

RISK AND PROTECTIVE FACTORS



WELL CHILD SERVICES



IMMUNISATION COVERAGE

Introduction

Immunisation is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. It provides both individual protection and population-wide protection by reducing the incidence of infectious diseases and preventing their spread to vulnerable people (also known as herd immunity) [65].

The 20th Century saw dramatic declines in vaccine-preventable diseases worldwide and vaccination has been identified as a cost-efficient means of reducing inequalities in health [66,67]. In New Zealand, vaccination rates have improved in recent years [68]. In the 12 months to June 2012, 92% of two year olds were fully immunised by their second birthday, as compared to 67% in 2007 [68,69]. However, vaccine preventable diseases persist and vaccination coverage remains below the thresholds required to provide the population-wide benefits of herd immunity for some diseases, including measles and pertussis [65,70,71]. In addition, a survey of New Zealand general practices, found that immunisation coverage and timeliness varied widely [72]. Both immunisation coverage ($p<0.001$) and timeliness ($p<0.001$) decreased with increased social deprivation. Three practice characteristics were significantly associated with improved coverage and timeliness: younger age at registration, use of one of four available practice management systems, and not having staff shortages.

The Ministry of Health thus remains committed to improving immunisation coverage rates and the timeliness of immunisation [69], with increased immunisation being one of six 2012/2013 Health Targets [73]. If this target is achieved, by July 2013, 85% of eight months olds should have had their primary course of immunisation (at six weeks, three months and five months) on time, increasing to 90% by July 2014 and 95% by December 2014.

The following section provides a brief overview of New Zealand's current immunisation schedule, along with a summary of recent changes, before reviewing immunisation coverage rates at five key milestone ages: 6, 12, 18 and 24 months and 5 years.

New Zealand's Current Immunisation Schedule

The New Zealand Immunisation Schedule offers publicly funded vaccination aimed at ten vaccine preventable diseases: diphtheria, tetanus, pertussis, poliomyelitis, hepatitis B, *Haemophilus influenzae* type b, measles, mumps, rubella and pneumococcal disease, to children aged between six weeks and 11 years (**Table 22**) [74]. In addition, human papillomavirus (HPV) vaccination is offered to girls aged 12 years. Publicly funded vaccinations for influenza, Meningococcal A, C Y and W135 and tuberculosis (BCG vaccination) are offered to those at risk.

While the majority of these vaccinations have been part of the Immunisation Schedule for some time, vaccinations for pneumococcal disease and human papillomavirus in girls are recent additions. The text box below thus provides a brief overview of these new additions to the Immunisation Schedule, as well as the likely impact they will have on the burden of infectious disease in New Zealand moving forward.



Table 22. The National Immunisation Schedule for Babies, Children and Adolescents

Age	Antigen	Vaccine Brand Name
6 weeks	diphtheria/tetanus/acellular pertussis/inactivated polio vaccine/ hepatitis B/ <i>Haemophilus influenzae</i> type b	1 injection (INFANRIX® -hexa)
	10-valent pneumococcal conjugate	1 injection (SYNFLORIX®)
3 months	diphtheria/tetanus/acellular pertussis/inactivated polio vaccine/ hepatitis B/ <i>Haemophilus influenzae</i> type b	1 injection (INFANRIX® -hexa)
	10-valent pneumococcal conjugate	1 injection (SYNFLORIX®)
5 months	diphtheria/tetanus/acellular pertussis/inactivated polio vaccine/ hepatitis B/ <i>Haemophilus influenzae</i> type b	1 injection (INFANRIX® -hexa)
	10-valent pneumococcal conjugate	1 injection (SYNFLORIX®)
15 months	<i>Haemophilus influenzae</i> type b	1 injection (Act-HIB)
	measles/mumps/rubella	1 injection (M-M-R® II)
	10-valent pneumococcal conjugate	1 injection (SYNFLORIX®)
4 years	diphtheria/tetanus/acellular pertussis/inactivated polio vaccine	1 injection (INFANRIX™-IPV)
	measles/mumps/rubella	1 injection (M-M-R® II)
11 years	diphtheria/tetanus/acellular pertussis	1 injection (BOOSTRIX™)
12 years girls only	human papillomavirus	3 doses given over 6 months (GARDASIL®)

Source: Ministry of Health, New Zealand Immunisation Schedule [74]

Recent Changes to the New Zealand Immunisation Schedule

The **10-valent pneumococcal conjugate vaccine (PCV-10)** was added to the schedule in 2011, a change from the previously used 7-valent vaccine (PCV-7) (introduced in June 2008) [71]. In New Zealand, the incidence of invasive pneumococcal disease (IPD), which became notifiable to Medical Officers of Health in 2008, among children under two years has reduced 70.9% since the introduction of PCV-7, from 100.4 cases per 100 000 in 2006/2007 to 29.2 per 100 000 in 2010 [75]. Between 2009 and 2010 IPD rates among children under two years decreased 52.6% in Europeans, 27.6% in Māori, and 37.4% in Pacific Peoples, however, these differences were not statistically significant. An ecological study in the US found that rates of antibiotic-resistant invasive pneumococcal infection among children under two years fell from 70.3 to 13.1 cases per 100,000 (a decline of 81%; 95% CI 80 to 82%) after the introduction of PCV-7 in 2000 [76]. There was an increase in infections caused by non-vaccine serotypes. A Dutch cost effectiveness analysis found that PCV-7 vaccination was not cost effective due to increases in invasive disease caused by non-vaccine serotypes, reducing the overall direct effects of vaccination and offsetting potential herd immunity in unvaccinated individuals [77]. The authors predicted that introduction of 10 or 13-valent vaccines could have better net health benefits and improved cost-effectiveness compared to PCV-7 through less replacement disease and increased herd protection.

HPV vaccination with Gardasil, a quadrivalent vaccine against HPV types 16 and 18 (responsible for approximately 70% of cervical cancer) and 6 and 11 (responsible for most genital warts) was added to the immunisation schedule for girls in 2008 [71]. The purpose of the vaccination programme is to reduce the incidence of HPV infection and the subsequent development of cervical cancer and to reduce inequalities in cervical cancer [78]. Overseas, pooled results from two large randomised controlled trials and two smaller trials providing data for 20,583 women, with a mean follow up of 3 years, found that in women negative for HPV16 or HPV18 infection during the vaccination regimen (n=17,129), vaccine efficacy was 99% (95% CI 93 to 100) for the primary endpoint of CIN2/3 or adenocarcinoma *in situ* (surrogate markers for cervical cancer) [79]. The intention to treat analysis of all the randomised women (including those who were HPV16/18-infected at baseline) revealed no protection for women infected with HPV 16 or 18 at baseline, supporting the benefit of giving the vaccine before the onset of sexual activity, and possible exposure to HPV16/18. Surveys of sexual behaviour conducted in New Zealand guided the decision to offer the vaccine to 12 year old girls [71]. An ecological study in Australia that compared the incidence of high grade cervical abnormalities before and after the introduction of the HPV vaccination programme identified a significant absolute decrease in the incidence of high grade abnormalities of 0.38% (95% CI 0.61 to 0.16) [80]. However, individual-level vaccine status was not considered and linkage between vaccination and screening registers is needed to confirm these findings independently of possible bias by screening policy or practice changes [81]. A second Australian ecological study identified declines in the diagnosis of genital warts in young women and heterosexual men attending the Melbourne Sexual Health clinic in the four years after the commencement of the vaccination programme for girls [82]. No significant declines were seen in older women and heterosexual men, or homosexual men. While these studies suggest benefits from the vaccination programme, it will take several decades to demonstrate a reduction in the burden of cervical cancer, the main goal of vaccination [81].

Immunisation Coverage Rates

The following section uses the National Immunisation Register to review immunisation coverage rates for children at 6, 12, 18 and 24 months and 5 years of age.

Data Source and Methods

Indicator

Proportion of Children Fully Immunised at 6, 12, 18 and 24 months and 5 years of age

Numerator: National Immunisation Register (NIR): The number of children who turned the milestone age during the reporting period and who had completed their age appropriate immunisations by the time they turned that milestone age.

Denominator: NIR: The number of children who turned the milestone age during the reporting period.

Notes on Interpretation

During pregnancy and after birth, parents are informed about the NIR, with Lead Maternity Carers playing a key role in information provision. Following delivery, all of the relevant information about each child is added to the NIR, with parents being able to 'opt off' having their child's immunisation information stored in the NIR. In this case the child's National Health Index number, date of birth, District Health Board and any immunisations already recorded in the NIR are retained, so that immunisation coverage can be accurately calculated. Parents may also choose not to immunise their children and this is recorded on the NIR as a declined immunisation event to prevent recalls.

The NIR was implemented by the Ministry of Health and District Health Boards in 2005. The rollout occurred in a staged fashion commencing with the Greater Auckland region in April 2005 and finishing in Nelson Marlborough in December 2005. Thus only children born from 2005 onwards have their details recorded in the NIR. However, all children immunised with the MeNZB vaccine as part Meningococcal B Immunisation Programme had their details recorded in the NIR, along with any other immunisations given at the same time (although no further vaccinations are recorded on the NIR for these older children). For further details on the NIR see <http://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/national-immunisation-register/questions-and-answers-national-immunisation-register>.

New Zealand Distribution and Trends

Distribution by Milestone Age

In New Zealand during 2009 (Q2) to 2012 (Q2), immunisation coverage rates were highest for children aged 12 and 24 months, followed by 18 months, and then five years, with coverage being lowest for children aged 6 months. Immunisation coverage rates however, increased for all age groups during this period (**Figure 64**).

Distribution by Ethnicity

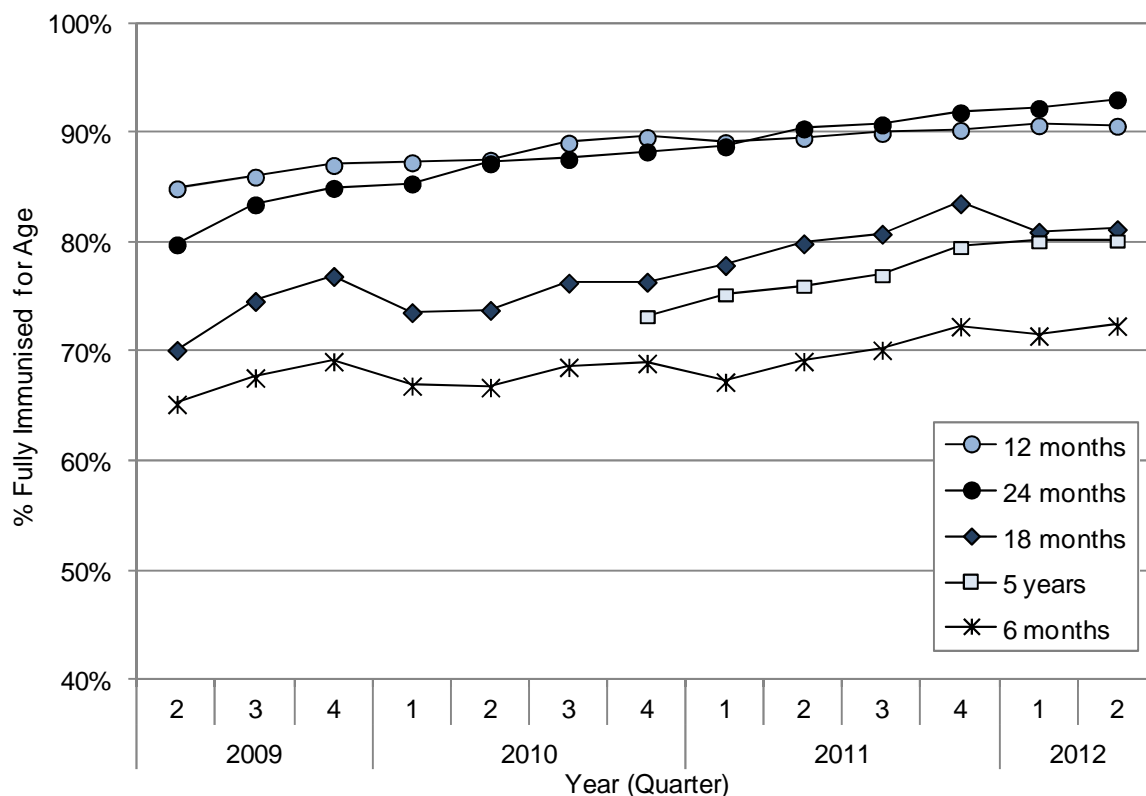
In New Zealand during 2009 (Q2) to 2012 (Q2), immunisation coverage rates at 6 and 18 months were higher for Asian > European > Pacific > Māori children. While similar ethnic differences were evident at 24 months during early 2009, by early 2012, coverage rates were higher for Asian and Pacific > European > Māori children. Immunisation coverage rates for all ethnic groups increased during this period (**Figure 66**). Thus by 2012 (Q2) immunisation coverage at 24 months was 97.6% for Asian, 96.8% for Pacific, 93.3% for European and 92.2% for Māori children (**Figure 65**).

Distribution by NZ Deprivation Index Decile

In New Zealand during 2009 (Q2) to 2012 (Q2), immunisation coverage rates at 6, 12 and 18 months and five years remained higher for children from the least deprived (NZDep deciles 1–2) > average (NZDep deciles 5–6) > most deprived (NZDep deciles 9–10) areas. While similar socioeconomic gradients were evident at 24 months during early 2009, these lessened, so that by the first two quarters of 2012, coverage rates were very similar for those from the most and least deprived areas (**Figure 66**). Thus by 2012 (Q2) immunisation coverage at 24 months was 93.8% for children from the least deprived (NZDep deciles 1–2) areas, 92.1% for children from average (NZDep deciles 5–6) areas, and 94.1% for children from the most deprived (NZDep deciles 9–10) areas (**Figure 67**).

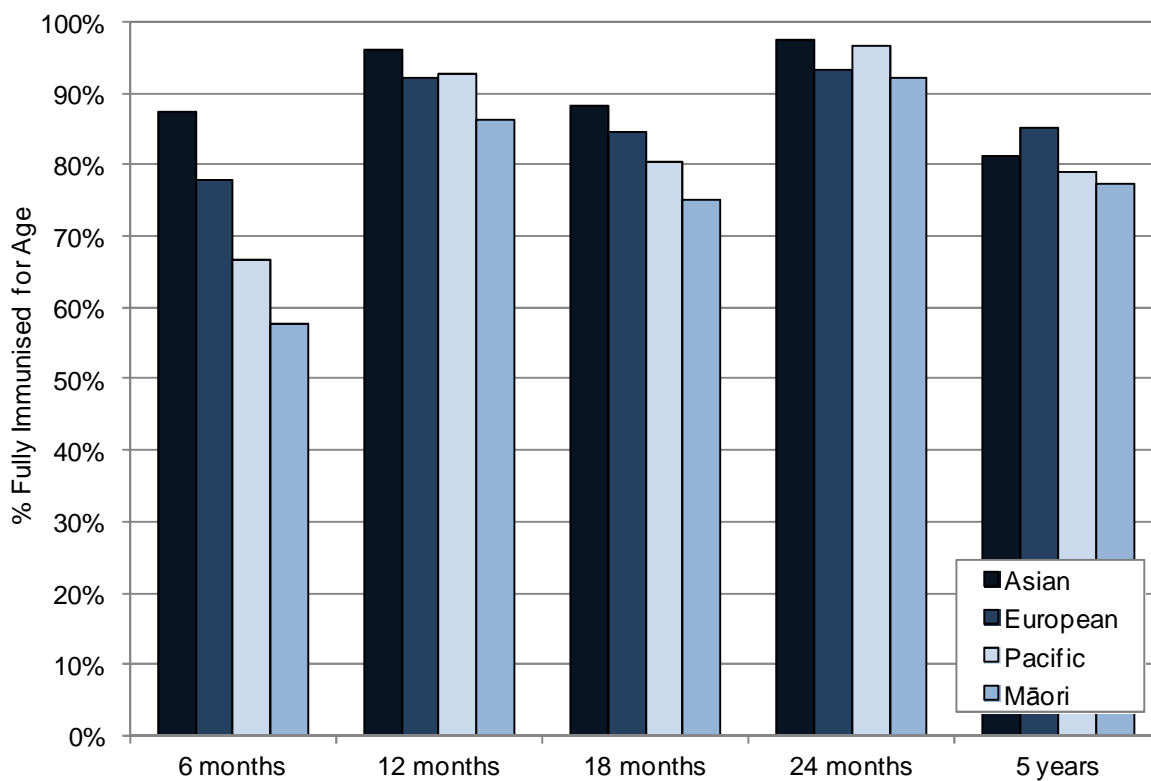


Figure 64. Immunisation Coverage by Milestone Age, New Zealand 2009 (Quarter 2) – 2012 (Quarter 2)



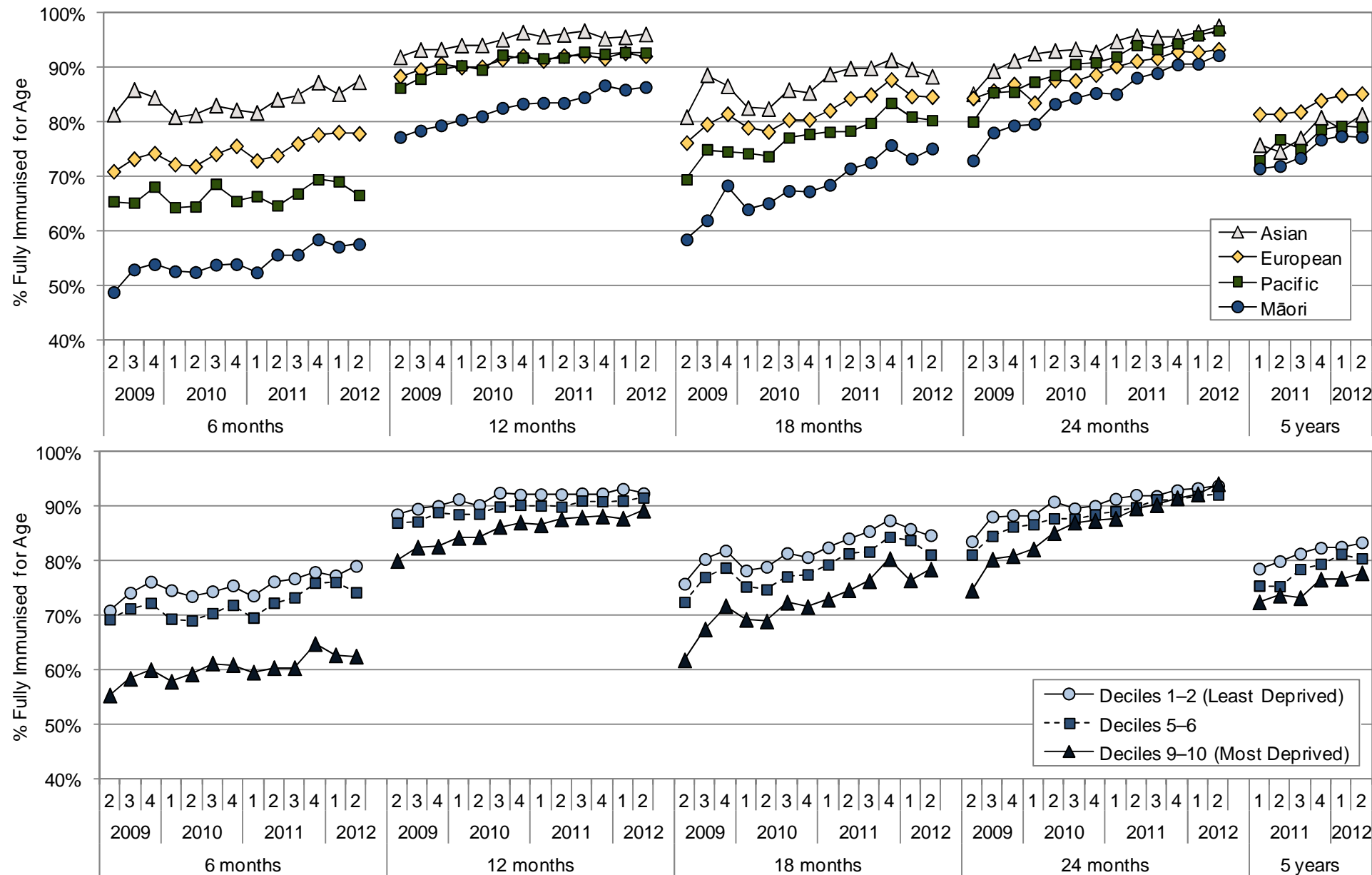
Source: National Immunisation Register

Figure 65. Immunisation Coverage by Milestone Age and Ethnicity, New Zealand 2012 (Quarter 2)



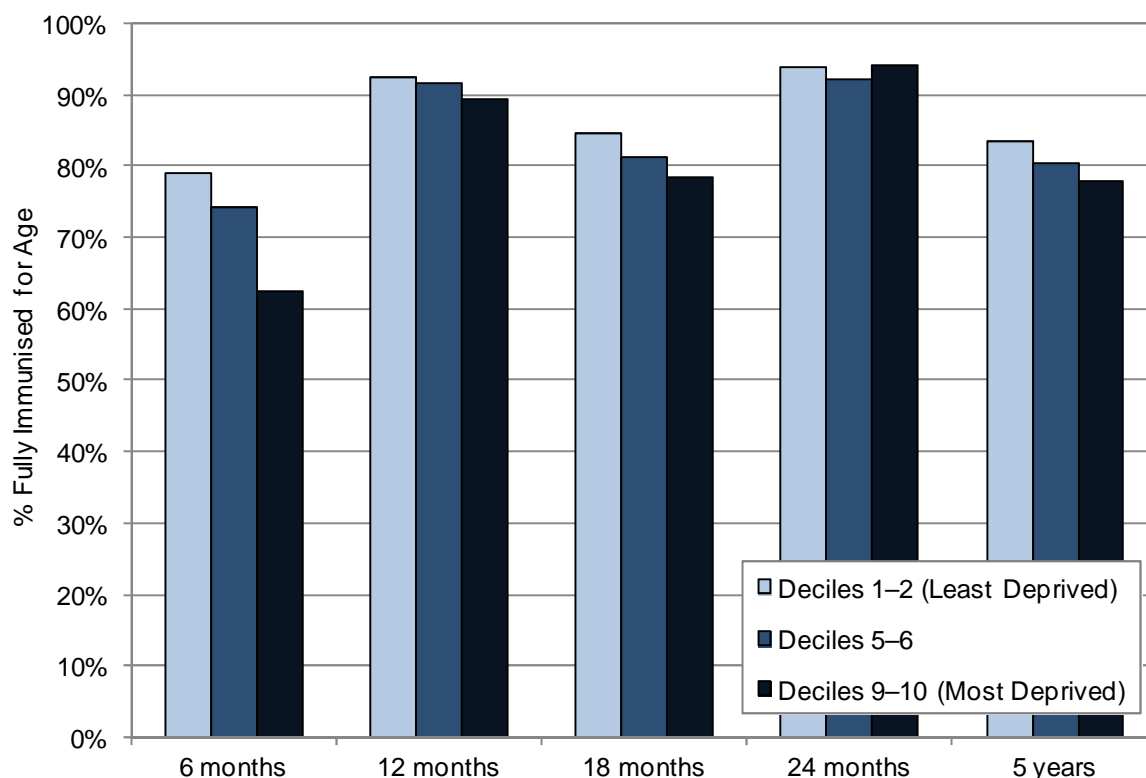
Source: National Immunisation Register; Note: Ethnicity is Level 1 Prioritised

Figure 66. Immunisation Coverage by Milestone Age, Ethnicity and NZ Deprivation Index Decile, New Zealand 2009 (Quarter 2) – 2012 (Quarter 2)



Source: National Immunisation Register; Note: Ethnicity is Level 1 Prioritised

Figure 67. Immunisation Coverage by Milestone Age and NZ Deprivation Index Decile, New Zealand 2012 (Quarter 2)



Source: National Immunisation Register

South Island Distribution and Trends

Distribution by Milestone Age

In the South Island DHBs during 2009(Q2) to 2012(Q2), immunisation coverage rates were highest for children aged 12 and 24 months, followed by 18 months and five years, with coverage being lowest for children 6 months of age. During 2012 (Q2), immunisation coverage at 24 months was 87.4% in Nelson Marlborough, 96.4% in South Canterbury, 91.0% in Canterbury, 78.4% in the West Coast and 95.1% in the Southern DHB, as compared to 93.1% for New Zealand as a whole (**Figure 68, Figure 69, Figure 70**).

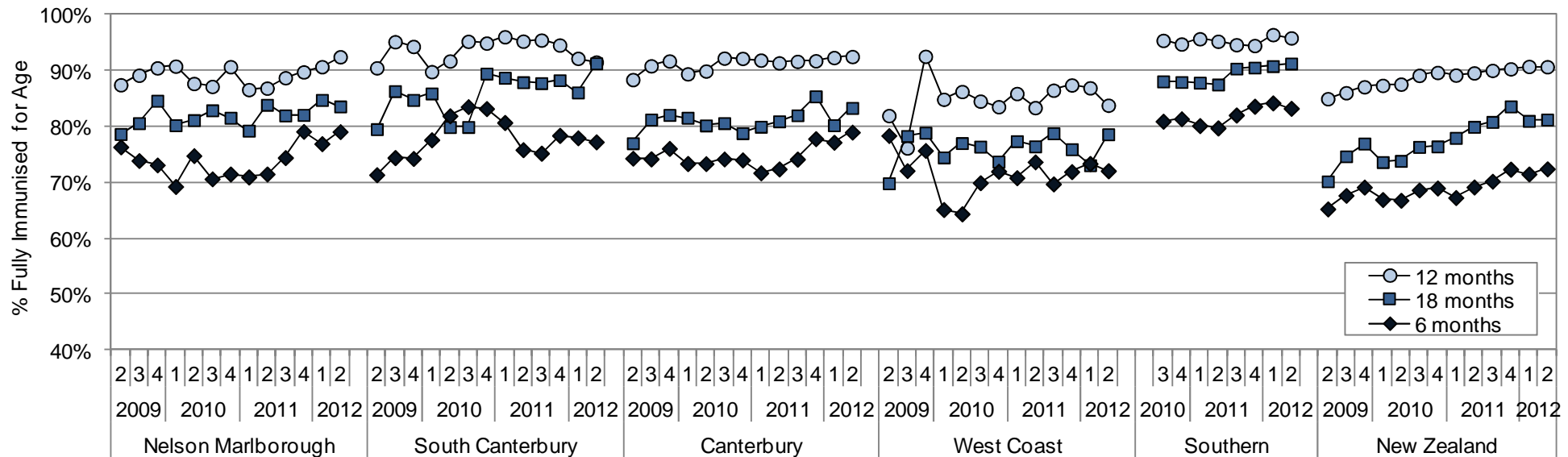
Distribution by Ethnicity

In the South Island DHBs during 2009(Q2) to 2012(Q2), there were no consistent ethnic differences in immunisation coverage rates at 24 months of age, with rates being very similar for Māori and European children (**Figure 71**).

Distribution by NZ Deprivation Index Decile

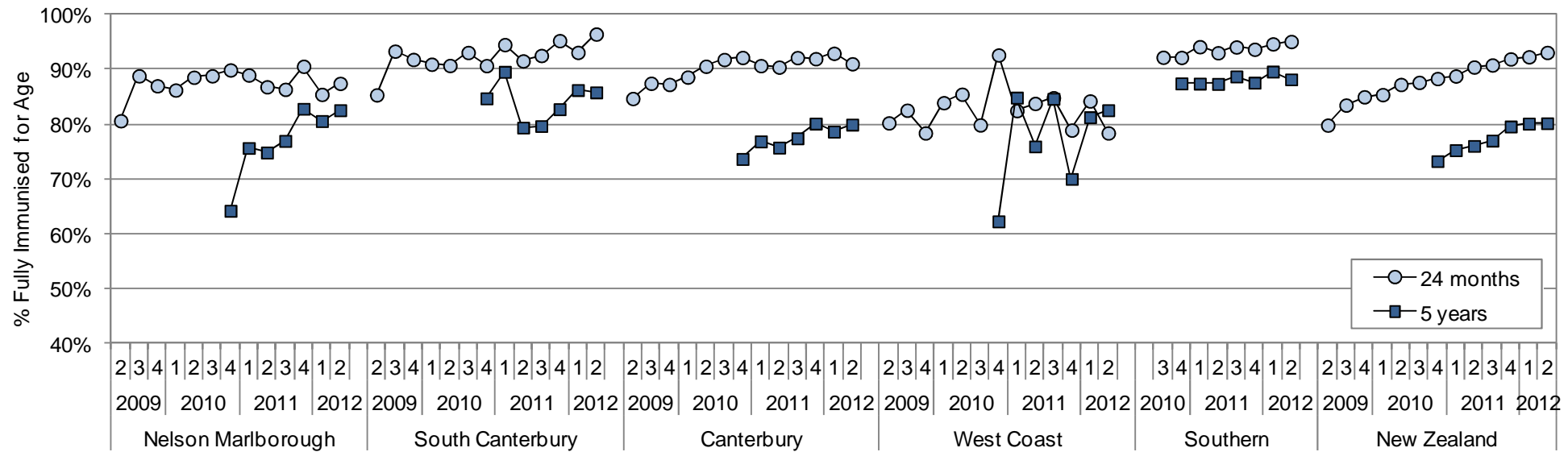
In Canterbury during (Q2)–2012 (Q2), immunisation coverage rates at 24 months were generally higher for children from the least deprived (NZDep deciles 1–2) and most deprived (NZDep Decile 9–10) areas, with rates being lowest for those from average (NZDep deciles 5–6) areas. No consistent socioeconomic differences (as measured by NZDep decile) were seen in the other South Island DHBs (**Figure 72**).

Figure 68. Immunisation Coverage by Milestone Age (6, 12 and 18 Months), South Island DHBs vs. New Zealand 2009 (Quarter 2) - 2012 (Quarter 2)



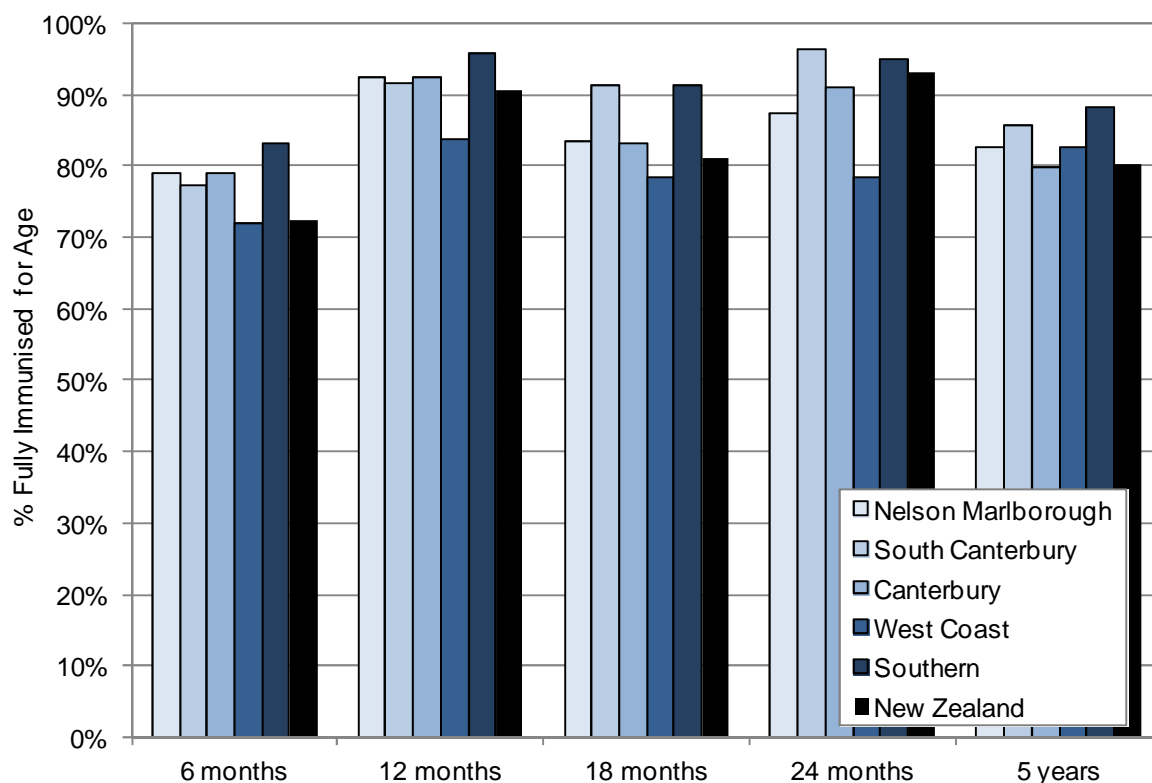
Source: National Immunisation Register

Figure 69. Immunisation Coverage by Milestone Age (Two and Five Years), South Island DHBs vs. New Zealand 2009 (Quarter 2) - 2012 (Quarter 2)



Source: National Immunisation Register

Figure 70. Immunisation Coverage by Milestone Age, South Island DHBs vs. New Zealand 2012 (Quarter 2)

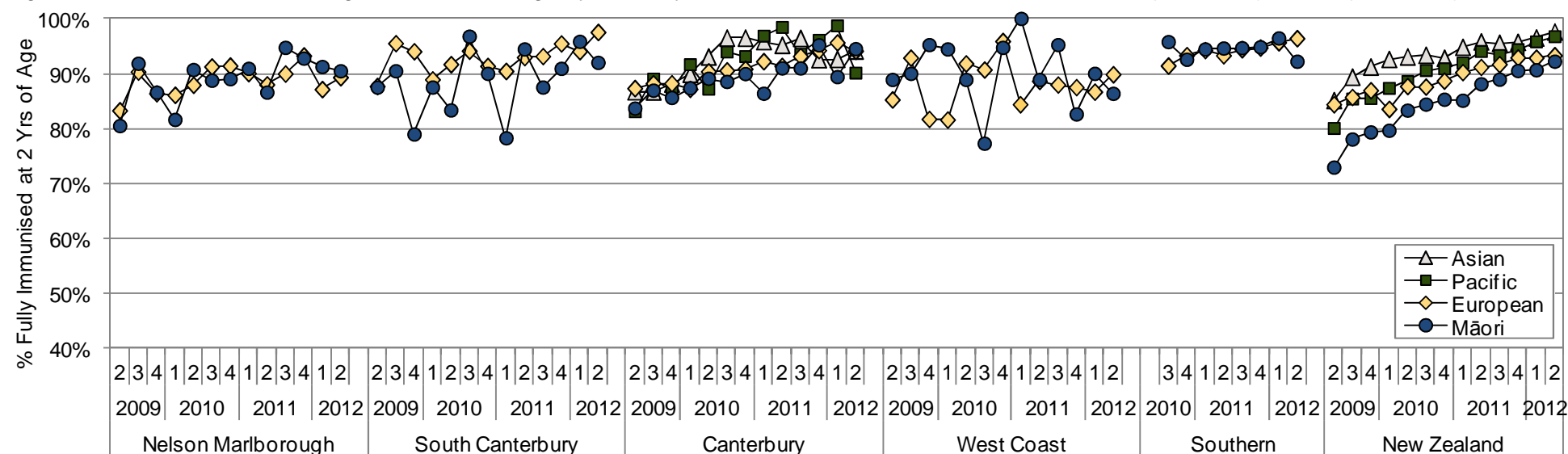


Source: National Immunisation Register

Local Policy Documents and Evidence-Based Reviews Relevant to Immunisation and Immunisation Coverage

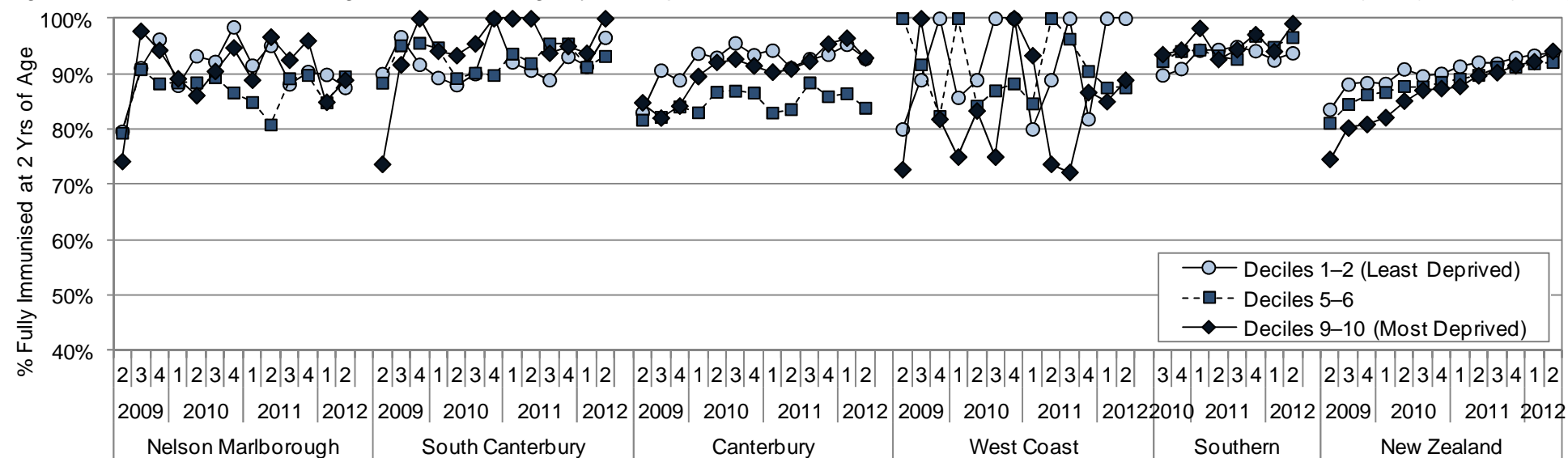
Table 23 below provides a brief overview of local policy documents and evidence-based reviews which consider immunisation and interventions aimed at increasing immunisation coverage.

Figure 71. Immunisation Coverage at 2 Years of Age by Ethnicity, South Island DHBs vs. New Zealand 2009 (Quarter 2) - 2012 (Quarter 2)



Source: National Immunisation Register; Note: Ethnicity is Level 1 Prioritised

Figure 72. Immunisation Coverage at 2 Years of Age by NZ Deprivation Index Decile, South Island DHBs vs. New Zealand 2009 (Qtr 2) - 2012 (Qtr 2)



Source: National Immunisation Register

Table 23. Local Policy Documents and Evidence-Based Reviews Relevant to Immunisation and Increasing Immunisation Coverage

Ministry of Health Policy Documents
<p>Ministry of Health. 2011. Immunisation Handbook 2011. Wellington: Ministry of Health. http://www.health.govt.nz/publication/immunisation-handbook-2011</p> <p>The Immunisation Handbook provides clinical guidance for health professionals on the effective and safe use of vaccines. The Handbook contains information on eligibility for vaccines and the diseases covered by the National Immunisation Schedule, as well as other vaccine preventable diseases.</p>
<p>Ministry of Health. 2011. Targeting Immunisation: increased immunisation. Wellington: Ministry of Health. http://www.health.govt.nz/publication/targeting-immunisation-increased-immunisation</p> <p>Increased immunisation has been a national health target since 2007. The 2012/2013 immunisation target (available at: http://www.health.govt.nz/new-zealand-health-system/health-targets/2012-13-health-targets) is that 85% of eight-month-olds will have their primary course of immunisation at six weeks, three months and five months on time by July 2013, increasing to 90% by July 2014 and 95% by December 2014. This report provides a summary of the reasons behind this target, including improvements in child health and reductions in ethnic inequalities in health, and a series of case studies illustrating best practice in increasing immunisation uptake. Three recommendations are identified:</p> <ul style="list-style-type: none"> • All children should be enrolled with a general practice as soon as possible after birth. • Parents should be contacted before each immunisation is due. • Immunisation appointments should be made at a time that suits the parents.
<p>Ministry of Health. Review of Neonatal BCG Immunisation Services in New Zealand. 2007, Ministry of Health: Wellington. http://www.health.govt.nz/publication/review-neonatal-bcg-immunisation-services-new-zealand</p> <p>This review evaluated the neonatal BCG immunisation programme. Its objectives were: to describe the neonatal BCG immunisation services; review tuberculosis (TB) surveillance data and service monitoring; identify any imbalance between current policy and services; and make recommendations on the future monitoring of the service. The incidence of TB over the previous 20 years was found to be stable although increasing rates had been identified in immigrants and refugees from high-risk Asian and African countries, and recent arrivals from Pacific countries and their contacts. A survey of all 21 DHBs indicated a wide variability in how the service was offered in New Zealand. Monitoring was patchy and only a few DHBs collected data on the number of TB risk assessments performed on babies, meaning that coverage rates could not be calculated because the total number of eligible babies was unknown. Three priorities for improving the effectiveness of service were identified: to institute a systematic approach to delivering the BCG immunisation service in all DHBs; to improve the quality of the monitoring of the BCG immunisation service; and to improve the completeness of notification data. The review made a number of recommendations in the areas of contracts, monitoring, new resources and surveillance.</p>
Cochrane Systematic Reviews
<p>Jefferson T, et al. 2012. Vaccines for preventing influenza in healthy children. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD004879.pub4 http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004879.pub4/abstract</p> <p>This review assessed the effects of influenza vaccines in healthy children, with the aims of assessing vaccine efficacy (prevention of confirmed influenza) and effectiveness (prevention of influenza-like illness (ILI)), and documenting adverse events associated with vaccination. Seventy-five studies (approximately 300,000 observations) were included in the review. The analysis of vaccine efficacy and effectiveness included 17 RCTs, 19 cohort studies and 11 case-control studies. Evidence from RCTs found that live attenuated vaccines had an overall efficacy 80% (RR 0.20; 95% CI 0.13 to 0.32). The overall risk difference (RD) for those aged 2 to 16 years was -0.16 (95% CI -0.20 to -0.11) indicating that six children aged two to 16 need to be vaccinated with live attenuated vaccine to prevent one case of influenza (infection and symptoms). There was no usable data for those aged two years or younger. Inactivated vaccines had lower efficacy, and in children aged two years or younger were not significantly more efficacious than placebo. The RD for children aged six or older was -0.35 (95% CI -0.54 to -0.15), indicating that 28 need to be vaccinated to prevent one case of influenza. There was no evidence of effect of vaccination on secondary cases, lower respiratory tract disease, drug prescriptions, otitis media and its consequences or socioeconomic impact. There was weak single-study evidence of the effect of vaccination on school absenteeism. Meta-analysis of safety outcome data was not feasible due to variability in study design and presentation of data and safety comparisons could not be made. Specific brands and situations have been associated with serious side effects (cataplexy, narcolepsy and febrile convulsions). The authors conclude that while influenza vaccines are efficacious in preventing cases of influenza in children older than two years of age, there is little evidence available those aged under two years, making current recommendations to vaccinate healthy children from six months of age in the USA, Canada, parts of Europe and Australia surprising. The authors also caution that trials included in the review are industry funded, and their content and conclusion should be interpreted with this knowledge. Such trials were found to be published in more prestigious journals and cited more than other studies independently from methodological quality and size while studies funded from public sources were significantly less likely to report conclusions favourable to the vaccine in a systematic review of 274 influenza vaccine studies published up to 2007 [83].</p>

Soares-Weiser K, et al. 2012. **Vaccines for preventing rotavirus diarrhoea: vaccines in use.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD008521.pub2
<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008521.pub2/abstract>

Rotavirus is the commonest cause of diarrhoea-related deaths in children under five years, and is a common cause of diarrhoea-related hospital admissions in high-income countries. The World Health Organization (WHO) recommends vaccination for all children, as deaths due to diarrhoea account for more than 10% of all deaths. This review assessed the effectiveness of rotavirus vaccines approved for use for preventing rotavirus diarrhoea. Secondary objectives were to assess the efficacy of rotavirus vaccines on all-cause diarrhoea, hospital admission, death, and safety profiles. Forty-three trials were included in the review (190,551 participants), 31 of which assessed RV1 (Rotarix, GlaxoSmithKline Biologicals) and 12 assessed RV5 (RotaTeq, Merck & Co., Inc.). Compared to placebo, RV1 was associated with a 70% reduction in all cases of rotavirus diarrhoea in the first (RR 0.30, 95% CI 0.18 to 0.50) and second year of life (RR 0.30, 95% CI 0.21 to 0.43), and an 80% reduction in severe episodes during the first (RR 0.20, 95% CI 0.11 to 0.35) and second year of life (RR 0.16, 95% CI 0.12 to 0.21). RV5 was associated with reductions of over 70% in any rotavirus diarrhoea (RR 0.27, 95% CI 0.22 to 0.33) or severe cases (RR 0.23, 95% CI 0.08 to 0.71) in the first year, and approximately 50% (RR 0.51, 95% CI 0.36 to 0.72 for all rotavirus diarrhoea and RR 0.44, 95% CI 0.22 to 0.88 for severe cases) in the second year. Both vaccines were associated with reductions in severe diarrhoea from all causes in the first year of life (RV1: RR 0.58, 95% CI 0.40 to 0.84; RV5 RR 0.49, 95% CI 0.40 to 0.60 (one trial only)) and RV1 was associated with a reduction in second year of life (RR 0.49, 95% CI 0.40 to 0.60). RV5 showed no difference with placebo in the second year of life. When tested against placebo the vaccines gave similar numbers of adverse events, including intussusception, and other events that required discontinuation of the vaccination schedule. The authors conclude that the data support the WHO recommendations to include rotavirus vaccination in immunisation schedules, particularly if there is a high burden of diarrhoeal deaths in children younger than five years.

Jacobson Vann JC & Szilagyi P. 2009. **Patient reminder and recall systems to improve immunization rates.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD003941.pub2
<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD003941.pub2/abstract>

This review assessed the effectiveness of patient reminder and recall systems in improving immunisation rates, and compared the effects of various types of reminders in different settings or patient populations. The review included 47 RCTs, 16 of which examined routine vaccinations for children and four which examined influenza vaccinations in high risk children. Overall increases in immunisation rates ranged from 1 to 20 percentage points. Reminders were effective for childhood vaccinations (OR 1.47, 95% CI 1.28 to 1.68) and childhood influenza vaccinations (OR 2.18, 95% CI 1.29 to 3.70). The one study assessing the effect of reminders on adolescent vaccinations in an urban setting found they were ineffective (OR 1.14, 95% CI 0.98 to 1.31). Unstable telephone numbers were problematic in this study, which used autodialed calls. All types of reminders (postcards, letters, telephone or autodialed calls) were effective. Person-to-person telephone reminders were the most effective (OR 1.92, 95% CI 1.20 to 3.07), but also the most costly.

Scott A, et al. 2011. **The effect of financial incentives on the quality of health care provided by primary care physicians.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD008451.pub2
<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008451.pub2/abstract>

This review expanded on the review below (Guiffrida et al, 1999) by including the effect of target payments and all other types of incentive payments, including pay-for-performance schemes and multifaceted schemes, on primary health care. Such schemes are popular internationally (for example the Quality and Outcomes Framework in the UK) despite little evidence of their success in improving the quality of primary health care. Seven studies were included in the review, two of which (controlled interrupted time series analyses) included childhood immunisation among their outcomes. Overall, the different financial interventions had modest and variable effects on the quality of health care provided by primary care physicians (PCPs). One of the studies which assessed childhood immunisation rates identified a statistically significant improvement in rates but this was due to a sharp fall in rates in the control group. The authors conclude that there is insufficient evidence to support or not support financial incentives. More rigorous trials are needed which also examine unintended consequences.

Uman LS, et al. 2009. **Psychological interventions for needle-related procedural pain and distress in children and adolescents.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD005179.pub2
<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD005179.pub2/abstract>

This reviewed examined the efficacy of cognitive-behavioural (CB) psychological interventions for needle-related procedural pain and distress in children and adolescents. Twenty-eight trials (1951 participants aged 2 to 19 years), mostly studying vaccinations and injections, were included in the review. The largest effect sizes for treatment improvement over control conditions were found for distraction (self-reported pain: SMD = -0.24, 95% CI -0.45 to -0.04), hypnosis (self-reported pain: SMD -1.47, 95% CI -2.67 to -0.27; self-reported distress: SMD -2.20, 95% CI -3.69 to -0.71; and behavioural measures of distress: SMD -1.07, 95% CI -1.79 to -0.35), and combined CB interventions (other-reported distress: SMD -0.88, 95% CI -1.65 to -0.12; and behavioural measures of distress: SMD -0.67, 95% CI -0.95 to -0.38). Although there is preliminary support for use of CB interventions to reduce distress associated with needle-related procedures, many of the studies failed to describe randomisation procedures and participants withdrawals/drop-outs and further research is required.

Giuffrida A, et al. 1999. **Target payments in primary care: effects on professional practice and health care outcomes.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD000531
<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD000531/abstract>

This review examined the effect of target payments on the professional practice of primary care physicians (PCPs) and health care outcomes. Only two RCTs (involving 149 practices) were included in the review, both of which assessed the effect of target payments on immunisation rates. One study (313 PCPs, 6,600 2 year olds and 6,400 5 year olds) assessed the effect of target payments on immunisation rates using an interrupted time series design. Before 1 April 1990 GPs received a fee for each immunisation made. After 1 April 1990, a lump sum payment was made if GPs immunised at least 70% of the eligible population (a higher rate of payment was paid to the GPs that reached a 90% target), but nothing was paid if they immunised less than the lower target. Immunisation rates improved after the introduction of target payment, however, a logistic regression model of the trend found that there was no evidence that the overall linear trend had changed as a result of the introduction of target payments.

Other Systematic Reviews

Glenton C, et al. 2011. **Can lay health workers increase the uptake of childhood immunisation? Systematic review and typology.** Tropical Medicine & International Health, 16(9), 1044-53.

This review assessed the effects of lay health workers (LHWs) on childhood immunisation uptake. Twelve studies, (including 10 RCTs) were included in the review, mostly comparing LHWs with no intervention or standard care. Seven of the studies were conducted among economically disadvantaged populations in high-income countries (LHWs made home visits to parents to promote routine childhood immunisations and encourage clinic visits for vaccination), and the remaining five studies were conducted in low and middle income countries (in some of which LHWs gave vaccinations). Most of the studies showed that LHWs increased immunisation coverage. The diversity of settings meant the meta-analysis was possible for only four of the studies, all in high income settings (3568 participants). These LHW programmes were associated with a statistically significant increased the number of children whose immunisations were up to date (RR 1.19, 95% CI 1.09 to 1.30). The authors conclude that while LHWs show promise in improving vaccination coverage, further high quality studies are need in low and middle income countries.

National Collaborating Centre for Women's and Children's Health. 2009. **Reducing differences in the uptake of immunisations (including targeted vaccines) in children and young people aged under 19 years: systematic review of effectiveness and cost effectiveness evidence.** London: National Collaborating Centre for Women's and Children's Health. <http://www.nice.org.uk/PH21>

This review provides the evidence base for the NICE guidance (available at <http://www.nice.org.uk/PH21>) on reducing differences in uptake of immunisations. The review is focussed on what interventions are effective and cost effective in reducing differences in immunisation uptake in children and young people aged under 19 years. The effectiveness review included 142 studies and the cost-effectiveness review included 10 studies. Three key themes were identified: issues relevant to all childhood vaccines; issues relevant to MMR as an exemplar of a universal vaccine; issues relevant to neonatal Hep B as an exemplar of a targeted vaccine. Interventions assessed included: recipient reminder/recall systems; home visits; client or family incentives/disincentives; interventions in school or day care settings; provider based interventions (including education, reminders and incentives); national immunisation programmes; and multi-component interventions. A review of studies examining barriers to immunisation and the views and experiences of children, young people, parents/carers, and health professionals is included. Only one study included evaluated differential uptake of immunisations across population subgroups, although numerous studies assessed targeted interventions. The executive summary provides 66 effectiveness evidence statements and three cost-effectiveness evidence statements. The quality of included studies was variable and while there were some RCTs included, only 16 intervention studies had the highest quality rating. Evidence-based recommendations include:

- improve access to immunisation services, for example, by extending clinic times and making sure clinics are 'child-friendly'
- provide parents and young people with tailored information and support and an opportunity to discuss any concerns
- check children and young people's immunisation status during health appointments and when they join nurseries, playgroups, schools and further education colleges, and offer them vaccinations
- ensure babies born to hepatitis B-positive mothers are given all recommended doses of the vaccine on time, a blood test to check for infection and, where appropriate, hepatitis B immunoglobulin.

Falagas ME & Zarkadoulia E. 2008. **Factors associated with suboptimal compliance to vaccinations in children in developed countries: a systematic review.** Current Medical Research and Opinion, 24(6), 1719-41.

This review evaluated factors associated with suboptimal compliance to vaccinations, focussed on children and adolescents in developed countries. Thirty-nine original studies were included in the review. Factors influencing compliance with vaccinations were divided into parental-childhood characteristics and healthcare structure-health professionals characteristics. Parent-childhood characteristics that were statistically significantly associated with suboptimal compliance were: non-white race, low socioeconomic status, paying for vaccination, lack of health insurance, low parental education, older age of the child, younger maternal age, large family size, late birth order, lack of knowledge about disease and vaccination, negative beliefs/attitudes towards vaccination, fear of side-effects/risks/contraindications, not remembering vaccination schedules and appointments, sick child delays, and delayed well child visits. Factors related to healthcare structures and health professionals that were statistically significant associated with suboptimal compliance included: scepticism/doubts regarding provided medical information, inadequate support from healthcare providers, lack of available health structures, and problems concerning transportation and accessibility to vaccination clinics. The authors suggest that by understanding factors associated with suboptimal compliance, efforts to improve compliance can be better targeted.

Briss PA, et al. 2000. **Reviews of evidence regarding interventions to improve vaccination coverage in children, adolescents, and adults. The Task Force on Community Preventive Services.** American Journal of Preventive Medicine, 18(1 Suppl), 97-140.

This publication reports on a series of systematic reviews that examined the effectiveness, applicability, economic impact, and barriers to use of population-based interventions to improve universal vaccination coverage, and provides a set of evidence-based recommendations. Three categories of interventions were addressed: increasing community demand for vaccination, enhancing access to vaccination services, and provider-based interventions. Recommendations include: use of client Reminder/recall interventions; multi-component interventions that include education; vaccination requirements for childcare, school, and college attendance; reducing out-of-pocket costs; expanding access in health care settings as part of multi-component interventions expanding access; vaccination programmes in women, infants, and children settings; home visits, although home visiting can be highly resource intensive relative to other options when applied only to improve vaccination coverage; assessment and feedback for vaccination providers There was insufficient evidence to support community-wide, education-only interventions, clinic-based, education-only interventions, client or family incentives, client-held medical records, vaccination programmes in schools or childcare centres, or provider education only. The reviews were used to inform the Community Guide to interventions to increase the use of universally recommended vaccines (<http://www.thecommunityguide.org/vaccines/universally/index.html>) which continues to be updated.

Other Relevant Evidence

Health Committee. 2011. **Inquiry into how to improve completion rates of childhood immunisation, and Briefings from the Chief Coroner on the coronial process, from Dr Michael Tatley on the adverse reaction process, and from Professor Sir Peter Gluckman on how to improve completion rates of childhood immunisation.** 49th Parliament: March. http://www.parliament.nz/en-NZ/PB/SC/Documents/Reports/8/c/a/49DBSCH_SCR5060_1-Inquiry-into-how-to-improve-completion-rates-of.htm

This parliamentary Health Committee inquiry into improving rates of childhood immunisation examined: statistics on timeliness and completion of vaccination in New Zealand, and international comparisons; the National Immunisation Register; relevant literature on optimising timeliness and completion rates; information on community concerns, informed consent and conscientious objection; and an assessment of the benefits of immunisation. Key informants inform the report. A large number of recommendations are made regarding what methods could be applied at minimal cost to improve immunisation coverage in New Zealand. Recommendations include an expansion of targets to older age groups, improvements in the National Immunisation Register, exploration of provider and parent incentives, and improved information resources targeted at parents. Dr Nikki Turner's "six start" plan to improve rates of childhood immunisation, covering enhanced business as usual, contractual/legislative aspects, responsibilities and support for primary care and parents, communication and safety surveillance, is included in the appendices.

On 22 June 2011, the Government, led by the Ministry of Health, issued its response to the Health Select Committee's Report, noting that the Ministry had met, or that work was underway to meet, the majority (24) of the Report's 30 recommendations (http://www.parliament.nz/en-NZ/PB/Presented/Papers/6/d/4/49DBHOH_PAP21651_1-Government-Response-to-Report-of-the-Health-Committee.htm). A briefing paper, released by the Ministry of Health in August 2012 outlines the Ministry's progress on implementation of the six remaining recommendations, including ongoing exploration of incentives for parents and providers and improved immunisation information for pregnant women (<http://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/immunisation-programme-decisions/progress-report-inquiry-how-improve-completion-rates-childhood-immunisation>).

Kaplan DW. 2010. **Barriers and Potential Solutions to Increasing Immunization Rates in Adolescents.** Journal of Adolescent Health, 46(2, Supplement 2), S24-S33.

This paper discusses the barriers and potential solutions to increasing vaccination rates in adolescents from a US point of view. While many barriers such as cost are common to all children, adolescents have changing emotional and cognitive development which may shape their receptivity to vaccination, and adolescents have lower rates of contact with acute and preventive health care, resulting in fewer vaccination opportunities. The solutions identified after review of the literature include: accessible electronic immunisation information systems that contain a complete vaccination history and flag recommended vaccines; offering alternative sites for vaccination such as schools; compulsory or mandated vaccines for middle and high school entry; and a review of consent procedures.

Bonanni P, et al. 2009. **Varicella vaccination in Europe - taking the practical approach.** BMC Medicine, 7(1), 26.

This report, by members of the Working Against Varicella in Europe (WAVE) group, funded by GlaxoSmithKline Biologicals, considers the practicalities of introducing routine childhood varicella vaccination in Europe, and discusses the benefits and challenges of different vaccination options. The authors argue that the epidemiology of varicella in Europe, and evidence of the effectiveness of routine varicella vaccination in Germany (preliminary reports only), support the adoption of routine vaccination in Europe, particularly now that the combined measles, mumps, rubella and varicella vaccine is available. Barriers to routine vaccination are assessed, including costs, perceptions that varicella is not a serious disease, and the need to achieve high coverage rates. The authors all have industry connections.

Note: the publications listed were identified using the search methodology outlined in **Appendix 1**

WELL CHILD/TAMARIKI ORA SERVICES

Introduction

The Well Child/Tamariki Ora (WC/TO) Framework was introduced in 2002 with the aim of reducing fragmentation and inconsistencies in the delivery of the WC/TO programme [84]. The programme provides a universal health assessment, and a health promotion and support service for children and their families from birth to five years. WC/TO services are provided by Plunket, DHB-funded providers, primary health organisations and Māori and Pacific non-government organisations [85]. A review of the 2002 framework, commencing in 2006, led to the phasing in of a new framework from July 2010.

The current WC/TO Framework consists of a series of initial contacts carried out by the lead maternity carer (LMC), a six-week check carried out by the baby's general practice, and eight core contacts, from four to six weeks to five years (see Methods box below) carried out by a WC/TO provider [86,87]. Contacts consist of health and development/clinical assessments, interventions and support, and promotion of health and development/health education. Health and development/clinical assessments include a review of maternal, family and child health and wellbeing, child growth and development, vision and hearing, developmental assessments (Parental Evaluation of Developmental Status PEDS), oral health (Lift the Lip), and a behavioural assessment at the B4 School Check. Interventions and support includes clinical evaluations, immunisations, ABC smoking cessation, family violence screening, response to assessments and additional contacts as required. Promotion of health and development/health education includes breastfeeding and nutrition, sudden unexpected death in infancy (SUDI) prevention, parenting support, injury prevention and childhood illness and child development education.

The recent review of the WC/TO Framework sought to determine which types of activities can help improve child health outcomes and reduce inequalities among children aged 0 to 5 years, based on evidence and best practice [85]. There is good evidence to support a range of health promotions activities in early childhood, including prevention of infectious diseases by vaccination and other means, reducing the risk of SUDI, supporting breastfeeding, encouraging better dental care, and informing and advising parents about the risk of accidents [88]. The evidence base for universal screening programmes is more limited [88,89]. However, several evidence-based screening tests, such as newborn hearing screening, are included in the Framework, and the recent review has led to the phasing out of those screening tests that do not appear to be effective, such as routine tympanometry for glue ear at three years [85].

With these issues in mind, the following section reviews the proportion of Plunket clients receiving each of their Core 1–7 Well Child contacts, as well as the proportion of four year old children receiving their B4 School Check.

Plunket Children Receiving Core Well Child Contacts

In New Zealand, Well Child/Tamariki Ora services are provided by a range of providers including Plunket, Māori and Pacific health providers and public health services. Of these, Plunket is the largest provider of Well Child Services. It sees over 91% of New Zealand's newborn babies during their first six weeks of life, with contacts including home visits, clinic based contacts, and visits at other locations such as marae, family centres, Kōhanga Reo and mobile buses [90]. In addition to its wide coverage, Plunket has a central database which allows it to assess the proportion of active clients receiving their core WC/TO contacts. The following section thus uses Plunket data to assess the proportion of Plunket children receiving their core WC/TO contacts during 2007–2012.



Data Sources and Methods

Indicator

Proportion of active Plunket clients who received their core Well Child contacts

Numerator: Plunket Database: Number of active Plunket clients who received their core Well Child contacts by scheduled core contact.

Denominator: Plunket Database: Total active clients in the Plunket database

Notes on Interpretation

Note 1: This data is based on clients who were active in the Plunket Database on 12 October 2012, when the data was extracted. Any clients discontinued by that date are not included in these figures. Contacts that took place up to and including the 21st September 2012 are included. This date is earlier than the date of data extraction as there is a three week lag from a contact taking place to it being entered in the Plunket database.

Note 2: In this analysis, data is presented for five birth cohorts; those born in the years ending June 2008, 2009, 2010, 2011 and 2012. Because the Core 7 contact is not scheduled until 2–3 years of age, not all birth cohorts had reached the age of eligibility for Core 7 by the time the data were extracted. Thus this section focuses on two age cohorts, with the oldest cohort (born in the year ending June 2008), providing the most up-to-date snapshot of Plunket children receiving their Core 1–7 visits. Given that the data for this earlier cohort is now somewhat dated, a second cohort, those born in the year ending June 2011, has been selected to provide the most up-to-date data on the proportion of Plunket children receiving their Core 1–5 contacts.

Note 3: The age bands used by Plunket for the Core Well Child Visits are outlined below:

Core Visit	Well Child/Tamariki Ora Age	Plunket Age Band
Core 1	4–6 weeks	2 weeks – 5 weeks 6 days
Core 2	8–10 weeks	6 weeks – 9 weeks 6 days
Core 3	3–4 months	10 weeks – 15 weeks 6 days
Core 4	5–7 months	16 weeks – 7 months 4 weeks
Core 5	9–12 months	7 months 4 weeks 1 day – 13 months 4 weeks
Core 6	15–18 months	13 months 4 weeks 1 day – 20 months 4 weeks
Core 7	2–3 years	20 months 4 weeks 1 day – 47 months 4 weeks

Note 4: Plunket data for the Core 8, B4 School Check is not presented in this section due to variations in the contractual arrangements for the provision of this core contact by DHB.

Note 5: Ethnicity is Māori and then Pacific prioritised

New Zealand Distribution and Trends

Trends in Proportion Receiving Core 1–7 Contacts

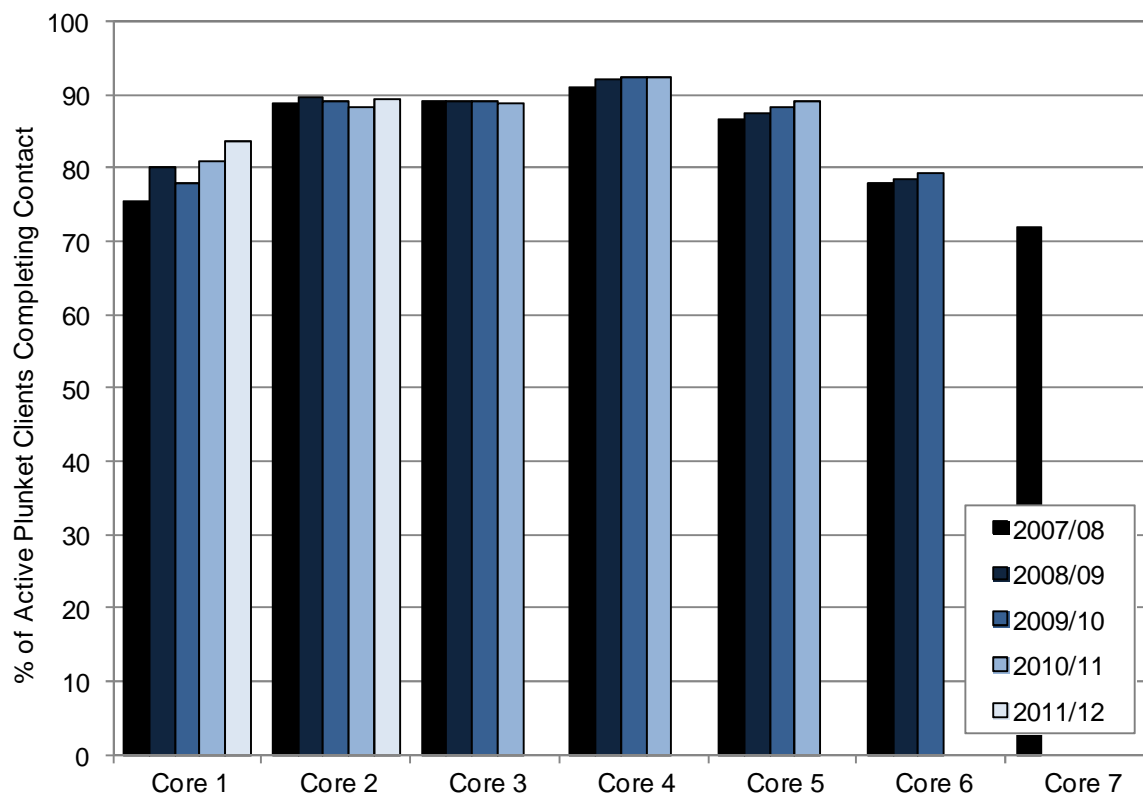
In New Zealand during July 2007–June 2012, the proportion of Plunket children receiving their Core 1 contact increased from 75.5% to 83.5%. In contrast, the proportions receiving their Core 2, Core 3 and Core 4 contacts were more static, although less data was available to assess trends from the Core 3 contact onwards (**Figure 73**).

Trends in Core 1 Contact by Ethnicity and NZDep Index Decile

In New Zealand during July 2007–June 2012, the proportion of Plunket babies (aged 2 weeks to 5 weeks 6 days) receiving their Core 1 contact increased for all ethnic groups, with rates increasing from 77.6% to 85.0% for European/Other babies, from 73.6% to 82.8% for Pacific babies, and from 69.0% to 78.6% for Māori babies. When broken down by NZ Deprivation Index decile, the proportion receiving their Core 1 contact increased from 77.8% to 84.4% for those living in the least deprived (NZDep decile 1) areas, from 76.8% to 84.8% for those living in average (NZDep decile 5) areas, and from 70.0% to 79.3% for those living in the most deprived (NZDep decile 10) areas (**Figure 74**).

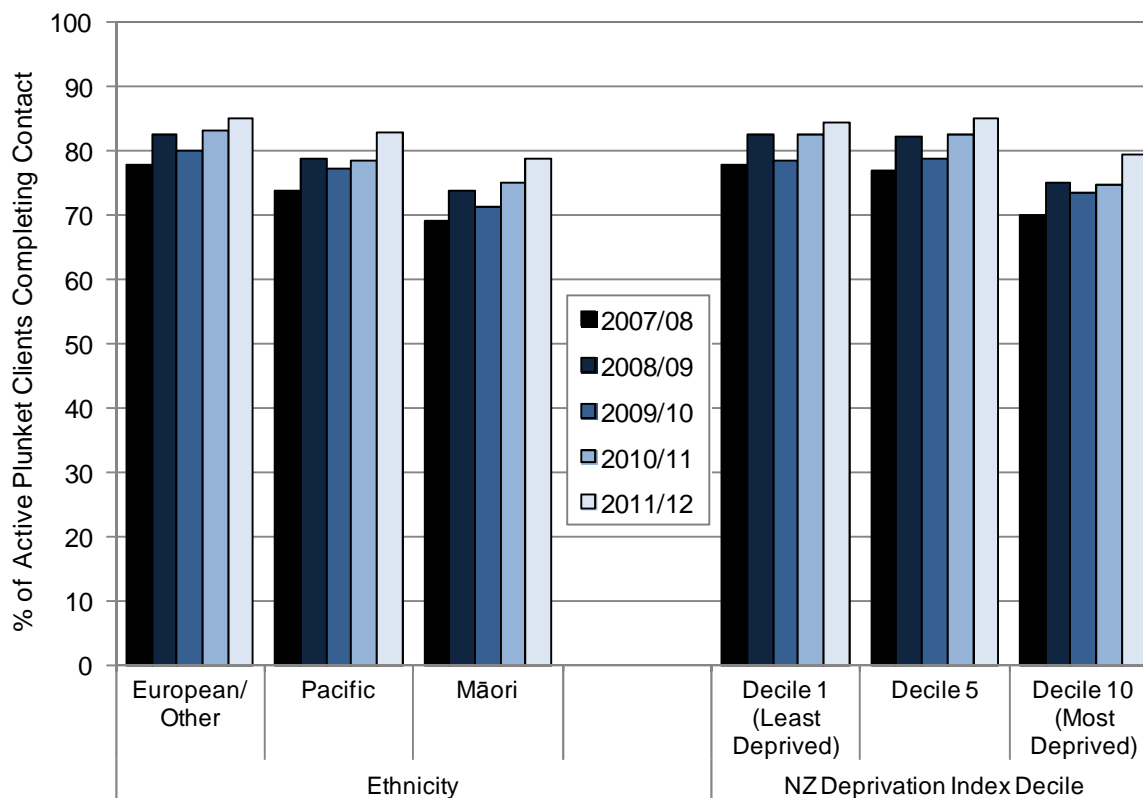


Figure 73. Proportion of New Zealand Children who Received their Core 1–7 Well Child Contacts by Birth Year, Active Plunket Clients Born July 2007 to June 2012



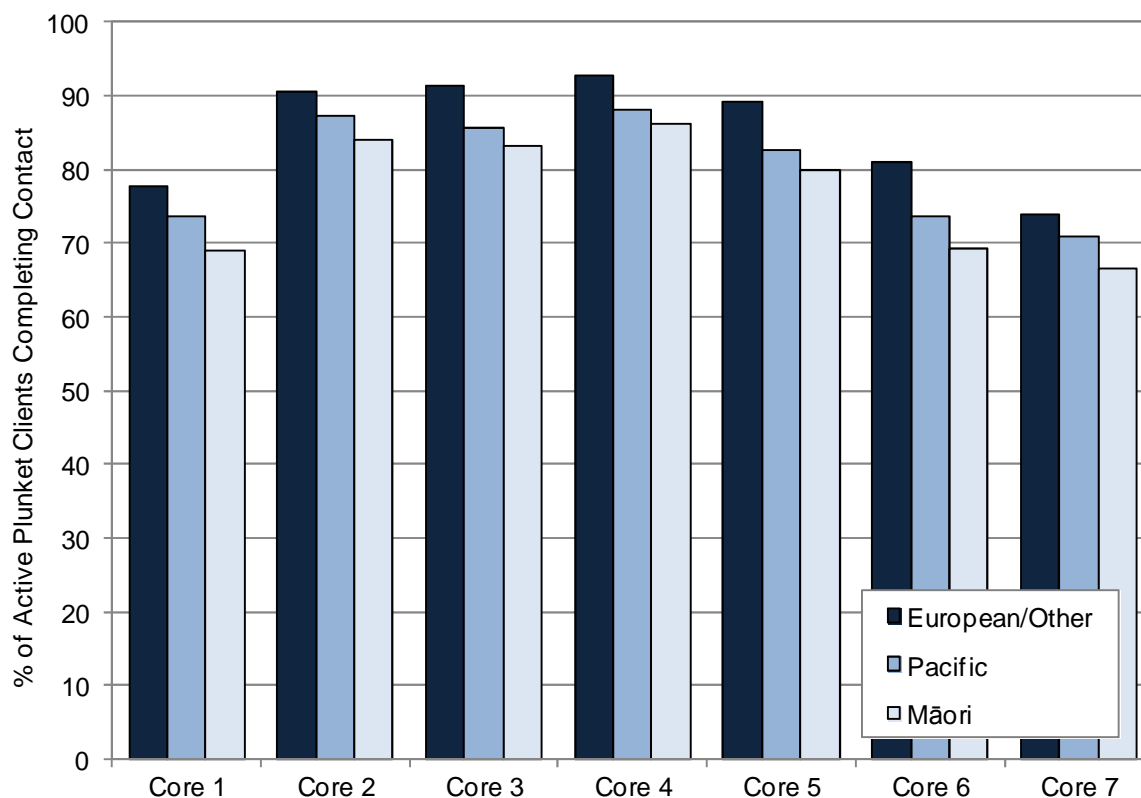
Source: Plunket

Figure 74. Proportion of New Zealand Babies who Received their Core 1 Well Child Contact by Ethnicity and NZ Deprivation Index Decile, Active Plunket Clients Born July 2007 to June 2012



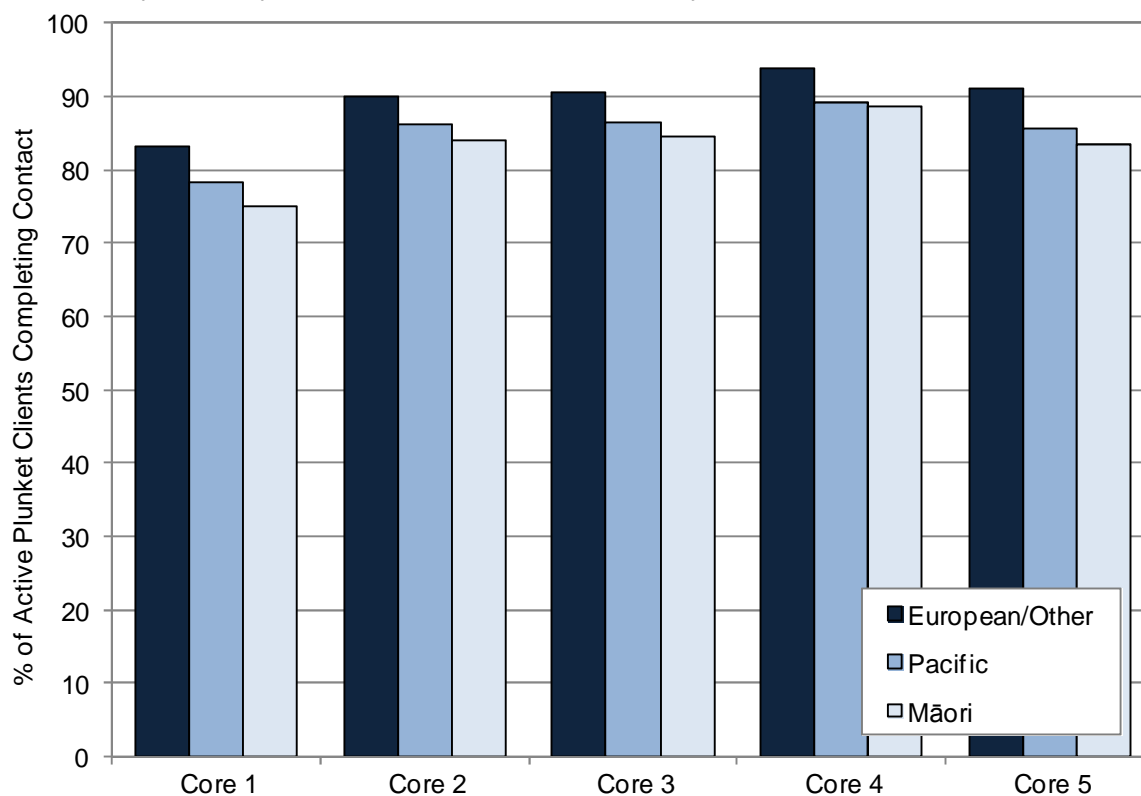
Source: Plunket; Note: Ethnicity is Prioritised

Figure 75. Proportion of New Zealand Children who Received their Core 1–7 Well Child Contacts by Ethnicity, Active Plunket Clients Born July 2007 to June 2008



Source: Plunket; Note: Ethnicity is Prioritised

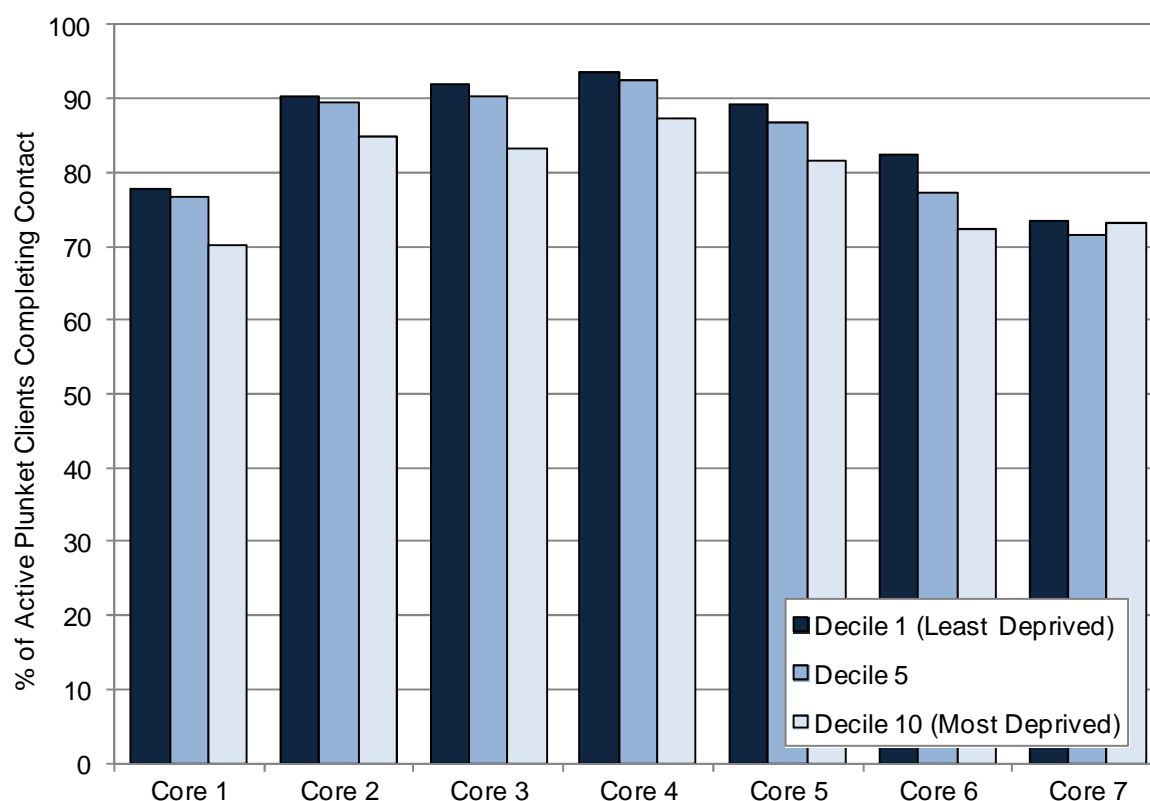
Figure 76. Proportion of New Zealand Children who Received their Core 1–5 Well Child Contacts by Ethnicity, Active Plunket Clients Born July 2010 to June 2011



Source: Plunket; Note: Ethnicity is Prioritised; Birth cohort not yet old enough for Core 6 and 7

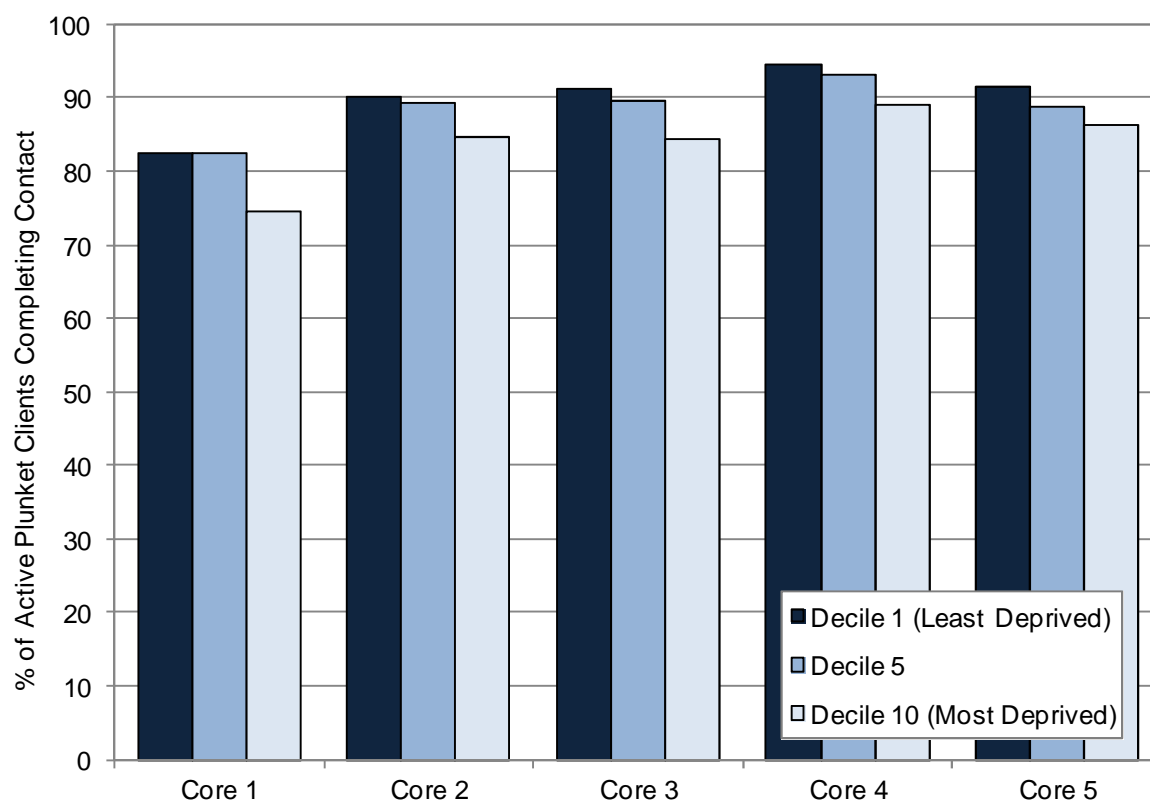


Figure 77. Proportion of New Zealand Children who Received their Core 1–7 Well Child Contacts by NZ Deprivation Index Decile, Active Plunket Clients Born July 2007 to June 2008



Source: Plunket

Figure 78. Proportion of New Zealand Children who Received their Core 1–5 Well Child Contacts by NZ Deprivation Index Decile, Active Plunket Clients Born July 2010 to June 2011



Source: Plunket; Note: Birth cohort not yet old enough for Core 6 and 7

Proportion Receiving Core Contacts by Ethnicity

In the cohort of Plunket children born during July 2007–June 2008, a higher proportion of European/Other > Pacific > Māori children received their Core 1–7 contacts. For this cohort, the Core 1 and 7 contacts were the least likely to be received, while the Core 2–5 contacts were the most likely to be received by children of all ethnic groups (**Figure 75**).

Similarly, in the cohort of Plunket children born during July 2010–June 2011, the proportion receiving their Core 1–5 contacts remained higher for European/Other > Pacific > Māori children. When compared to the 2007/2008 birth cohort however, the proportion receiving their Core 1 contact had increased for all ethnic groups (**Figure 76**).

Proportion Receiving Core Contacts by NZDep Index Decile

In the cohort of Plunket children born during July 2007–June 2008, a higher proportion of children from the least deprived and average (NZDep deciles 1 and 5) areas received their Core 1–6 contacts than did children from the most deprived (NZDep decile 10) areas. Differences by NZDep decile were less evident for the Core 7 contact (**Figure 77**).

Similarly, in the cohort of Plunket children born during July 2010–June 2011, a higher proportion of children from the least deprived and average (NZDep deciles 1 and 5) areas received their Core 1–5 contacts than did children from the most deprived (NZDep decile 10) areas. When compared to the 2007/2008 birth cohort however, the proportion receiving their Core 1 contact had increased for children from all three NZDep deciles (NZDep deciles 1, 5 and 10) (**Figure 78**).

South Island Distribution and Trends

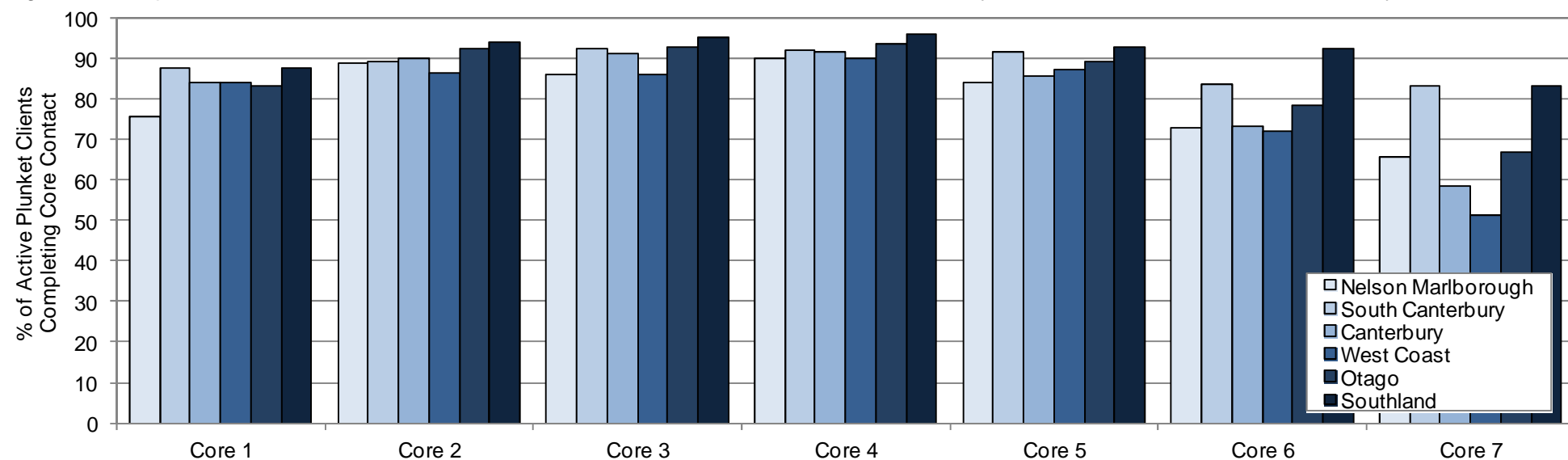
Proportion Receiving Core Contacts

Of the Nelson Marlborough Plunket cohort born during July 2007–June 2008, 75.7% had received their Core 1 contact, as compared to 87.8% in South Canterbury, 84.2% in Canterbury, 83.9% in the West Coast, 83.3% in Otago and 87.8% in Southland. The Core 2–4 contacts were the most likely to be received, while the Core 6 and 7 contacts were the least likely to be received (**Figure 79**).

While similar patterns were seen for the cohort born during July 2010–June 2011, the proportion of Nelson Marlborough children receiving their Core 1 contact had increased to 88.0%, while the proportion receiving their Core 1 contact in the West Coast had fallen to 74.0% (**Figure 79, Figure 80, Figure 81**).

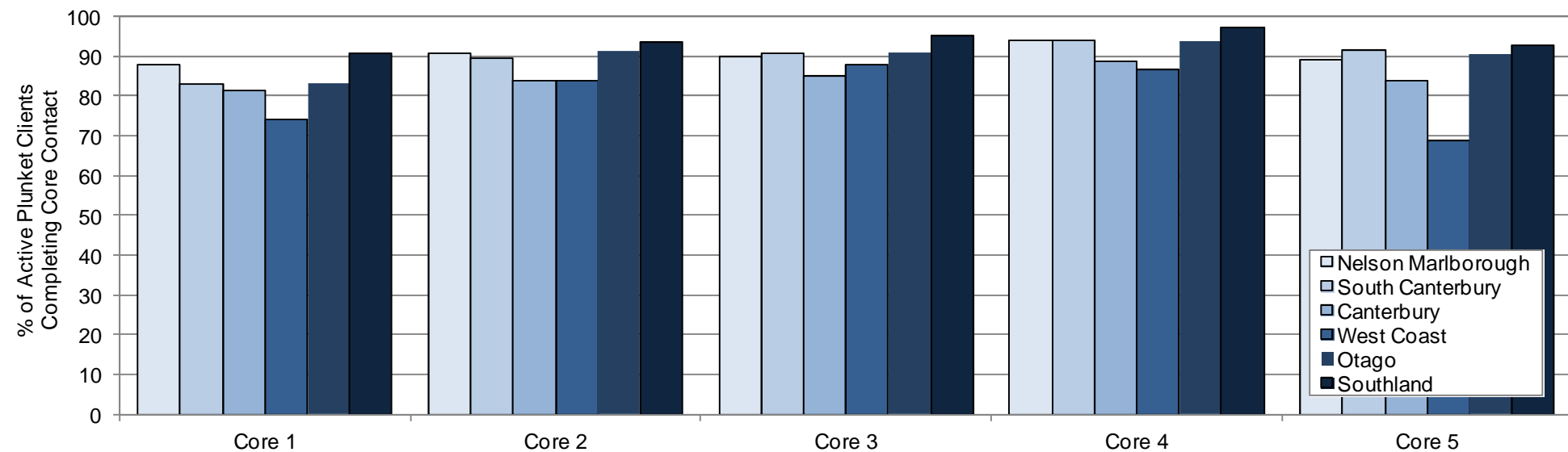


Figure 79. Proportion of South Island Children who Received Core 1–7 Well Child Contacts by DHB, Active Plunket Clients Born July 07–June 08



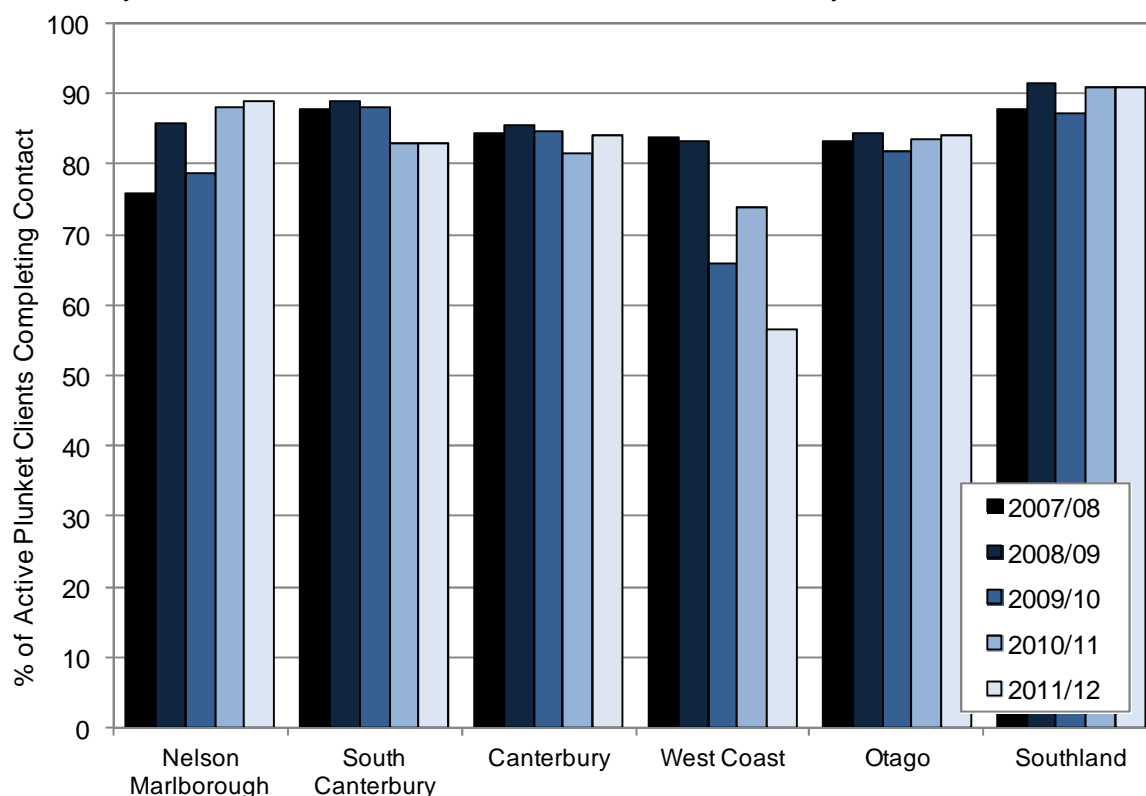
Source: Plunket

Figure 80. Proportion of South Island Children who Received Core 1–5 Well Child Contacts by DHB, Active Plunket Clients Born July 10–June 11



Source: Plunket; Note: Birth cohort not yet old enough for Core 6 and 7

Figure 81. Proportion of South Island Babies who Received their Core 1 Well Child Contact by District Health Board, Active Plunket Clients Born July 2007 to June 2012



Source: Plunket

Proportion Receiving Core Contacts by Ethnicity

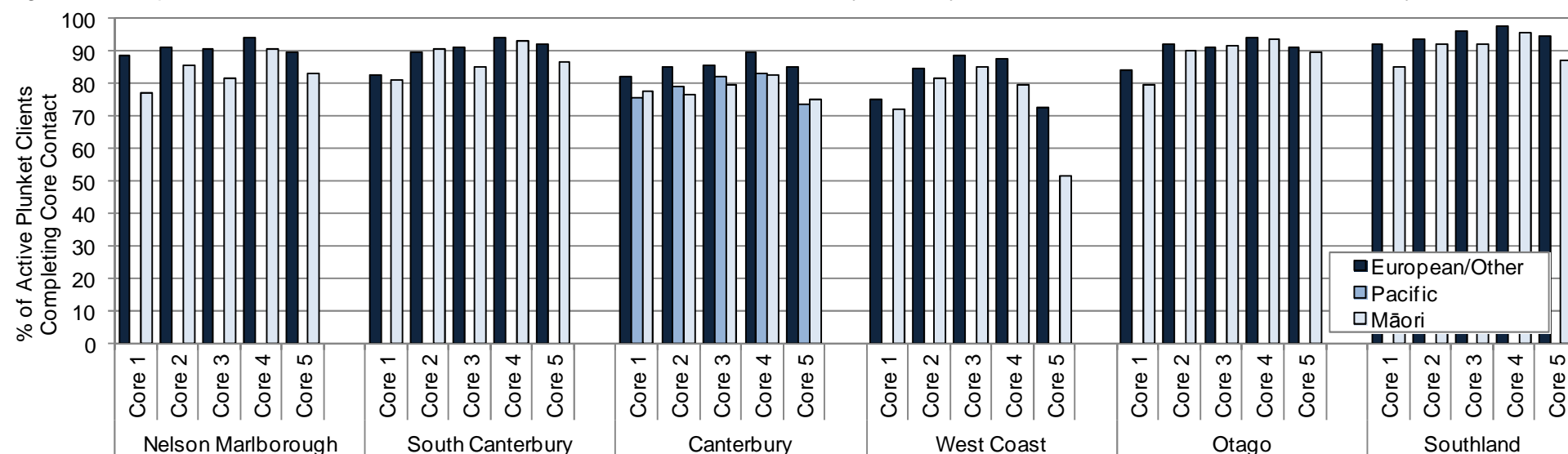
Of the Canterbury Plunket cohort born during July 2010–June 2011, a higher proportion of European/Other children received their Core 1–5 contacts than did Pacific or Māori children. In Nelson Marlborough, the West Coast and Southland a higher proportion of European/Other children received their Core 1–5 contacts than did Māori children, while in South Canterbury and for some Core contacts in Otago, ethnic differences were less evident (**Figure 82**).

Proportion Receiving Core Contacts by NZDep Index Decile

Of the Canterbury Plunket cohort born during July 2010–June 2011, a higher proportion of children from the least deprived (NZDep decile 1) areas received their Core 1–5 contacts, than did children from the most deprived (NZDep decile 10) areas. In the other South Island DHBs however, socioeconomic gradients were less consistent, with rates being higher for those in the least deprived > most deprived areas for some contacts, but rates either being similar, or the patterns being reversed for others (**Figure 83**).

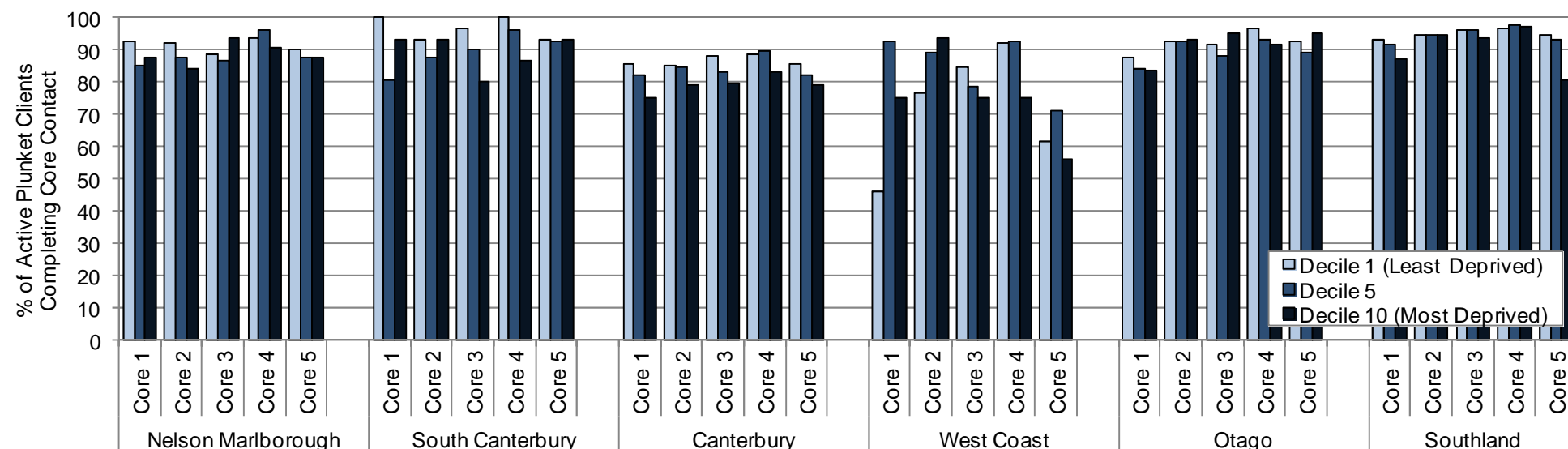


Figure 82. Proportion of Children who Received Core 1–5 Well Child Contacts by Ethnicity and DHB, Active Plunket Clients Born July 10–June 11



Source: Plunket; Note: Ethnicity is Prioritised; Birth cohort not yet old enough for Core 6 and 7

Figure 83. Proportion of Children who Received Core 1–5 Well Child Contacts by NZ Deprivation Index Decile and DHB, Active Plunket Clients Born July 2010–June 2011



Source: Plunket; Note: Birth cohort not yet old enough for Core 6 and 7

The B4 School Check

The B4 School Check is the eighth core contact in the Well Child Tamariki Ora Schedule and has been offered to the families of four year old children nationally since September 2008. Registered nurses undertake the checks in a variety of settings including preschools, Kōhanga Reo, doctor's clinics and other community venues, with children missing out on their check usually being assessed at school at five years of age [91].

The aim of the B4 School Check is to identify any health, behavioural, developmental or social concerns which may affect a child's ability to do well at school (e.g. hearing problems, communication difficulties) and to make timely referrals that ensure that children arrive at school ready to participate. The check itself usually takes 45–60 minutes and includes advice and support for parents about child health and development, a child health questionnaire, hearing, vision and oral health screens, a questionnaire to identify developmental and behavioural problems, height and weight measurements, and referrals to specialist services if problems are identified that need further investigation [91].

The following section reviews the proportion of children who received their B4 School Checks during the years ending June 2011 and June 2012.

Data Sources and Methods

Indicator

1. Proportion of all eligible children receiving B4 School Checks
2. Proportion of children from the most deprived areas receiving B4 School Checks

Numerator: Number of children receiving B4 School Checks

Denominator: Number of children eligible for B4 School Checks

Estimated for the total population, as well as those living in the most deprived (NZDep deciles 9–10) areas

Notes on Interpretation

The data in this section were sourced from the Ministry of Health's B4 School Check website <http://www.health.govt.nz/our-work/life-stages/child-health/b4-school-check/b4-school-check-information-health-sector>

South Island Distribution

In Nelson Marlborough in the year ending June 2012, 81.6% of all eligible children received their B4 School Check, as compared to 95.6% in South Canterbury, 75.9% in Canterbury, 79.6% on the West Coast and 83.2% in the Southern DHB. When only children from the most deprived (NZDep deciles 9–10) areas were considered, 81.2% in Nelson Marlborough, 100% in South Canterbury, 67.1% in Canterbury, 81.3% on the West Coast and 86.6% in the Southern DHB received their B4 School Check (**Table 24, Figure 84**).

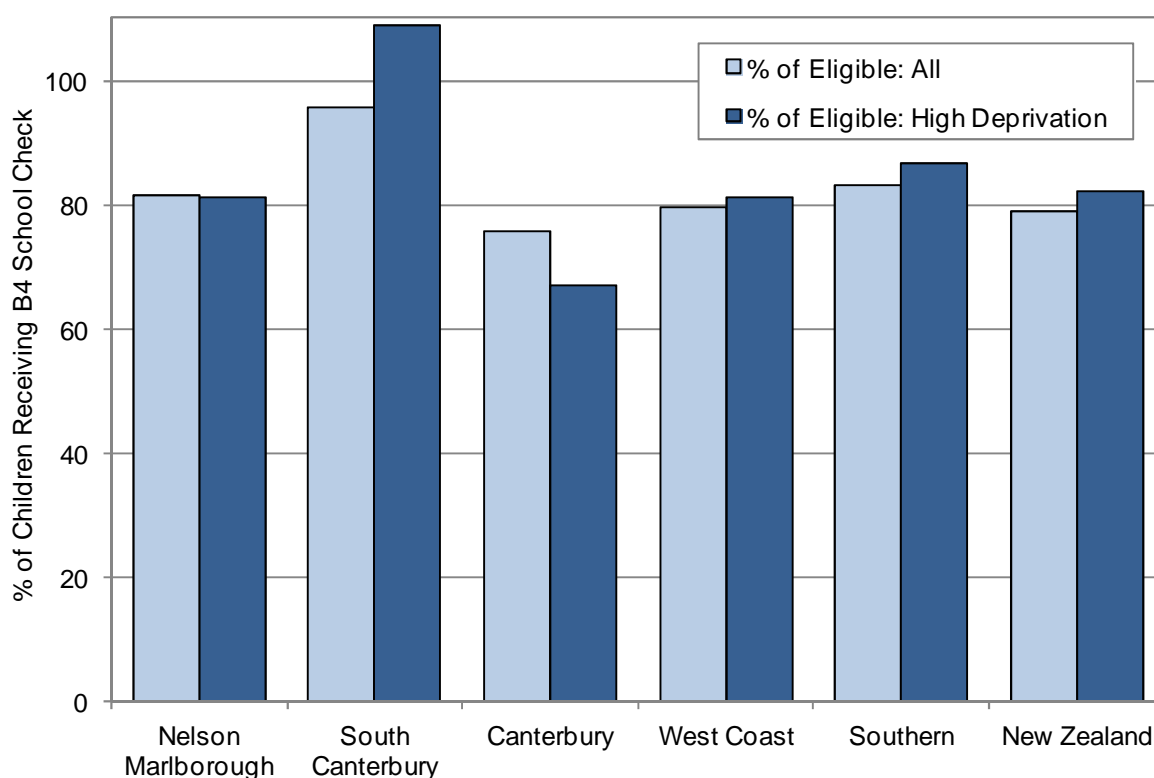


Table 24. Proportion of Eligible Children Receiving B4 School Checks, South Island DHBs vs. New Zealand in the Years Ending June 2011 and June 2012

DHB	Number of Checks: Excluding Unpaid	Number of Checks: High Deprivation	Number of Checks: Including Unpaid	% of Eligible: All	% of Eligible: High Deprivation
Year Ending June 2012					
Nelson Marlborough	1,490	147	1,519	81.6	81.2
South Canterbury	649	74	652	95.6	108.8
Canterbury	5,266	561	5,813	75.9	67.1
West Coast	336	39	350	79.6	81.3
Southern	3,130	393	3,175	83.2	86.6
New Zealand	51,461	11,920	53,022	79.0	82.2
Year Ending June 2011					
Nelson Marlborough	1,382	118	1,392	80.9	85.5
South Canterbury	649	71	654	94.7	87.7
Canterbury	4,432	473	4,769	64.7	56.7
West Coast	271	54	277	69.7	90.0
Southern	3,102	371	3,125	81.4	84.3
New Zealand	45,855	11,349	46,915	72.1	75.3

Source: Ministry of Health

Figure 84. Proportion of Eligible Children Receiving B4 School Checks, South Island DHBs vs. New Zealand in the Year Ending June 2012



Source: Ministry of Health

Local Policy Documents and Evidence-Based Reviews Relevant to Well Child/Tamariki Ora Services

Table 25 below provides a brief overview of local policy documents and evidence-based reviews relevant to Well Child/Tamariki Ora Services. In addition **Table 23** on **Page 166** provides an overview of publications which consider immunisation and interventions aimed at increasing immunisation coverage.

Table 25. Local Policy Documents and Evidence-Based Reviews Relevant to Well Child/Tamariki Ora Services

Ministry of Health Policy Documents
<p>Ministry of Health. 2010. Well Child/Tamariki Ora Schedule: Birth, to four to six weeks. Wellington: Ministry of Health.</p> <p>Ministry of Health. 2010. Well Child/Tamariki Ora National Schedule: Four to six weeks, to five years. Wellington: Ministry of Health.</p> <p>http://www.health.govt.nz/our-work/life-stages/child-health/well-child-services/well-child-publications/well-child-national-schedule</p> <p>The Well Child/Tamariki Ora (WC/TO) Schedules describe the assessment, prevention and early intervention activities undertaken in the WC/TO setting. The birth to four to six weeks schedule encompasses the postnatal care provided to mother and baby by the Lead Maternity Carer, the handover to WC/TO services at four to six weeks and the six week GP check and vaccinations. Health and development assessments include maternal wellbeing, family and child health and wellbeing, hearing screening and metabolic screening. Interventions and support include ABC smoking cessation, postnatal depression screening and family violence response. Promotion of health and development includes breastfeeding, maternal nutrition, immunisation, SUDI prevention and parenting support and advice. The four to six weeks to five years schedule outlines the clinical assessment, intervention and health education activities for each of the eight universal core contacts delivered in the WC/TO programme, to children aged up to five years, and their families. Core contacts occur at 4–6 weeks, 8–10 weeks, 3–4 months, 5–7 months, 9–12 months, 15–18 months, 2–3 years and 4–4.5 years (the B4 School Check). Recent changes to the schedule are outlines in the documents below.</p>
<p>Ministry of Health. 2010. Changes to the Well Child/Tamariki Ora Framework. Wellington: Ministry of Health.</p> <p>http://www.health.govt.nz/publication/changes-well-child-tamariki-ora-framework</p> <p>This document sets out the key changes to the Well Child/Tamariki Ora (WC/TO) Framework introduced in 2010 following a review of the 2002 framework. Key changes to the Framework and National Schedule include: changes to the content, timing and flexibility of core contacts to better address emerging issues for children and their families/whānau; additional WC/TO contacts to be allocated and referrals to be made on the basis of need (assessed by a needs assessment and care-planning process and tool); an increased focus on the identification and management of family violence and child abuse and neglect; routine use of the Patient Health Questionnaire (PHQ3) (a validated tool to assess the possibility of postnatal depression); introduction of the Parental Evaluation of Developmental Status (PEDS) questionnaire, a well-validated, evidence-based questionnaire for identifying child development issues from the three-month core contact through to the B4 School Check; additional contacts if breastfeeding issues are identified and the introduction of WHO growth charts; introduction of an oral health screen (Lift the Lip), risk assessment and completion of enrolment for dental services at the 9–12-month core contact, and Lift the Lip assessments at subsequent core contacts; phasing out of the tympanometry check for otitis media with effusion at three years and introduction of routine preschool vision and hearing screening at the B4 School Check; and development of an evidence-based quality framework.</p>
<p>Ministry of Health. 2010. Supporting Evidence for Changes to the Content of the Well Child/Tamariki Ora Framework: Background Paper 2007. Wellington: Ministry of Health. http://www.health.govt.nz/publication/supporting-evidence-changes-content-well-child-tamariki-ora-framework</p> <p>This report summarises the findings from the review of Well Child/Tamariki Ora (WC/TO) Framework and provides background information and evidence for the proposed changes to the Framework. The review included a literature review and consultation process and sought to: identify/confirm the health outcomes the Government should seek for children from birth to five years of age; determine the best way to improve child health outcomes and reduce inequalities; determine which types of activities can assist in achieving these outcomes within the framework; assess the extent to which the clinical content and processes underpinning the current framework will achieve these outcomes and meet current evidence of best practice; make recommendations for any changes to the current framework, including service delivery, the contracting framework and infrastructural requirements; and identify opportunities for reprioritising existing funding and priorities for any new funding. The review did not identify a need for radical change, supporting ongoing provision of a universal service, but found that several important areas were not well covered, including maternal postnatal depression, nutrition, dental care, infant and child mental health, and developmental delay. A number of proposals for revisions to the Framework are made including the introduction of the B4 School Check after the fourth birthday.</p>

Ministry of Health. 2008. **The B4 School Check: A handbook for practitioners**. Wellington: Ministry of Health.
<http://www.health.govt.nz/publication/b4-school-check-handbook-practitioners>

This handbook provides guidance to clinicians on the standard protocols for each component of the B4 School Check, and can be used for planning services, training nurses and vision and hearing technicians, and improving quality. Clinical pathways and referral processes for the screening and surveillance aspects of the B4 School Check are provided. The purpose of the B4 School Check is to promote health and wellbeing in preschool children and identify behavioural, developmental or other health concerns that may adversely affect the child's ability to learn in the school environment. The check includes: advice and support for parents about child health and development; a child health questionnaire; a hearing screen; a vision screen; an oral health screen; questionnaires to identify developmental and behavioural problems (completed by parents and teachers in discussion with health professionals using the Strengths and Difficulties Questionnaire and the Parental Evaluation of Developmental Status questionnaire); height and weight measurement; and referral of the child to specialist services if the child appears to have problems that need further investigation.

Cochrane Systematic Reviews

Powell C & Hatt SR. 2009. **Vision screening for amblyopia in childhood**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD005020.pub3 <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD005020.pub3/abstract>

This systematic review aimed to assess the effectiveness of vision screening in reducing the prevalence of amblyopia, a reversible deficit of vision that has to be treated within the sensitive period for visual development. No RCTs or cluster RCTs comparing the prevalence of amblyopia in screened versus unscreened populations were identified. The authors conclude that there is currently insufficient evidence to determine whether or not screening programmes reduce the proportion of older children and adults with amblyopia, and some robust evaluation of screening programmes that are in place is required.

Simpson SA, et al. 2007. **Identification of children in the first four years of life for early treatment for otitis media with effusion**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD004163.pub2
<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004163.pub2/abstract>

This systematic review assessed the effectiveness of screening and treating children with clinically important otitis media with effusion (OME or 'glue ear') in the first four years of their life on language and behavioural outcomes. No RCTs comparing outcomes for children randomised to be screened for OME with outcomes for children randomised to not be screened for OME were identified. Three RCTs (668 participants) evaluating interventions for OME in children identified through screening were included in the review. Children with OME were randomised either to treatment with ventilation tube insertion or 'no treatment', 'watchful waiting' or 'late treatment with ventilation tubes'. No evidence of a clinically important benefit in language development from screening and treating children with clinically important OME was found in any of the studies.

Other Systematic Reviews

Oberklaid F, et al. 2002. **Child Health Screening and Surveillance: a critical review of the evidence**. Canberra: National Health and Medical Research Council. <http://www.nhmrc.gov.au/guidelines/publications/ch42>

This extensive review of child health screening and surveillance examined the evidence base for specific screening and surveillance activities in childhood (birth to 18 years) and provides a summary of the evidence, recommendations and a research agenda for each child health topic identified. Topics covered include: congenital adrenal hyperplasia, cardiac disease, congenital hypothyroidism, cystic fibrosis, hearing loss, hip dysplasia, undescended testes, vision, dental health, development, height and weight. Relatively few topics could be recommended for formal screening programmes (congenital hypothyroidism – good evidence, cystic fibrosis – fair evidence, hip dysplasia – fair evidence for ultrasound screening, insufficient evidence for examination, universal neonatal hearing – fair evidence, phenylketonuria – fair evidence). Formal screening programmes could not be recommended for many conditions, for a variety of reasons including: multidimensional conditions on a continuum of normality-abnormality that do not lend themselves to pass/fail criteria; available screening tests not considered sufficiently acceptable to the target population, based on reported uptake rates of either the screening test or definitive referral; sensitivity could not readily be balanced against specificity (very large numbers of false positives a by-product of capturing all or most of those with the target condition); the target condition itself was too variable over time to justify screening at a single time point, but evidence to support periodic screening (surveillance) was not available; management for those detected by screening has not shown to significantly alter outcomes or there was not an agreed therapy.

Other Relevant Evidence

The Scottish Government. 2011. **A New Look at Hall 4 – the Early Years: Good Health for Every Child**. Edinburgh: The Scottish Government. <http://www.scotland.gov.uk/Resource/Doc/337318/0110676.pdf>

Scottish Executive. 2005. **Health for all Children 4: Guidance on implementation in Scotland**. Edinburgh: Scottish Executive. <http://www.scotland.gov.uk/Publications/2005/04/15161325/13269>

The 2011 guidance document supplements the 2005 guidance, setting out the way forward for the successful delivery of Health for All Children (Hall 4) in the early years. It focuses on three main aspects of health service delivery to children and their families in the early years: the allocation of the Health Plan Indicator (HPI); the 24–30 month review; and the delivery of health improvement information and advice. It discusses the role of the Public Health Nurse – Health Visitor, the 'Named Person', who acts as the first point of contact and provider of universal services for children and families in the early years (to primary school entry), focusing on early intervention, prevention and health promotion, promoting social inclusion and reducing inequalities in health; addressing key public health priorities, and supporting the capacity of families to parent within their local communities. The guidance recommends that all children should have an HPI by six months, carried out using the model available at:

<http://www.scotland.gov.uk/Publications/2011/03/22145900/2> and local tools. There are two categories of HPI – 'Core' (receiving the universal health visiting service) and 'Additional' (receiving additional health visiting support and/or support from other disciplines/agencies). The re-introduction of the 24–30 month review for all children is discussed and the guidance discusses the role of the Public Health Nurse – Health Visitor in delivering health improvement.

Shribman S & Billingham K. 2009. **Healthy Child Programme: Pregnancy and the first five years of life**. London: Department of Health.

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_107563

This guide is for commissioners and providers of services in pregnancy and the first years of life and provides updated guidance, and core requirements of the Health Child Programme (HCP). The HCP is a universal programme of screening tests, immunisations, developmental reviews, and information and guidance to support parenting and healthy choices, and opportunities to identify families that are in need of additional support and children who are at risk of poor outcomes. The guidance is based on evidence set out in Health for All Children. An increased emphasis on parenting support, evidence-based child development, integration of services and the progressive nature of the universal service, i.e. a universal service with additional services for those with specific needs and risks is discussed. The early years HCP schedule, beginning antenatally at the booking visiting and finishing at school entry aged five years, is described.

Council on Children With Disabilities, et al. 2006. **Identifying Infants and Young Children With Developmental Disorders in the Medical Home: An Algorithm for Developmental Surveillance and Screening**. *Pediatrics*, 118(1), 405-20.

This American Academy of Pediatrics statement provides an algorithm to support health care professionals in addressing developmental concerns in children from birth to three years of age. It is recommended that developmental surveillance be incorporated at every well-child preventive care visit and concerns raised should be promptly addressed with standardised developmental screening tests. Administration of screening tests is recommended at 9, 18, and 24 or 30-month routine visits. A variety of screening tools are described. Medical evaluation is advised for all those with positive tests.

Note: the publications listed were identified using the search methodology outlined in **Appendix 1**

SUBSTANCE USE



SMOKING IN PREGNANCY

Introduction

Tobacco smoking during pregnancy is linked to adverse health effects for women and babies. It is the most important potentially preventable cause of a range of adverse pregnancy outcomes [92]. For example, it is associated with placental abruption, miscarriage, stillbirth, preterm birth and low birthweight [93,94]. Maternal smoking also affects foetal growth and neurodevelopment and is associated with an increased risk of a number of congenital birth defects [95]. Prenatal smoke exposure is associated with an increased risk of infant irritability, inattention, increased tone, and decreased responsiveness to inanimate sounds [96], and is a significant risk factor for Sudden Infant Death Syndrome (SIDS) [97]. In addition, the prevalence of obesity in preschool children is also higher for those whose mother smoked during pregnancy and male and female sub fertility/infertility in adult life has been linked to maternal smoking [96]. Further, studies on the association between parental smoking and childhood cancer correlate paternal smoking with a higher risk of cancers in early life, especially cancers of the blood forming organs [96]. Finally, second-hand tobacco smoke exposure during pregnancy is associated with an increased risk of adverse birth outcomes [98].

While the 2009 New Zealand Tobacco Use Survey suggested that the prevalence of smoking in New Zealand had decreased significantly, from 24.4% in 2006 to 21.8% in 2009, the prevalence of smoking, or exposure to second-hand smoke amongst pregnant women is not known [99]. However, an analysis of the New Zealand College of Midwives database revealed a reduction in reported smoking at booking visit from 22.9% in 2004 to 19.2% in 2007 [100]. Similarly, a New Zealand cohort study of 829 women published in 2003 found 22.2% of pregnant women reported smoking at conception. Of these women 67.2% (14.9% of the original cohort) continued to smoke beyond the first trimester [101]. This is likely to have been an underestimate given that smokers, women from socioeconomically deprived areas and single women were underrepresented among survey responders. In this study, smoking rates at conception were higher amongst women with a partner who smoked, Māori women, those with a community services card and those in receipt of income support, with these women also being less likely to stop smoking in the first trimester. Research also suggests that those most likely to smoke during pregnancy are those that find it most difficult to quit, emphasising the need to address wider socioeconomic factors linked to smoking [102].

The following section uses data from the National Maternity Collection to assess the proportion of women who smoked at first registration with a Lead Maternity Carer (LMC), as well as the proportion not registered with a LMC at the time of delivery (in order to assess any potential biases introduced by the use of a LMC registration based cohort).

Data Sources and Methods

Indicator

1. *Proportion of babies born to mothers not registered with a lead maternity carer at the time of delivery*

Numerator: National Maternity Collection: Number of babies born to mothers who were flagged as not being registered with a LMC at the time of delivery.

Denominator: National Maternity Collection: Number of babies born.

2. *Distribution of the number of cigarettes smoked at first registration with a lead maternity carer, by the mothers of newborn babies*

Numerator: National Maternity Collection: Number of cigarettes smoked per day at first registration with a lead maternity carer, by the mothers of newborn babies

Denominator: National Maternity Collection: Number of babies born

3. *Proportion of babies born to mothers who smoked at first registration with a lead maternity carer*

Numerator: National Maternity Collection: Number of babies born to mothers who smoked at first registration with a lead maternity carer

Denominator: National Maternity Collection: Number of babies born



Notes on Interpretation

Note 1: The National Maternity Collection (MAT) contains information on selected publicly funded maternity services from nine months before to three months after a birth. It integrates information from two data sources: LMC claims for payment for Primary Maternity Services provided under Section 88 of the NZ Public Health and Disability Act 2000; and data from the National Minimum Dataset (NMDS) on hospital admissions during pregnancy, birth and the postnatal period for mother and baby.

Up until June 2007, Section 88 claims data coverage was 95% of known births. However in July 2007, due to a funding change, DHB-employed midwifery teams ceased to submit claims to the Ministry of Health for their services. Thus no LMC registration data (including smoking status) is currently available in MAT for women who opt for DHB-based primary maternity care. In this dataset it is thus difficult to distinguish between those who were not registered with a LMC at the time of delivery because they accessed their primary maternity care through DHB services and those who received no antenatal care at all.

Note 2: In this analysis, the baby's hospital admission (birth) data from the NMDS was linked with maternal Section 88 claims data using a de-identified pregnancy key, with the unit of analysis being the baby rather than the mother (e.g. maternal information for twins is included twice in the analysis). Of the 129,635 babies born during 2009–2010, 1,113 (0.86%) were not able to be matched to their mother's MAT record.

Note 3: A relatively high proportion of babies (15.5%) had missing information on maternal smoking status at first LMC registration, with the majority of these babies having mothers who were not registered with a LMC. The proportion with missing information was thus not randomly distributed, but rather was higher for Pacific babies, those with younger mothers and those from more deprived areas. Large variations between DHBs were also evident. As a result, all of the data in this section have been presented both with missing smoking status included and excluded from the analysis. In interpreting these data, maternal smoking rates with missing responses included should be viewed as providing an absolute minimum estimate of the number of babies whose mother's smoked at first LMC registration. While maternal smoking rates with missing responses excluded may provide a closer approximation of the true rate, they may still be an underestimate. For example, a higher proportion of babies with younger mothers and those from more deprived areas had missing smoking status data, as well as higher smoking rates amongst those for whom maternal smoking status was known.

Note 4: MAT does not contain details on stillborn babies as they are not assigned a NHI number at birth and are thus not reported to the National Minimum Dataset.

Babies Born to Mothers Not Registered with a LMC at Delivery

New Zealand Distribution

In New Zealand during 2009–2010, 16.2% of babies were born to mothers who were not registered with a LMC at the time of delivery. However many of these babies' mothers may have accessed hospital-based maternity services, making it difficult to estimate the proportion who received no antenatal care at all during pregnancy (**Table 26**).

Table 26. Status of Maternal Registration with a Lead Maternity Carer at the Time of Delivery for New Zealand Babies Born 2009–2010

Maternal LMC Registration at Delivery	No. of Babies: Total 2009–2010	No. of Babies: Annual Average	Percent of Babies (%)
New Zealand			
Registered with a LMC	107,524	53,762	82.94
Not Registered with a LMC	20,997	10,499	16.20
LMC Registration Status Not Known	1,114	557	0.86
Total	129,635	64,818	100.00

Source: National Maternity Collection; Note: Information is for live born babies only

New Zealand Distribution by Maternal Age, Ethnicity and NZDep Decile

In New Zealand during 2009–2010, Pacific, Asian/Indian and Māori babies (vs. European babies) were *significantly* more likely to have mothers who were not registered with a LMC at delivery, as were the babies of younger mothers (less than 30 years vs. 30 or more years). A *significantly* higher proportion of babies from average to more deprived areas (NZDep06 deciles 3–10 vs. deciles 1–2) also had mothers who were not registered with a LMC at delivery (**Table 27**).

Table 27. Proportion of Babies Born to Mothers Not Registered with a Lead Maternity Carer at Delivery by Maternal Age, Ethnicity and NZDep Index Decile, New Zealand 2009–2010

Variable	No. of Babies: Annual Average			Mother Not Registered: Rate per 100 Babies (%)	Rate Ratio	95% CI
	Mother Not Registered with LMC	Mother Registered with LMC	Total			
Maternal Age						
<20 Years	988	3,664	4,652	21.2	1.39	1.32–1.45
20–24 Years	2,285	9,644	11,928	19.2	1.25	1.20–1.30
25–29 Years	2,613	13,291	15,904	16.4	1.07	1.03–1.11
30–34 Years	2,463	15,295	17,758	13.9	0.90	0.87–0.94
35+ Years	2,149	11,867	14,015	15.3	1.00	
Baby's Ethnicity						
Asian/Indian	1,526	5,219	6,745	22.6	2.48	2.39–2.59
European	2,912	29,072	31,984	9.1	1.00	
Māori	2,750	14,119	16,869	16.3	1.79	1.73–1.85
Pacific	2,876	4,390	7,266	39.6	4.35	4.21–4.49
NZ Deprivation Index Decile						
Deciles 1–2	863	8,289	9,152	9.4	1.00	
Deciles 3–4	1,139	9,106	10,245	11.1	1.18	1.11–1.25
Deciles 5–6	1,388	10,780	12,167	11.4	1.21	1.14–1.28
Deciles 7–8	2,156	12,249	14,404	15.0	1.59	1.51–1.67
Deciles 9–10	4,834	13,013	17,847	27.1	2.87	2.74–3.01

Source: National Maternity Collection; Note: Information is for live born babies only

South Island Distribution

In Nelson Marlborough (24.6%) and the West Coast (70.0%) during 2009–2010, the proportion of babies whose mother was not registered with a LMC at delivery was *significantly* higher than the New Zealand rate, while in South Canterbury (2.4%), Canterbury (3.8%), Otago (0.5%) and Southland (9.0%) the proportion was *significantly* lower (**Table 28**). However many of these babies' mothers may have accessed hospital-based maternity services, making it difficult to estimate the proportion who received no antenatal care at all during pregnancy.

Table 28. Status of Maternal Registration with a Lead Maternity Carer at the Time of Delivery for Babies Born 2009–2010, South Island DHBs vs. New Zealand

DHB/Area	No. of Babies: Annual Average			Mother Not Registered: Rate per 100 Babies (%)	Rate Ratio	95% CI
	Mother Not Registered with LMC	Mother Registered with LMC	Total			
Nelson Marlborough	416	1,279	1,695	24.6	1.50	1.41–1.60
South Canterbury	16	653	669	2.4	0.15	0.10–0.21
Canterbury	253	6,402	6,655	3.8	0.23	0.21–0.25
West Coast	289	124	413	70.0	4.28	4.09–4.49
Otago	11	2,057	2,067	0.5	0.03	0.02–0.05
Southland	151	1,519	1,670	9.0	0.55	0.50–0.62
New Zealand	10,499	53,762	64,261	16.3	1.00	

Source: National Maternity Collection; Note: Information is for live born babies only



Maternal Smoking at First Registration with a LMC

New Zealand Distribution Number of Cigarettes Smoked

In New Zealand during 2009–2010, 15.3% of babies did not have their mother's smoking status at first LMC registration recorded in the National Maternity Collection, with the majority of omissions being for babies whose mothers were not registered with a LMC at delivery. Of those babies whose mother's smoking status was known, 83.5% had a non-smoking mother, while 10.5% had a mother who smoked less than 10 cigarettes per day and 6.0% had a mother who smoked 10 or more cigarettes per day (**Table 29**).

Table 29. Number of Cigarettes Smoked Daily, at First Registration with a Lead Maternity Carer, by the Mothers of Babies Born in New Zealand 2009–2010

No. of Cigarettes Smoked per Day	No. of Babies: Total 2009–2010	No. of Babies: Annual Average	Percent of Babies (%)	
			Unknown Smoking Status Included	Unknown Smoking Status Excluded
New Zealand				
Non-Smoker	91,425	45,713	70.52	83.49
<10	11,474	5,737	8.85	10.48
10–20	5,850	2,925	4.51	5.34
>20	757	379	0.58	0.69
Unknown	20,129	10,065	15.53	
Total	129,635	64,818	100.00	100.00

Source: National Maternity Collection; Note: Information is for live born babies only

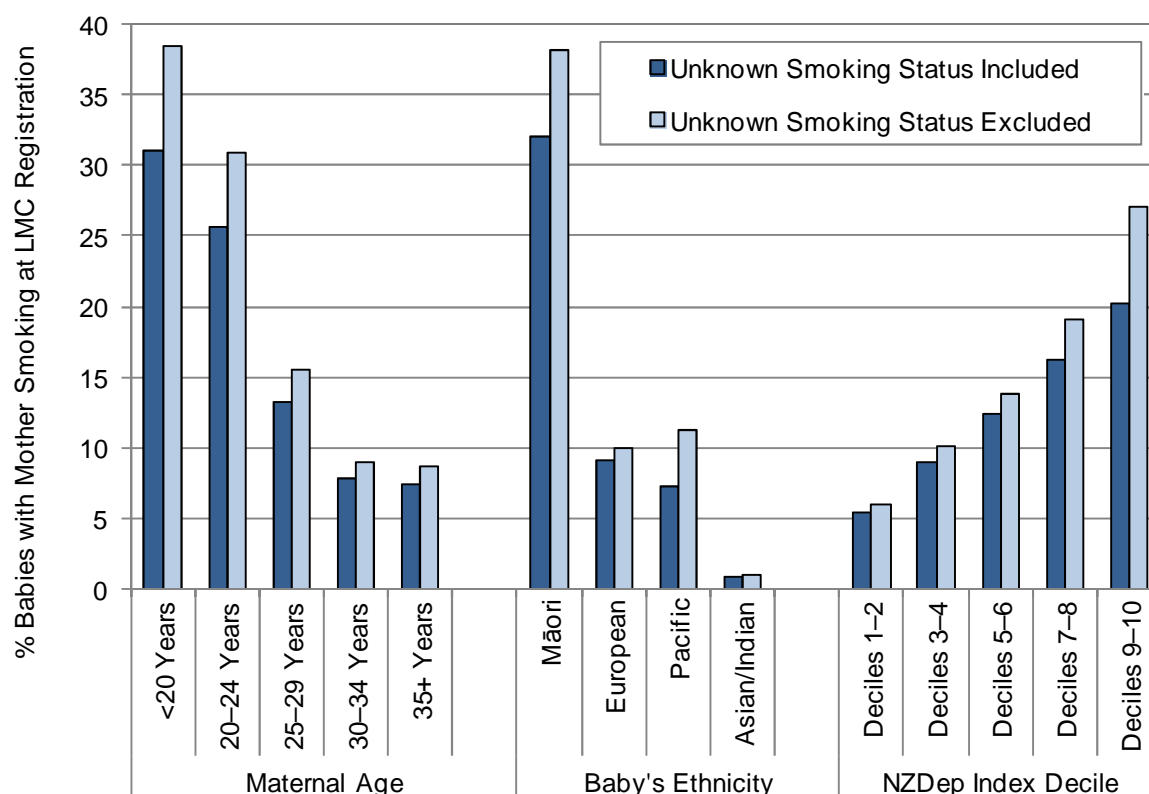
New Zealand Distribution by Maternal Age, Ethnicity and NZDep Decile

In New Zealand during 2009–2010, Māori and Pacific babies (vs. European and Asian/Indian babies), and the babies of younger mothers (less than 30 years vs. 30 or more years), were *significantly* more likely to have mothers who smoked at first LMC registration. A *significantly* higher proportion of babies from average to more deprived areas (NZDep06 deciles 3–10 vs. deciles 1–2) also had mothers who smoked at first LMC registration (**Figure 85, Table 30**).

New Zealand Distribution by Maternal Age and Ethnicity

In New Zealand during 2009–2010, when broken down by maternal age and baby's ethnicity, the mothers of Māori babies, regardless of maternal age, had higher smoking rates at first LMC registration than the mothers of European or Pacific babies, while the maternal smoking rates of Asian/Indian babies were lower. In addition, maternal smoking rates for European babies were higher than for Pacific babies with younger mothers (less than 27 years), although differences were less marked for those with older mothers (**Figure 86**).

Figure 85. Proportion of Babies Born to Mothers who Smoked at First Registration with a Lead Maternity Carer by Maternal Age, Baby's Ethnicity and NZ Deprivation Index Decile, New Zealand 2009–2010



Source: National Maternity Collection; Note: Information is for live born babies only; Ethnicity is Level 1 Prioritised; Decile is NZDep06

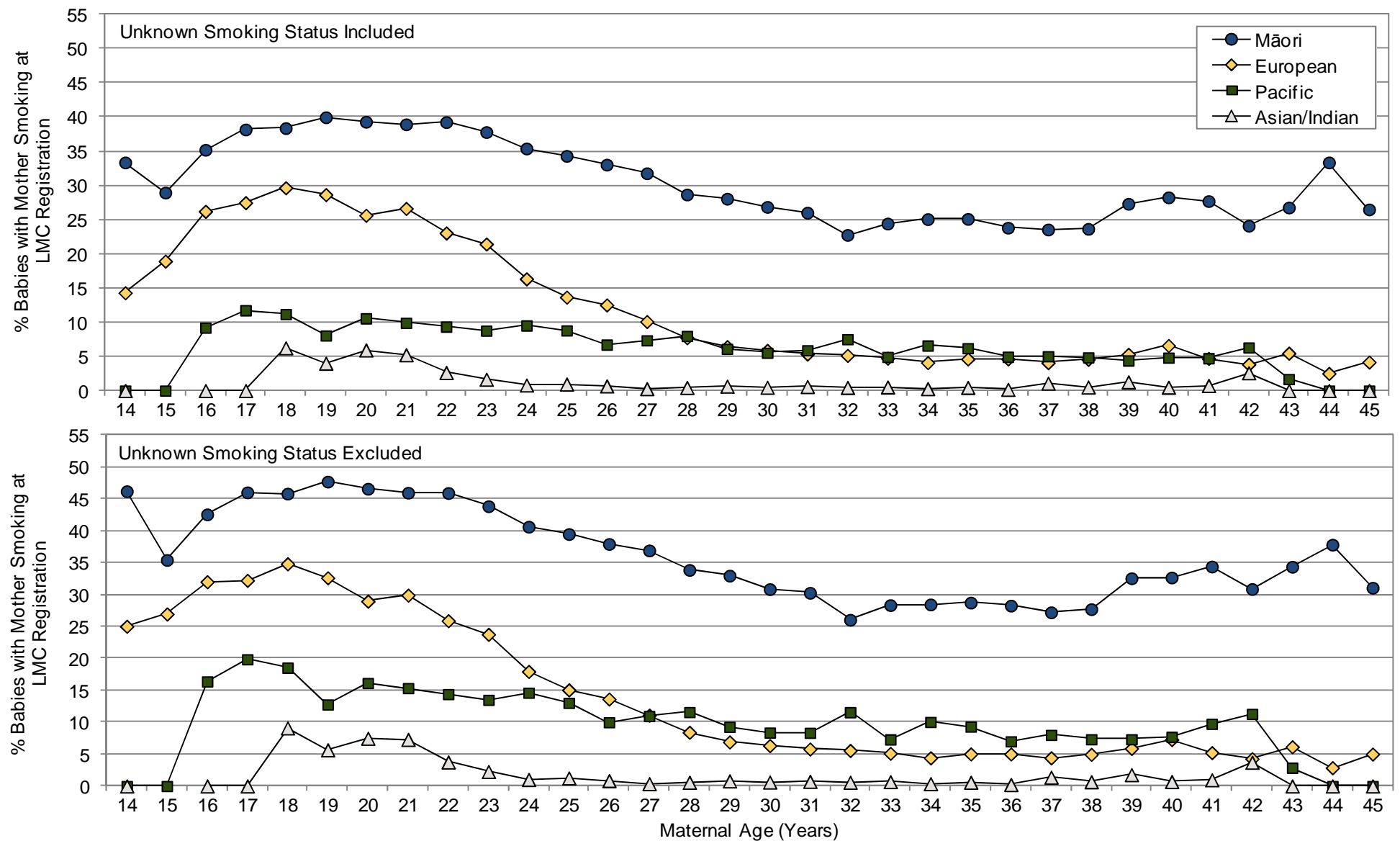
Table 30. Proportion of Babies Born to Mothers who Smoked at First Registration with a Lead Maternity Carer by Maternal Age, Baby's Ethnicity and NZ Deprivation Index Quintile, New Zealand 2009–2010

Variable	Rate	Rate Ratio	95% CI	Rate	Rate Ratio	95% CI
	Maternal Smoking at LMC Registration					
	Unknown Smoking Status Included			Unknown Smoking Status Excluded		
Maternal Age						
<20 Years	31.00	4.15	3.95–4.37	38.50	4.44	4.22–4.67
20–24 Years	25.66	3.44	3.28–3.60	30.95	3.57	3.41–3.74
25–29 Years	13.23	1.77	1.69–1.86	15.56	1.79	1.71–1.89
30–34 Years	7.81	1.05	0.99–1.11	8.94	1.03	0.98–1.09
35+ Years	7.46	1.00		8.67	1.00	
Baby's Prioritised Ethnicity						
Asian/Indian	0.80	0.09	0.07–0.11	1.02	0.10	0.08–0.12
European	9.05	1.00		9.92	1.00	
Māori	32.02	3.54	3.44–3.64	38.12	3.84	3.74–3.95
Pacific	7.28	0.80	0.76–0.86	11.30	1.14	1.07–1.21
NZ Deprivation Index Quintile						
Deciles 1–2	5.45	1.00		5.98	1.00	
Deciles 3–4	9.01	1.65	1.53–1.78	10.10	1.69	1.57–1.82
Deciles 5–6	12.32	2.26	2.11–2.42	13.85	2.31	2.16–2.48
Deciles 7–8	16.29	2.99	2.80–3.19	19.05	3.18	2.98–3.40
Deciles 9–10	20.24	3.71	3.48–3.96	27.04	4.52	4.24–4.81

Source: National Maternity Collection; Note: Information is for live born babies only; Rate is per 100 babies



Figure 86. Proportion of Babies Born to Mothers who Smoked at First Registration with a Lead Maternity Carer by Baby's Ethnicity and Maternal Age, New Zealand 2009–2010



Source: National Maternity Collection; Note: Information is for live born babies only; Ethnicity is Level 1 Prioritised

South Island Distribution

South Island vs. New Zealand

In South Canterbury (19.8%) and Southland (21.0%) during 2009–2010, maternal smoking rates at first LMC registration were *significantly* higher than the New Zealand rate (16.5%) amongst babies whose maternal smoking status was known, while in Nelson Marlborough (14.3%), Canterbury (13.6%) and Otago (15.2%) rates were *significantly* lower. Rates in the West Coast (19.8%), while higher, were not *significantly* different from the New Zealand rate (**Table 31, Figure 87**).

Table 31. Proportion of Babies Born to Mothers who Smoked at First Registration with a Lead Maternity Carer, South Island DHBs vs. New Zealand 2009–2010

DHB/Area	Number of Babies: Annual Average 2009–2010			% Babies with Maternal Smoker	Rate Ratio	95% CI
	Maternal Smoker	Non- Smoker	Total			
Maternal Smoking at LMC Registration						
Unknown Smoking Status Included						
Nelson Marlborough	184	1,529	1,713	10.7	0.77	0.70–0.85
South Canterbury	130	541	671	19.3	1.38	1.24–1.55
Canterbury	883	5,785	6,668	13.2	0.95	0.91–0.99
West Coast	28	397	425	6.6	0.47	0.37–0.61
Otago	313	1,757	2,070	15.1	1.08	1.01–1.17
Southland	320	1,354	1,673	19.1	1.37	1.28–1.47
New Zealand	9,041	55,777	64,818	13.9	1.00	
Unknown Smoking Status Excluded						
Nelson Marlborough	184	1,100	1,284	14.3	0.87	0.79–0.95
South Canterbury	130	526	655	19.8	1.20	1.07–1.34
Canterbury	883	5,593	6,476	13.6	0.83	0.79–0.86
West Coast	28	114	142	19.8	1.20	0.95–1.52
Otago	313	1,746	2,059	15.2	0.92	0.86–0.99
Southland	320	1,205	1,525	21.0	1.27	1.18–1.36
New Zealand	9,041	45,713	54,753	16.5	1.00	

Source: National Maternity Collection; Note: Information is for live born babies only

South Island Number of Cigarettes Smoked

In the South Island during 2009–2010, the proportion of babies who did not have their mother's smoking status at first LMC registration recorded in the National Maternity Collection, ranged from 0.5% in Otago to 66.7% in the West Coast, with the majority of omissions being for babies whose mothers were not registered with a LMC at delivery. Of those babies whose mother's smoking status was known, the proportion with a non-smoking mother ranged from 79.0% in Southland to 86.4% in Canterbury, while the proportion who had a mother who smoked 10 or more cigarettes per day ranged from 5.1% in Nelson Marlborough to 10.6% on the West Coast (**Table 32**).

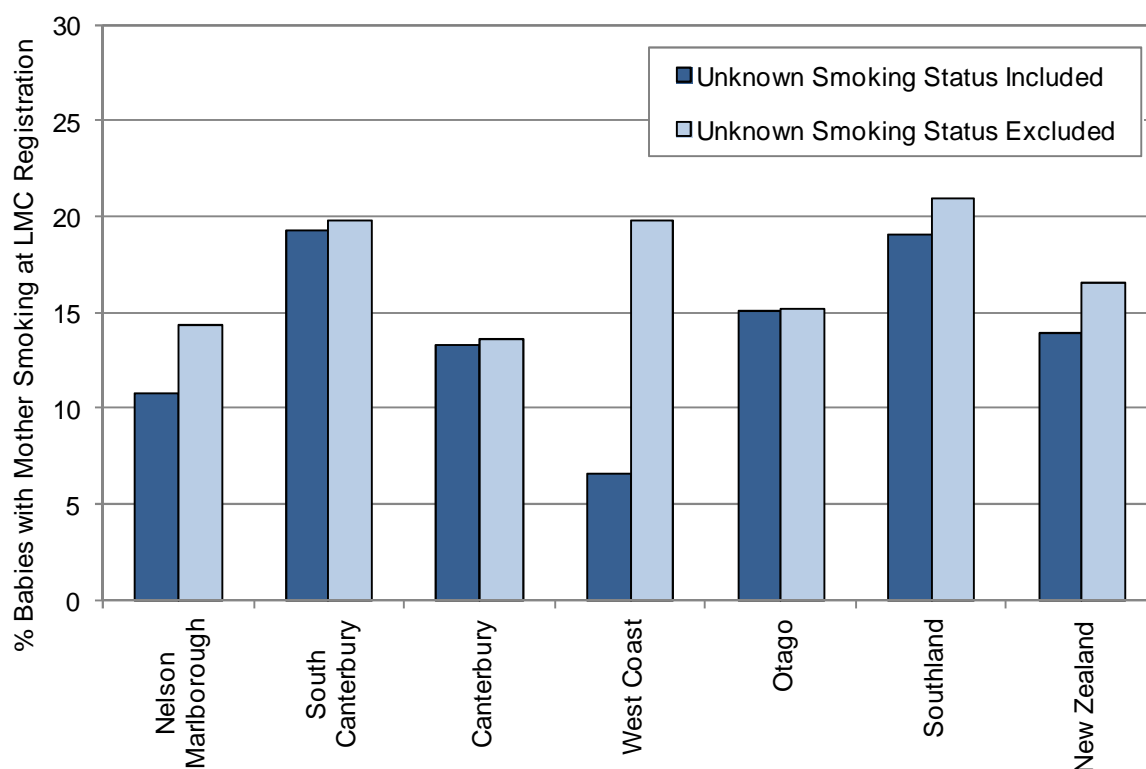


Table 32. Number of Cigarettes Smoked Daily at First Registration with a Lead Maternity Carer by the Mothers of South Island DHBs Babies Born 2009–2010

Number of Cigarettes Smoked per Day	Number of Babies: Total 2009–2010	Number of Babies: Annual Average	Percent of Babies (%)	
			Unknown Smoking Status Included	Unknown Smoking Status Excluded
Nelson Marlborough				
Non-Smoker	2,200	1,100	64.2	85.7
<10	238	119	6.9	9.3
10 to 20	112	56	3.3	4.4
>20	18	9	0.5	0.7
Unknown	858	429	25.0	
Nelson Marlborough Total	3,426	1,713	100.00	100.0
South Canterbury				
Non-Smoker	1,051	526	78.4	80.2
<10	174	87	13.0	13.3
10 to 20	78	39	5.8	6.0
>20	7	4	0.5	0.5
Unknown	31	16	2.3	
South Canterbury Total	1,341	671	100.0	100.0
Canterbury				
Non-Smoker	11,186	5,593	83.9	86.4
<10	1,068	534	8.0	8.2
10 to 20	606	303	4.5	4.7
>20	92	46	0.7	0.7
Unknown	383	192	2.9	
Canterbury Total	13,335	6,668	100.0	100.0
West Coast				
Non-Smoker	227	114	26.7	80.2
<10	26	13	3.1	9.2
10 to 20	26	13	3.1	9.2
>20	4	2	0.5	1.4
Unknown	567	284	66.7	
West Coast Total	850	425	100.0	100.0
Otago				
Non-Smoker	3,491	1,746	84.3	84.8
<10	394	197	9.5	9.6
10 to 20	200	100	4.8	4.9
>20	32	16	0.8	0.8
Unknown	22	11	0.5	
Otago Total	4,139	2,070	100.0	100.0
Southland				
Non-Smoker	2,410	1,205	72.0	79.0
<10	352	176	10.5	11.5
10 to 20	239	120	7.1	7.8
>20	48	24	1.4	1.6
Unknown	297	149	8.9	
Southland Total	3,346	1,673	100.0	100.0

Source: National Maternity Collection; Note: Information is for live born babies only

Figure 87. Proportion of Babies Born to Mothers who Smoked, at First Registration with a Lead Maternity Carer, South Island DHBs vs. New Zealand 2009–2010



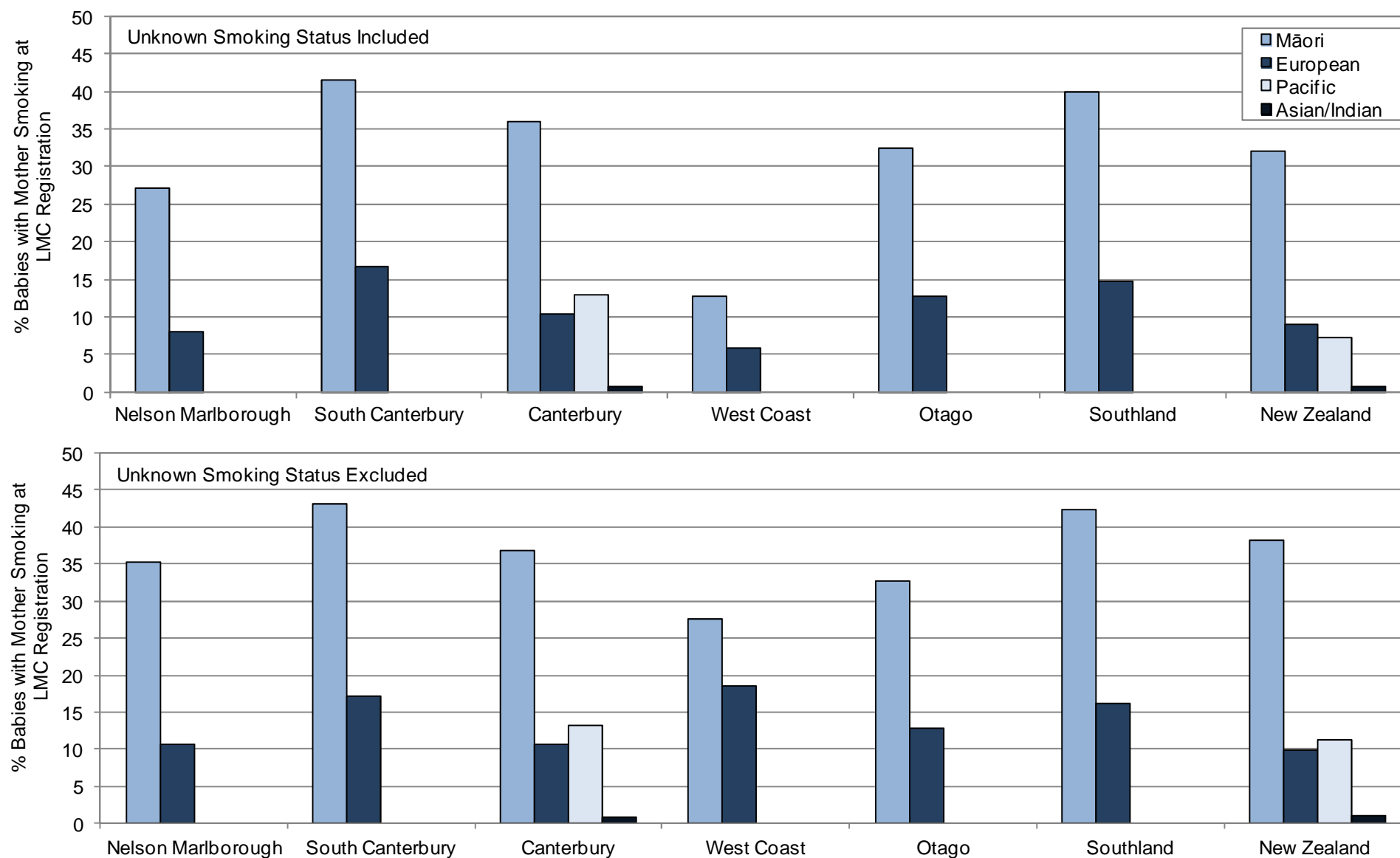
Source: National Maternity Collection; Note: Information is for live born babies only

South Island Distribution by Ethnicity

In Canterbury during 2009–2010, maternal smoking rates at first LMC registration were higher for Māori babies than for European and Pacific babies, with rates for Asian/Indian babies being lower than for all other ethnic groups. In the other South Island DHBs, maternal smoking rates were higher for Māori babies than for European babies (**Figure 88**).



Figure 88. Proportion of Babies Born to Mothers who Smoked, at First Registration with a Lead Maternity Carer, by Ethnicity, South Island DHBs vs. New Zealand 2009–2010



Source: National Maternity Collection; Note: Information is for live born babies only; Ethnicity is Level 1 Prioritised

Local Policy Documents and Evidence-Based Reviews Relevant to the Cessation of Smoking in Pregnancy

Table 33 below provides a brief overview of local policy documents and evidence-based reviews which consider interventions to promote smoking cessation during pregnancy. Given that smoking during pregnancy has been shown to be highest amongst younger mothers, **Table 41 (Page 218)** and **Table 42 (Page 222)**, which provide an overview of publications on smoking prevention and cessation in young people are relevant.

Table 33. Local Policy Documents and Evidence-Based Reviews Relevant to the Cessation of Smoking in Pregnancy

Ministry of Health Policy Documents
<p>Ministry of Health. 2007. New Zealand Smoking Cessation Guidelines. Wellington: Ministry of Health. http://www.health.govt.nz/publication/new-zealand-smoking-cessation-guidelines</p> <p>These guidelines identify pregnant and breastfeeding women as priority population groups for cessation throughout pregnancy and the post-partum period. While recognising that there is limited evidence for the effectiveness of nicotine replacement therapy (NRT) in pregnancy, following analysis of the risks and benefits known at the time, the guidelines support the use of NRT in pregnancy and breastfeeding.</p>
Cochrane Systematic Reviews
<p>Hajek P, et al. 2009. Relapse prevention interventions for smoking cessation. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD003999.pub3 http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003999/frame.html</p> <p>This updated review assessed the effectiveness of relapse prevention interventions aimed at reducing the proportion of recent quitters who return to smoking. It included 14 RCTs of behavioural interventions designed to assist pregnant and postpartum ex-smokers to remain abstinent throughout their pregnancy and/or after the delivery. The pooled analysis failed to identify any significant benefits at the end of pregnancy or in the postpartum period (n = 3273, RR 1.07; 95% CI 0.98 to 1.18). The authors conclude that there is currently insufficient evidence to support the use of behavioural interventions for relapse prevention.</p>
<p>Coleman T, et al. 2012. Pharmacological interventions for promoting smoking cessation during pregnancy. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD010078 http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD010078/abstract</p> <p>This review of nicotine replacement therapy (NRT) in pregnancy identified six RCTs (1745 pregnant regular smokers) where NRT was used with or without behavioural support. No statistically significant difference was seen for smoking cessation after using NRT compared to control (RR 1.33, 95% CI 0.93 to 1.91, six studies, 1745 women). Subgroup analysis comparing placebo-RCTs with those which did not use placebos found that efficacy estimates for cessation varied with trial design (placebo RCTs, RR 1.20, 95% CI 0.93 to 1.56, four studies, 1524 women; non-placebo RCTs, RR 7.81, 95% CI 1.51 to 40.35, two studies, 221 women). There were no statistically significant differences in rates of miscarriage, stillbirth, premature birth, birthweight, low birthweight, admissions to neonatal intensive care or neonatal death between NRT or control groups. The authors conclude that there is insufficient evidence to demonstrate that NRT for pregnant women is effective or safe, or to determine whether or not using NRT has positive or negative effects on birth outcomes. Further research, ideally from placebo-controlled RCTs is needed.</p>
<p>Lumley J, et al. 2009. Interventions for promoting smoking cessation during pregnancy. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD001055.pub3 http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001055/frame.html</p> <p>This updated review assessing the effectiveness of smoking cessation interventions during pregnancy on smoking behaviour and neonatal outcomes identified 72 studies. The meta-analysis included 56 RCTs and nine cluster-RCTs (25,000 women) and found that smoking cessation interventions in pregnancy reduced the proportion of women continuing to smoke in late pregnancy (RR 0.94, 95% CI 0.93 to 0.96), an absolute difference of 6% more women stopping smoking in the intervention groups compared to controls. Intervention was associated with a significant improvement in birth outcomes with reductions in low birth weight (RR 0.83, 95% CI 0.73 to 0.95) and pre-term births (RR 0.86, 95% CI 0.74 to 0.98). The most effective intervention appeared to be providing incentives, although the trials were small-scale. Eight trials of smoking relapse prevention (over 1000 women) showed no statistically significant reduction in relapse. The authors recommend the implementation of smoking cessation interventions in all maternity care settings.</p>
Other Systematic Reviews
<p>Baxter S, et al. 2011. The effectiveness of interventions to establish smoke-free homes in pregnancy and in the neonatal period: a systematic review. Health Education Research, 26(2), 265-82.</p> <p>This systematic review assessed the effectiveness of interventions aimed at establishing smoke-free homes in pregnancy and the neonatal period. Seventeen heterogeneous trials were included, 12 of which were RCTs. Interventions included counselling, counselling with additional elements, motivational interviewing and individual programmes. Sample sizes were small and the evidence inconclusive with few significant effects. While the evidence remains unclear the authors argue that pregnancy and early infancy may be an optimal time to target interventions.</p>

National Institute for Health and Clinical Excellence. 2010. **How to stop smoking in pregnancy and following childbirth (NICE public health guidance 26)**. London: National Institute for Health and Clinical Excellence.
<http://www.nice.org.uk/guidance/PH26>

This NICE public health guidance provides comprehensive evidence-based guidance on providing smoking cessation services to pregnant women. It includes a systematic review and cost-benefit analysis to identify effective cessation interventions for women who smoke before or during pregnancy (12 studies and a Cochrane review), interventions to improve partner support and partner cessation during pregnancy (18 studies) and interventions to prevent women who quit smoking during pregnancy and after childbirth to relapse (35 studies and a Cochrane review). While there was good evidence to support smoking cessation interventions (including financial incentives and self-help), there was a lack of evidence on how to prevent relapse after giving birth and limited evidence of the effectiveness of interventions to help partners to quit or establish smoke-free homes.

Bauld L, et al. 2010. **The effectiveness of NHS smoking cessation services: a systematic review**. Journal of Public Health, 32(1), 71-82.

This systematic review assessing the effectiveness of UK NHS smoking cessation services identified 20 studies, four of which were RCTs. The review included a 2005 national evaluation of NHS stop smoking services which found a 53% reduction in carbon monoxide validated quit rates at 4 weeks, falling to 15% at 1 year. Overall, the review suggested that group interventions appeared to be more successful than individual interventions although they may be more difficult to deliver and less acceptable to patients. Pregnant women had lower quit rates than other groups and may suspend their smoking rather than quit altogether, suggesting the need for further research in this subpopulation.

Baxter S, et al. 2010. **Factors relating to the uptake of interventions for smoking cessation among pregnant women: A systematic review and qualitative synthesis**. Nicotine & Tobacco Research, 12(7), 685-94.

This systematic review assessed factors enabling or discouraging the uptake of smoking cessation services among pregnant smokers, to identify ways of improving services. Twenty-three studies met the inclusion criteria (10 qualitative studies, 10 cross-sectional studies and 3 narrative reports) for analysis and qualitative synthesis. A number of aspects of service delivery that could affect the uptake of smoking cessation interventions were identified, including whether or not the subject of smoking was routinely broached; staff perceptions of ineffectiveness including lack of patient motivation and lack of effectiveness of interventions; and contradicting advice regarding complete cessation of cutting back. The authors suggest strengthening staff support through training and/or protocols and using the evidence-base to challenge perceptions of ineffectiveness amongst staff.

Naughton F, et al. 2008. **Self-help smoking cessation interventions in pregnancy: a systematic review and meta-analysis**. Addiction, 103(4), 566-79.

This review examined the efficacy of self-help interventions for pregnant smokers, and whether the type and intensity of self-help materials (e.g. written, electronic) was important. The primary meta-analysis of 12 studies comparing usual care with self-help indicated that self-help interventions increased cessation rates over usual care (median quit rate 4.9% for usual care vs. 13.2% for self-help, odds ratio 1.83, 95% CI 1.23 to 2.73). There was insufficient evidence to indicate whether more sophisticated or intensive approaches were more effective.

Ruger JP & Emmons KM. 2008. **Economic Evaluations of Smoking Cessation and Relapse Prevention Programs for Pregnant Women: A Systematic Review**. Value in Health, 11(2), 180-90.

This review examined economic evaluations of smoking cessation and relapse prevention programmes for pregnant women. The review identified eight studies, three of which used cost-benefit analyses. All the studies found a favourable cost-benefit ratio of up to three to one (for every \$1 invested \$3 are saved in downstream health-related costs) for smoking cessation interventions. The true benefit of smoking cessation programmes may be greater when societal gains and incremental health gains are included.

Levitt C, et al. 2007. **Systematic Review of the Literature on Postpartum Care: Effectiveness of Interventions for Smoking Relapse Prevention, Cessation, and Reduction in Postpartum Women**. Birth, 34(4), 341-47.

This review examined the evidence for the efficacy of postpartum interventions aiming to prevent relapse, improve smoking cessation, and reduce the number of cigarettes smoked. Only three RCTs were identified. Despite some evidence of attitudinal change there were no statistically significant benefits of advice materials or counselling interventions on smoking outcomes.

Other Related Articles

Public and Population Health Unit and Service Development and Funding. 2009. **Encouraging Auahi Kore (Smokefree) Pregnancies in Northland: Report of a formative evaluation**. Whangarei: Northland District Health Board.

[http://www.northlanddnhb.org.nz/Portals/0/Communications/Publications/Northland Smoking in Pregnancy Report.pdf](http://www.northlanddnhb.org.nz/Portals/0/Communications/Publications/Northland_Smoking_in_Pregnancy_Report.pdf)

This evaluation of smoking cessation support for pregnant women in Northland found that while Northland DHB had prioritised smoking cessation support for pregnant women few women accessed smoking cessation support during pregnancy. Strengthening support for Aukati Kai Paipa services for pregnant women, supporting Māori role models, considering the creation of a regional 'Pregnancy Smoking Cessation Coordinator' position and strengthening Smoke-free systems in Maternity and Primary care were recommended.

Note: The publications listed above were identified using the search methodology outlined in **Appendix 1**

SECOND-HAND CIGARETTE SMOKE EXPOSURE

Introduction

Children living in households with smokers are at risk of the adverse effects of second-hand smoke [103]. For example, children exposed to second-hand smoke are at increased risk of sudden infant death syndrome, lower respiratory illnesses, middle ear illnesses, and respiratory symptoms including asthma and impaired lung function [103,104]. It has also been estimated that second-hand smoke exposure contributes to approximately 15,000 episodes of childhood asthma, more than 27,000 medical consultations for childhood respiratory problems and 1,500 operations to treat glue ear annually in New Zealand [105]. Household smoking, particularly by parents, also significantly increases the risk of uptake of smoking amongst children [106]. While total home smoking bans appear to have some effect on children's exposure to cigarette smoke, if carers continue to smoke, children remain at risk of second-hand smoke exposure in other settings including in vehicles [103].

In the 2009 New Zealand Tobacco Use Survey (5,222 people aged 15 to 64 years), approximately 10% of Households with a child aged 0 to 14 years reported smoking inside the home [99]. Households with Māori respondents (21.3%, 95% CI 17.4–25.2) were *significantly* more likely to report smoking in the home than those with European/Other (8.9%, 95% CI 7.2–10.6) respondents. Households in the most deprived areas were over five times more likely to have a smoker than those in the least deprived areas. Similarly in the 2010 National Year 10 ASH Snapshot Survey, 38.1% of 32,605 year 10 students (14 to 15 year olds) reported that one or both parents smoked and 19.1% reported that people smoked inside their home [107]. During 2006–2010 however, there was a significant decrease in the proportion of Māori, Pacific, European and Asian students reporting smoking in their home, with the greatest reductions being for Pacific students (adjusted OR 0.64, 95% CI 0.57– 0.73).

Although smoking rates in New Zealand appear to be falling, research suggests that smoking is increasingly concentrated in socioeconomically disadvantaged communities [108]. Further a 2002 study estimated that tobacco expenditure accounted for almost 14% of non-housing related household spending in some low income households [109]. Thus while increasing the price of cigarettes through increases in taxation is effective in reducing smoking prevalence, it also risks increasing financial hardship among socioeconomically disadvantaged groups where smoking persists, emphasising the need for comprehensive tobacco control strategies [108].

The following section uses data from the National Maternity Collection to review the proportion of babies with mothers who smoked at two weeks after delivery. A later section uses Action on Smoking and Health (ASH) survey data to review the proportion of Year 10 students with parents who smoked, or who lived in homes where people smoked inside.

Maternal Smoking at Two Weeks After Delivery

The National Maternity Collection (MAT) collates Lead Maternity Carer (LMC) claims data, with information being available on maternal smoking status at two weeks after delivery for around 80% of all New Zealand births.

Data Sources and Methods

Indicator

1. *Distribution of the number of cigarettes smoked at two weeks after delivery by the mothers of babies born 2009–2010*

Numerator: National Maternity Collection: Number of cigarettes smoked at two weeks after delivery, by the mothers of babies born 2009–2010

Denominator: National Maternity Collection: Number of babies born.



2. Proportion of babies born to mothers who smoked at two weeks after delivery

Numerator: National Maternity Collection: Number of babies born to mothers who smoked at two weeks after delivery

Denominator: National Maternity Collection: Number of babies born.

Notes on Interpretation

Note 1: The National Maternity Collection (MAT) contains information on selected publicly funded maternity services from nine months before to three months after a birth. It integrates information from two data sources: LMC claims for payment for Primary Maternity Services provided under Section 88 of the NZ Public Health and Disability Act 2000; and data from the National Minimum Dataset (NMDS) on hospital admissions during pregnancy, birth and the postnatal period for mother and baby.

Up until June 2007, Section 88 claims data coverage was 95% of known births. However in July 2007, due to a funding change, DHB employed midwifery teams ceased to submit claims to the Ministry of Health for their services. Thus no LMC registration data (including smoking status) is currently available in MAT for women who opt for DHB based primary maternity care.

Note 2: In this analysis, the baby's hospital admission (birth) data from the NMDS was linked with maternal Section 88 claims data using a de-identified pregnancy key, with the unit of analysis being the baby rather than the mother (e.g. maternal information for twins is included twice in the analysis). Of the 129,635 babies born during 2009–2010, 1,113 (0.86%) were not able to be matched to their mother's MAT record.

Note 3: A relatively high proportion of babies (19.4% during 2009–2010) had missing information on maternal smoking status at two weeks after delivery, with the majority of these babies having mothers who were not registered with a LMC. The proportion with missing information was thus not randomly distributed, but rather was higher for Pacific babies, those with younger mothers and those from more deprived areas. Large DHB variations were also evident (see Smoking in Pregnancy Section for further details). As a result, all of the data in this section have been presented with missing smoking status both included and excluded from the analysis. In interpreting these data, maternal smoking rates with missing responses included should be viewed as providing an absolute minimum estimate of the number of babies whose mother's smoked at two weeks after delivery. While maternal smoking rates with missing responses excluded may provide a closer approximation of the true rate, they may still be an underestimate, as a higher proportion of babies with younger mothers and those from more deprived areas, for example, had missing smoking status data as well as higher smoking rates amongst those for whom maternal smoking status was known.

Note 4: MAT does not contain details on stillborn babies as they are not assigned a NHI number at birth and are thus not reported to the National Minimum Dataset.

New Zealand Distribution Number of Cigarettes Smoked

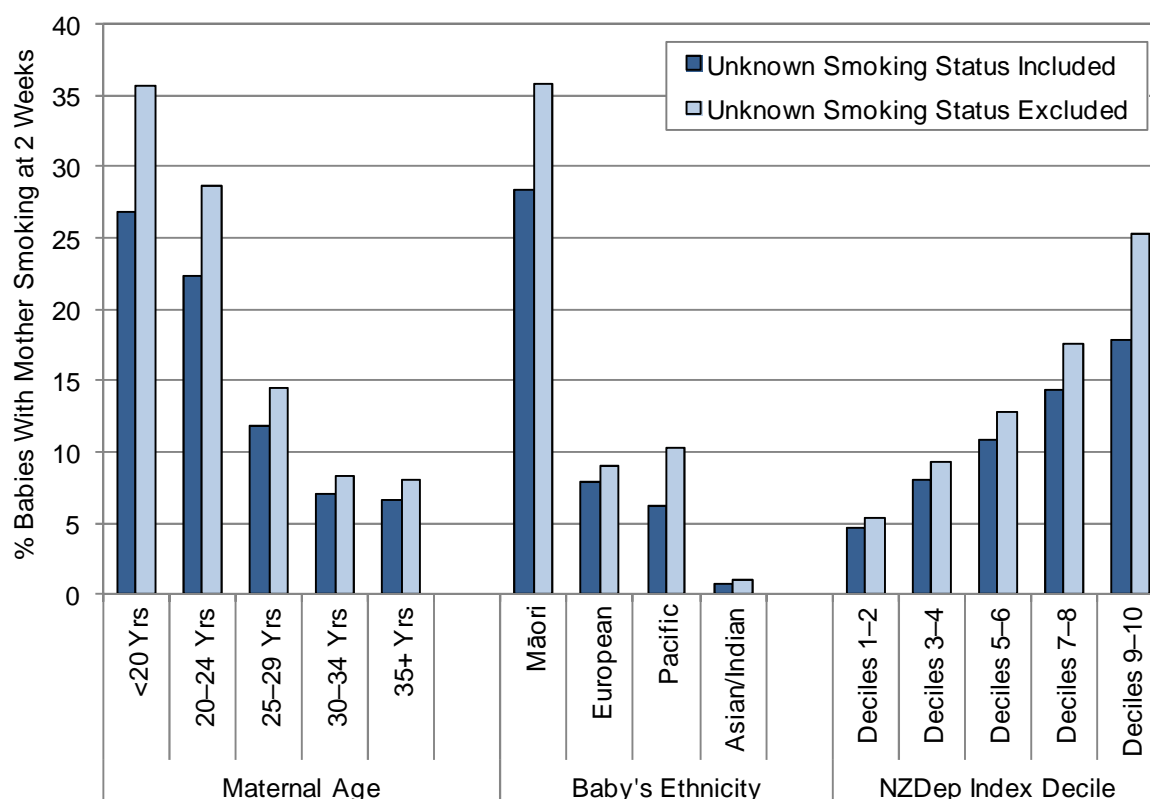
In New Zealand during 2009–2010, 19.4% of babies did not have their mother's smoking status at two weeks after delivery recorded in the National Maternity Collection, with the majority of omissions being for babies whose mothers were unregistered with a LMC at delivery. Of those babies whose mother's smoking status was known, 84.8% had a non-smoking mother, while 9.7% had a mother who smoked less than 10 cigarettes per day and 5.6% had a mother who smoked 10 or more cigarettes per day (**Table 34**).

Table 34. Number of Cigarettes Smoked at Two Weeks After Delivery, by the Mothers of New Zealand Babies Born 2009–2010

No. of Cigarettes per Day at Two Weeks After Delivery	No. of Babies: Total 2009–2010	No. of Babies: Annual Average	Percent of Babies (%)	
			Unknown Smoking Status Included	Unknown Smoking Status Excluded
New Zealand				
Non-Smoker	88,584	44,292	68.3	84.8
<10	10,093	5,047	7.8	9.7
10 to 20	5,097	2,549	3.9	4.9
>20	723	362	0.6	0.7
Unknown	25,138	12,569	19.4	
Total	129,635	64,818	100.0	100.00

Source: National Maternity Collection

Figure 89. Proportion of Babies Born to Mothers who Smoked at Two Weeks After Delivery by Maternal Age, Baby's Ethnicity and NZ Deprivation Index Decile, New Zealand 2009–2010



Source: National Maternity Collection; Note: Ethnicity is Level 1 Prioritised; Decile is NZDep06

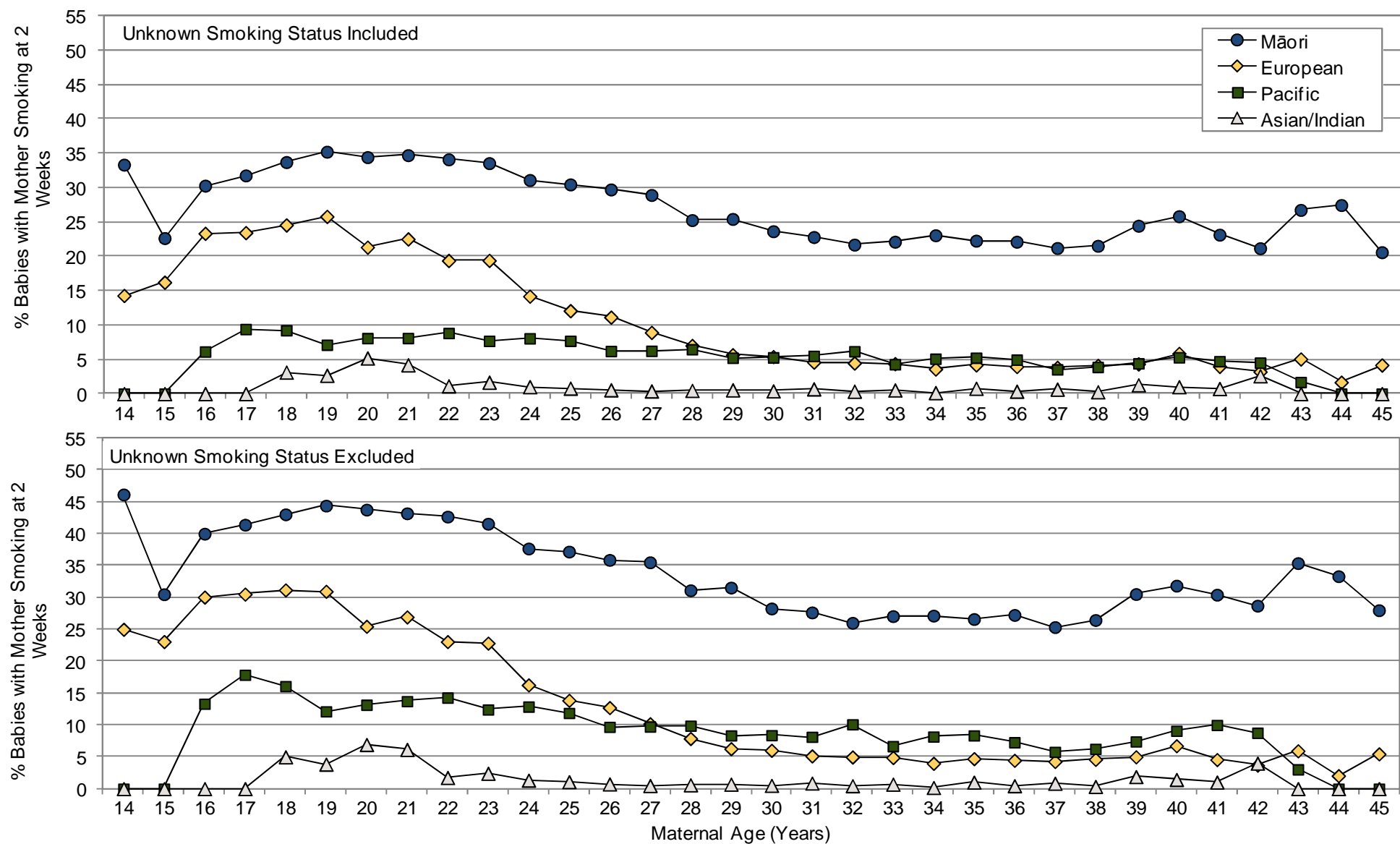
Table 35. Proportion of Babies Born to Mothers who Smoked at Two Weeks After Delivery by Maternal Age, Baby's Ethnicity and NZ Deprivation Index Quintile, New Zealand 2009–2010

Variable	Rate (%)	Rate Ratio	95% CI	Rate (%)	Rate Ratio	95% CI
	Maternal Smoking at 2 Weeks					
	Unknown Smoking Status Included			Unknown Smoking Status Excluded		
	Maternal Age					
<20 Years	26.85	4.03	3.82–4.26	35.74	4.43	4.20–4.68
20–24 Years	22.37	3.36	3.20–3.53	28.66	3.55	3.38–3.73
25–29 Years	11.79	1.77	1.68–1.87	14.49	1.80	1.71–1.89
30–34 Years	7.00	1.05	0.99–1.11	8.32	1.03	0.97–1.09
35+ Years	6.66	1.00		8.06	1.00	
	Baby's Prioritised Ethnicity					
Asian/Indian	0.72	0.09	0.07–0.11	0.95	0.11	0.09–0.13
European	7.93	1.00		9.05	1.00	
Māori	28.43	3.58	3.47–3.70	35.76	3.95	3.83–4.08
Pacific	6.24	0.79	0.74–0.84	10.25	1.13	1.06–1.21
	NZ Deprivation Index Quintile					
Deciles 1–2	4.66	1.00		5.31	1.00	
Deciles 3–4	7.99	1.71	1.58–1.86	9.31	1.75	1.62–1.90
Deciles 5–6	10.87	2.33	2.17–2.51	12.75	2.40	2.23–2.59
Deciles 7–8	14.36	3.08	2.87–3.31	17.62	3.32	3.09–3.56
Deciles 9–10	17.87	3.83	3.58–4.11	25.34	4.77	4.46–5.11

Source: National Maternity Collection; Note: Rate is per 100 live born babies; Ethnicity is Level 1 Prioritised; Decile is NZDep06



Figure 90. Proportion of Babies Born to Mothers who Smoked at Two Weeks After Delivery by Baby's Ethnicity and Maternal Age, New Zealand 2009–2010



Source: National Maternity Collection; Note: Ethnicity is Level 1 Prioritised

New Zealand Distribution by Maternal Age, Ethnicity and NZDep Decile

In New Zealand during 2009–2010, Māori and Pacific babies (vs. European and Asian/Indian babies) were *significantly* more likely to have mothers who smoked at two weeks after delivery, as were the babies of younger mothers (less than 30 years vs. 30 or more years). A *significantly* higher proportion of babies from average to more deprived areas (NZDep06 deciles 3–10 vs. deciles 1–2) also had mothers who smoked at two weeks after delivery (**Figure 89, Table 35**).

New Zealand Distribution by Maternal Age and Ethnicity

In New Zealand during 2009–2010, when broken down by maternal age and baby's ethnicity, the mothers of Māori babies had higher smoking rates at two weeks after delivery than European or Pacific babies at all ages from 14 to 45 years. The maternal smoking rates of Asian/Indian babies however, were lower in most age groups. In addition, maternal smoking rates for European babies were higher than for Pacific babies for those with younger mothers (less than 27 years), although differences were less marked for those with older mothers (**Figure 90**).

South Island Distribution

South Island Number of Cigarettes Smoked

In the South Island during 2009–2010, the proportion of babies who did not have their mother's smoking status at two weeks after delivery recorded in the National Maternity Collection ranged from 2.5% in Otago to 72.6% in the West Coast, with the majority of omissions being for babies whose mothers were unregistered with a LMC at delivery. Of those babies whose mother's smoking status was known, the proportion who had a non-smoking mother ranged from 79.1% in Southland to 87.5% in Canterbury, while the proportion that had a mother who smoked 10 or more cigarettes per day ranged from 4.7% in Nelson Marlborough to 10.7% on the West Coast (**Table 36**).

South Island vs. New Zealand

In South Canterbury (19.9%) and Southland (20.9%) during 2009–2010, maternal smoking rates at two weeks after delivery were *significantly* higher than the New Zealand rate amongst babies whose maternal smoking status was known, while in Canterbury (12.5%) rates were *significantly* lower. Rates in Nelson Marlborough (13.8%), the West Coast (19.3%) and Otago (15.1%) were not *significantly* different from the New Zealand rate (**Table 37, Figure 91**).

South Island Distribution by Ethnicity

In Canterbury during 2009–2010, maternal smoking rates at two weeks after delivery were higher for Māori babies than for European and Pacific babies, with rates for Asian/Indian babies being lower than for all other ethnic groups. In the other South Island DHBs, maternal smoking rates were higher for Māori babies than for European babies (**Figure 92**).



Table 36. Number of Cigarettes Smoked at Two Weeks After Delivery, by the Mothers of South Island Babies Born 2009–2010

Number of Cigarettes Smoked per Day	Number of Babies: Total 2009–2010	Number of Babies: Annual Average	Percent of Babies (%)	
			Unknown Smoking Status Included	Unknown Smoking Status Excluded
Nelson Marlborough				
Non-Smoker	2,122	1,061	61.9	86.2
<10	223	112	6.5	9.1
10 to 20	102	51	3.0	4.1
>20	16	8	0.5	0.6
Unknown	963	482	28.1	
Nelson Marlborough Total	3,426	1,713	100.0	100.0
South Canterbury				
Non-Smoker	973	487	72.6	80.1
<10	175	88	13.1	14.4
10 to 20	62	31	4.6	5.1
>20	5	3	0.4	0.4
Unknown	126	63	9.4	
South Canterbury Total	1,341	671	100.0	100.0
Canterbury				
Non-Smoker	10,976	5,488	82.3	87.5
<10	918	459	6.9	7.3
10 to 20	555	278	4.2	4.4
>20	99	50	0.7	0.8
Unknown	787	394	5.9	
Canterbury Total	13,335	6,668	100.0	100.0
West Coast				
Non-Smoker	188	94	22.1	80.7
<10	20	10	2.4	8.6
10 to 20	22	11	2.6	9.4
>20	3	2	0.4	1.3
Unknown	617	309	72.6	
West Coast Total	850	425	100.0	100.0
Otago				
Non-Smoker	3,428	1,714	82.8	84.9
<10	382	191	9.2	9.5
10 to 20	198	99	4.8	4.9
>20	28	14	0.7	0.7
Unknown	103	52	2.5	
Otago Total	4,139	2,070	100.0	100.0
Southland				
Non-Smoker	2,303	1,152	68.8	79.1
<10	336	168	10.0	11.5
10 to 20	227	114	6.8	7.8
>20	44	22	1.3	1.5
Unknown	436	218	13.0	
Southland Total	3,346	1,673	100.0	100.0

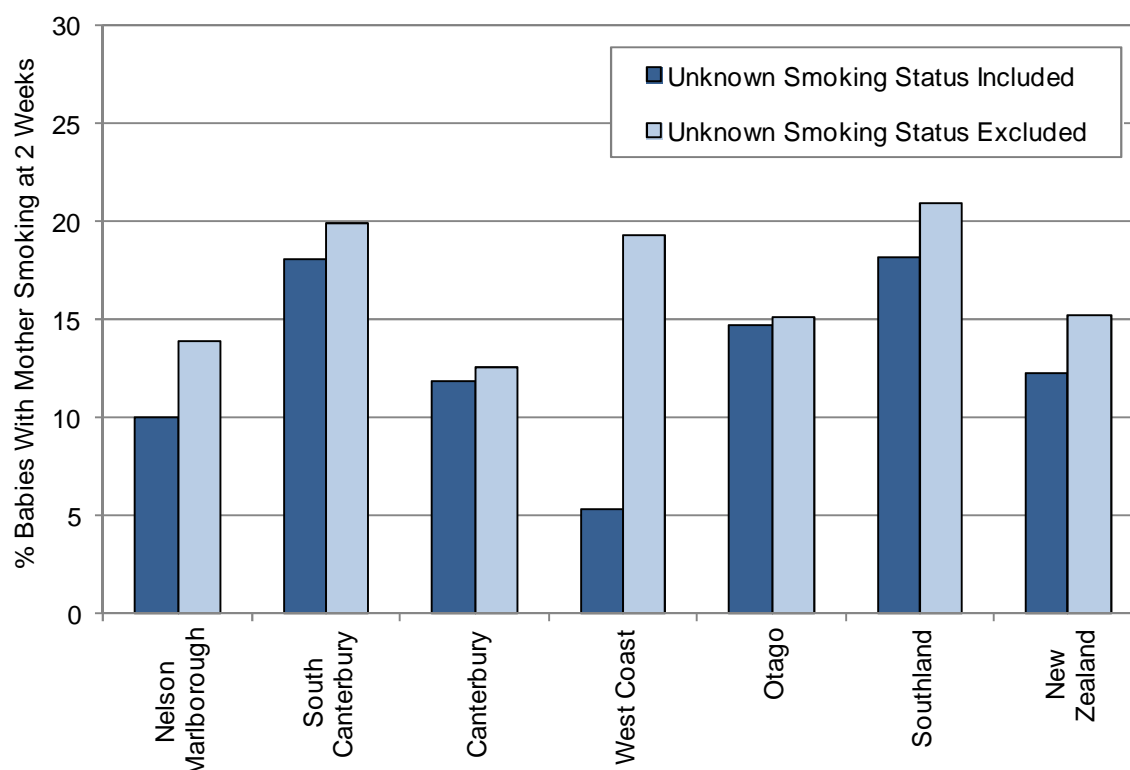
Source: National Maternity Collection

Table 37. Proportion of Babies Born to Mothers who Smoked at Two Weeks After Delivery, South Island vs. New Zealand 2009–2010

DHB/Area	Number of Babies: Annual Average 2009–2010			Percent of Babies with Maternal Smoker	Rate Ratio	95% CI
	Maternal Smoker	Maternal Non- Smoker	Total Number of Babies			
Maternal Smoking at 2 Weeks						
Unknown Smoking Status Included						
Nelson Marlborough	171	1,543	1,713	10.0	0.81	0.73–0.90
South Canterbury	121	550	671	18.0	1.47	1.31–1.65
Canterbury	786	5,882	6,668	11.8	0.96	0.91–1.01
West Coast	23	403	425	5.3	0.43	0.32–0.57
Otago	304	1,766	2,070	14.7	1.19	1.11–1.29
Southland	304	1,370	1,673	18.1	1.48	1.37–1.59
New Zealand	7,969	56,849	64,818	12.3	1.00	
Unknown Smoking Status Excluded						
Nelson Marlborough	171	1,061	1,232	13.8	0.91	0.82–1.00
South Canterbury	121	487	608	19.9	1.31	1.17–1.46
Canterbury	786	5,488	6,274	12.5	0.82	0.78–0.86
West Coast	23	94	117	19.3	1.27	0.97–1.65
Otago	304	1,714	2,018	15.1	0.99	0.92–1.06
Southland	304	1,152	1,455	20.9	1.37	1.27–1.47
New Zealand	7,969	44,292	52,261	15.2	1.00	

Source: National Maternity Collection

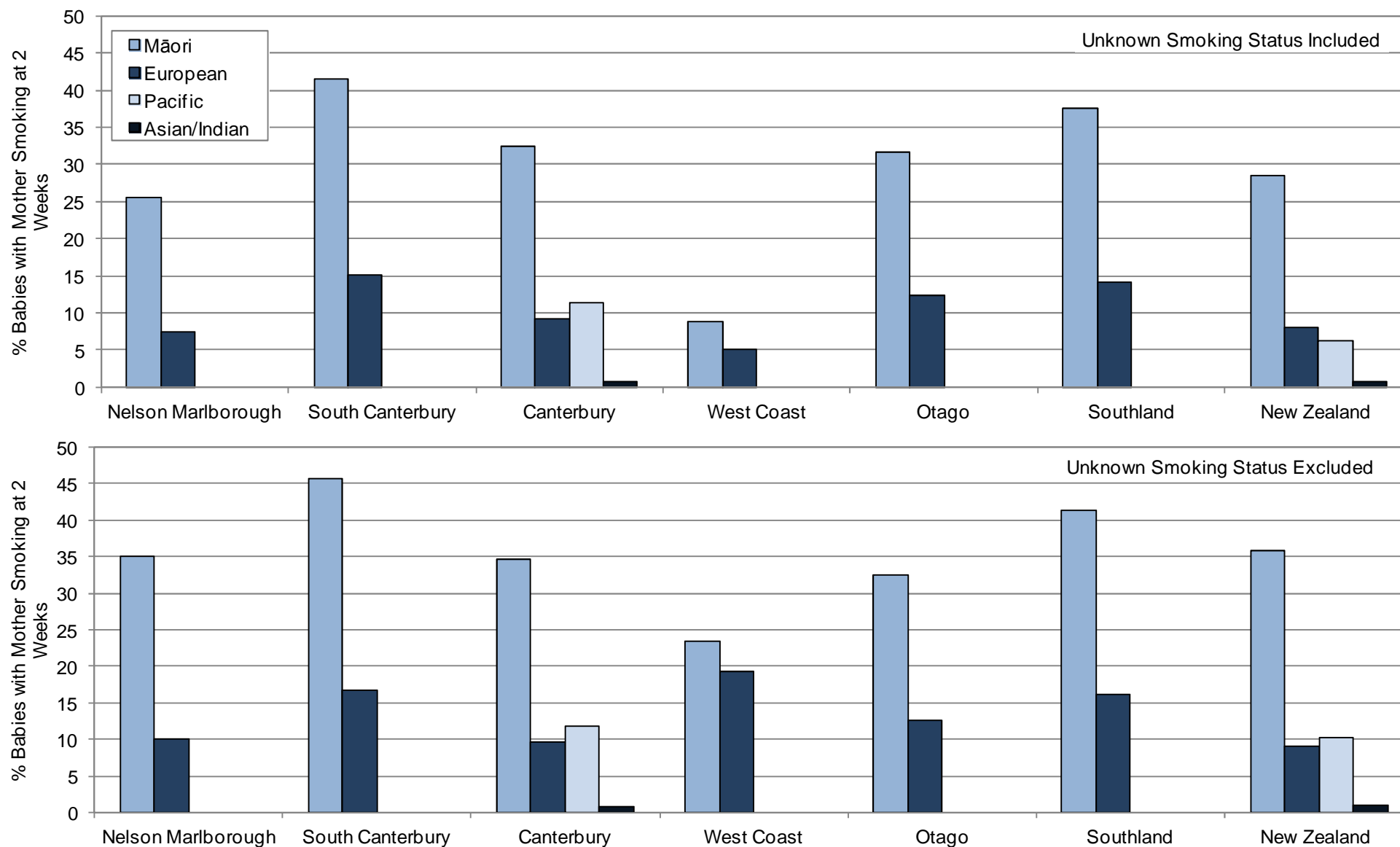
Figure 91. Proportion of Babies Born to Mothers who Smoked at Two Weeks After Delivery, South Island DHBs vs. New Zealand 2009–2010



Source: National Maternity Collection



Figure 92. Proportion of Babies Born to Mothers who Smoked at Two Weeks After Delivery by Baby's Ethnicity, South Island DHBs vs. New Zealand 2009–2010



Source: National Maternity Collection; Note: Ethnicity is Level 1 Prioritised

Exposure to Second-Hand Cigarette Smoke in the Home

Action on Smoking and Health (ASH) was established in 1982 with the aim of reducing smoking and smoking-related premature deaths. Since 1997, ASH has conducted annual surveys of smoking behaviour in Year 10 students, and since 1999 has collected information from over 30,000 students annually. The following section uses ASH Survey data to review the proportion of Year 10 students with parents who smoke, or who live in homes where people smoke inside.

Data Source and Methods

Definition

1. *Proportion of Year 10 students with parents who smoke*

Numerator: ASH Surveys: Number of Year 10 students who report that one or both parents smoke

Denominator: ASH Survey: Number of Year 10 Students surveyed

2. *Proportion of Year 10 students or who live in a home where people smoke inside*

Numerator: ASH Surveys: Number of Year 10 students living in a home where people smoke inside

Denominator: ASH Survey: Number of Year 10 Students surveyed

Notes on Interpretation

Note 1: Action on Smoking and Health (ASH) was established in 1982 with the aim of reducing smoking and smoking-related premature deaths. While the Ministry of Health provides funding for the annual Year 10 (14 to 15 years) Smoking Survey, ASH manages the data collection and oversees its analysis [110]. Since 1997, ASH has conducted annual surveys of smoking behaviour in Year 10 students, and since 1999 has collected information from over 30,000 students annually. All schools with Year 10 students (except correspondence schools) are invited to participate, with survey packs being sent to consenting schools. Teachers supervise the completion of the questionnaires in class, with questions covering a range of demographic factors and smoking-related topics. While it has been suggested that this design means it is not always clear how the sample has been selected and how consistently the survey has been administered, the large sample size and annual frequency makes the survey useful for monitoring the smoking behaviour of Year 10 students and for understanding trends and risk factors for smoking initiation [111].

Note 2: Since 2001 participation rates have fluctuated, with school response rates of 67% in 2002 falling to 47% in 2007, before increased again to 54% in 2008, and 58% in 2010 (in 2010 the sample comprised 54% of the Year 10 population). Such variable participation rates however may potentially introduce a fluctuating bias into each year's results. For example, the 2008 survey was under-representative of Māori students and those from low decile schools, with this underrepresentation potentially leading to an underestimates of smoking rates in the 2008 sample [112]. However the 2010 survey had a very similar gender and ethnicity distribution to the national Year 10 population [107].

New Zealand Distribution and Trends

Trends in Parental and Household Smoking Behaviour

In New Zealand during 2001–2010, the proportion of Year 10 students with a parent(s) who smoked did not change *significantly*, being 40.2% in 2001 and 38.1% in 2010. In contrast, the proportion of students who lived in homes where smoking occurred inside declined *significantly*, from 30.5% in 2001 to 19.1% in 2010 (**Figure 95**).

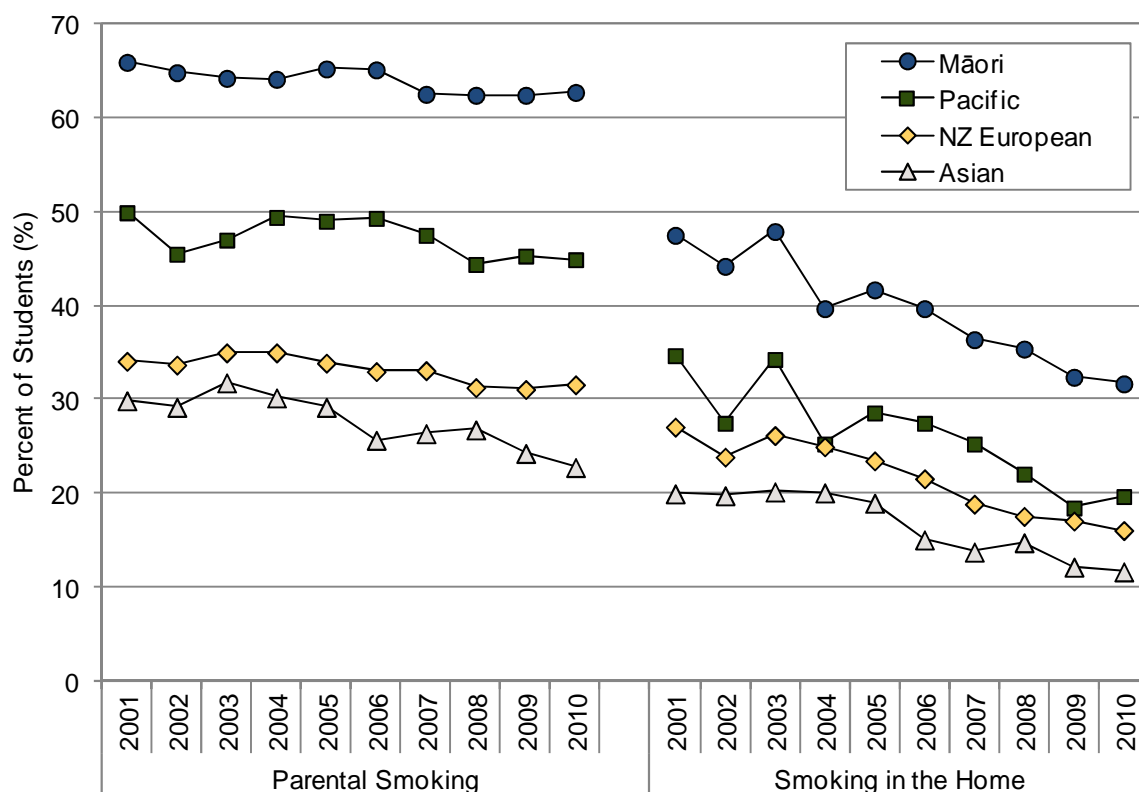
Ethnic Differences in Parental and Household Smoking Behaviour

In New Zealand during 2001–2010, there were no *significant* changes in parental smoking rates for European students (34.1% in 2001 vs. 31.6% 2010), although rates for Māori students (65.9% in 2001 to 62.7% in 2010), Pacific students (49.9% in 2001 to 44.9% 2010) and Asian students (29.9% in 2001 to 22.8% to 2010) did decline *significantly* during 2006–2010. Throughout this period, parental smoking rates remained higher for Māori > Pacific > European > Asian students (**Figure 93**).

Ethnic differences were also evident in exposure to cigarette smoke in the home. During 2001–2010, the proportion of 14–15 year olds living in homes where people smoked inside declined for all ethnic groups, with rates falling from 47.5% to 31.7% for Māori, from 34.7% to 19.7% for Pacific, from 27.1% to 16.1% for European and from 20.0% to 11.7% for Asian students. These declines were *significant* for all four ethnic groups during 2006–2010 (**Figure 93**).

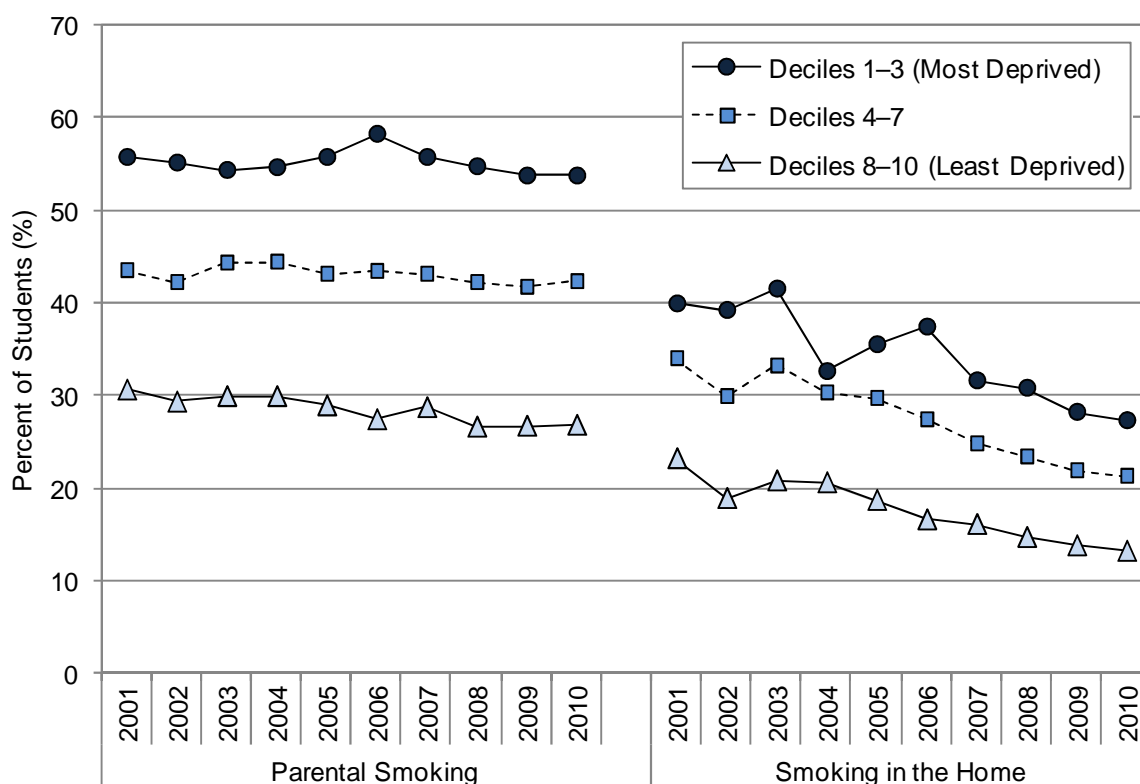


Figure 93. Proportion of Year 10 Students with Parents who Smoke or who Live in a Home with Smoking Inside by Ethnicity, New Zealand ASH Surveys 2001–2010



Source: ASH Year 10 Surveys [107]; Note: Ethnicity is prioritised

Figure 94. Proportion of Year 10 Students with Parents who Smoke or who Live in a Home with Smoking Inside by School Socioeconomic Decile, New Zealand ASH Surveys 2001–2010



Source: ASH Year 10 Surveys [107]

Socioeconomic Differences in Parental and Household Smoking

In New Zealand during 2001–2010, parental smoking rates declined *significantly* for students from schools in the least deprived (deciles 8–10) areas, with rates falling from 30.6% in 2001 to 26.8% in 2010. However, rates for students from schools in average (deciles 4–7) areas were relatively static (43.5% in 2001 vs. 42.3% in 2010), as were rates for students from schools in the most deprived (deciles 1–3) areas (55.7% in 2001 vs. 53.7% in 2010). Throughout this period, parental smoking rates were higher for students from schools in the most deprived > average > least deprived areas (**Figure 94**).

Exposure to smoking in the home was also higher for those from schools in the most deprived > average > least deprived areas, although exposures were lower than parental smoking rates might predict, suggesting that a proportion of families with household members who smoked did not permit smoking inside the home. During 2001–2010, exposure to smoking in the home declined *significantly* for all socioeconomic groups (deciles 8–10, from 23.2% in 2001 to 13.2% in 2010; deciles 4–7, from 34.0% in 2001 to 21.3% in 2010; and deciles 1–3, from 39.9% in 2001 to 27.3% in 2010) (**Figure 94**).

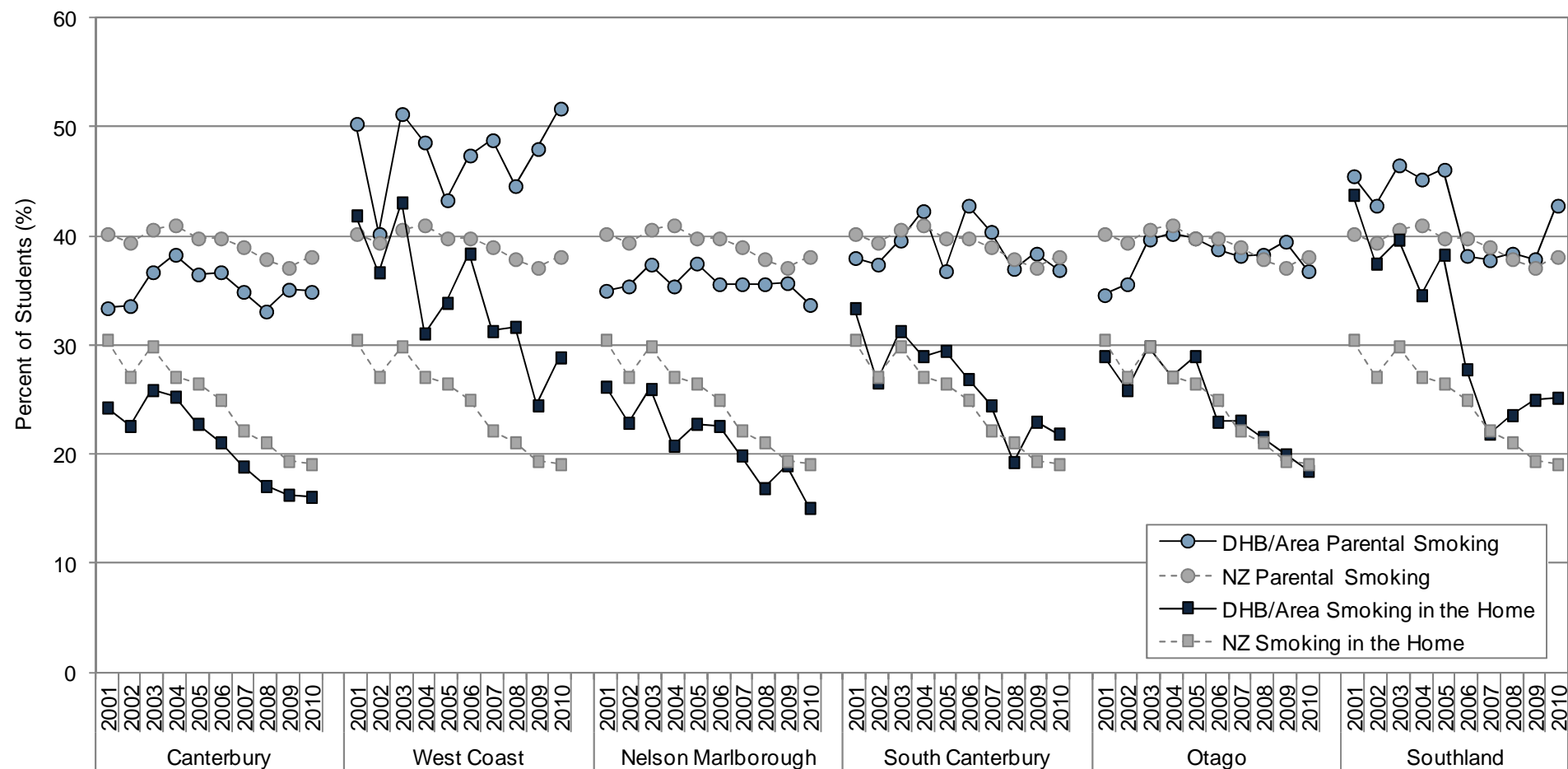
South Island Distribution and Trends

Parental and Household Smoking in the South Island

During 2001–2010, while trends in the proportion of Year 10 students who reported at least one parent smoking varied by DHB, the proportion who reported living in a home where people smoked inside declined in all South Island DHBs. During this period, rates for both outcomes were consistently lower than the New Zealand rate in Canterbury and Nelson Marlborough but consistently higher than the New Zealand rate in the West Coast. Rates in South Canterbury and Otago were similar to the New Zealand rate, while rates in Southland varied from year to year (**Figure 95**).



Figure 95. Proportion of Year 10 Students with Parents who Smoke or who Live in Homes with Smoking Inside, South Island DHBs vs. New Zealand, ASH Surveys 2001–2010



Source: ASH Year 10 Surveys [107]

Local Policy Documents and Evidence-Based Reviews Relevant to the Prevention of Second-Hand Cigarette Smoke Exposure in Children

In New Zealand, there is no national strategy focussed on the prevention of second-hand cigarette exposure in children. Any local strategies developed will thus need to incorporate evidence from a variety of sources. **Table 38** (below) provides an overview of a range of New Zealand policy documents and evidence-based reviews which may be useful in this context. In addition, **Table 33 (Page 197)** provides an overview of publications relevant to the cessation of smoking in pregnancy, and **Table 41 (Page 218)** and **Table 42 (Page 222)** address the prevention and cessation of smoking in young people.

Table 38. Local Policy Documents and Evidence-Based Reviews Relevant to the Prevention of Exposure to Second-Hand Cigarette Smoke in Children

Ministry of Health Policy Documents
<p>Ministry of Health. 2007. New Zealand Smoking Cessation Guidelines. Wellington: Ministry of Health. http://www.health.govt.nz/publication/new-zealand-smoking-cessation-guidelines</p> <p>The smoking cessation guidelines recommend that all health workers should be aware of the risks of second-hand smoke to children and young people exposed to smoking in their families and homes. Brief advice and cessation support should be offered to all family members who smoke.</p>
<p>Ministry of Health. 2010. Well Child/Tamariki Ora National Schedule: Four to six weeks, to five years. Wellington: Ministry of Health.</p> <p>Ministry of Health. 2010. Well Child/Tamariki Ora National Schedule: Birth, to four to six weeks. Wellington: Ministry of Health. http://www.health.govt.nz/our-work/life-stages/child-health/well-child-services/well-child-publications/well-child-national-schedule</p> <p>The Well child/Tamariki Ora schedule outlines the assessment, intervention, and health education activities for each of the Lead Maternity Carer postnatal contacts, the GP six week visit and the eight universal core contacts delivered in the Well Child programme, to children aged between four to six weeks, and five years and their families. ABC smoking cessation advice, as described in the New Zealand Smoking Cessation Guidelines, is recommended at each contact.</p>
Cochrane Systematic Reviews
<p>Priest N, et al. 2008. Family and carer smoking control programmes for reducing children's exposure to environmental tobacco smoke. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD001746.pub2 http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001746/frame.html</p> <p>This review examined the effectiveness of interventions aimed at reducing environmental smoke exposure in children. Thirty-six controlled trials were included, 30 of which random allocation. The majority of trials targeted parents in 'well-child' or 'ill-child' healthcare settings, and including educational and counselling interventions. There was insufficient evidence to clearly demonstrate the effectiveness a particular intervention. Eleven studies identified a statistically significant effect of the intervention on children's smoke exposure, four of which delivered intensive counselling in healthcare settings.</p>
Other Systematic Reviews
<p>Rosen LJ, et al. 2012. Parental Smoking Cessation to Protect Young Children: A Systematic Review and Meta-analysis. Pediatrics, 129(1), 141-52.</p> <p>This recent systematic review of interventions aimed at parental smoking cessation identified 18 controlled trials (7053 participants). Interventions included self-help, counselling and medication and took place in a range of settings. Meta-analysis revealed a significant improvement in overall quit rates for intervention groups compared to controls (RR 1.34, 95% CI 1.05 to 1.71) and a risk difference of 0.04 (95% CI 0.01 to 0.07), suggesting that an additional 4% of parents in the intervention groups stopped smoking. The subgroups with significantly increased quit rates were those with children aged 4 to 17 years, interventions whose primary goal was cessation, interventions that offered medications and interventions with high follow-up rates (over 80%). While interventions significantly increased quit rates the authors note that the majority of parents continued to smoke, necessitating additional strategies.</p>

Note: The publications listed above were identified using the search methodology outlined in **Appendix 1**

TOBACCO USE IN YOUNG PEOPLE

Introduction

Cigarette smoking in young people is associated with addiction to nicotine, reduced lung function, reduced lung growth, asthma, and early abdominal aortic atherosclerosis [113]. The average age for smoking initiation among young people in New Zealand is 14.6 years, and the majority of adult smokers started smoking in adolescence [114,115]. Those who do not smoke before the age of 20 are significantly less likely to start as adults [116].

The prevalence of smoking amongst young people appears to be declining, in line with national smoking prevalence [99]. The Action on Smoking and Health (ASH) New Zealand national surveys of 14 and 15 year olds revealed a significant decline in smoking between 2006 and 2010 (adjusted OR for regular smoking 0.65, 95% CI 0.62–0.69) [107]. In the 2010 survey of 32,605 14 and 15 year old students, 10.0% reported regular smoking (at least daily, weekly or monthly) and 64.4% reported they had never smoked, a significant increase in those that reported they had never smoked since 2006 (adjusted OR 1.61, 95% CI 1.56–1.66). The highest prevalence of smoking was reported by Māori females and by students from low decile schools. Overall, smoking rates were significantly higher for Māori, Pacific and Asian students than for European/other students, after adjustment for age and sex. Students were also significantly more likely to smoke if both parents smoked than if neither parent smoked, and if they had a best friend who smoked. Adolescent smoking in New Zealand has also been linked to the amount of pocket money received and to smoking at home [117].

Despite the apparent decline in cigarette smoking, young people continue to smoke and disparities remain. Smoking control programmes in young people must therefore focus on both prevention of smoking initiation and smoking cessation.

The following section reviews smoking prevalence in 14 to 15 year olds using data from the ASH New Zealand Smoking Surveys, as well as smoking in young people aged 15–24 years using data from the 2009 New Zealand Tobacco Use Survey.

ASH Year 10 Survey Data

The Year 10 ASH Smoking Survey has been used to monitor smoking in 14 and 15 year old students since 1999. The Survey samples around half of the secondary schools with Year 10 students in New Zealand, with sample sizes exceeding 25,000 students each year [118]. The results thus reflect the smoking behaviour of 14 to 15 year old secondary school students and are useful in understanding trends and risk factors for smoking initiation.

Data Source and Methods

Definition

1. Proportion of Year 10 Students who are daily smokers
2. Proportion of Year 10 Students who have never smoked

Data Source

Numerator: ASH Surveys Number of Year 10 students who are daily smokers
Number of Year 10 students who have never smoked

Denominator: ASH Survey Number of Year 10 Students surveyed

Notes on Interpretation

Note 1: Action on Smoking and Health (ASH) was established in 1982 with the aim of reducing smoking and smoking-related premature deaths. While the Ministry of Health provides funding for the annual national Year 10 Smoking Survey, ASH manages the data collection and oversees its analysis [110]. Since 1997, ASH has conducted annual surveys of smoking behaviour in Year 10 (14 to 15 year old) students, and since 1999 has collected information from more than 25,000 students annually.

Note 2: Questionnaires are self-administered and cover demographic variables as well as smoking-related issues. Survey forms with instructions are mailed to all secondary schools and teachers supervise the completion of the questionnaires by students. It has been suggested that such a design means it is not always clear how the sample has been selected and how consistently the survey has been administered, however, the large sample size and annual frequency makes the survey useful for monitoring smoking behaviour of Year 10 students in New Zealand, and a useful tool for understanding trends and risk factors for smoking initiation [111].

Note 3: In 2000 and 2001, over 70% of schools in NZ participated and of these, 70% of enrolled students took part [119]. Since then however, participation rates have declined, with school response rates being 67% in 2002, 66% in 2003, 65% in 2004, 58% in 2005, 57% in 2006, 47% in 2007 and 54% in 2008. In 2008, compared to the national Year 10 population, Māori, and low decile schools were underrepresented. This underrepresentation is likely to systematically bias the results of later surveys, with the proportion of young people living with parents who smoke, or in a home with smoking inside, likely to be increasingly under-represented in these figures [112].

All of the data in this section was downloaded from <http://www.ash.org.nz/?t=157>

New Zealand Distribution and Trends

New Zealand Trends

In New Zealand during 1999–2011 the proportion of Year 10 students who were daily smokers declined, from 15.6% in 1999 to 4.1% in 2011. Similarly, the proportion who had never smoked increased, from 31.6% in 1999 to 70.4% in 2011 (**Figure 98**).

Gender and Ethnicity

In New Zealand during 1999–2011, daily smoking rates for Māori and Pacific students were higher for females, while rates for Asian students were higher for males. There were also marked ethnic differences in daily smoking during this period, with rates being consistently higher for Māori > Pacific > European and Asian students (**Figure 96**). Daily smoking rates declined for students of all ethnic groups during 1999–2011 however, with rates falling from 30.3% to 10.3% for Māori students, 19.9% to 5.9% for Pacific students, from 12.9% to 2.4% for European students and from 7.0% to 1.2% for Asian students.

Gender and Socioeconomic Status

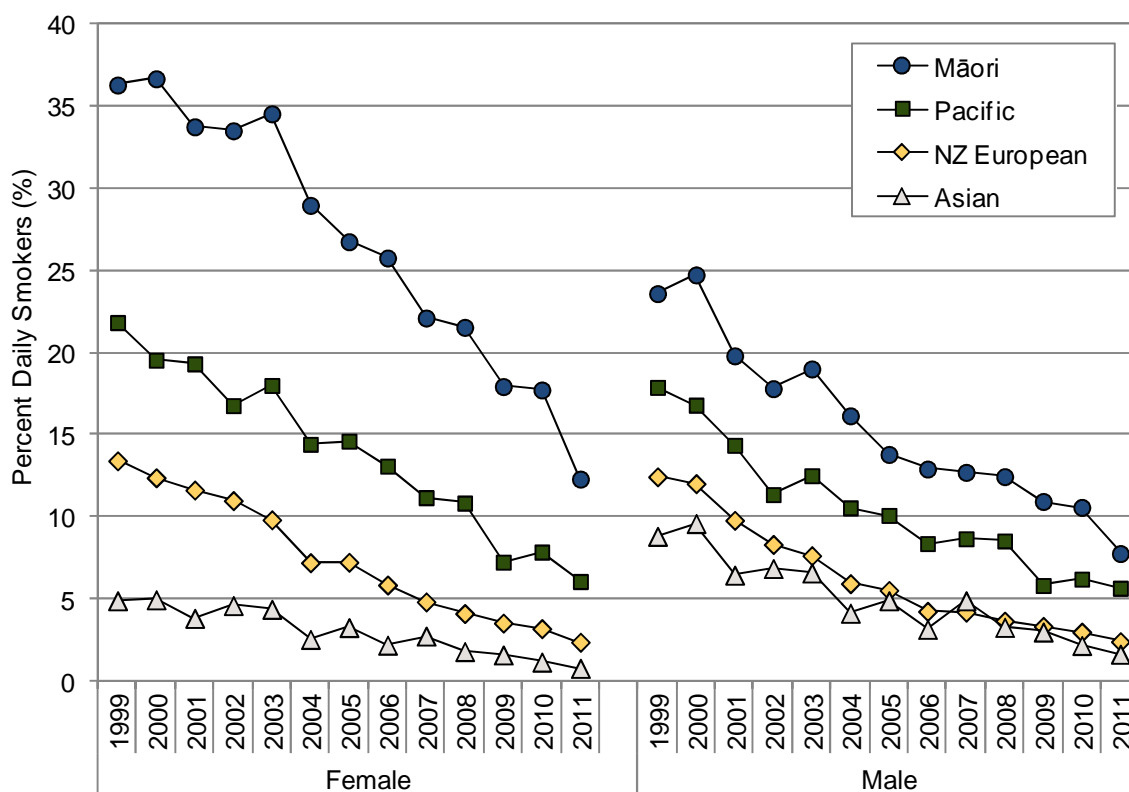
In New Zealand during 1999–2011, daily smoking rates were higher for students attending schools in the most deprived (deciles 1–3) > average (deciles 4–7) > least deprived (deciles 8–10) areas. While gender differences were again evident, these diminished as the level of deprivation decreased, with the higher female smoking rates seen in the most deprived schools, virtually disappearing in the least deprived schools (**Figure 97**). Daily smoking rates declined for students of all socioeconomic groups during 1999–2011 however, with rates falling from 23.5% to 9.6% for students from schools in the most deprived areas, from 16.2% to 4.6% for schools in average areas, and from 11.8% to 1.9% for students from schools in the least deprived areas.

South Island Distribution and Trends

In all of the South Island DHBs during 1999–2011, the proportion of Year 10 students who were daily smokers declined, while the proportion who had never smoked increased. Daily smoking rates were very similar to the New Zealand rate in all South Island DHBs, although the proportion who had never smoked was slightly lower than the New Zealand rate in the West Coast and Southern DHBs (**Figure 98**).

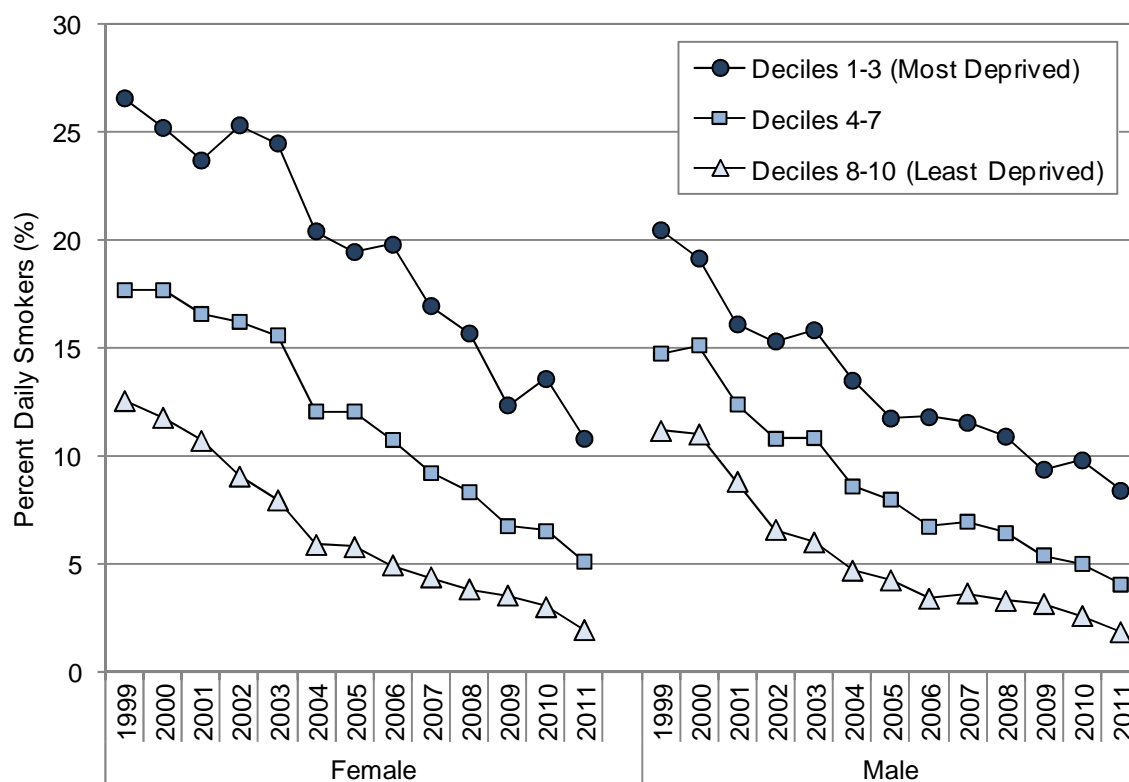


Figure 96. Daily Smoking Rates in Year 10 Students by Gender and Ethnicity, New Zealand ASH Surveys 1999–2011



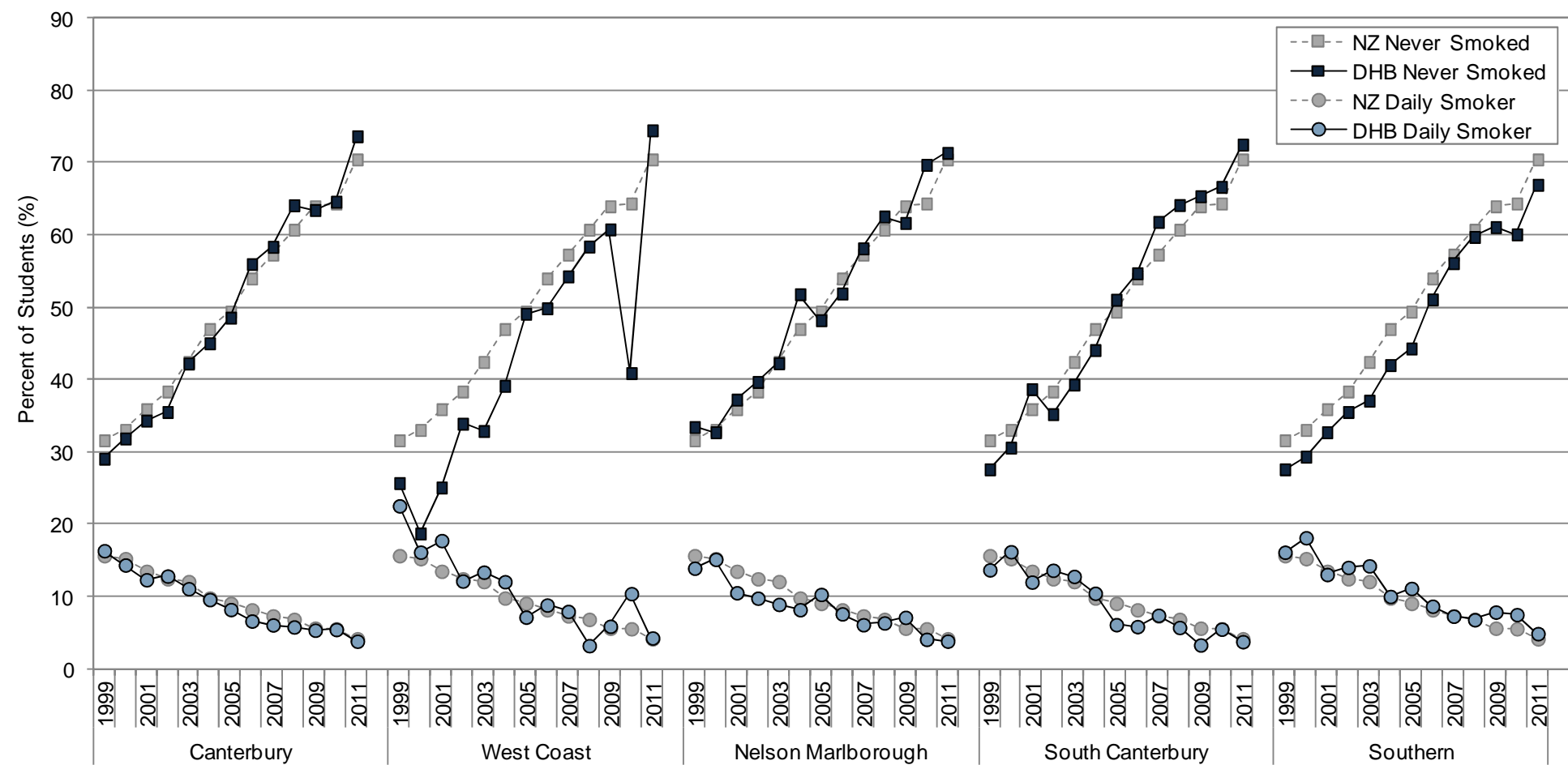
Source: ASH Year 10 Surveys [120]; Note: Ethnicity is prioritised

Figure 97. Daily Smoking Rates in Year 10 Students by Gender and School Socioeconomic Decile, New Zealand ASH Surveys 1999–2011



Source: ASH Year 10 Surveys [120]

Figure 98. Daily vs. Never Smoking Rates in Year 10 Students, South Island DHBs vs. New Zealand ASH Surveys 1999–2011



Source: ASH Year 10 Surveys [120]

2009 New Zealand Tobacco Use Survey

The New Zealand Tobacco Use Surveys are part of the New Zealand Health Monitor, an integrated programme of household surveys managed by the Ministry of Health. There have been three comprehensive national tobacco use surveys conducted in New Zealand: in 2006, 2008 and 2009. This section reviews tobacco use in young people aged 15–19 years and 20–24 years using data from the 2009 New Zealand Tobacco Use Survey [121].

Data Source and Methods

Definition

1. The proportion of young people aged 15–19 and 20–24 years who were current smokers
2. The proportion of young people aged 15–19 and 20–24 years who were non-smokers

Data Source

2009 New Zealand Tobacco Use Survey (NJTUS)

Numerator

Number of young people who were current smokers (current is defined as someone who has smoked more than 100 cigarettes in their lifetime and at the time of the survey was smoking at least once a month)

Number of young people who were non-smokers (including ex-smokers and those who have never smoked)

Denominator

Number of young people surveyed

Notes on Interpretation

The target population for the 2009 NJTUS was the usually resident population aged 15–64 years living in private dwellings in New Zealand. A multi-stage, stratified, probability-proportional-to-size sampling design was used. The design included a Pacific stratum, as well as sampling by District Health Board area and a screen sample to boost the proportions of Māori, Pacific people and those aged 15–24 years.

Participation in the 2009 NJTUS was voluntary, with the survey being carried out by trained interviewers from January to May 2009 using a face-to-face computer-assisted personal interview system. A total sample size of 5222 people aged 15–64 years was achieved, with a weighted response rate of 71.3%. The total sample included 980 Māori, 522 Pacific people, 560 Asian people and 3202 European/Other people. The survey data were weighted so that estimates of population totals, averages and proportions were representative of the total resident population of New Zealand [121].

In the 2009 NJTUS ethnicity was self-defined with participants being able to report affiliation with multiple ethnicities, using the Statistics NZ's standard ethnicity question. Ethnicity was then outputted into four ethnic groups: European/Other, Māori, Pacific, Asian. The 'Other' ethnic group (comprising mainly Middle-Eastern, Latin-American and African ethnicities) was combined with 'European' to avoid small number problems. Because participants could be counted in one or more of the four ethnic groups, direct comparisons between ethnic groups are not possible, with all rate ratios being calculated by comparing each ethnic group to the total population [121].

New Zealand Distribution

Distribution by Age and Gender

In the 2009 NZ Tobacco Use Survey, while the proportion of females (19.1% and 31.2%) who were current smokers was higher than for males (16.9% and 30.1%) at both 15–19 years and 20–24 years, in neither case did these differences reach statistical significance. The proportion of young people aged 20–24 years (30.7%) who were current smokers however, was *significantly* higher than for those aged 15–19 years (18.0%) (**Table 39**).

Distribution by Gender and Ethnicity

In the 2009 NZ Tobacco Use Survey, while current smoking rates for Māori, Pacific and Asian females aged 15–19 years were higher than for males, these differences did not reach statistical significance (**Figure 99**). When compared to the total population rate, current smoking rates for Māori young people (RR 2.15 95% CI 1.62–2.67) were *significantly* higher, while rates for Asian young people were *significantly* lower (RR 0.24 95% CI 0.00–0.70). Rates for Pacific (RR 1.56 95% CI 0.88–2.24) and European/Other young people (RR 0.93 95% CI 0.83–1.04) were not *significantly* different from the total population rate for those aged 15–19 years.

Table 39. Smoking Status of Young People Aged 15–24 Years by Gender and Age Group, 2009 NZ Tobacco Use Survey

Gender	15–19 Years		20–24 Years	
	Prevalence Estimate	95% CI	Prevalence Estimate	95% CI
Current Smokers				
Males	16.9	12.0–21.9	30.1	23.2–36.9
Females	19.1	14.5–23.8	31.2	23.8–38.5
Total	18.0	14.9–21.2	30.7	25.5–35.8
Non-Smokers				
Males	82.7	77.7–87.6	66.6	59.4–73.8
Females	79.8	75.2–84.4	68.3	61.0–75.6
Total	81.3	78.2–84.3	67.5	62.1–72.8

Source: 2009 New Zealand Tobacco Use Survey [121]

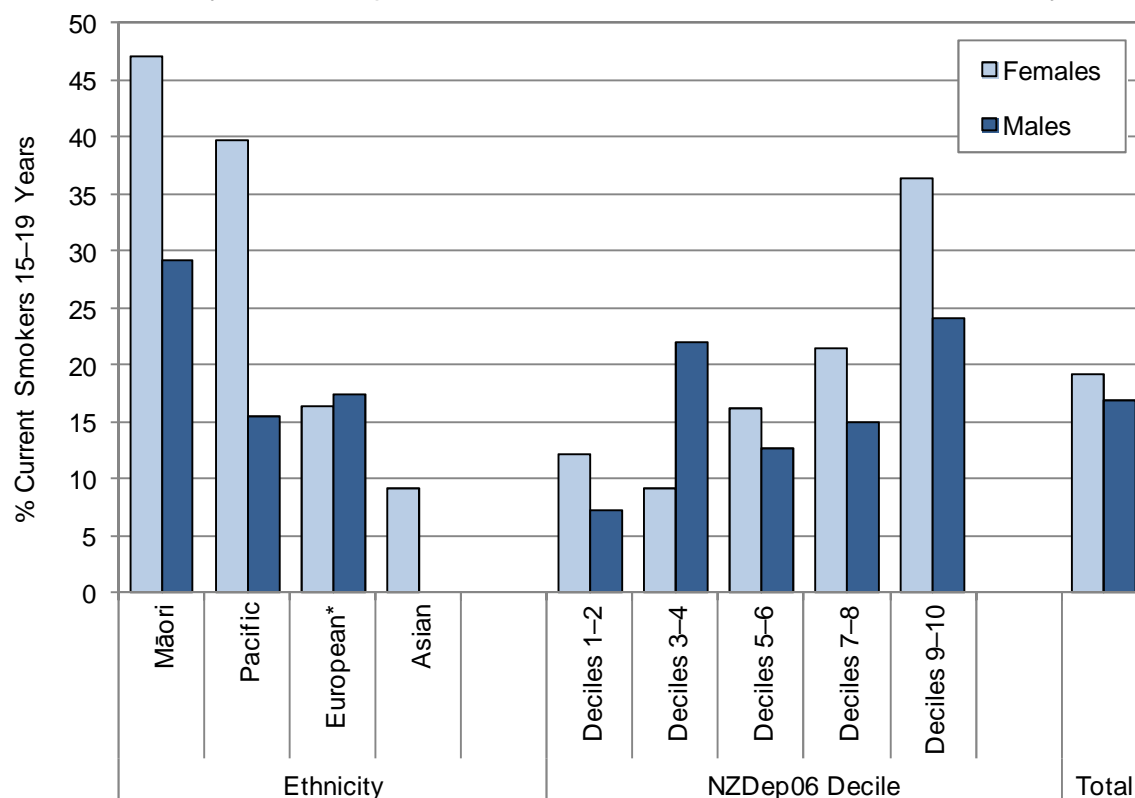
Distribution by Gender and NZ Deprivation Index Decile

In the 2009 NZ Tobacco Use Survey, while current smoking rates for females aged 15–19 years in some NZDep06 deciles were higher than for males, in no cases did these differences reach statistical significance (**Figure 99**). Current smoking rates for young people from the most deprived (NZDep deciles 9–10) areas (30.9% 95% CI 22.6–39.3) however, were *significantly* higher than for those from the least deprived (NZDep deciles 1–2) areas (10.0% 95% CI 4.2–19.2).

Source of Tobacco in the Last Month

In the 2009 NZ Tobacco Use Survey, current smokers aged 15–19 years indicated that the most common way of sourcing tobacco in the past month was to buy it themselves (79.3% 95% CI 70.7–87.9), although other sources of tobacco were friends (27.6% 95% CI 18.9–36.2) or family (22.9% 95% CI 14.7–31.1) (**Table 40**).

Figure 99. Proportion of Young People Aged 15–19 Years who were Current Smokers by Gender, Ethnicity and NZ Deprivation Index Decile, 2009 NZ Tobacco Use Survey



Source: 2009 New Zealand Tobacco Use Survey [121]; Note: Ethnicity is Total Response Ethnicity; * European also includes Other



Table 40. Source of Tobacco in the Last Month for Current Smokers Aged 15–19 Years by Gender, 2009 New Zealand Tobacco Use Survey

Males		Females		Total	
Prevalence Estimate	95% CI	Prevalence Estimate	95% CI	Prevalence Estimate	95% CI
In the last month I got my cigarettes from: Family					
23.2	12.4–37.3	22.6	11.9–36.7	22.9	14.7–31.1
In the last month I got my cigarettes from: Friends					
35.5	21.6–51.6	20.3	10.6–33.4	27.6	18.9–36.2
In the last month I got my cigarettes from: I bought them					
81.4	70.5–92.3	77.3	63.8–90.9	79.3	70.7–87.9
In the last month I got my cigarettes from: Somewhere else					
0	0.0–7.1	2.6	0.1–14.2	1.4	0.0–7.5

Source: 2009 New Zealand Tobacco Use Survey [121]; Note: Multiple responses were possible so columns do not sum to 100%

Local Policy Documents and Evidence-Based Reviews Relevant to the Prevention or Cessation of Smoking in Young People

In New Zealand, there is no national strategy focused on the prevention of youth smoking. There are several policy documents addressing the prevention or cessation of cigarette smoking in general. In addition, a large number of evidence-based reviews consider smoking prevention and cessation in adolescents. **Table 41** below provides an overview of local policy documents and evidence-based reviews addressing the prevention of smoking in young people, and **Table 42 (page 222)** addresses smoking cessation. **Table 33 (page 197)** summarises publications addressing the cessation of smoking in pregnancy, and **Table 38 (page 211)** summarises publications which consider the prevention of exposure to second-hand cigarette smoke in children.

Table 41. Local Policy Documents and Evidence-Based Reviews Relevant to the Prevention of Smoking in Young People

Ministry of Health Policy Documents
<p>Ministerial Committee on Drug Policy. 2007. National Drug Policy 2007–2012. Wellington: Ministry of Health. http://www.ndp.govt.nz/moh.nsf/indexcm/ndp-publications-nationaldrugpolicy20072012</p> <p>This document sets out Government policy on tobacco, alcohol and other drugs and provides guidance for policies and practices aimed at minimising drug-related harm in the community. The overarching goal is to prevent and reduce the health, social and economic harms linked to tobacco, alcohol and other drug use, by means of supply control, demand reduction and problem limitation. Objectives include preventing or delaying the uptake of tobacco, particularly in Māori, Pacific peoples and young people; and decreasing the harm caused by tobacco by reducing the prevalence of tobacco smoking, the consumption of tobacco products and exposure to second-hand smoke. The policy aims to help governmental and nongovernmental agencies develop strategies consistent with the national direction.</p>
<p>Ministry of Health. 2004. Clearing the Smoke: A Five-Year Plan for Tobacco Control in New Zealand (2004–2009). Wellington: Ministry of Health. http://www.health.govt.nz/publication/clearing-smoke-five-year-plan-tobacco-control-new-zealand-2004-2009</p> <p>This document provides the action plan for tobacco control developed under the National Drug Policy. The goals of the plan are to: significantly reduce levels of tobacco consumption and smoking prevalence; reduce inequalities in health outcomes; reduce the prevalence of smoking among Māori to at least the same level as among non-Māori; and reduce New Zealanders' exposure to second-hand smoke. The objectives to achieve these goals are to: prevent smoking initiation; promote smoking cessation; prevent harm to non-smokers from second-hand smoke; improve support for monitoring, surveillance and evaluation; improve infrastructural support and co-ordination for tobacco control activities.</p>

Cochrane Systematic Reviews

Johnston V, et al. 2012. **Incentives for preventing smoking in children and adolescents.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD008645.pub2

<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008645.pub2/abstract>

This review examined whether incentives prevent children and adolescents from starting to smoke. Seven controlled studies (age range 11 to 14 years) met inclusion criteria, five of which had analysable data and contributed to the meta-analysis (6362 participants, non-smokers at baseline). All but one of the studies were trials of the Smokefree Class Competition (SFC), widely implemented throughout Europe. Classes in the SFC commit to being smoke-free for a six month period. They report regularly on their smoking status; if 90% or more of the class is non-smoking at the end of the six months, the class goes into a competition to win prizes. One non-randomised controlled trial of SFC reported a significant effect of the competition on the prevention of smoking at the longest follow-up, but after adjustment by the reviewers the result was no longer statistically significant. The pooled RR for the more robust RCTs (3 studies, n = 3056) did not identify a significant difference in smoking initiation in the long term (RR 1.00, 95% CI 0.84 to 1.19). There was little robust evidence to suggest that unintended consequences (such as youth making false claims about their smoking status and bullying of smoking students) were consistently associated with the interventions, although this was not a focus of the research. The authors conclude that incentive programmes have not yet been shown to prevent smoking initiation among youth, and further robust research in different population groups is required.

Lovato C, et al. 2011. **Impact of tobacco advertising and promotion on increasing adolescent smoking behaviours.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD003439.pub2

<http://www.mrw.interscience.wiley.com/cochrane/clsystrev/articles/CD003439/frame.html>

This review identified 19 longitudinal studies that assessed individuals' smoking behaviour and exposure to advertising, receptivity or attitudes to tobacco advertising, or brand awareness at baseline, and assessed smoking behaviour at follow ups. The studies followed over 29,000 baseline non-smokers aged 18 and under. In 18 of studies participants who were more aware of or receptive to tobacco advertising, were more likely to have experimented with cigarettes or become smokers at follow up, supporting a causal link between advertising and tobacco use in young people.

Carson KV, et al. 2012. **Interventions for tobacco use prevention in Indigenous youth.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD009325.pub2

<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009325.pub2/abstract>

This review assessed the effectiveness of intervention programmes to prevent tobacco use initiation or progression to regular smoking amongst young indigenous populations. Two RCTs (1505 participants) met inclusion criteria. Both studies were based in Native American populations and employed multi-component community-based interventions tailored to the specific cultural aspects of the population. No difference was observed in weekly smoking at 42 months follow up in the one study assessing this outcome (skills-community group versus control: RR 0.95, 95% CI 0.78 to 1.14; skills only group versus control: RR 0.86, 95% CI 0.71 to 1.05). Positive change found in the second study at post-test was not maintained at six month follow up. Given the paucity of evidence the authors conclude that methodologically rigorous trials are needed to investigate interventions aimed at preventing the uptake of tobacco use amongst indigenous youth and to assist in bridging the gap between tobacco-related health disparities in indigenous and non-indigenous populations.

Carson KV, et al. 2011. **Community interventions for preventing smoking in young people.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD001291.pub2

<http://www.mrw.interscience.wiley.com/cochrane/clsystrev/articles/CD001291/frame.html>

This 2011 update reviewed trials comparing the effectiveness of multi-component community interventions with single component or school-based only interventions in influencing smoking behaviour in young people, including preventing uptake. The interventions used co-ordinated, widespread, multi-component programmes which aimed to influence behaviour. The programmes included education of retailers, mass media, school and family-based components, and there was often community involvement in planning and/or implementation. Twenty-five studies (15 RCTs and 10 non-randomised controlled trials) were included in the review, ten of which were associated with a reduction in smoking uptake in the intervention group. Changes in intentions to smoke, knowledge, attitudes and perceptions about smoking did not generally appear to affect long-term smoking behaviour. Overall there was some evidence to support the effectiveness of community interventions. The authors identify the strong influence of local factors and likely difficulties with replication of interventions but suggest the principles and methods on which successful interventions are based may be useful in programme implementation in similar settings.

Brinn MP, et al. 2010. **Mass media interventions for preventing smoking in young people.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD001006.pub2

<http://www.mrw.interscience.wiley.com/cochrane/clsystrev/articles/CD001006/frame.html>

This updated review evaluated the effectiveness of mass media interventions to prevent smoking in young people. The primary outcome was reduced smoking uptake, and secondary outcomes included improved attitudes and behaviours. Seven studies (approximately 49,398 participants), all of which had a controlled trial design, met the inclusion criteria. Three studies were associated with a reduction in smoking behaviour in young people. Common features of successful campaigns included multiple channels for media delivery, combined school and media components and repeated exposure to campaign messages delivered to the same cohort of students for a minimum of three years. The authors provide recommendations for planning and evaluating campaigns.

Stead LF & Lancaster T. 2008. **Interventions for preventing tobacco sales to minors**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD001497.pub2
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001497/frame.html>

This review assessed the effect of interventions aimed at reducing underage access to tobacco by deterring retailers from making illegal sales. Outcomes included both changes in retailer compliance assessed by test purchasing, and changes in young people's smoking behaviour and their perceived ease of access. Thirty-five studies, thirteen of which had a control group, were included in the review. Active enforcement and/or multi-component educational strategies were more effective than information alone. While sales were reduced, none of the communities studied achieved complete, sustained compliance. There was limited evidence for an effect of retailer interventions on youth perceptions of ease of access to tobacco, or on smoking behaviour.

Thomas RE, et al. 2007. **Family-based programmes for preventing smoking by children and adolescents**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD004493.pub2
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD004493/frame.html>

This review examined the effectiveness of interventions to help family members strengthen non-smoking attitudes and promote non-smoking by children and other family members. Twenty-two RCTs, of variable quality, were included in the narrative synthesis. Some well-executed RCTs showed family interventions may prevent adolescent smoking, but RCTs which were less well executed had mostly neutral or negative results and it was not possible to draw firm conclusions. Implementer training and the fidelity of implementation were related to positive outcomes, but the number of sessions was not.

Thomas RE & Perera R. 2006. **School-based programmes for preventing smoking**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD001293.pub2
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001293/frame.html>

This review identified 23 randomised controlled trials of behavioural interventions (information-giving, social influence approaches, social skills training, and community interventions) in schools to prevent children and adolescents starting smoking. There was little evidence that information-giving alone is effective. The majority of trials used social influence type interventions, about half of which had a short-term effect on children's smoking behaviour. There was limited support for interventions that included developing generic social competence and community initiatives.

Other Systematic Reviews

U.S. Department of Health and Human Services. 2012. **Preventing tobacco use among youth and young adults: A report of the Surgeon General**. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health

This recent report includes a review of the effectiveness of interventions to prevent and reduce tobacco use in young people. The review found sufficient evidence to conclude that mass media campaigns, comprehensive community programmes, comprehensive control programmes, and price increases can both prevent the initiation and reduce the prevalence of tobacco use in young people. The review identified short-term beneficial effects from school-based programmes based on the social influences model but programmes that were implemented in combination with other interventions produced larger and more sustained effects.

Sutcliffe K, et al. 2011. **Young people's access to tobacco: a mixed-method systematic review**. London: EPPI Centre, Social Science Research Unit, Institute of Education, University of London.

This report sought to identify the retail and non-retail sources of tobacco used by young people and included a review of international evidence assessing the effect of interventions aimed at reducing non-retail access to cigarettes by young people. Four types of intervention have been evaluated (possession laws; retail interventions measuring the impact on social access; school policies; and home access restrictions) using a mixture of RCTs (possession law interventions) and observational studies. None of the interventions specifically targeted proxy purchasing, identified as an important source of non-retail tobacco. The overall evidence base was limited.

National Institute for Health and Clinical Excellence. 2010. **School-based interventions to prevent the uptake of smoking among children and young people (NICE public health guidance 23)**. London: National Institute for Health and Clinical Excellence. <http://www.nice.org.uk/guidance/PH23>.

This NICE public health guidance provides comprehensive evidence-based guidance on school-based interventions to prevent smoking uptake by children and young people. It includes a systematic review assessing the effectiveness of interventions. The review included 64 RCTs, with between 500 and 17,446 participants and follow up of up to 13 years. Meta-analysis of 27 RCTs demonstrated a significant intervention effect. There was moderate evidence indicating that multi-component interventions incorporating both school and community components were ineffective in preventing uptake compared to usual education. There was no clear evidence to favour a particular conceptual model (social influence, social competence, information giving and combined interventions). Adverse or unintentional effects were not specifically examined in any of the studies. Despite 62 large RCTs there was little evidence about what works for whom besides weak evidence indicating that school-based interventions starting soon after primary school entry may be effective in reducing the uptake of smoking up to age of 14, and strong evidence that booster sessions enhance effectiveness of main programmes.

Emory K, et al. 2010. **The association between home smoking restrictions and youth smoking behaviour: a review.** Tobacco Control, 19(6), 495-506.

This review assessed the association between home smoking restrictions and the prevention of youth smoking. Nineteen studies met the inclusion criteria, two of which were longitudinal studies and the remainder cross-sectional. Sixteen studies, including the two longitudinal studies, showed some association between restrictions and reduced adolescent smoking behaviours. Completely smoke-free homes appear to be more effective than partial restrictions and the benefits of smoke-free policies were less clear in homes where at least one adult smoked.

National Institute for Health and Clinical Excellence. 2008. **Mass-media and point-of-sales measures to prevent the uptake of smoking by children and young people.** London: National Institute for Health and Clinical Excellence. <http://www.nice.org.uk/PH014>.

This public health guidance provides a set of evidence-based recommendations on mass-media and point-of-sales measures to prevent the uptake of smoking by children and young people. The guidance includes a systematic review, an economic appraisal, stakeholder comments and the results of fieldwork. The review included 61 studies (40 mass media and 21 access restriction studies). There was sufficient evidence to support mass media interventions in smoking prevention and interventions were more effective when combined with broader tobacco control strategies and when campaigns were long lasting with higher exposure levels. Although there was evidence that access restriction interventions affect young people's ability to access cigarettes only two studies addressed the impact of interventions on smoking behaviour. It is recommended that mass-media and point-of-sales measures should be combined with other prevention activities as part of a comprehensive tobacco control strategy.

Kavanagh J, et al. 2006. **A systematic review of the evidence for incentive schemes to encourage positive health and other social behaviours in young people.** London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

This systematic review assessed the effectiveness of incentive schemes in encouraging positive health behaviour in young people. The review identified two school-based anti-smoking competitions whose combined results were associated with significant reductions in daily smoking rates immediately after the intervention and at one year follow-up. The results should be interpreted with caution given the small number of studies and the authors recommend that classroom-based incentive schemes which aim to delay the onset of or reduce levels of smoking should be piloted and evaluated in RCTs.

Other Relevant Publications

Māori Affairs Committee. 2010. **Inquiry into the tobacco industry in Aotearoa and the consequences of tobacco use for Māori. Report of the Māori Affairs Committee.** 49th Parliament: November.

New Zealand Parliament. 2011. **Government Response to the Report of the Māori Affairs Committee on its Inquiry into the tobacco industry in Aotearoa and the consequences of tobacco use for Māori (Final Response).** http://www.parliament.nz/NR/rdonlyres/3AAA09C2-AD68-4253-85AE-BCE90128C1A0/188520/DBHOH_PAP_21175_GovernmentFinalResponsetoReportoft.pdf.

The report details the findings of the 2009–2010 Māori Select Committee inquiry into the tobacco industry in Aotearoa and the consequences of tobacco use for Māori. The committee received 260 written submissions, 1,715 form letters and heard 96 oral submissions. The aim of the inquiry was to develop an effective approach to reducing smoking rates amongst Māori, and all other New Zealanders. The goal is for tobacco consumption and smoking prevalence to be halved by 2015 across all demographics, and for New Zealand to be a smoke-free nation by 2025. Stopping children from getting addicted to smoking is identified as an area requiring particular attention. The report includes a comprehensive list of recommendations.

In its response, the government has agreed to examine further options for measures to limit tobacco supply including: restricting the number and location of tobacco retailers, to reduce the exposure of children and young people to tobacco; continuing to prioritise advertising campaigns directed at preventing children from taking up smoking; and considering options to extend smoke-free restrictions to protect children.

Note: The publications listed above were identified using the search methodology outlined in **Appendix 1**

Table 42. Local Policy Documents and Evidence-Based Reviews Relevant to Smoking Cessation in Young People

Ministry of Health Policy Documents
<p>Ministry of Health. 2011. Targeting Smokers: Better Help for Smokers to Quit. Wellington: Ministry of Health. http://www.health.govt.nz/publication/targeting-smokers-better-help-smokers-quit</p> <p>The health target "Better Help for Smokers to Quit" was introduced in 2009, requiring DHBs to ensure that 95% of hospitalised smokers will be provided with advice and help to quit by July 2012. From July 2011 the target was extended to the primary care sector, where 90% of enrolled patients who smoke and are seen in general practice should be provided with advice and help to quit by July 2012.</p>
<p>Ministry of Health. 2007. New Zealand Smoking Cessation Guidelines. Wellington: Ministry of Health. http://www.health.govt.nz/publication/new-zealand-smoking-cessation-guidelines</p> <p>Ministry of Health. 2007. Smoking Cessation Competencies for New Zealand. Wellington: Ministry of Health. http://www.health.govt.nz/publication/smoking-cessation-competencies-new-zealand</p> <p>The New Zealand smoking cessation guidelines, and their associated competencies for delivery, identify young people as a priority population for cessation and suggest that it is likely that interventions need to be different, given differences in lifestyle and attitudes to smoking and quitting. The guidelines are structured around the 'ABC' approach (asking about smoking status and documenting the response; providing brief advice to stop smoking to all those who smoke, regardless of their desire or motivation to quit; and providing evidence-based cessation treatment). The guidelines state that nicotine replacement therapy (NRT) can be considered but there is insufficient evidence to support the effectiveness of NRT in young people.</p>
<p>Ministry of Health. 2009. Implementing the ABC Approach for Smoking Cessation: Framework and Work Programme. Wellington: Ministry of Health. http://www.health.govt.nz/publication/implementing-abc-approach-smoking-cessation-framework-and-work-programme</p> <p>This document contains the framework for implementing the ABC approach for smoking cessation. The ABC approach is based on the premise that initiating multiple quit attempts with supported treatment is associated with higher numbers of smokers who cease smoking in the long term. The aim is to integrate the ABC approach into routine care, so that the health sector can approach smoking cessation in a systematic and continuous way.</p>
Cochrane Systematic Reviews
<p>Whittaker R, et al. 2012. Mobile phone-based interventions for smoking cessation. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD006611.pub3 http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD006611.pub3/abstract</p> <p>This reviewed assessed whether mobile phone-based interventions are effective at helping smokers of any age who wanted to quit, to stop smoking. Five randomised trials (over 9000 participants) with at least six month cessation outcomes were included in the review. Three studies involved a purely text messaging intervention that has been adapted over the course of these three studies for different populations and contexts (first developed in New Zealand, including Māori participants). One multi-arm study assessed a text messaging intervention and an internet QuitCoach separately and in combination. The final study involved a video messaging intervention delivered via the mobile phone. Pooled results revealed that mobile phone interventions increased the long term quit rates compared with control programmes (RR 1.71, 95% CI 1.47 to 1.99). The authors conclude that the current evidence supports the use of text-messaging interventions to help smokers to quit.</p>
<p>Carson KV, et al. 2012. Interventions for smoking cessation in Indigenous populations. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD009046.pub2 http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD009046/frame.html</p> <p>This review sought to evaluate the effectiveness of smoking cessation interventions in indigenous populations, who carry a disproportionate burden of smoking-related morbidity and mortality. Four studies met eligibility criteria, two of which were New Zealand studies (mobile phone text messaging and bupropion, both in adults), highlighting the paucity of available evidence. The limited but available evidence reported indicated that smoking cessation interventions specifically targeted at Indigenous populations can produce smoking abstinence but further research is needed.</p>
<p>Carson KV, et al. 2012. Training health professionals in smoking cessation. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD000214.pub2 http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000214/frame.html</p> <p>This review assessed the effectiveness of training health professionals in the delivery of smoking cessation interventions to their patients. Seventeen RCTs and cluster RCTs (28,531 participants assessed at baseline, 21,031 at final follow up, 1,434 individual health professionals) were included in the review. Thirteen found no evidence of an effect for continuous smoking abstinence following the intervention. Meta-analysis of 14 studies for point prevalence of smoking produced a statistically and clinically significant effect in favour of the intervention (OR 1.36, 95% CI 1.20 to 1.55). Meta-analysis of eight studies that reported continuous abstinence was also statistically significant (OR 1.60, 95% CI 1.26 to 2.03, p= 0.03). Health professionals who had received training were significantly more likely to perform smoking cessation tasks, including: asking patients to set a quit date, make follow-up appointments, counselling of smokers, and provision of self-help material. No evidence of an effect was observed for the provision of nicotine gum/replacement therapy. The authors conclude that training health professionals to provide smoking cessation interventions had a measurable effect on smoking prevalence and abstinence and professional performance.</p>

Grimshaw G & Stanton A. 2010. **Tobacco cessation interventions for young people**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD003289.pub4
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003289/frame.html>

While there are multiple Cochrane reviews for smoking cessation interventions in adults, this updated report reviewed studies aimed specifically at young people. Twenty-four trials (11 RCTs, 11 cluster RCTs and 2 controlled trials), involving 5000 participants (regular smokers aged under 20 years) met inclusion criteria. Most of the trials involved a form of motivational enhancement with psychological support. Programmes that combine a variety of approaches, including taking into account the young person's preparation for quitting, supporting behavioural change and enhancing motivation show promise with some persistence of abstinence (30 days point prevalence abstinence or continuous abstinence at six months). The three trials with evidence about pharmacological interventions (nicotine replacement and bupropion) did not demonstrate effectiveness for adolescent smokers.

Civiljak M, et al. 2010. **Internet-based interventions for smoking cessation**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD007078.pub3
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD007078/frame.html>

This systematic review of trials assessing the effectiveness of internet-based interventions for smoking cessation identified 20 trials, three of which recruited adolescents. Limited meta-analysis was possible due to the heterogeneity of the populations, interventions and outcomes. Results suggested that some Internet-based interventions can assist smoking cessation, especially if the information is appropriately tailored to the users and frequent automated contacts with the users are ensured, however evidence for long term benefit was limited. Of the adolescent trials, two small trials did not detect an effect on cessation compared to control, and one small trial detected a benefit of a web-based adjunct to a group programme.

Other Cochrane Systematic Reviews of Interest

The large body of literature on smoking cessation for adults is reflected in the number of Cochrane reviews published. The reviews listed below focus on adults but may provide useful background information.

Ussher MH, et al. 2012. **Exercise interventions for smoking cessation**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD002295.pub4
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD002295/frame.html>

White AR, et al. 2011. **Acupuncture and related interventions for smoking cessation**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD000009.pub3
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000009/frame.html>

Cahill K & Perera R. 2011. **Competitions and incentives for smoking cessation**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD004307.pub4
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD004307/frame.html>

Lancaster T & Stead LF. 2009. **Self-help interventions for smoking cessation**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD001118.pub2
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001118/frame.html>

Lancaster T & Stead LF. 2008. **Individual behavioural counselling for smoking cessation**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD001292.pub2
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001292/frame.html>

Cahill K, et al. 2008. **Workplace interventions for smoking cessation**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD003440.pub3
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003440/frame.html>

Secker-Walker R, et al. 2008. **Community interventions for reducing smoking among adults**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD001745
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001745/frame.html>

Stead LF, et al. 2008. **Nicotine replacement therapy for smoking cessation**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD000146.pub3
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000146/frame.html>

Hughes JR, et al. 2007. **Antidepressants for smoking cessation**. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD000031.pub3
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000031/frame.html>

Other Systematic Reviews

U.S Department of Health and Human Services. 2012. **Preventing tobacco use among youth and young adults: A report of the Surgeon General**. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

This recent report includes an extensive review of the effectiveness of interventions to promote smoking cessation in adolescents. Cognitive behavioural strategies and achieving sufficient dosage of programming (number of sessions) appeared to be important. There was little evidence of the efficacy of pharmacological adjuncts in youth smoking cessation and gaps in the evidence include longer term follow up and how to effectively recruit young smokers to intervention programmes.

<p>Kim Y, et al. 2011. Effectiveness of pharmacologic therapy for smoking cessation in adolescent smokers: Meta-analysis of randomized controlled trials. American Journal of Health-System Pharmacy, 68(3), 219-26.</p> <p>This meta-analysis evaluating the effectiveness of pharmacologic therapy (bupropion and nicotine replacement therapy) for smoking cessation in adolescent smokers included six RCTs, involving 816 smokers aged 12–20 years. No significant increase in abstinence rates was detected with pharmacologic therapy (RR 1.38, 95% CI 0.92–2.07). Subgroup meta-analysis found no significant increases in abstinence rates in short-term (≤12 weeks) or mid-term (26 weeks) follow-up periods. Few adverse events were reported. While current evidence does not support the effectiveness of pharmacologic interventions for adolescents, the authors note the small number of trials and participants.</p>
<p>Bryant J, et al. 2011. A systematic review and meta-analysis of the effectiveness of behavioural smoking cessation interventions in selected disadvantaged groups. Addiction, 106(9), 1568-85.</p> <p>This review assessed the effectiveness of behavioural interventions (including verbal advice, self-help, incentives and psychological interventions) in disadvantaged groups. Meta-analysis of four studies of behavioural interventions for at-risk youth did not reveal a significant effect on smoking cessation, (RR 1.55, CI 0.74–3.26) but sample sizes and the number of well-controlled RCTs pooled for analysis were small.</p>
<p>Heckman CJ, et al. 2010. Efficacy of motivational interviewing for smoking cessation: a systematic review and meta-analysis. Tobacco Control, 19(5), 410-16.</p> <p>This systematic review and meta-analysis of interventions incorporating motivational interviewing (MI) for smoking cessation identified 31 trials, including eight trials in adolescents. The meta-analysis of all 31 trials (9485 individual participants) showed an overall odds ratio (OR) comparing likelihood of abstinence in the MI versus control condition of 1.45 (95% CI 1.14 to 1.83). For adolescents the OR for the MI effect was 2.29 (95% CI 1.34 to 3.89), suggesting that current MI smoking cessation approaches can be effective for adolescents.</p>
<p>Sussman S & Sun P. 2009. Youth tobacco use cessation: 2008 update. Tobacco Induced Diseases, 5(1), 3.</p> <p>This updated review included 64 controlled trials assessing teen smoking cessation interventions. Meta-analysis found an overall absolute advantage in quitting of 4.26% in intervention groups compared to control (an improvement in the 2.90% absolute risk reduction, 95% CI 1.47 to 4.35, in the 2006 meta-analysis of 48 studies). Studies using programmes based on social influences, cognitive-behavioural theory, or programming to enhance motivation were more effective and the strongest effects were found in classroom-based educational programs, school-based clinics, and computer-based programmes. Programmes consisting of at least 5 sessions were more effective.</p>
<p style="text-align: center;">Other Related Articles and Reviews</p>
<p>Brinson D. 2009. How to Increase the Delivery of Effective Smoking Cessation Treatments in Primary Care Settings: Guidance for doctors, nurses, other health professionals and healthcare organisations: Summary Report. Wellington: Ministry of Health and HSAC, University of Canterbury. http://www.health.govt.nz/publication/how-increase-delivery-effective-smoking-cessation-treatments-primary-care-settings</p> <p>This report includes a review of evidence assessing the effectiveness of smoking cessation services in primary care and guidance on the delivery of ABC smoking cessation services in the primary care setting. The review includes five systematic reviews and 37 studies using a variety of methods to assess training, multi-component interventions, reminders, financial incentives and audit and feedback. The author suggests that the evidence supports a comprehensive package, including providing all health care professionals with adequate training and resources, implementation of a system to record smoking status, provision of prompts, feedback and incentives to health care professionals. There was some evidence to support a team approach, in which the different ABC tasks are shared amongst different health professionals and organisations.</p>
<p>National Institute for Health and Clinical Excellence. 2008. Smoking cessation services in primary care, pharmacies, local authorities and workplaces, particularly for manual working groups, pregnant women and hard to reach communities (NICE public health guidance 10). London: National Institute for Health and Clinical Excellence. http://www.nice.org.uk/PH010.</p> <p>These guidelines provide a set of evidence-based recommendations for delivering smoking cessation services in hard to reach populations. The guidance includes a systematic review and cost-benefit analysis. Young people aged 12 to 17 who show a commitment to quit smoking are identified as a target group. Information, advice and support should be offered and NRT can be prescribed as part of a supervised regime if there is evidence of nicotine dependence.</p>

Note: The publications listed above were identified using the search methodology outlined in **Appendix 1**

ALCOHOL-RELATED HOSPITAL ADMISSIONS

Introduction

New Zealand does not have a legal drinking age, but it is illegal for people under the age of 18 years to purchase alcohol (lowered from 20 to 18 in 1999) [122]. However, research indicates that drinking alcohol is common under the age of 18, and young people were identified as a key at-risk population group in the National Drug Policy 2007–2012 [123]. A number of national surveys have examined the prevalence of alcohol use among young people in New Zealand. The 2007/2008 New Zealand Alcohol and Drug Use survey of 6784 New Zealanders aged 16 to 64 years found that 79.6% (95% CI 71.2 to 88.0) of people aged 16 to 17 years had consumed alcohol in the past year, mostly at home (74.3%, 95% CI 66.6–82.0) or in someone else's home (79.1%, 95% CI 72.4–85.9). One in three (32.3%, 95% CI 24.3 to 40.3) past-year drinkers aged 16 to 17 years had consumed a large amount of alcohol at least monthly in the past year. Past-year drinkers aged 16 to 17 experienced significantly more harmful effects due to their own alcohol use than those aged 18–65 years [122]. In another survey of 1203 12 to 17 year olds by, the Alcohol Advisory Council (ALAC) in 2010, 15% of young people were classified as “binge drinkers” (consumed five or more standard drinks on the last occasion they drank alcohol), 17% as “moderate drinkers” (currently drinks alcohol, but did not consume five or more standard drinks on their last drinking occasion) and 68% as “non-drinkers” (self-reported not drinking alcohol at the time of the survey) [124]. Seventy per cent of ‘drinkers’ (those that self-reported drinking alcohol at the time of the survey) reported that they had started having more than an occasional sip of alcohol by the time they were 15 years old and 21% by the time they were 13 years old.

In addition, the Youth '07 survey of 9107 secondary school students from across New Zealand, found that 71.6% of students reported having ever drunk alcohol, and 60.6% were current drinkers (defined as those who noted they had drunk alcohol at some time and in a subsequent key indicator, did not respond “I don't drink alcohol now”) [125]. Current drinking was more common in students from less deprived areas (high deprivation 56.2%, medium deprivation 61.3%; low deprivation 62.6 %). Asian and Pacific students were less likely than Māori and NZ European students to have ever drunk, or to be currently drinkers. Nearly half (46.1%) of current drinkers reported that they usually consume five or more alcoholic drinks within a four hour session (binge drinking). Older children, those living in socioeconomically more deprived neighbourhoods, and those who were Māori or Pacific were more likely to report binge drinking in the previous four weeks.

Research suggests that alcohol use in young people is associated with a wide range of adverse short and long term effects, including increased risk of motor vehicle and other accidents; risky sexual behaviour, sexually transmitted infections (STIs) and pregnancy; victimisation by or perpetration of violence and sexual assaults; obesity and increased risk of other substance use [126]. The earlier a young person starts drinking, and the higher the level of alcohol use, the higher the risk of adverse outcomes. In New Zealand, the Youth '07 survey found that students reported several types of harm associated with drinking alcohol, including being injured (21.7% of current drinkers), doing things that could have resulted in serious trouble (24.0% of male current drinkers, and 15.3% of females), and having unsafe sex (14.4%). Almost a quarter (23.8%) of all students reported that within the previous month they had been a passenger in a car driven by someone who was potentially drunk (had consumed more than 2 drinks in the 2 hours prior to driving).

The following section explores alcohol-related hospital admissions in young people aged 15–24 years. Note: As alcohol is often coded as a secondary cause (e.g. in a traffic crash, alcohol will only be listed after the primary diagnosis (e.g. fractured femur) and external cause (e.g. vehicle occupant in transport accident) have been recorded), the following section includes all admissions where alcohol was listed in any of the first 15 diagnoses or 10 external causes of injury. Further, because of regional inconsistencies in the uploading of emergency department (ED) cases to the National Minimum Dataset, all admissions



with an ED specialty code on discharge have been excluded. While it is likely that such an approach will result in a significant undercount (due to regional variations in coding and the fact that many alcohol-related issues are dealt with in the ED setting), it is nevertheless hoped that it will serve to identify “the tip of the iceberg” in terms of the contribution alcohol makes to hospital admissions in this age group.

Data Source and Methods

Definition

1. *Alcohol-related hospital admissions in young people aged 15–24 years*

Data Source

Numerator: National Minimum Dataset (NMDs): Hospital admissions with an ICD-10-AM alcohol-related diagnosis in any of their first 15 diagnostic codes (F10 Mental and behavioural disorders due to alcohol, T51 Toxic effects of alcohol) or first 10 external cause codes (X45 Accidental poisoning by/ exposure to alcohol, X65 Intentional self-poisoning by/exposure to alcohol, Y15 Poisoning by/exposure to alcohol of undetermined intent, Y90–91 Evidence of alcohol involvement determined by blood alcohol level or level of intoxication).

Denominator: Statistics NZ Estimated Resident Population (projected from 2007)

Notes on Interpretation

Note 1: It is likely that the figures presented reflect a significant undercount as a result of regional differences in the extent to which: 1) clinicians document alcohol as a contributory cause of admission; 2) coders code alcohol-related diagnoses over and above those associated with the primary diagnosis and first external cause of injury code. In this context, a 2000 study of the role alcohol played in injury attendances at an Auckland emergency department noted 35% of injured patients had consumed alcohol prior to their injury [127]. In contrast, an analysis of New Zealand ED cases for the period 2000–2005 using the NMDs found that only 10.3% of injury cases in young people 15–24 years had any mention of alcohol, while 4.5% of injury cases admitted beyond the ED (the group reviewed in this section) had alcohol as a listed cause. This suggests that the figures in this section are likely to significantly underestimate the contribution alcohol makes to hospital admissions in this age group.

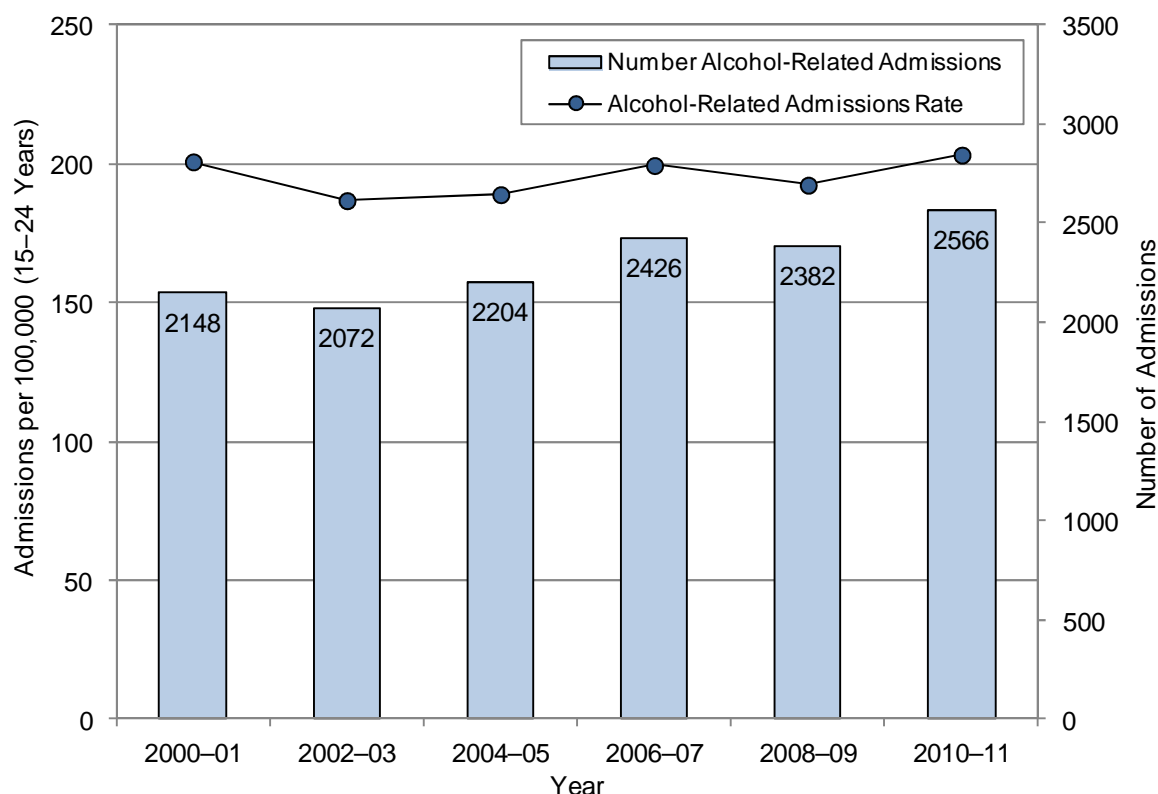
Note 2: Due to inconsistent uploading of ED cases to the NMDs, all admissions with an ED specialty code on discharge have been excluded (see **Appendix 3** for a more detailed discussion of this issue). While this filtering is likely to remove a large number of alcohol-related cases, it has been undertaken with a view to enhancing the comparability of admission rates across DHBs.

New Zealand Distribution and Trends

New Zealand Trends

In New Zealand during 2000–2011, alcohol-related hospital admissions in young people were relatively static. While on average 1,150 admissions occurred per year, it is likely that this reflects a significant undercount, as identification relies on hospital staff at the time of discharge listing alcohol as a contributory cause, as well as coders assigning alcohol-related diagnoses in cases where alcohol contributed to, but was not the sole reason for admission (**Figure 100**).

Figure 100. Alcohol-Related Hospital Admissions in Young People Aged 15–24 Years, New Zealand 2000–2011



Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department cases removed; Numbers are per 2-year period

New Zealand Distribution by Primary Diagnosis

In New Zealand during 2007–2011, alcohol was listed as a contributory cause in a large number of hospital admissions. However only 8.8% of these admissions had acute intoxication or the toxic effects of alcohol listed as the primary diagnosis. In 36.5% of cases an injury was the primary diagnosis, with head and upper limb injuries playing a particularly prominent role. In addition, 32.2% of admissions had a mental health condition (including alcohol dependence) listed as the primary diagnosis, with schizophrenia being the most frequent mental health diagnosis recorded. Finally, 11.8% of admissions had poisoning by other drugs or substances listed as the primary reason for admission (**Table 43**). In interpreting these figures however, it must be remembered that as a result of inconsistent uploading of emergency department cases to the National Minimum Dataset, ED cases have been removed. These figures thus reflect the more severe end of spectrum, as it is likely that many cases of acute intoxication or minor injury were dealt with in the ED setting.



Table 43. Alcohol-Related Hospital Admissions in Young People Aged 15–24 Years by Primary Diagnosis, New Zealand 2007–2011

Primary Diagnosis	Number: Total 2007–2011	Number: Annual Average	Rate per 100,000	% of Admissions
Mental and Behavioural Disorders				
Alcohol: Acute Intoxication	424	84.8	13.62	6.8
Alcohol: Dependence	130	26.0	4.18	2.1
Alcohol: Other Mental/Behavioural Disorders	153	30.6	4.91	2.5
Schizophrenia	401	80.2	12.88	6.5
Other Schizotypal and Delusional Disorders	274	54.8	8.80	4.4
Bipolar Effective Disorder	117	23.4	3.76	1.9
Depression/Other Mood Disorders	393	78.6	12.62	6.3
Reaction to Stress/Adjustment Disorder	201	40.2	6.46	3.2
Other Mental and Behavioural Disorders	332	66.4	10.66	5.3
Gastrointestinal System				
Gastritis/Upper Gastrointestinal Bleeding	124	24.8	3.98	2.0
Other Gastrointestinal Conditions	102	20.4	3.28	1.6
Injury and Poisoning				
Head Injury	788	157.6	25.31	12.7
Neck Injury	73	14.6	2.34	1.2
Shoulder/Upper Arm Injuries	100	20.0	3.21	1.6
Elbow/Forearm Injuries	290	58.0	9.32	4.7
Wrist/Hand Injuries	335	67.0	10.76	5.4
Lower Limb Injuries	321	64.2	10.31	5.2
Poisoning*	731	146.2	23.48	11.8
Toxic Effect of Alcohol	121	24.2	3.89	1.9
Other Injuries	360	72.0	11.56	5.8
All Other Diagnoses				
Other Conditions	440	88.0	14.13	7.1
Total Alcohol-Related Admissions	6,210	1,242.0	199.48	100.0

Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department cases removed; *Poisoning includes drugs, medicines, and biological substances

New Zealand Distribution by External Cause of Injury

In New Zealand during 2007–2011, 59.3% of alcohol-related hospital admissions in young people had an external cause of injury (e-code) recorded. Of all alcohol-related admissions, 13.5% were associated with an episode of self-harm and 8.7% with an assault. A further 6.4% were for injuries sustained while the young person was the occupant of a car, with the majority occurring as the result of a car colliding with a stationary object, or overturning. Finally 8.3% were associated with a fall and 8.1% with inanimate mechanical forces (**Table 44**).

Table 44. Listed External Causes of Injury for Alcohol-Related Hospital Admissions in Young People Aged 15–24 Years, New Zealand 2007–2011

Primary External Cause of Injury	Number: Total 2007–2011	Number: Annual Average	Rate per 100,000	% of Admissions
Young People Aged 15–24 Years				
Alcohol-Related Hospital Admissions				
Intentional Self-Harm	840	168.0	26.98	13.5
Assault	542	108.4	17.41	8.7
Falls	515	103.0	16.54	8.3
Inanimate Mechanical Forces	500	100.0	16.06	8.1
Undetermined Intent	220	44.0	7.07	3.5
Transport: Car Occupant Collide Stationery Object	172	34.4	5.53	2.8
Transport: Car Occupant Overturning	126	25.2	4.05	2.0
Transport: Car Occupant, Other Injury	97	19.4	3.12	1.6
Transport: Pedestrian	68	13.6	2.18	1.1
Transport: Cyclist	22	4.4	0.71	0.4
Transport: Motorbike	59	11.8	1.90	1.0
Transport: Other Land Transport	41	8.2	1.32	0.7
Accidental Poisoning: Alcohol	62	12.4	1.99	1.0
Accidental Poisoning: Other Substances	81	16.2	2.60	1.3
Other External Causes	337	67.4	10.83	5.4
No External Cause of Injury Listed*	2,528	505.6	81.21	40.7
Total Alcohol-Related Admissions	6,210	1,242.0	199.48	100.0

Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department cases removed; *includes non-injury admissions

New Zealand Distribution by Age and Gender

In New Zealand during 2007–2011, alcohol-related hospital admissions were relatively infrequent in children, but rose rapidly during the teenage years. While gender differences were less marked for those in their early teens (13–15 years), a marked male predominance was evident from 16 years of age onwards (**Figure 101**).

New Zealand Distribution by Ethnicity and Gender

In New Zealand during 2007–2011, alcohol-related hospital admissions were *significantly* higher for males. Rates were also *significantly* higher for Māori young people than for Pacific or European/Other young people (**Table 45**). Similar ethnic differences were seen during 2000–2011 (**Figure 102**).

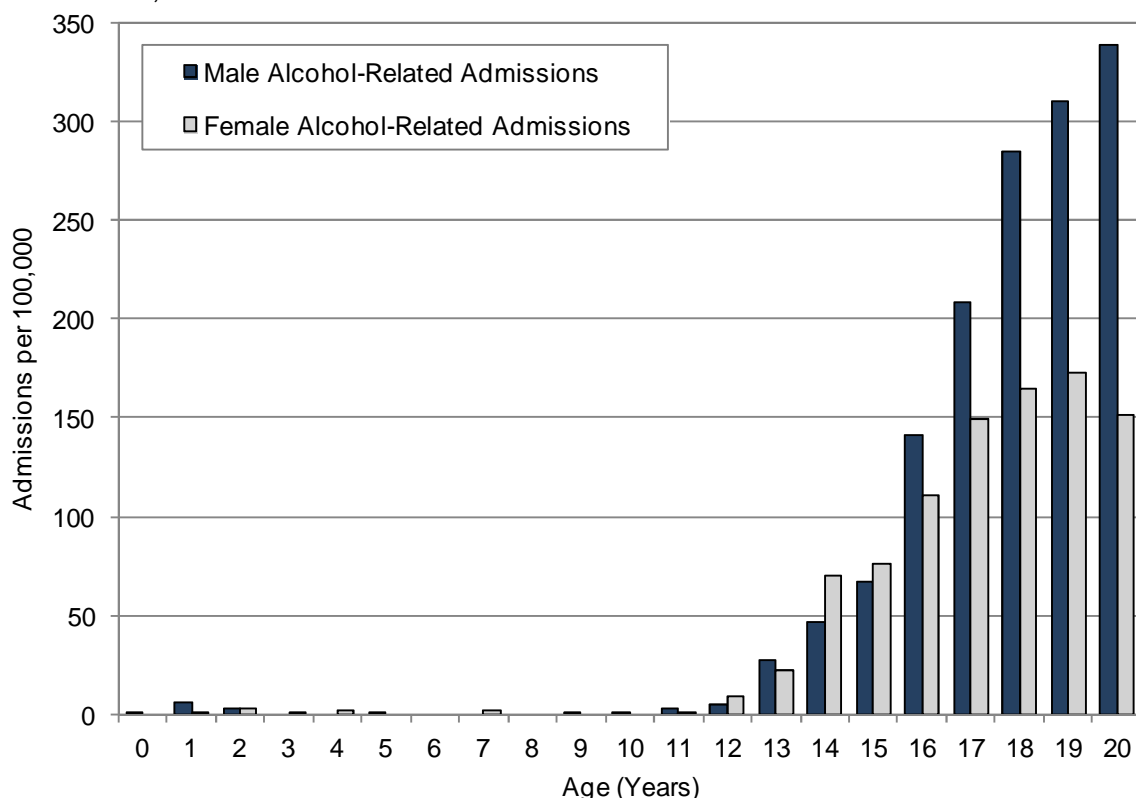
Table 45. Alcohol-Related Hospital Admissions in Young People Aged 15–24 Years by Ethnicity and Gender, New Zealand 2007–2011

Alcohol-Related Hospital Admissions							
Variable	Rate	Rate Ratio	95% CI	Variable	Rate	Rate Ratio	95% CI
European/Other	162.7	1.00		Female	147.3	1.00	
Māori	343.5	2.11	2.00–2.23	Male	249.6	1.69	1.61–1.78
Pacific	172.2	1.06	0.96–1.17				

Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Rates are per 100,000; Rate Ratios are unadjusted; Ethnicity is Level 1 Prioritised; Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department cases removed

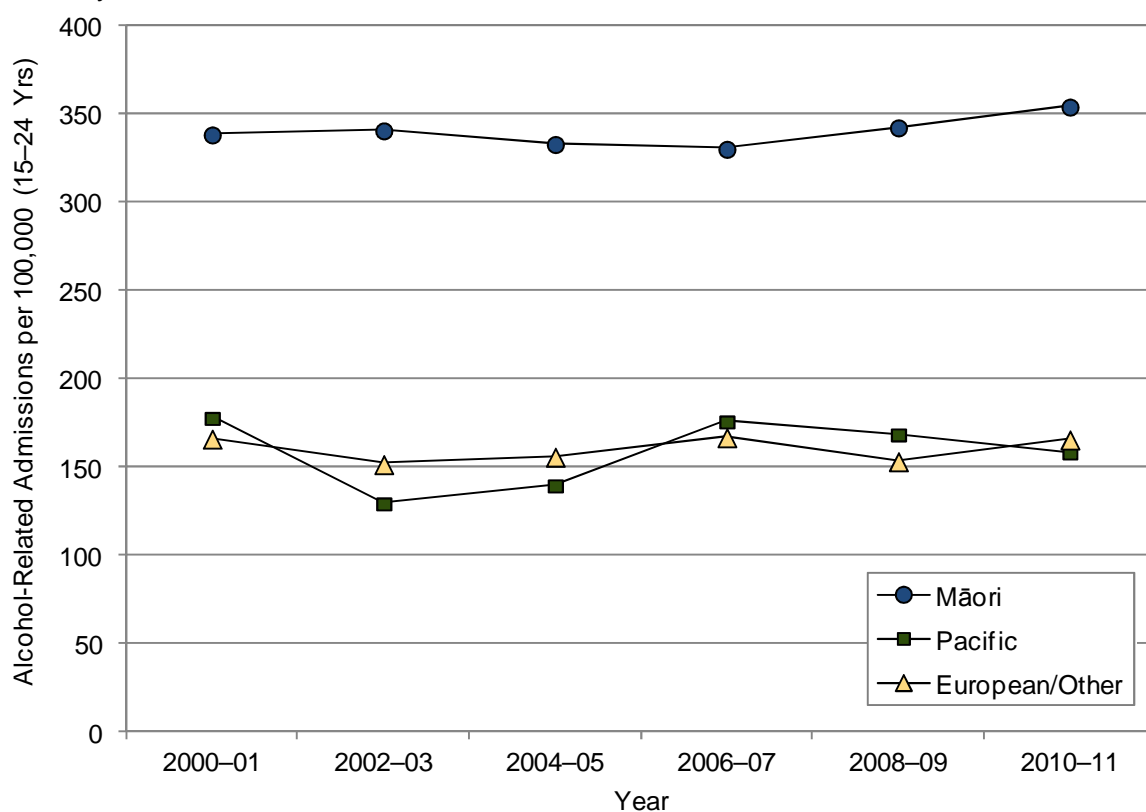


Figure 101. Alcohol-Related Hospital Admissions in Children and Young People by Age and Gender, New Zealand 2007–2011



Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department cases removed

Figure 102. Alcohol-Related Hospital Admissions in Young People Aged 15–24 Years by Ethnicity, New Zealand 2000–2011



Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Ethnicity is Level 1 Prioritised; Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department cases removed

South Island Distribution and Trends

South Island vs. New Zealand

In Nelson Marlborough, South Canterbury, the West Coast and Southland during 2007–2011, alcohol-related hospital admissions in young people were *significantly* higher than the New Zealand rate, while in Canterbury and Otago rates were not *significantly* different from the New Zealand rate (**Table 46**). While on average 57.4 alcohol-related admissions per year occurred in Nelson Marlborough, 29.2 in South Canterbury, 153.2 in Canterbury, 18.6 in the West Coast, 71.8 in Otago and 44.4 in Southland, in reality it is likely that the number was much higher due to the limitations of the National Minimum Dataset in identifying alcohol-related admissions in this age group.

Table 46. Alcohol-Related Hospital Admissions in Young People Aged 15–24 Years, South Island DHBs vs. New Zealand 2007–2011

DHB/Area	Number: Total 2007–2011	Number: Annual Average	Rate per 100,000	Rate Ratio	95% CI
Young People Aged 15–24 Years					
Alcohol-Related Hospital Admissions					
Nelson Marlborough	287	57.4	361.4	1.81	1.61–2.04
South Canterbury	146	29.2	458.0	2.30	1.95–2.70
Canterbury	766	153.2	212.8	1.07	0.99–1.15
West Coast	93	18.6	492.1	2.47	2.01–3.03
Otago	359	71.8	215.3	1.08	0.97–1.20
Southland	222	44.4	317.6	1.59	1.39–1.82
New Zealand	6,210	1,242.0	199.5	1.00	

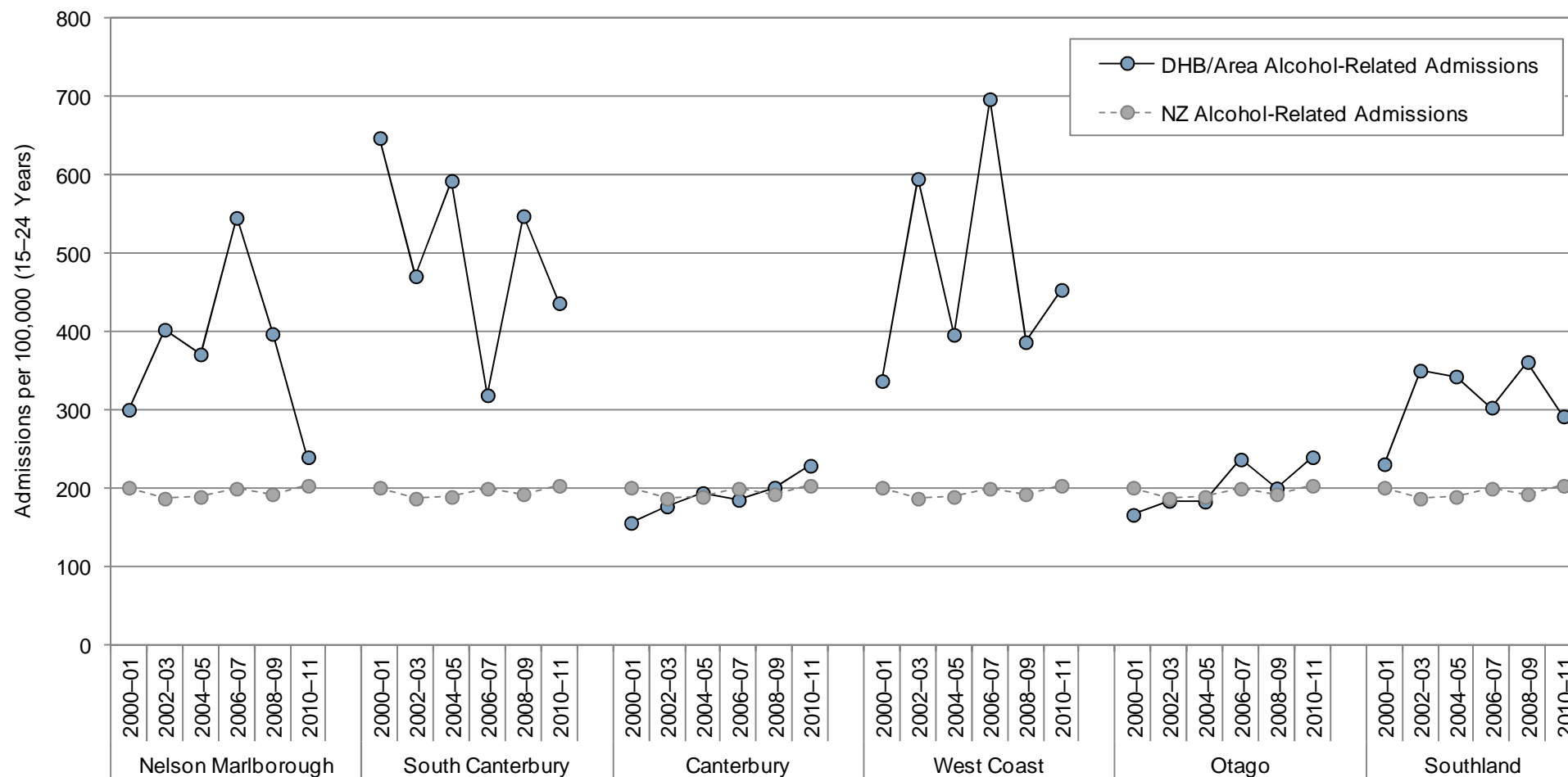
Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department cases removed

South Island Trends

In the South Island during 2000–2011, while there were large year variations in alcohol-related hospital admissions in young people, rates in Nelson Marlborough, South Canterbury, the West Coast and Southland were consistently higher than the New Zealand rate, while in Canterbury and Otago rates were more similar (**Figure 103**).



Figure 103. Alcohol-Related Hospital Admissions in Young People Aged 15–24 Years, South Island DHBs vs. New Zealand 2000–2011



Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department cases removed

Local Policy Documents and Evidence-Based Reviews Relevant to the Prevention of Alcohol-Related Harm

Table 47 below provides an overview of New Zealand alcohol and addiction policy documents and international evidence-based reviews and guidelines that address reducing alcohol use and alcohol-related harm in young people. In addition, **Table 115 (Page 415)** provides an overview of publications relevant to the prevention of drug use in young people, which frequently encompass alcohol and other drug use.

Table 47. Local Policy Documents and Evidence-Based Reviews Relevant to the Reduction of Alcohol-Related Harm in Young People

Ministry of Health Policy Documents
<p>Ministry of Health. 2010. Mental Health and Addiction Action Plan 2010. Wellington: Ministry of Health. http://www.health.govt.nz/publication/mental-health-and-addiction-action-plan-2010</p> <p>This document builds on Te Tāhuhu and Te Kōkiri, the national strategy and action plan for mental health and addictions to 2015, identifying the key priorities for Ministry-led activities. Tackling alcohol and other drug-related harm is one of four prioritised actions and includes increasing the number of community youth alcohol and other drug (AOD) treatment places available to give young offenders access to court directed community AOD treatment programmes.</p>
<p>Ministry of Health. 2007. Te Raukura. Mental health and alcohol and other drugs: Improving outcomes for children and youth. Wellington: Ministry of Health. http://www.health.govt.nz/publication/te-raukura-mental-health-and-alcohol-and-other-drugs-improving-outcomes-children-and-youth</p> <p>This report identifies continued improvement in child and adolescent mental health (CAMHS) and alcohol and other drug (AOD) specialist services as a priority for the mental health and addiction sector. The key issues are identified, including inequalities, access to services, child and youth AOD services, intersectoral collaboration and primary mental health care. Priorities for action are defined, including improvement in understanding and recognition of AOD issues in CAMHS; improvement in the these gaps availability of AOD service provision within CAMHS; and identification by DHBs of gaps in AOD service provision for children and youth, and development and implementation of plans to address improvement in understanding and recognition of AOD issues in CAMHS.</p>
<p>Ministry of Health. 2005. Te Tāhuhu – Improving Mental Health 2005–2015: The Second New Zealand Mental Health and Addiction Plan Wellington: Ministry of Health.</p> <p>Ministry of Health. 2006. Te Kōkiri: The Mental Health and Addiction Action Plan 2006–2015. Wellington: Ministry of Health. http://www.health.govt.nz/our-work/mental-health-and-addictions/mental-health/mental-health-strategic-direction</p> <p>Te Tāhuhu set out Government policy and priorities for mental health and addiction for 2005–2015. Te Kōkiri set out the action plan and includes a mixture of high level initiatives and specific operational actions. Addiction is identified as one of ten leading challenges and a number of actions to improving access to and quality of addiction services and broaden the range of services available are included. Young people are identified as at increasing risk of substance abuse and specific attention to services for this group is recommended.</p>
Cochrane Systematic Reviews
<p>Foxcroft DR & Tsertsvadze A. 2011. Universal family-based prevention programs for alcohol misuse in young people. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD009308 http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD009308/frame.html</p> <p>This reviewed assessed the effectiveness of universal family-based prevention programs in preventing alcohol misuse in children aged up to 18 years. Twelve heterogeneous RCTs, with 202 to 3,496 participants, were included in the review. The majority of trials assessed the effectiveness of interventions to promote the awareness and skills in parents and adolescents. Nine trials showed some evidence of effectiveness compared to a control or other intervention group, with persistence of effects over the medium and longer-term (up to 36 months), four of which were gender-specific, focusing on young females. Two studies with large sample sizes found no effects.</p>
<p>Foxcroft DR & Tsertsvadze A. 2011. Universal multi-component prevention programs for alcohol misuse in young people. Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD009307 http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD009307/frame.html</p> <p>This review assessed the effectiveness of universal multi-component prevention programs in preventing alcohol misuse in children up to 18 years of age. Twenty RCTs, with 361 to 12,022 participants, assessing combinations of school, community, and/or family-based programmes, were included. The aims of the evaluated interventions in the majority of trials were the promotion of awareness in parents and adolescents. It was unclear whether the majority of trials used adequate randomisation of programme allocation concealment. Twelve of the trials showed some evidence of effectiveness compared to a control or other intervention group, with persistence of effects ranging from 3 months to 3 years. Assessment of the additional benefit of multiple versus single component interventions was possible in 7 trials with multiple arms, only one of which showed a clear benefit for components delivered in more than one setting. Although there is some evidence to support the effectiveness of multi-component interventions there is little evidence to support multiple components being more effective than interventions with single components.</p>

Foxcroft DR & Tsertsvadze A. 2011. **Universal school-based prevention programs for alcohol misuse in young people.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD009113
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD009113/frame.html>

This review assessed the effectiveness of school-based programmes aimed at preventing alcohol misuse in young people aged up to 18 years. The review included 53, mostly cluster-randomised, controlled trials. Interventions included alcohol awareness education, social and peer resistance skills, normative feedback, and development of behavioural norms and positive peer affiliations aimed at reducing alcohol consumption or problem drinking. Eleven trials focussed exclusively on alcohol, with the remainder focussing on multiple factors or alcohol and other drugs. The results were mixed, six of the 11 alcohol exclusive studies and 14 of the remaining interventions found significantly greater reductions in alcohol use in the intervention groups compared to a standard curriculum. There were no easily discernible patterns in programmes associated with positive results compared to those with no effect. The authors concluded that there is currently evidence to support some generic psychosocial and developmental prevention programmes.

Thomas RE, et al. 2011. **Mentoring adolescents to prevent drug and alcohol use.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD007381.pub2
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD007381/frame.html>

This review assessed the effectiveness of structured mentoring programmes to prevent alcohol and drug use. The review included 4 RCTs with 1,994 participants (aged 12 years in two trials and 9–16 years in two trials), conducted among deprived populations in the US. Two RCTs found mentoring reduced the rate of initiation of alcohol (pooled RR for mentoring compared to no intervention 0.71, 95% CI 0.57 to 0.90) A third trial found no significant difference and the fourth trial did not assess alcohol use. One RCT found significantly less “illegal” drug usage (RR 0.54, 95%CI 0.35 to 0.83). No adverse effects were detected. There was limited scope for the interventions to be effective due to low rates of commencing alcohol and drug use during the intervention period, probably reflecting the relative youth of the samples.

Stade BC, et al. 2009. **Psychological and/or educational interventions for reducing alcohol consumption in pregnant women and women planning pregnancy.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD004228.pub2
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD004228/frame.html>

This review assessed the effectiveness of psychological and educational interventions (such as supportive counselling and brief education) aimed at reducing alcohol consumption during pregnancy in pregnant women or women planning pregnancy. Four RCTs (715 pregnant women) met inclusion criteria for the review. For most outcomes there were no significant differences between groups; and results relating to abstaining or reducing consumption were mixed. Although individual studies suggested that interventions may increase abstinence and reduce alcohol consumption in pregnancy, the paucity of good quality RCTs limited the ability of the review to determine which type of intervention would be most effective.

Kaner EFS, et al. 2007. **Effectiveness of brief alcohol interventions in primary care populations.** Cochrane Database of Systematic Reviews doi:10.1002/14651858.CD004148.pub3
<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD004148/frame.html>

This review assessed the effectiveness of brief alcohol interventions of up to four sessions, in adult patients presenting to primary care for reasons other than specific alcohol treatment. Twenty-two RCTs (7,619 participants) were included in the meta-analysis. Participants receiving brief intervention had lower alcohol consumption than the control group after follow-up of one year or longer (average difference 38 grams/week, range 23 to 54 grams). Subgroup analysis confirmed a benefit in men but not in women. While brief interventions appear to be effective in men, the benefit in women is unclear and it is not known whether such interventions are useful for young people.

Other Systematic Reviews

Newton AS, et al. 2011. **Instruments to Detect Alcohol and Other Drug Misuse in the Emergency Department: A Systematic Review.** Pediatrics, 128(1), e180-e92.

This review assessed the effectiveness of screening instruments aimed at identifying alcohol and other drug (AOD) misuse in paediatric patients presenting to emergency departments (ED) for other reasons. Six prospective diagnostic studies, with 100 to 200 participants aged 12 to 21 years, were included. Meta-analysis was not possible due to heterogeneity but instruments based on diagnostic criteria for AOD disorders appeared to be the most effective in detecting alcohol abuse and dependence (sensitivity: 0.88; specificity: 0.90; LR+: 8.80, LR-0.13) and cannabis use disorder (sensitivity: 0.96; specificity: 0.86; LR+: 6.83, LR-:0.05), indicating that they approached usefulness in ruling in AOD disorders and were useful in ruling in them out. The authors recommend that ED clinicians use a 2-question instrument for detecting youth alcohol misuse and a 1-question instrument for detecting cannabis misuse. These recommendations are based on a small number of US studies and may not be transferrable and it is not yet known whether screening should be targeted or universal, or the effect of identification on outcomes.

Shults RA, et al. 2009. **Effectiveness of Multicomponent Programs with Community Mobilization for Reducing Alcohol-Impaired Driving.** American Journal of Preventive Medicine, 37(4), 360-71.

This systematic review assessed the effectiveness and economic efficiency of multicomponent programmes with community mobilisation in reducing alcohol-impaired driving. Six U.S. based trials (two group randomised trials) were included in the review. The review found evidence that carefully planned, well-executed multicomponent programmes were effective in reducing alcohol-related crashes with associated cost savings, although the possibility of publication bias is acknowledged. Effective programmes included most or all of the following features: sobriety checkpoints; responsible beverage service training; efforts to limit access to alcohol, particularly among young people; public education campaigns; and media advocacy efforts to gain the support of policymakers and the public. The authors emphasise the fact that the results can only be generalised to similarly well planned and executed programmes which are likely to require substantial resources.

Smit E, et al. 2008. **Family interventions and their effect on adolescent alcohol use in general populations; a meta-analysis of randomized controlled trials.** Drug and Alcohol Dependence, 97(3), 195-206.

This meta-analysis assessed the effectiveness of family interventions (children age 9 to 13.9 at pre-test) aimed at reducing adolescent drinking. Eighteen RCTs were included. Pooled results identified an overall effect of family interventions in reducing alcohol initiation (OR 0.71; 95% CI: 0.54 to 0.94) and frequency of alcohol use (Cohen's *d*: -0.25; 95% CI: -0.37 to -0.12). The most successful interventions continued to be effective in reducing alcohol initiation at 48 months follow-up (pooled estimate OR: 0.53; 95% CI: 0.38, 0.75). However, the effectiveness of the interventions may have been overestimated by the lack of intention-to-treat analysis, if high-risk families were selectively more likely to drop out of the study, and despite promising results a strengthening of the evidence base is recommended.

Elder RW, et al. 2005. **Effectiveness of School-Based Programs for Reducing Drinking and Driving and Riding with Drinking Drivers: A Systematic Review.** American Journal of Preventive Medicine, 28(5, Supplement), 288-304.

This review examined the effectiveness of school-based programmes in reducing the number of young people who drink drive or ride with drink drivers. Three types of intervention were reviewed: school-based instructional programmes, peer organisations and social norming programmes. Nine studies were included, of variable quality (five randomised or group randomised trials). Only one included study provided sufficient evidence to demonstrate that a school-based instructional programme was effective in reducing riding with drink drivers, but there was insufficient evidence to demonstrate effectiveness in reducing drink driving.

Other Relevant Evidence

Ministry of Health. 2010. **Alcohol and Pregnancy: A practical guide for health professionals.** Wellington: Ministry of Health. <http://www.health.govt.nz/publication/alcohol-and-pregnancy-practical-guide-health-professionals>

This short resource is aimed at encouraging and promoting good practice among primary care health professionals. It provides a summary of the potential consequences of drinking alcohol in pregnancy, including foetal alcohol spectrum disorder; and a three-step guide (in pregnant women and those planning pregnancy: ask about alcohol; provide brief advice; assist those having difficulty stopping including information on referrals to specialist services).

National Institute for Health and Clinical Excellence. 2011. **Alcohol-use disorders: Diagnosis, assessment and management of harmful drinking and alcohol dependence (NICE clinical guideline 115).** London: National Institute for Health and Clinical Excellence. <http://guidance.nice.org.uk/CG115>.

These evidence-based guidelines include guidance on assessment and interventions for children and young people aged 10 to 17 years who misuse alcohol. If alcohol misuse is identified as a potential problem in children and young people an initial brief assessment of the duration and severity of the alcohol misuse should be made, followed by referral to a specialist child and adolescent mental health service (CAMHS) for a comprehensive assessment for all those aged 10 to 15 years. Children and young people who misuse alcohol should be offered individual cognitive behavioural therapy for those with limited co-morbidities and good social support or multicomponent programmes (such as multidimensional family therapy, brief strategic family therapy, functional family therapy or multi-systemic therapy) for those with significant co-morbidities and/or limited social support. Diagnostic instruments are poorly developed or not available for children and young and the guidelines highlight the need for further research in this area.

National Institute for Health and Clinical Excellence. 2010. **Alcohol-use disorders: preventing the development of hazardous and harmful drinking (NICE public health guidance 24).** London: National Institute for Health and Clinical Excellence. <http://guidance.nice.org.uk/PH24/>.

These evidence-based guidelines contain high level recommendations on alcohol pricing, availability and marketing and a number of health sector recommendations. It is recommended that children aged 10 to 15 years thought to be at risk from their alcohol use should be assessed and referred to specialist services. Assessment should include identification of underlying family, school or other difficulties. Young people aged 16 and 17 years thought to be at risk from their alcohol use should be screening using the Alcohol-use Disorders Identification Test (AUDIT), the 'gold standard' screening questionnaire for detecting hazardous and harmful drinking in adults. Groups for targeted screening are identified. Extended brief interventions are recommended for those identified via screening as drinking hazardously or harmfully.

Thomas J, et al. 2008. **Targeted youth support: Rapid Evidence Assessment of effective early interventions for youth at risk of future poor outcomes.** In: **Research Evidence in Education Library.** London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

This systematic rapid evidence assessment sought to identify the risk and protective factors associated with Targeted Youth Support (an initiative aimed at vulnerable young people which involves ensuring that agencies work together to meet young people's needs) outcomes, and to review the systematic reviews examining what services and interventions work to reduce poor outcomes in young people. The report identified a variety of risk factors associated with drug and alcohol misuse, including poor parental supervision, low income and poor housing, family conflict and school exclusion. The systematic reviews examining interventions to reduce alcohol misuse identified few proven effective interventions and the authors highlight the need for further research exploring the distinction between universal versus targeted interventions, parental attitudes towards alcohol and drug use and peer-led interventions.

National Institute for Health and Clinical Excellence. 2007. **Interventions in schools to prevent and reduce alcohol use among children and young people (NICE public health guidance 7).** London: National Institute for Health and Clinical Excellence. <http://www.nice.org.uk/PH007>.

These evidence-based guidelines provide recommendations on school-based interventions to reduce alcohol use in children and young people. Recommendations on alcohol education and partnerships with other agencies are made. While the systematic review identified some effective programmes, sufficient to make recommendations, the evidence was not extensive and most of it was U.S. based. It was not possible to determine the differential effectiveness of interventions in relation to disadvantaged and minority groups or determine what impact the recommendations may have on health inequalities.

Note: the publications listed were identified using the search methodology outlined in **Appendix 1**