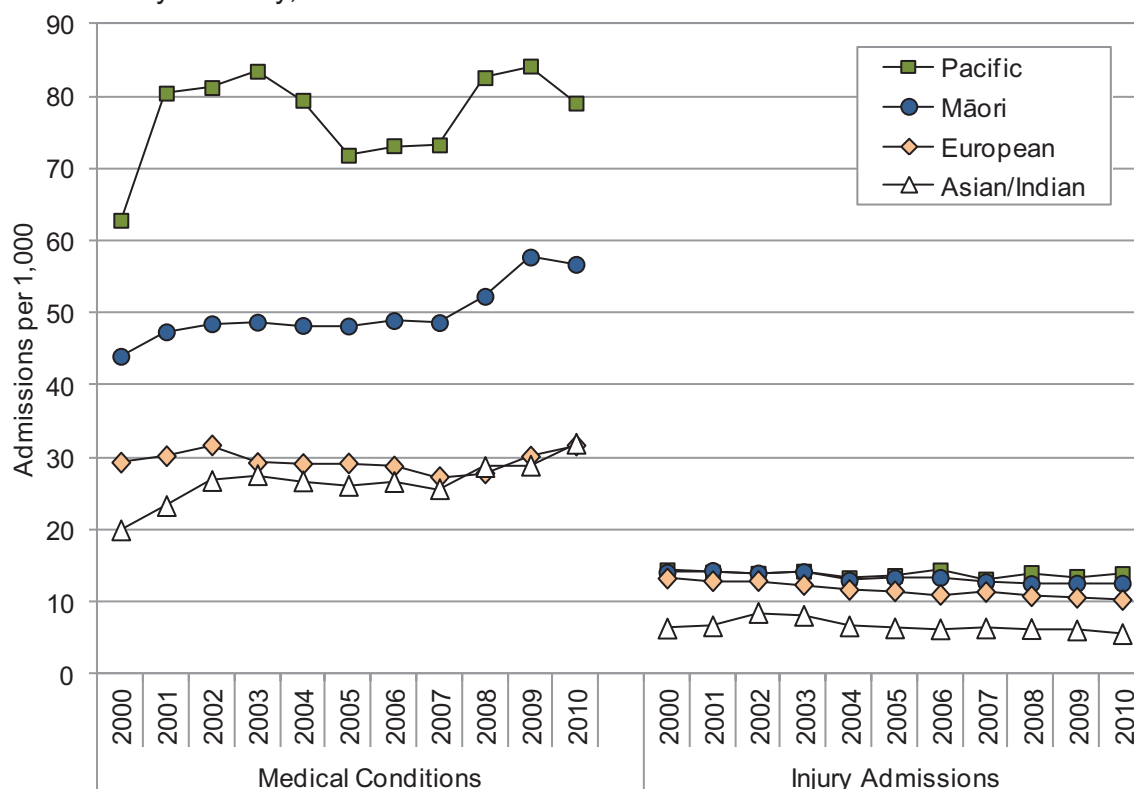
Hospital Admissions for Medical Conditions: In New Zealand during 2000–2010, hospitalisations for medical conditions with a social gradient were consistently higher for Pacific > Māori > European and Asian/Indian children. For Pacific children, admissions increased during the early 2000s, reached a peak in 2003 and then declined. An upswing in rates was again evident during 2007–2009, with rates then declining during 2010. For Māori children, rates were static during the mid-2000s, but then increased between 2007 and 2009, while for Asian/Indian and European children rates were static during the mid-2000s but increased after 2007 (**Figure 171**).

Hospital Admissions for Injuries: In New Zealand during 2000–2010, injury admissions with a social gradient were also higher for Pacific and Māori > European > Asian/Indian children. Admission rates for European and Māori children declined during 2000–2010, while rates for Pacific and Asian/Indian children were more static, with ethnic differences being greater in 2010 than they were in 2000. While in absolute terms, the magnitude the ethnic differences seen appeared to be less marked than for medical conditions, for technical reasons, comparisons between these categories is not strictly possible (see Note 4 in Methods section) (**Figure 171**).

Mortality: In New Zealand during 2000–2008, SUDI mortality was consistently higher for Māori > Pacific > European and Asian/Indian infants, while mortality from medical conditions with a social gradient was generally higher for Māori and Pacific > European and Asian/Indian children. Mortality from injuries with a social gradient was also consistently higher for Māori than for European and Asian/Indian children while rates for Pacific children were more variable (**Figure 172**).

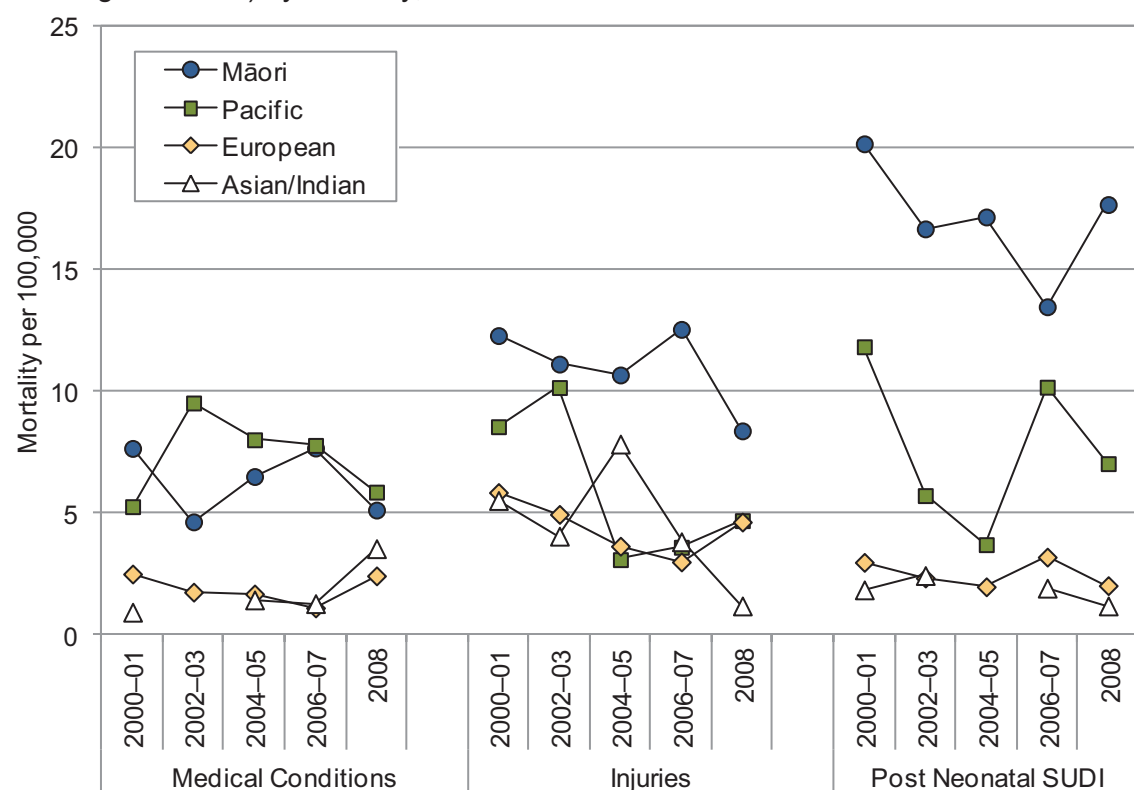


Figure 171. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years by Ethnicity, New Zealand 2000–2010



Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injury Admissions: Emergency Department Cases removed. Ethnicity is Level 1 Prioritised.

Figure 172. Mortality from Conditions with a Social Gradient in Children Aged 0–14 Years (excluding Neonates) by Ethnicity, New Zealand 2000–2008



Source: Numerator: National Mortality Collection (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: SUDI deaths are for infants aged 29–364 days only. Ethnicity is Level 1 Prioritised.

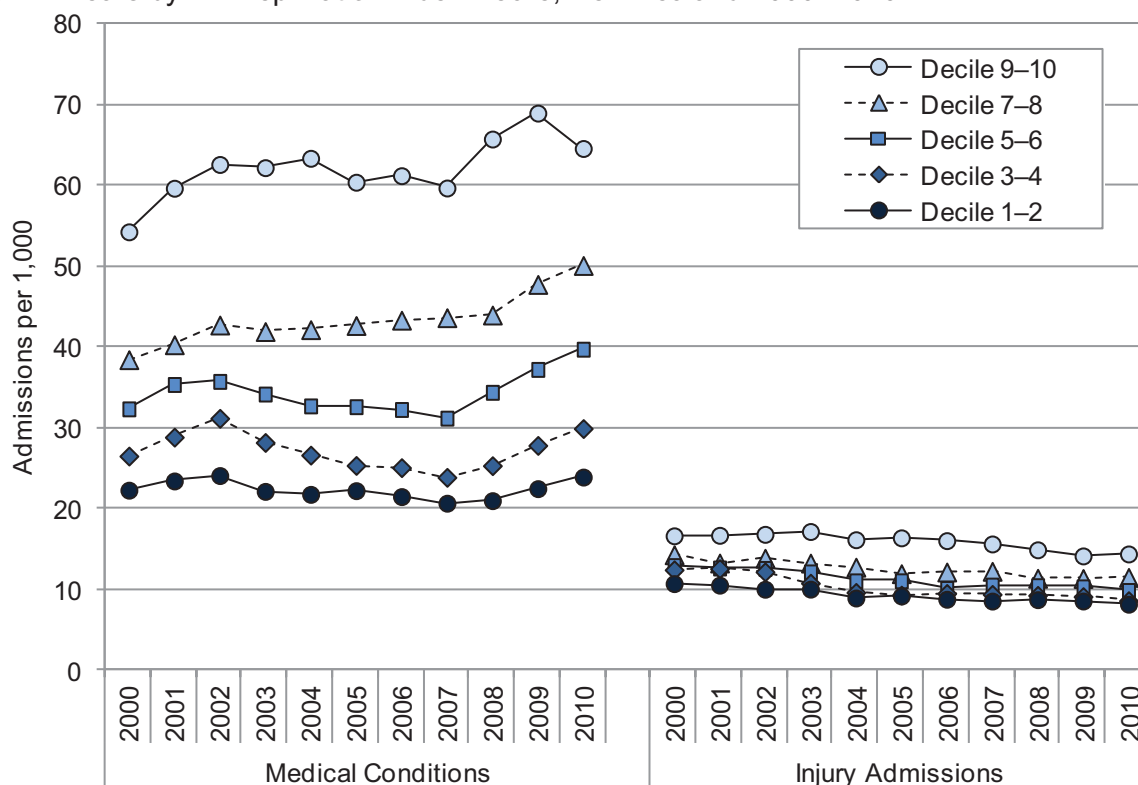
New Zealand Trends by NZDep Decile

Hospital Admissions for Medical Conditions: In New Zealand during 2000–2010, hospital admissions for medical conditions with a social gradient were consistently higher for those living in Decile 9–10 > Decile 7–8 > Decile 5–6 > Decile 3–4 > Decile 1–2 areas. While admissions for those in Decile 1–7 areas increased during 2008–2010, admissions for those in Decile 9–10 areas declined after 2009.

Hospital Admissions for Injuries: In New Zealand during 2000–2010, injury admissions with a social gradient were also consistently higher for those living in Decile 9–10 > Decile 7–8 > Decile 5–6 > Decile 3–4 > Decile 1–2 areas, although rates gradually declined for all socioeconomic groups during this period. While in absolute terms the socioeconomic differences seen were less marked than for medical conditions, for technical reasons comparisons between these admission categories is not strictly possible (see Note 4 in Methods section) (**Figure 173**).

Mortality: In New Zealand during 2000–2008, medical conditions and injuries with a social gradient, and post neonatal SUDI were all consistently higher for those in the most deprived (Decile 9–10) areas than for those in the least deprived (Decile 1–2) areas, with the greatest absolute differences being evident for post neonatal SUDI (**Figure 174**).

Figure 173. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years by NZ Deprivation Index Decile, New Zealand 2000–2010



Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injury Admissions: Emergency Department Cases removed.

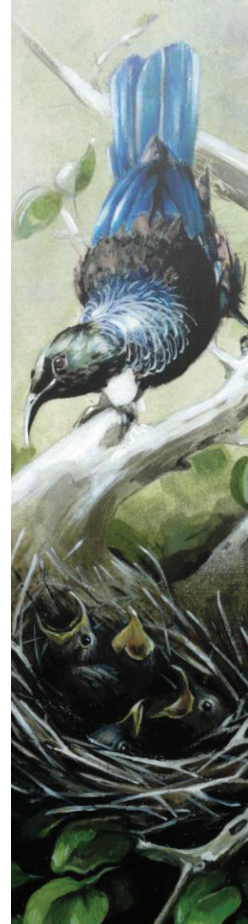
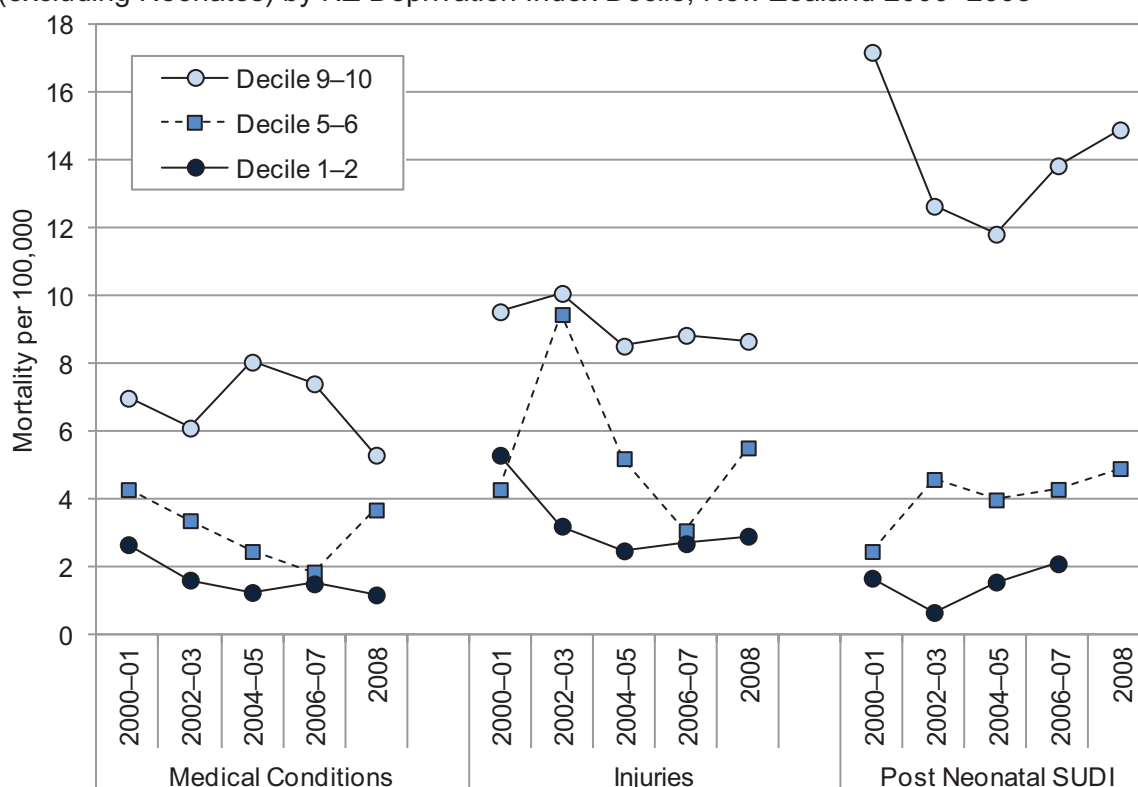


Figure 174. Mortality from Conditions with a Social Gradient in Children Aged 0–14 Years (excluding Neonates) by NZ Deprivation Index Decile, New Zealand 2000–2008



Source: Numerator: National Mortality Collection (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: SUDI deaths are for infants aged 29–364 days only.

New Zealand Distribution by Ethnicity, NZDep Index Decile and Gender

Hospital Admission for Medical Conditions: In New Zealand during 2006–2010, hospital admissions for medical conditions with a social gradient were *significantly* higher for Pacific > Māori > European and Asian/Indian children, males and those in average-to-more deprived (NZDep decile 3–10) areas (**Table 178**).

Hospital Admission for Injuries: Similarly during 2006–2010, hospital admissions for injury admissions with a social gradient were *significantly* higher for Pacific > Māori > European > Asian/Indian children, males and those in average-to-more deprived (NZDep decile 4–10) areas. While the magnitude of these social differences appeared smaller for injury admissions, it must be remembered that for technical reasons (See Note 4 in Methods Section) these categories are not strictly comparable (**Table 178**).

Mortality: In New Zealand during 2004–2008, mortality from medical conditions with a social gradient was *significantly* higher for Pacific and Māori > European and Asian/Indian children and those in more deprived (Decile 7–10) areas. Similarly mortality from injuries with a social gradient was *significantly* higher for Māori > Asian, Pacific and European children, males and those in more deprived (Deciles 3–4 and 7–10) areas (**Table 179**). Differences in SUDI mortality are considered in the Infant Mortality section.

Table 178. Risk Factors for Hospital Admissions with a Social Gradient in Children Aged 0–14 Years, New Zealand 2006–2010

Medical Conditions							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				NZ Deprivation Index Quintile			
Decile 1	22.2	1.00		Decile 1–2	21.9	1.00	
Decile 2	21.6	0.97	0.95–1.00	Decile 3–4	26.4	1.21	1.18–1.23
Decile 3	25.1	1.13	1.10–1.16	Decile 5–6	34.9	1.60	1.57–1.63
Decile 4	27.5	1.24	1.21–1.28	Decile 7–8	45.7	2.09	2.05–2.12
Decile 5	32.6	1.47	1.43–1.51	Decile 9–10	64.0	2.92	2.88–2.97
Decile 6	36.9	1.66	1.62–1.71	Ethnicity			
Decile 7	41.3	1.86	1.82–1.91	Asian/Indian	28.4	0.98	0.96–1.00
Decile 8	49.5	2.23	2.18–2.29	European	29.1	1.00	
Decile 9	59.4	2.68	2.62–2.74	Māori	52.8	1.82	1.80–1.84
Decile 10	67.9	3.06	3.00–3.13	Pacific	78.4	2.70	2.67–2.73
Gender							
Female	36.0	1.00		Male	43.8	1.22	1.21–1.23
Injuries							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				NZ Deprivation Index Quintile			
Decile 1	8.75	1.00		Decile 1–2	8.5	1.00	
Decile 2	8.26	0.94	0.90–0.99	Decile 3–4	9.1	1.07	1.04–1.11
Decile 3	8.87	1.01	0.97–1.06	Decile 5–6	10.2	1.20	1.16–1.24
Decile 4	9.35	1.07	1.02–1.12	Decile 7–8	11.7	1.37	1.33–1.41
Decile 5	10.2	1.17	1.12–1.22	Decile 9–10	15.0	1.76	1.71–1.81
Decile 6	10.2	1.17	1.12–1.22	Ethnicity			
Decile 7	11.1	1.27	1.22–1.33	Asian/Indian	6.0	0.56	0.54–0.58
Decile 8	12.2	1.39	1.34–1.45	European	10.7	1.00	
Decile 9	14.9	1.70	1.64–1.77	Māori	12.7	1.18	1.15–1.20
Decile 10	15.1	1.72	1.66–1.79	Pacific	13.7	1.28	1.24–1.31
Gender							
Female	8.92	1.00		Male	13.3	1.49	1.47–1.52

Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injury Admissions: Emergency Department Cases removed; Rates are per 1,000; Rate Ratios are unadjusted; Ethnicity is Level 1 Prioritised.



Table 179. Risk Factors for Mortality with a Social Gradient in Children Aged 0–14 Years, New Zealand 2004–2008

Medical Conditions							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Prioritised Ethnicity			
Decile 1–2	1.32	1.00		Asian/Indian	1.83	1.15	0.52–2.57
Decile 3–4	1.57	1.20	0.54–2.67	European	1.59	1.00	
Decile 5–6	2.44	1.85	0.89–3.87	Māori	6.69	4.22	2.86–6.21
Decile 7–8	3.30	2.51	1.26–5.00	Pacific	7.47	4.71	2.95–7.53
Decile 9–10	7.23	5.49	2.92–10.34	Gender			
				Female	2.86	1.00	
				Male	3.91	1.37	0.99–1.89
Injuries							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Prioritised Ethnicity			
Decile 1–2	2.63	1.00		Asian/Indian	4.70	1.32	0.79–2.19
Decile 3–4	4.85	1.84	1.09–3.10	European	3.57	1.00	
Decile 5–6	4.40	1.67	0.98–2.84	Māori	10.96	3.07	2.33–4.04
Decile 7–8	5.28	2.00	1.21–3.32	Pacific	3.61	1.01	0.59–1.75
Decile 9–10	8.66	3.29	2.06–5.24	Gender			
				Female	4.34	1.00	
				Male	6.51	1.50	1.16–1.94
SUDI: See Infant Mortality Section							

Source: Numerator: National Mortality Collection; Denominator Statistics NZ Estimated Resident Population.
Note: Rates are per 100,000; Rate Ratios are unadjusted; Ethnicity is Level 1 Prioritised.

South Island Distribution and Trends

South Island DHBs vs. New Zealand

Hospital Admissions: In the South Island during 2006–2010, hospital admissions for medical conditions with a social gradient were *significantly* lower than the New Zealand rate in all DHBs. While injury admissions with a social gradient were also *significantly* lower than the New Zealand rate in Nelson Marlborough and Otago, rates in South Canterbury, the West Coast, Canterbury and Southland were similar to the New Zealand rate (**Table 180**).

South Island Distribution by Cause

Hospital Admissions for Medical Conditions: In the South Island DHBs during 2006–2010, asthma, gastroenteritis and upper respiratory tract infections were the most frequent reasons for hospitalisations for medical conditions with a social gradient, although viral infections of unspecified site and bronchiolitis also made a contribution in some DHBs. Infectious and respiratory diseases collectively were responsible for the majority of medical admissions during this period (**Table 181**, **Table 182**).

Hospital Admissions for Injuries: In the South Island during 2006–2010, falls and inanimate mechanical forces were the most frequent reasons for injury admissions with a social gradient in all DHBs, although transport injuries as a group also made a significant contribution (**Table 181**, **Table 182**).



Table 180. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years, South Island DHBs vs. New Zealand 2006–2010

DHB	Number: Total 2006– 2010	Number: Annual Average	Rate per 1,000	Rate Ratio	95% CI
Medical Conditions					
Nelson Marlborough	3,370	674	26.1	0.65	0.63–0.68
South Canterbury	1,140	228	22.0	0.55	0.52–0.58
West Coast	835	167	26.5	0.66	0.62–0.71
Canterbury	15,699	3,140	32.7	0.82	0.81–0.83
Otago	3,975	795	24.8	0.62	0.60–0.64
Southland	4,084	817	37.5	0.94	0.91–0.97
New Zealand	178,343	35,669	40.0	1.00	
Injury Admissions					
Nelson Marlborough	1,249	250	9.68	0.87	0.82–0.92
South Canterbury	575	115	11.1	0.99	0.92–1.08
West Coast	367	73	11.6	1.04	0.94–1.15
Canterbury	5,296	1,059	11.0	0.99	0.96–1.02
Otago	1,423	285	8.87	0.79	0.75–0.84
Southland	1,172	234	10.8	0.96	0.91–1.02
New Zealand	49,875	9,975	11.2	1.00	

Source: Numerator National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and arranged only; Injury Admissions: Emergency Department Cases removed.

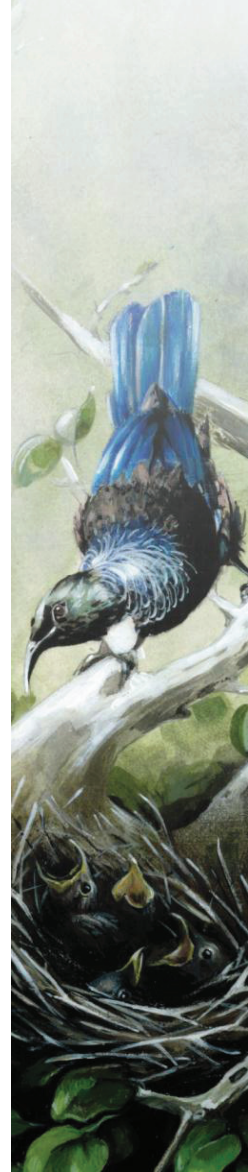


Table 181. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years by Primary Diagnosis, Nelson Marlborough 2006–2010

Primary Diagnosis	Nelson Marlborough			
	Number: Total 2006–2010	Number: Annual Average	Rate per 1,000	% of Total
Medical Conditions				
Gastroenteritis	510	102.0	3.95	15.1
Acute Upper Respiratory Infections Excl Croup	479	95.8	3.71	14.2
Asthma	465	93.0	3.60	13.8
Viral Infection of Unspecified Site	365	73.0	2.83	10.8
Acute Bronchiolitis	363	72.6	2.81	10.8
Bacterial/Non-Viral Pneumonia	237	47.4	1.84	7.0
Croup / Laryngitis / Tracheitis / Epiglottitis	207	41.4	1.60	6.1
Skin Infections	165	33.0	1.28	4.9
Urinary Tract Infection	120	24.0	0.93	3.6
Epilepsy / Status Epilepticus	100	20.0	0.77	3.0
Febrile Convulsions	99	19.8	0.77	2.9
Otitis Media	75	15.0	0.58	2.2
Dermatitis and Eczema	52	10.4	0.40	1.5
Inguinal Hernia	33	6.6	0.26	1.0
Viral Pneumonia	31	6.2	0.24	0.9
Osteomyelitis	21	4.2	0.16	0.6
Nutritional Deficiencies / Anaemias	11	2.2	0.09	0.3
Vaccine Preventable Diseases	10	2.0	0.08	0.3
Bronchiectasis	9	1.8	0.07	0.3
Viral/Other/NOS Meningitis	7	1.4	0.05	0.2
Meningococcal Disease	7	1.4	0.05	0.2
Rheumatic Fever/Heart Disease	3	0.6	0.02	0.1
Bacterial Meningitis	<3	s	s	s
Nelson Marlborough Total	3,370	674.0	26.1	100.0
Injury Admissions				
Falls	651	130.2	5.04	52.1
Mechanical Forces: Inanimate	200	40.0	1.55	16.0
Transport: Cyclist	117	23.4	0.91	9.4
Accidental Poisoning	105	21.0	0.81	8.4
Mechanical Forces: Animate	66	13.2	0.51	5.3
Electricity / Fire / Burns	51	10.2	0.40	4.1
Transport: Vehicle Occupant	35	7.0	0.27	2.8
Transport: Pedestrian	22	4.4	0.17	1.8
Drowning / Submersion	<3	s	s	s
Nelson Marlborough Total	1,249	249.8	9.68	100.0

Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injuries: Emergency Department Cases removed; s: suppressed due to small numbers.

Table 182. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years by Primary Diagnosis, South Canterbury 2006–2010

Primary Diagnosis	South Canterbury			
	Number: Total 2006– 2010	Number: Annual Average	Rate per 1,000	% of Total
Medical Conditions				
Gastroenteritis	268	53.6	5.18	23.5
Asthma	163	32.6	3.15	14.3
Viral Infection of Unspecified Site	130	26.0	2.51	11.4
Acute Upper Respiratory Infections Excl Croup	126	25.2	2.43	11.1
Acute Bronchiolitis	115	23.0	2.22	10.1
Croup / Laryngitis / Tracheitis / Epiglottitis	71	14.2	1.37	6.2
Bacterial/Non-Viral Pneumonia	62	12.4	1.20	5.4
Febrile Convulsions	44	8.8	0.85	3.9
Skin Infections	38	7.6	0.73	3.3
Urinary Tract Infection	32	6.4	0.62	2.8
Epilepsy / Status Epilepticus	25	5.0	0.48	2.2
Otitis Media	17	3.4	0.33	1.5
Viral Pneumonia	15	3.0	0.29	1.3
Dermatitis and Eczema	13	2.6	0.25	1.1
Inguinal Hernia	12	2.4	0.23	1.1
Osteomyelitis	4	0.8	0.08	0.4
Nutritional Deficiencies / Anaemias	<3	s	s	s
Bronchiectasis	<3	s	s	s
Meningococcal Disease	<3	s	s	s
Vaccine Preventable Diseases	<3	s	s	s
South Canterbury Total	1,140	228.0	22.0	100.0
Injury Admissions				
Falls	306	61.2	5.91	53.2
Mechanical Forces: Inanimate	90	18.0	1.74	15.7
Transport: Cyclist	51	10.2	0.99	8.9
Accidental Poisoning	46	9.2	0.89	8.0
Mechanical Forces: Animate	42	8.4	0.81	7.3
Electricity / Fire / Burns	24	4.8	0.46	4.2
Transport: Vehicle Occupant	9	1.8	0.17	1.6
Transport: Pedestrian	5	1.0	0.10	0.9
Drowning / Submersion	<3	s	s	s
South Canterbury Total	575	115.0	11.1	100.0

Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injuries: Emergency Department Cases removed; s: suppressed due to small numbers.

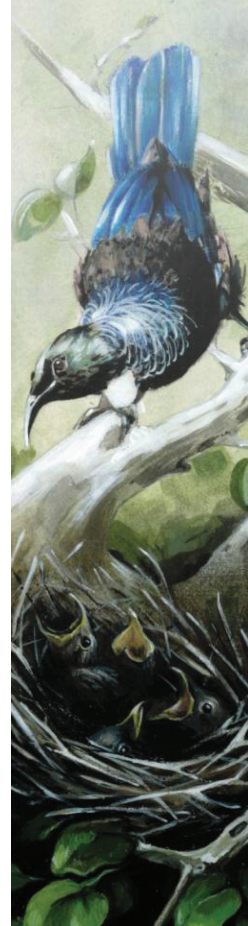


Table 183. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years by Primary Diagnosis, Canterbury 2006–2010

Primary Diagnosis	Canterbury			
	Number: Total 2006– 2010	Number: Annual Average	Rate per 1,000	% of Total
Medical Conditions				
Acute Upper Respiratory Infections Excl Croup	2,744	548.8	5.72	17.5
Gastroenteritis	2,618	523.6	5.46	16.7
Asthma	2,201	440.2	4.59	14.0
Viral Infection of Unspecified Site	1,898	379.6	3.96	12.1
Acute Bronchiolitis	1,661	332.2	3.46	10.6
Bacterial/Non-Viral Pneumonia	844	168.8	1.76	5.4
Skin Infections	729	145.8	1.52	4.6
Croup / Laryngitis / Tracheitis / Epiglottitis	658	131.6	1.37	4.2
Urinary Tract Infection	608	121.6	1.27	3.9
Epilepsy / Status Epilepticus	425	85.0	0.89	2.7
Otitis Media	273	54.6	0.57	1.7
Dermatitis and Eczema	250	50.0	0.52	1.6
Febrile Convulsions	237	47.4	0.49	1.5
Viral Pneumonia	129	25.8	0.27	0.8
Osteomyelitis	102	20.4	0.21	0.6
Inguinal Hernia	95	19.0	0.20	0.6
Viral/Other/NOS Meningitis	62	12.4	0.13	0.4
Nutritional Deficiencies / Anaemias	34	6.8	0.07	0.2
Vaccine Preventable Diseases	32	6.4	0.07	0.2
Bronchiectasis	29	5.8	0.06	0.2
Meningococcal Disease	28	5.6	0.06	0.2
Bacterial Meningitis	19	3.8	0.04	0.1
Rheumatic Fever/Heart Disease	16	3.2	0.03	0.1
Tuberculosis	7	1.4	0.01	<0.1
Canterbury Total	15,699	3,139.8	32.7	100.0
Injury Admissions				
Falls	2,613	522.6	5.45	49.3
Mechanical Forces: Inanimate	1,229	245.8	2.56	23.2
Accidental Poisoning	497	99.4	1.04	9.4
Transport: Cyclist	309	61.8	0.64	5.8
Mechanical Forces: Animate	298	59.6	0.62	5.6
Electricity / Fire / Burns	166	33.2	0.35	3.1
Transport: Vehicle Occupant	92	18.4	0.19	1.7
Transport: Pedestrian	74	14.8	0.15	1.4
Drowning / Submersion	18	3.6	0.04	0.3
Canterbury Total	5,296	1,059.2	11.0	100.0

Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injuries: Emergency Department Cases removed

Table 184. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years by Primary Diagnosis, the West Coast 2006–2010

Primary Diagnosis	West Coast			
	Number: Total 2006– 2010	Number: Annual Average	Rate per 1,000	% of Total
Medical Conditions				
Gastroenteritis	159	31.8	5.04	19.0
Asthma	141	28.2	4.47	16.9
Acute Upper Respiratory Infections Excl Croup	107	21.4	3.39	12.8
Acute Bronchiolitis	87	17.4	2.76	10.4
Viral Infection of Unspecified Site	84	16.8	2.66	10.1
Bacterial/Non-Viral Pneumonia	68	13.6	2.16	8.1
Croup / Laryngitis / Tracheitis / Epiglottitis	39	7.8	1.24	4.7
Febrile Convulsions	35	7.0	1.11	4.2
Skin Infections	28	5.6	0.89	3.4
Otitis Media	17	3.4	0.54	2.0
Urinary Tract Infection	14	2.8	0.44	1.7
Dermatitis and Eczema	12	2.4	0.38	1.4
Epilepsy / Status Epilepticus	11	2.2	0.35	1.3
Inguinal Hernia	10	2.0	0.32	1.2
Viral Pneumonia	7	1.4	0.22	0.8
Meningococcal Disease	5	1.0	0.16	0.6
Osteomyelitis	5	1.0	0.16	0.6
Viral/Other/NOS Meningitis	4	0.8	0.13	0.5
Vaccine Preventable Diseases	<3	s	s	s
West Coast Total	835	167.0	26.5	100.0
Injury Admissions				
Falls	190	38.0	6.02	51.8
Mechanical Forces: Inanimate	76	15.2	2.41	20.7
Transport: Cyclist	26	5.2	0.82	7.1
Mechanical Forces: Animate	24	4.8	0.76	6.5
Accidental Poisoning	18	3.6	0.57	4.9
Transport: Vehicle Occupant	14	2.8	0.44	3.8
Electricity / Fire / Burns	14	2.8	0.44	3.8
Transport: Pedestrian	4	0.8	0.13	1.1
Drowning / Submersion	<3	s	s	s
West Coast Total	367	73.4	11.6	100.0

Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injuries: Emergency Department Cases removed; s: suppressed due to small numbers.

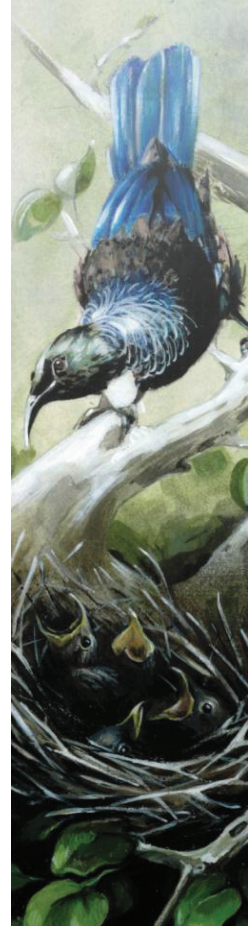


Table 185. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years by Primary Diagnosis, Otago 2006–2010

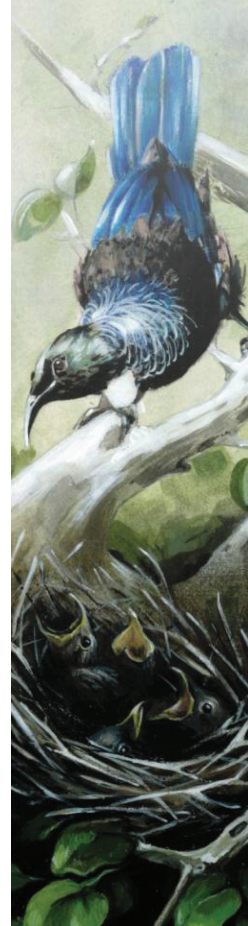
Primary Diagnosis	Otago			
	Number: Total 2006– 2010	Number: Annual Average	Rate per 1,000	% of Total
Medical Conditions				
Gastroenteritis	733	146.6	4.57	18.4
Acute Upper Respiratory Infections Excl Croup	685	137.0	4.27	17.2
Asthma	598	119.6	3.73	15.0
Acute Bronchiolitis	415	83.0	2.59	10.4
Viral Infection of Unspecified Site	265	53.0	1.65	6.7
Bacterial/Non-Viral Pneumonia	239	47.8	1.49	6.0
Skin Infections	219	43.8	1.37	5.5
Croup / Laryngitis / Tracheitis / Epiglottitis	187	37.4	1.17	4.7
Urinary Tract Infection	144	28.8	0.90	3.6
Otitis Media	118	23.6	0.74	3.0
Epilepsy / Status Epilepticus	111	22.2	0.69	2.8
Febrile Convulsions	51	10.2	0.32	1.3
Viral Pneumonia	43	8.6	0.27	1.1
Inguinal Hernia	42	8.4	0.26	1.1
Dermatitis and Eczema	41	8.2	0.26	1.0
Osteomyelitis	33	6.6	0.21	0.8
Meningococcal Disease	14	2.8	0.09	0.4
Viral/Other/NOS Meningitis	11	2.2	0.07	0.3
Nutritional Deficiencies / Anaemias	10	2.0	0.06	0.3
Vaccine Preventable Diseases	6	1.2	0.04	0.2
Bacterial Meningitis	5	1.0	0.03	0.1
Bronchiectasis	4	0.8	0.02	0.1
Rheumatic Fever/Heart Disease	<3	s	s	s
Otago Total	3,975	795.0	24.8	100.0
Injury Admissions				
Falls	721	144.2	4.50	50.7
Mechanical Forces: Inanimate	280	56.0	1.75	19.7
Transport: Cyclist	120	24.0	0.75	8.4
Accidental Poisoning	98	19.6	0.61	6.9
Mechanical Forces: Animate	82	16.4	0.51	5.8
Electricity / Fire / Burns	53	10.6	0.33	3.7
Transport: Vehicle Occupant	41	8.2	0.26	2.9
Transport: Pedestrian	22	4.4	0.14	1.5
Drowning / Submersion	6	1.2	0.04	0.4
Otago Total	1,423	284.6	8.87	100.0

Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injuries: Emergency Department Cases removed; s: suppressed due to small numbers.

Table 186. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years by Primary Diagnosis, Southland 2006–2010

Primary Diagnosis	Southland			
	Number: Total 2006– 2010	Number: Annual Average	Rate per 1,000	% of Total
Medical Conditions				
Gastroenteritis	716	143.2	6.58	17.5
Acute Bronchiolitis	620	124.0	5.70	15.2
Acute Upper Respiratory Infections Excl Croup	530	106.0	4.87	13.0
Asthma	499	99.8	4.59	12.2
Viral Infection of Unspecified Site	469	93.8	4.31	11.5
Bacterial/Non-Viral Pneumonia	223	44.6	2.05	5.5
Epilepsy / Status Epilepticus	189	37.8	1.74	4.6
Skin Infections	185	37.0	1.70	4.5
Croup / Laryngitis / Tracheitis / Epiglottitis	167	33.4	1.54	4.1
Urinary Tract Infection	120	24.0	1.10	2.9
Otitis Media	118	23.6	1.08	2.9
Febrile Convulsions	66	13.2	0.61	1.6
Dermatitis and Eczema	55	11.0	0.51	1.3
Inguinal Hernia	35	7.0	0.32	0.9
Viral Pneumonia	24	4.8	0.22	0.6
Osteomyelitis	19	3.8	0.17	0.5
Bronchiectasis	17	3.4	0.16	0.4
Meningococcal Disease	12	2.4	0.11	0.3
Vaccine Preventable Diseases	8	1.6	0.07	0.2
Viral/Other/NOS Meningitis	6	1.2	0.06	0.1
Nutritional Deficiencies / Anaemias	4	0.8	0.04	0.1
Rheumatic Fever/Heart Disease	<3	s	s	s
Bacterial Meningitis	<3	s	s	s
Southland Total	4,084	816.8	37.5	100.0
Injury Admissions				
Falls	477	95.4	4.39	40.7
Mechanical Forces: Inanimate	312	62.4	2.87	26.6
Accidental Poisoning	134	26.8	1.23	11.4
Transport: Cyclist	77	15.4	0.71	6.6
Mechanical Forces: Animate	65	13.0	0.60	5.5
Electricity / Fire / Burns	45	9.0	0.41	3.8
Transport: Vehicle Occupant	38	7.6	0.35	3.2
Transport: Pedestrian	21	4.2	0.19	1.8
Drowning / Submersion	3	0.6	0.03	0.3
Southland Total	1,172	234.4	10.8	100.0

Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and Arranged Admissions only; Injuries: Emergency Department Cases removed; s: suppressed due to small numbers.



Mortality: In the South Island during 2004–2008, while numbers were too small for trend analysis, injuries and medical conditions with a social gradient, and (post neonatal) SUDI all contributed to mortality in children in most DHBs (**Table 187**).

Table 187. Mortality from Conditions with a Social Gradient in Children Aged 0–14 Years (excluding Neonates) by Main Underlying Cause of Death, the South Island DHBs 2004–2008

Cause of Death	Number: Total 2004–2008	Number: Annual Average	Rate per 100,000
Nelson Marlborough			
Medical Conditions	<3	s	s
Injuries	7	1.4	5.35
Nelson Marlborough Total	8	1.6	6.11
South Canterbury			
Medical Conditions	<3	s	s
Injuries	<3	s	s
SUDI (Infant)	<3	s	s
South Canterbury Total	5	1.0	9.41
Canterbury			
Medical Conditions	7	1.4	1.49
Injuries	16	3.2	3.41
SUDI (Infant)	14	2.8	2.98
Canterbury Total	37	7.4	7.89
West Coast			
Injuries	<3	s	s
West Coast Total	<3	s	s
Otago			
Medical Conditions	<3	s	s
Injuries	10	2.0	6.16
SUDI (Infant)	5	1.0	3.08
Otago Total	17	3.4	10.5
Southland			
Medical Conditions	5	1.0	4.50
Injuries	7	1.4	6.30
SUDI (Infant)	8	1.6	7.20
Southland Total	20	4.0	18.0

Source: Numerator: National Mortality Collection; Denominator Statistics NZ Estimated Resident Population.

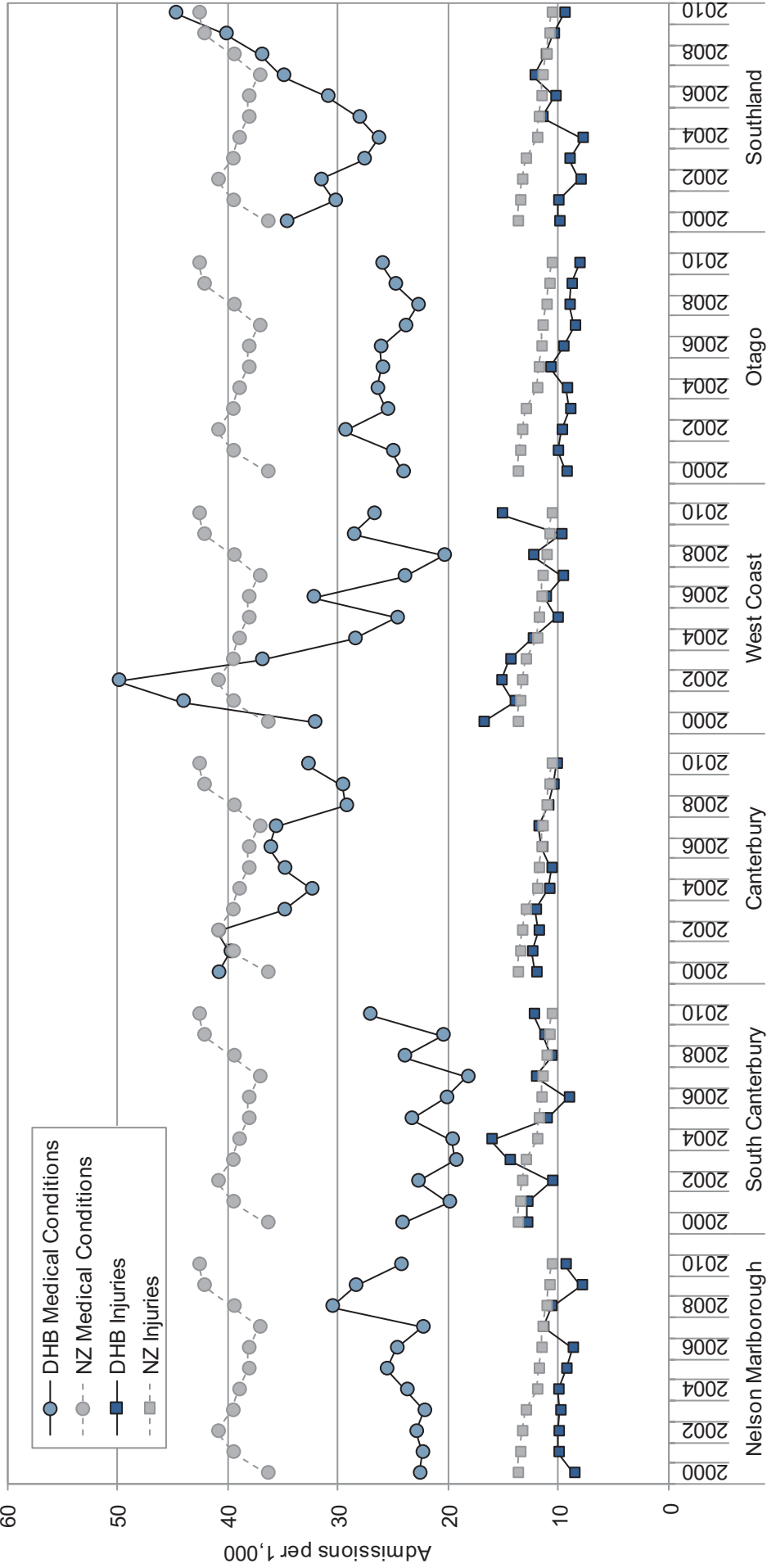
Note: s: suppressed due to small numbers.

South Island Trends

Hospital Admissions for Medical Conditions: In Nelson Marlborough, South Canterbury and Otago during 2000–2010, hospital admissions for medical conditions with a social gradient were relatively static, although a peak in rates occurred in Nelson Marlborough during 2008–2009. In Canterbury and the West Coast, rates exhibited a fluctuating downward trend, while in Southland, rates increased steeply after 2004 (**Figure 175**).

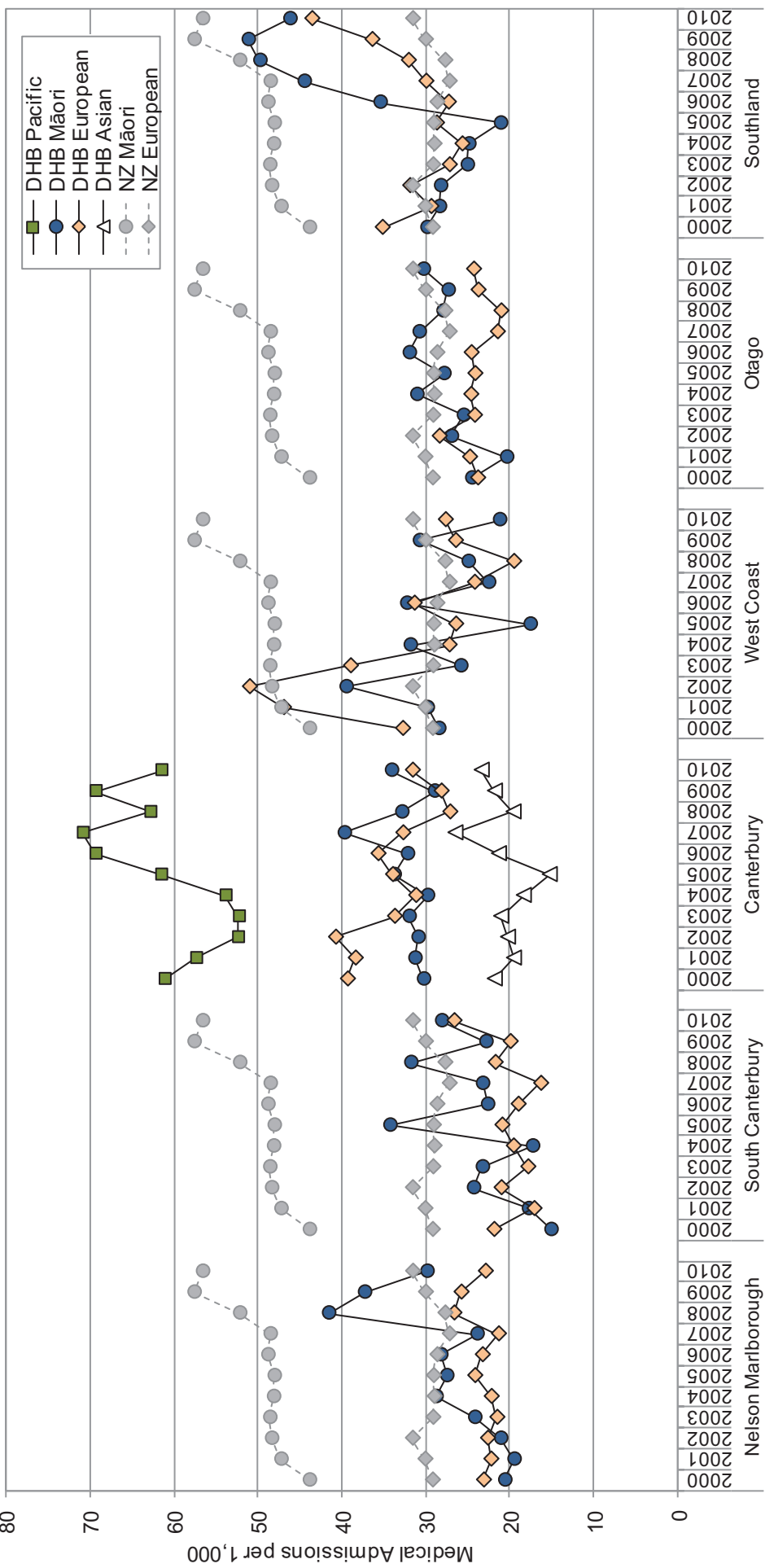
Hospital Admissions for Injuries: In Nelson Marlborough, South Canterbury, Otago and Southland during 2000–2010, while there were individual year to year variations, hospital admissions for injuries with a social gradient remained relatively static, while in Canterbury and the West Coast (prior to 2010) rates exhibited a fluctuating downward trend (**Figure 175**).

Figure 175. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0–14 Years, South Island DHBs vs. New Zealand 2000–2010



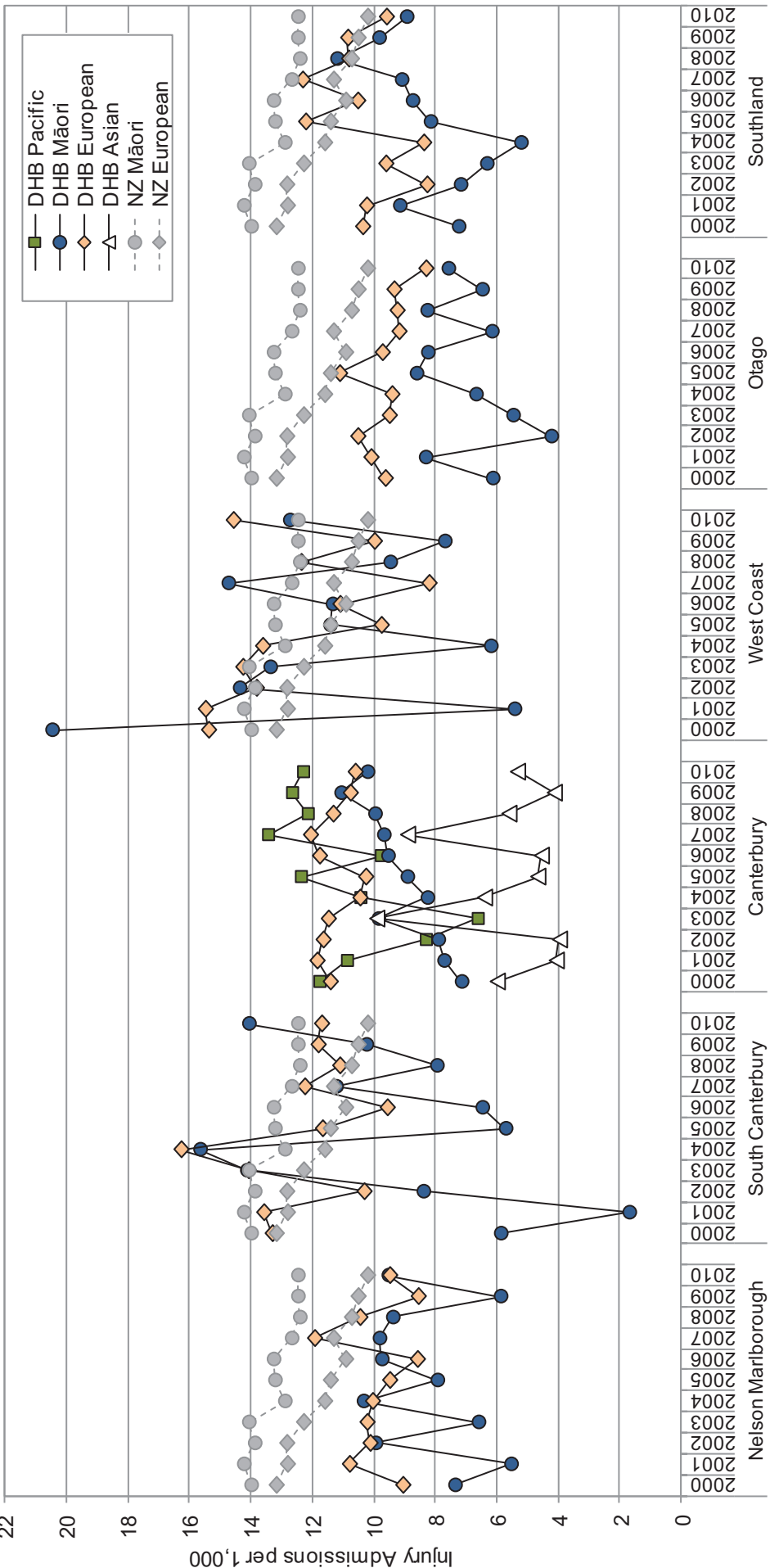
Source: Numerator: National Minimum Dataset (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Medical Conditions: Acute and arranged only; Injury Admissions: Emergency Department Cases removed.

Figure 176. Hospital Admissions for Medical Conditions with a Social Gradient in Children Aged 0–14 Years by Ethnicity, the South Island DHBs vs. New Zealand 2000–2010



Source: Numerator: National Minimum Dataset (Acute and Arranged Admissions only, Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Ethnicity is Level 1 Prioritised.

Figure 177. Hospital Admissions for Injuries with a Social Gradient in Children Aged 0–14 Years by Ethnicity, the South Island DHBs vs. New Zealand 2000–2010



Source: Numerator: National Minimum Dataset (Emergency Department Cases and Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note: Ethnicity is Level 1 Prioritised.

South Island Trends by Ethnicity

Hospital Admissions for Medical Conditions: In Canterbury during 2000–2010, hospital admissions for medical conditions with a social gradient were higher for Pacific > Māori and European > Asian/Indian children, although in the West Coast no consistent differences were seen between Māori and European children. In Nelson Marlborough, South Canterbury, Otago and Southland admissions were higher for Māori than for European children during the mid-late 2000s (**Figure 176**).

Hospital Admissions for Injuries: In Canterbury during 2000–2010, no consistent ethnic differences in hospital admissions for injuries with a social gradient were evident, although admissions for European children were generally higher than for Māori and Asian/Indian children for the majority of this period. In Nelson Marlborough, South Canterbury and the West Coast no consistent differences were seen between Māori and European children, although in Otago and Southland, admissions were generally higher for European than for Māori children (**Figure 177**).

Summary

In New Zealand during 2006–2010, gastroenteritis, bronchiolitis, and asthma made the largest individual contributions to hospitalisations for medical conditions with a social gradient, although infectious and respiratory diseases collectively were responsible for the majority of admissions. Falls, followed by inanimate mechanical forces were the leading causes of injury admissions with a social gradient, although transport injuries as a group also made a significant contribution. Similarly, during 2004–2008 SUDI made the single largest contribution to mortality with a social gradient. Vehicle occupant related deaths, followed by pedestrian injuries and drowning, made the largest contribution to injury related deaths, while bacterial/non-viral pneumonia was the leading cause of mortality from medical conditions.

In terms of trends, medical admissions with a social gradient increased during the early 2000s, reached peak in 2002 and then declined, with an upswing in rates again being evident during 2007–2009. In contrast, injury admissions with a social gradient declined throughout 2000–2010. During this period, hospitalisations for medical conditions with a social gradient were consistently higher for Pacific > Māori > European and Asian/Indian children. For Pacific children, admissions increased during the early 2000s, reached a peak in 2003 and then declined. An upswing in rates was again evident during 2007–2009, with rates then declining during 2010. For Māori children, rates were static during the mid-2000s, but then increased during 2007–2009, while for Asian/Indian and European children rates were static during the mid-2000s but increased after 2007. Injury admissions with a social gradient were also higher for Pacific and Māori > European > Asian/Indian children. Admission rates for European and Māori children declined during 2000–2010, while rates for Pacific and Asian/Indian children were more static, with ethnic differences being greater in 2010 than they were in 2000.

In the South Island during 2006–2010, hospital admission rates for medical conditions with a social gradient were *significantly* lower than the New Zealand rate in all DHBs. While rates of injury admissions with a social gradient were also *significantly* lower than the New Zealand rate in Nelson Marlborough and Otago, rates in South Canterbury, the West Coast, Canterbury and Southland were similar to the New Zealand rate. Asthma, gastroenteritis and upper respiratory tract infections were the most frequent reasons for hospitalisations for medical conditions with a social gradient in the South Island DHBs, although viral infections of unspecified site and bronchiolitis also made a contribution in some DHBs. Infectious and respiratory diseases collectively were responsible for the majority of medical admissions during this period. Falls and inanimate mechanical forces were the most frequent reasons for injury admissions with a social gradient in all DHBs, although transport injuries as a group also made a significant contribution.



INJURIES ARISING FROM THE ASSAULT, NEGLECT OR MALTREATMENT OF CHILDREN

Introduction

Longitudinal studies suggest that 4–10% of New Zealand children experience physical abuse and 11–20% experience sexual abuse during childhood and that the long term consequences for these children are significant [270]. During the 1990s, New Zealand ranked 3rd highest amongst rich nations for its child maltreatment death rates [271], with 49 children <15 years dying as a result of maltreatment between 1996 and 2000. This situation does not appear to have improved over time, with mortality rates almost doubling during the late 1980s and changing very little since then [272]. Mortality represents the tip of the iceberg however, with the number of notifications to Child Youth and Family (CYF) for possible abuse or neglect increasing each year. In the 2009/2010 year, CYF received around 125,000 notifications, with just over half of such notifications each year typically requiring further action [273]. This is of concern, as in addition to the physical effects, research has shown that survivors of childhood abuse often suffer long term psychological sequelae including depression, post-traumatic stress disorder, substance abuse, suicide / suicide attempts and high risk sexual behaviour [274].

The following section explores hospital admissions and mortality from injuries arising from the assault, neglect or maltreatment of children aged 0–14 years using information from the National Minimum Dataset and the National Mortality Collection.

Data Source and Methods

Definition

1. Hospitalisations for Injuries Arising From the Assault / Neglect / Maltreatment of Children Aged 0–14 Years
2. Deaths from Injuries Arising from the Assault / Neglect / Maltreatment of Children Aged 0–14 Years

Data Source

1. Hospital Admissions

Numerator: National Minimum Dataset: Hospital admissions of children (0–14 years) with a primary diagnosis of injury (ICD-10-AM S00–T79) and an external cause code of intentional injury (ICD-10-AM X85–Y09) in any of the first 10 External Cause codes. As outlined in **Appendix 3**, in order to ensure comparability over time, all cases with an Emergency Department Specialty Code (M05–M08) on discharge were excluded.

Denominator: NZ Statistics NZ Estimated Resident Population.

2. Mortality

Numerator: National Mortality Collection: Deaths in children (0–14 years) with a clinical code (cause of death) of Intentional Injury (ICD-10-AM X85–Y09).

Denominator: NZ Statistics NZ Estimated Resident Population.

Interpretation

The limitations of the National Minimum Dataset are discussed at length in **Appendix 3**. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

Indicator Category Admissions Proxy C; Mortality Ideal B

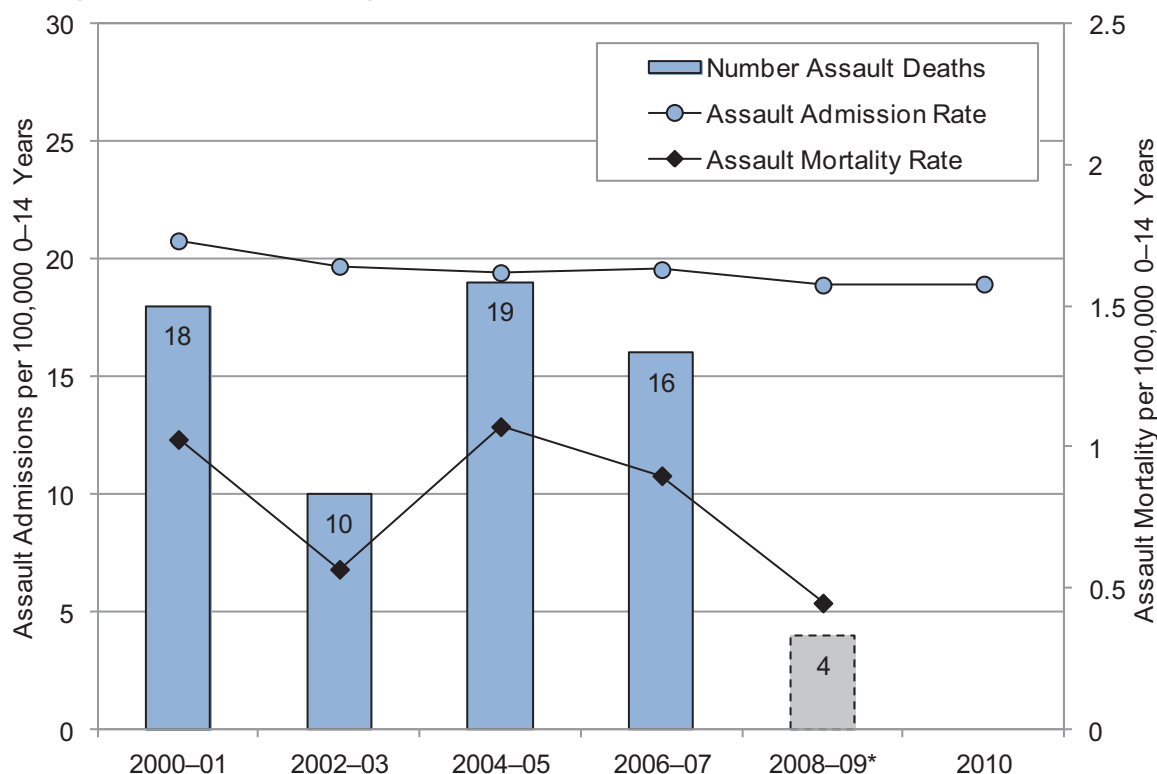
New Zealand Distribution and Trends

New Zealand Trends

In New Zealand during 2000–2010, hospital admissions for injuries arising from the assault, neglect or maltreatment of children declined very gradually, while mortality during 2000–2008 fluctuated from year to year. On average during 2000–2008, 7.4 children per year died as a result of injuries arising from assault, neglect or maltreatment (**Figure 178**).

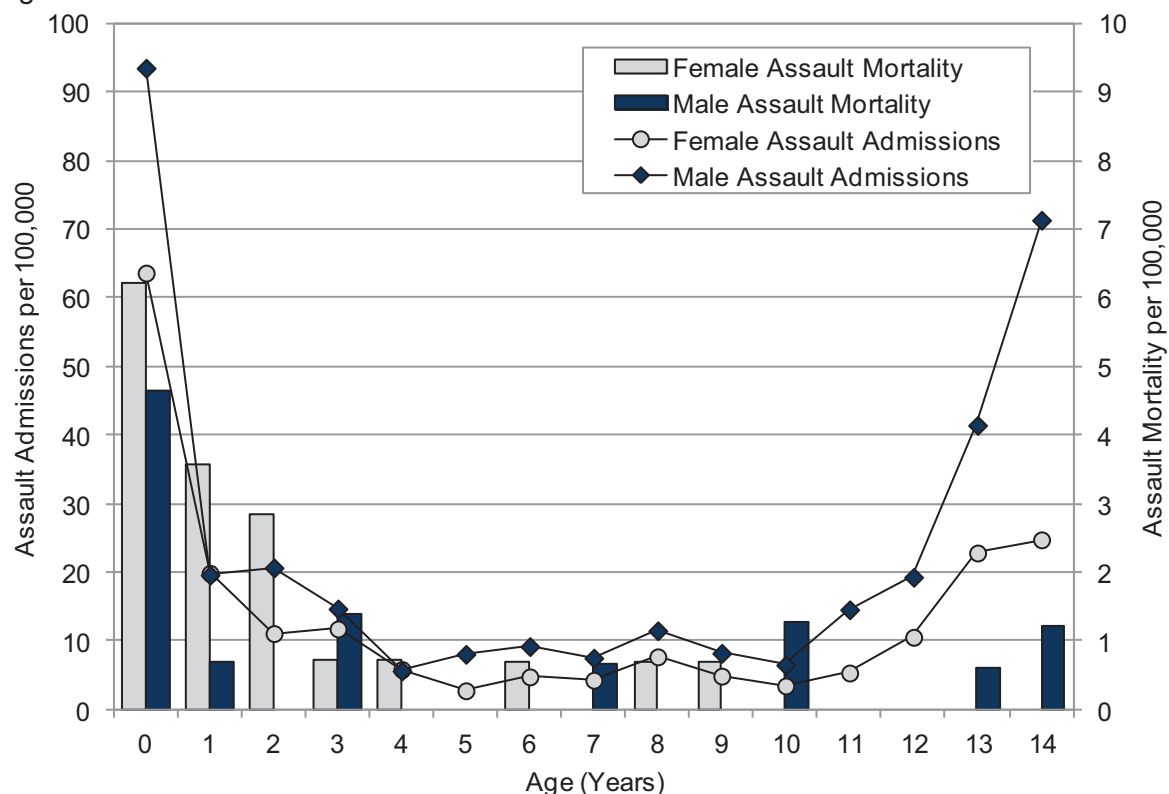


Figure 178. Hospital Admissions (2000–2010) and Deaths (2000–2008) due to Injuries Arising from the Assault, Neglect or Maltreatment of New Zealand Children 0–14 Years



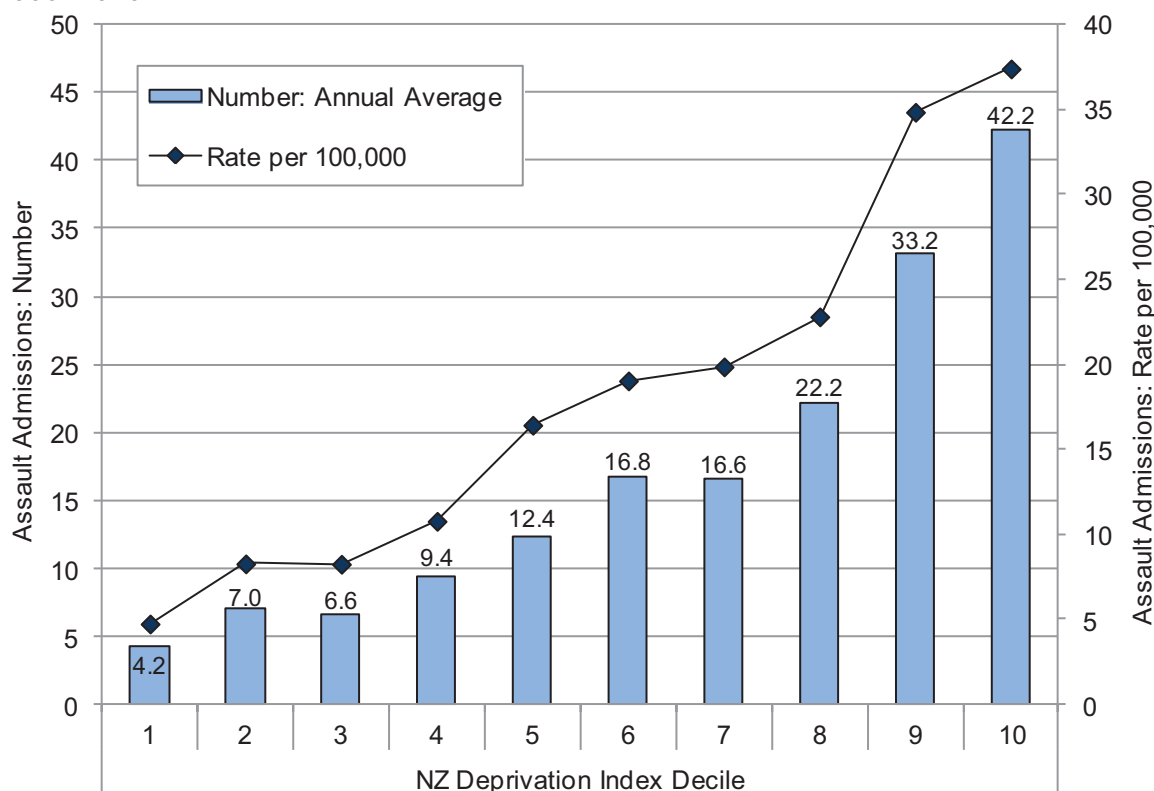
Source: Numerator Admissions: National Minimum Dataset; Numerator Mortality: National Mortality Collection; Denominator: Statistics NZ Estimated Resident Population. *Note: Numbers are per 2-year period with the exception of 2008 which is for a single year only.

Figure 179. Hospital Admissions (2006–2010) and Deaths (2004–2008) due to Injuries Arising from the Assault, Neglect or Maltreatment of New Zealand Children 0–14 Years by Age and Gender



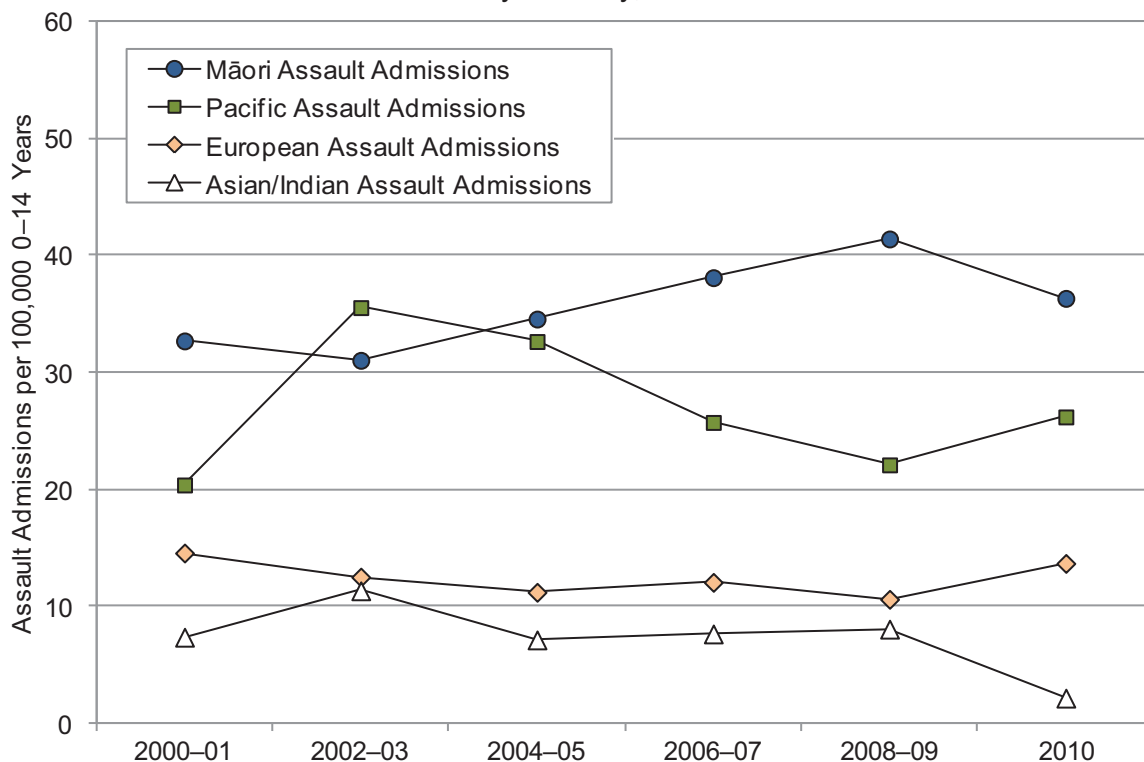
Source: Numerator Admissions: National Minimum Dataset; Numerator Mortality: National Mortality Collection; Denominator: Statistics NZ Estimated Resident Population

Figure 180. Hospital Admissions for Injuries Arising from the Assault, Neglect or Maltreatment of Children 0–14 Years by NZ Deprivation Index Decile, New Zealand 2006–2010



Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population

Figure 181. Hospital Admissions for Injuries Arising from the Assault, Neglect or Maltreatment of Children 0–14 Years by Ethnicity, New Zealand 2000–2010



Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population.
Note: Ethnicity is Level 1 Prioritised.



Table 188. Hospital Admissions for Injuries Arising from the Assault, Neglect or Maltreatment of Children 0–14 Years by Ethnicity, NZ Deprivation Index Decile and Gender, New Zealand 2006–2010

Variable	Number: Total 2006–2010	Number: Annual Average	Rate per 100,000	Rate Ratio	95% CI
NZ Deprivation Index Decile					
Decile 1	21	4.2	4.75	1.00	
Decile 2	35	7.0	8.29	1.74	1.02–3.00
Decile 3	33	6.6	8.26	1.74	1.01–3.01
Decile 4	47	9.4	10.8	2.27	1.36–3.80
Decile 5	62	12.4	16.4	3.46	2.11–5.68
Decile 6	84	16.8	19.0	4.01	2.49–6.47
Decile 7	83	16.6	19.9	4.18	2.59–6.75
Decile 8	111	22.2	22.8	4.80	3.01–7.66
Decile 9	166	33.2	34.9	7.34	4.66–11.55
Decile 10	211	42.2	37.4	7.87	5.03–12.33
NZ Deprivation Index Quintile					
Decile 1–2	56	11.2	6.48	1.00	
Decile 3–4	80	16.0	9.58	1.48	1.05–2.08
Decile 5–6	146	29.2	17.8	2.75	2.02–3.75
Decile 7–8	194	38.8	21.5	3.31	2.46–4.46
Decile 9–10	377	75.4	36.2	5.59	4.22–7.41
Gender					
Female	302	60.4	13.9	1.00	
Male	554	110.8	24.3	1.75	1.52–2.01
Prioritised Ethnicity					
Asian/Indian	28	5.6	6.59	0.56	0.38–0.82
European	293	58.6	11.8	1.00	
Māori	420	84.0	39.1	3.32	2.86–3.85
Pacific	104	20.8	24.4	2.07	1.65–2.59

Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population.
Note: Rate is per 100,000 per year; Rate Ratios are unadjusted; Ethnicity is Level 1 Prioritised.

New Zealand Distribution by Age and Gender

In New Zealand during 2006–2010, hospital admissions for injuries arising from the assault, neglect or maltreatment of children exhibited a U-shaped distribution with age, with rates being higher for infants <1 year and those > 11 years of age. In contrast, mortality was highest for infants < 1 year. While the gender balance for admissions was relatively even during infancy and early childhood, admissions for males became more predominant as adolescence approached (**Figure 179**).

New Zealand Distribution by Ethnicity, NZDep Index Decile and Gender

In New Zealand during 2006–2010, hospital admissions for injuries arising from the assault, neglect or maltreatment of children were significantly higher for males, Māori > Pacific > European > Asian/Indian children, and those living in average-to-more deprived (NZDep decile 2–10) areas (**Table 188**).

Similarly, during 2000–2010 hospital admissions for injuries arising from the assault, neglect or maltreatment of children were consistently higher for Māori and Pacific > European > Asian/Indian children, with rates also being higher for Māori than for Pacific children from 2004–05 onwards (**Figure 181**).

Nature of the Injury Sustained

During 2006–2010, the most common specific injury types sustained as the result of the assault, neglect or maltreatment of children aged 0–4 years were subdural haemorrhages and superficial head injuries, followed by fractures of the skull and face, and fractures of the femur. For children aged 5–12 years, head, upper limb and abdominal / spinal / pelvic injuries predominated, with superficial head injuries, fractures of the skull and facial bones and concussions being amongst the most common specific injury types documented (**Table 189**).

Table 189. Nature of Injury Arising from Assault, Neglect or Maltreatment in Hospitalised Children 0–12 Years by Age Group, New Zealand 2006–2010

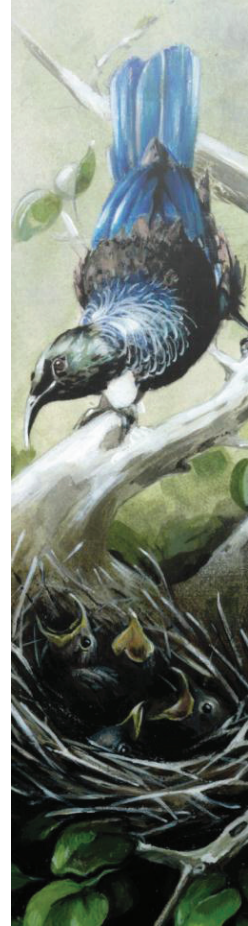
Nature of Injury	Total Number 2006–2010	Annual Average	% of Injuries in Age Group
Children 0–4 Years			
Traumatic Subdural Haemorrhage (S065)	116	23.2	29.4
Superficial Head Injury (S00)	62	12.4	15.7
Fracture Skull or Facial Bones (S02)	17	3.4	4.3
Other Head Injuries (Remainder S00–S09)	44	8.8	11.1
Injuries to Abdomen, Spine and Pelvis (S30–S39)	28	5.6	7.1
Injuries to Thorax (Including Rib Fractures) (S20–S29)	11	2.2	2.8
Injuries to Upper Limb (S40–S69)	27	5.4	6.8
Fracture of Femur (S72)	16	3.2	4.1
Other Injuries to Lower Limb (S70–S99)	19	3.8	4.8
Maltreatment (T74)	36	7.2	9.1
Other Injuries	19	3.8	4.8
Total	395	79.0	100.0
Children 5–12 Years			
Superficial Head Injury (S00)	30	6.0	15.5
Fracture Skull or Facial Bones (S02)	18	3.6	9.3
Concussion (S060)	16	3.2	8.2
Other Head Injuries (Remainder S00–S09)	35	7.0	18.0
Injuries to Abdomen, Spine and Pelvis (S30–S39)	23	4.6	11.9
Injuries to Thorax (Including Rib Fractures) (S20–S29)	3	0.6	1.5
Injuries to Upper Limb (S40–S69)	29	5.8	14.9
Injuries to Lower Limb (S70–S99)	11	2.2	5.7
Maltreatment (T74)	11	2.2	5.7
Other Injuries	18	3.6	9.3
Total	194	38.8	100.0

Source: National Minimum Dataset

South Island Distribution and Trends

South Island DHBs vs. New Zealand

In Canterbury during 2006–2010, hospital admissions for injuries arising from the assault, neglect or maltreatment of children were *significantly* higher than the New Zealand rate, while in the remaining South Island DHBs rates were not *significantly* different from the New Zealand rate (**Table 190**).



South Island Trends

In the South Island DHBs during 2000–2010, large year to year variations made trends in hospital admissions for injuries arising from the assault, neglect or maltreatment of children difficult to interpret (**Figure 182**).

South Island DHBs Mortality

In the South Island during 2000–2008, a total of 14 children died as the result of injuries arising from assault, neglect or maltreatment (Canterbury n=1, Nelson Marlborough n=8, Otago n=4, Southland n=1).

Table 190. Hospital Admissions for Injuries Arising from the Assault, Neglect, or Maltreatment of Children 0–14 Years, South Island DHBs vs. New Zealand 2006–2010

DHB	Total No. Admissions 2006–2010	No. Admissions Annual Average	Rate per 100,000	Rate Ratio	95% CI
Injuries Arising from the Assault, Neglect or Maltreatment of Children 0–14 Years					
Nelson Marlborough	23	4.6	17.8	0.93	0.61–1.41
West Coast	4	0.8	12.7	0.66	0.25–1.77
Canterbury	126	25.2	26.3	1.37	1.14–1.65
South Canterbury	7	1.4	13.5	0.71	0.34–1.48
Otago	23	4.6	14.3	0.75	0.49–1.13
Southland	24	4.8	22.1	1.15	0.77–1.73
New Zealand	856	171.2	19.2	1.00	

Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population

Summary

In New Zealand during 2006–2010, hospital admissions for injuries sustained as the result of the assault, neglect or maltreatment of children exhibited a U-shaped distribution with age, with rates being highest for infants < 1 year, and those > 11 years of age. In contrast, mortality was highest for infants < 1 year. While the gender balance for admissions was relatively even during infancy and early childhood, hospital admissions for males became more predominant as adolescence approached. In addition, admissions were also *significantly* higher for males, Māori > Pacific > European > Asian/Indian children, and those in average / more deprived (NZDep decile 2–10) areas.

In Canterbury during 2006–2010, hospital admissions for injuries arising from the assault, neglect or maltreatment of children were *significantly* higher than the New Zealand rate, while in the remaining South Island DHBs rates were not *significantly* different from the New Zealand rate. During 2000–2008, a total of 14 South Island children died as the result of injuries arising from assault, neglect or maltreatment.



Figure 182. Hospital Admissions for Injuries Arising from the Assault, Neglect or Maltreatment of Children Aged 0–14 Years, South Island DHBs vs. New Zealand 2000–2010

