New Zealand Child and Youth Epidemiology Service

# Health and wellbeing of under-five year olds in the South Island 2017

# Appendices

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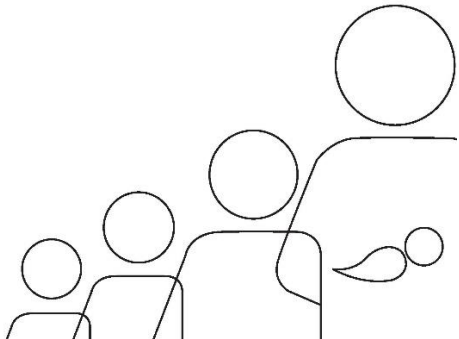

This report has been prepared for the South Island Alliance: Nelson Marlborough, Canterbury, South Canterbury, West Coast and Southern District Health Boards.

While every endeavour has been made to use accurate data in this report, there are currently variations in the way data are collected from DHB and other agencies that may result in errors, omissions or inaccuracies in the information in this report. The NZCYES does not accept liability for any inaccuracies arising from the use of these data in the production of these reports, or for any losses arising as a consequence thereof.

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# XII. APPENDICES

## APPENDIX 1: EVIDENCE FOR GOOD PRACTICE

For most indicators in this report there is a section devoted to evidence for good practice. These comprise evidence summaries, references and links that aim to provide readers with a starting point from which to consider the most effective interventions that are available to address particular child and youth health issues. Included are New Zealand policy documents such as Ministry of Health Strategies and Toolkits, New Zealand and international guidelines, and evidence-based reviews that are relevant to the prevention and management of child and youth health issues. The approach taken in these sections is intended to assist health professionals use the principles of evidence-based medicine (EBM), that is, to solve problems by using the best available research evidence and combining this with clinical expertise and patient values.[1] Evidence-based reviews, the best known of which are those produced by the Cochrane Collaboration, collate all the available evidence (published and unpublished trials, observational studies etc.) relevant to a particular health intervention, evaluate it in a rigorous manner, and publish the resulting synthesis of the evidence in a format that allows readers to quickly evaluate the effectiveness of the intervention.

When preparing the evidence for good practice section for each indicator, the authors searched a number of EBM journals and databases (e.g. the Cochrane Library) as well as Ovid MEDLINE and PubMed for systematic reviews of population level interventions in child and youth health. They also conducted smart searches in Google Scholar for journal articles and Google for government documents.

**Methodology used in preparing policy/evidence of good practice sections**

***New Zealand policy documents***

Each review section provides a list of Ministry of Health (or where appropriate, other Government Agency) policy documents and strategies relevant to the area. Using Google.com a smart search was conducted of Ministry of Health and other government departments.

*Example smart searches used*:

("fetal alcohol syndrome" OR "fetal alcohol spectrum disorder" OR FAS OR FASD) site:.health.govt.nz

("fetal alcohol syndrome" OR "fetal alcohol spectrum disorder" OR FAS OR FASD) site:.govt.nz

***Evidence for good practice***

The databases listed below were searched for reviews assessing the effectiveness of population level interventions to prevent and/or manage each of the issues included in this report. These databases were chosen because of the high calibre of the institutions maintaining them. The search strategy concentrated on publications that attempted to synthesise all of the available evidence, thereby providing the broadest possible coverage of the relevant literature. In general, only literature from the last three years was searched, although earlier publications were included if there was a lack of more recent information. Individual trials and protocols were not specifically sought but if there was no other relevant information available, an attempt was made to locate individual research reports or recommendations. It is hoped that that, although the lists of references provided are not completely comprehensive, they will nevertheless provide a useful starting point for DHBs wishing to explore strategies to address particular child and youth health issues.

Evidence-Based Medicine Reviews

This database allows seven EBM resources to be searched at once including The Database of Reviews of Effects (DARE), Health Technology Assessments (HTA) and the NHS Economic Evaluation Database (NHSEED) all produced by National Health Services' Centre for Reviews and Dissemination at the University of York, U.K., The Cochrane Database of Systematic Reviews, and the ACP Journal Club.

National Guideline Clearinghouse http://www.guideline.gov

This is a searchable database of evidence-based clinical practice guidelines maintained by the Agency for Healthcare Research and Quality in the United States.

Centre for Reviews and Dissemination (CRD) http://www.york.ac.uk/inst/crd

This is a department of the University of York and is part of the National Centre for Health Research (NCHR)
While CRD produces the database of Review Effects (DARE), captured in the Evidence-Based Medicine Review Database, searching the CRD site identifies other reviews not captured by DARE. This database is available through most local library services. Due to cessation of funding, no new records have been added to the database since March 2015.

National Institute for Health and Clinical Excellence (NICE) http://www.nice.org.uk

This is an independent organisation based in the United Kingdom, which provides national guidance on the promotion of good health and the prevention and treatment of ill health.

Guide to Community Preventive Services: Systematic Reviews and Evidence Based Recommendations
This guide was developed by the non-federal Task Force on Community Preventive Services whose members are appointed by the Director of the Centre for Disease Control and Prevention (CDC). The Community Guide summarises what is known about the effectiveness, economic efficiency, and feasibility of interventions to promote community health and prevent disease http://www.thecommunityguide.org/about.
In addition to these databases the websites of the World Health Organization, and government health departments in Australia, the UK, the US, and Canada, often yielded relevant guidance, as did the sites of international clinical collaborations such as the European Cystic Fibrosis Society and the International Society for Pediatric and Adolescent Diabetes.

# APPENDIX 2: STATISTICAL METHODS

Inferential statistics are used when a researcher wishes to use a sample to draw conclusions about a larger population as a whole; for example, weighing a class of 10 year old boys, in order to estimate the average weight of all 10 year old boys in New Zealand. The findings obtained from the sample provide an estimate for the population, but will always differ from it to some degree, simply due to chance. Similarly, samples are used when a researcher questions whether the risk of developing a particular condition is different between two groups, and the fit of the estimate obtained from the samples to the actual population needs to be carefully considered. An example of this would be a study examining whether lung cancer is more common in smokers or non-smokers; researchers using sample groups would have to consider the possibility that some of the differences observed arose from chance variations in the populations sampled.

Over time, statisticians have developed a range of measures to quantify the uncertainty associated with random sampling error. These measures can assign a level of confidence to estimates and conclusions drawn from samples, allowing researchers to assess, for example, whether the average weight of boys in the sample reflects the true weight of all 10 year old boys, or the rates of lung cancer in smokers are really different to those in non-smokers. Two of the most frequently used statistical significance tests are:

***P*-values:** The *p*-value from a statistical test measures the probability of finding a difference at least as large as the one observed between groups, if there were no real differences between the groups studied. For example, if statistical testing of the difference in lung cancer rates between smokers and non-smokers resulted in a *p*-value of 0.01, this tells us that the probability of such a difference occurring if the two groups were identical is 0.01 or 1%. Traditionally, results are considered to be statistically significant if the $p<0.05$; that is, when the probability of the observed differences occurring by chance is less than 5%.[2]

**Confidence Intervals:** When sampling from a population a confidence interval is a range of values that contains the measure of interest. While a confidence interval for the average height of ten year old boys could be 20cm to 200cm, for example, the smaller range of 130cm to 150cm is a more informative statistic. A 95% confidence interval suggests that if you were to repeat the sampling process 100 times, 95 times out of 100 the confidence interval would include the true value.1 Where the observed counts are small and the denominator is large, then a Poisson distribution has been utilised for both rate and confidence interval calculations.[3]

The indicators in this report are mainly presented using crude (unadjusted) rates or by age group (age-specific rates).

**Crude rates**: Measures the number of people with the condition of interest in relation to the number of people in the population. It is calculated by dividing the number of people with the condition of interest in a specific time period by the total number of people in the population in the same time period.

**Age-specific rates**: Measures the occurrence of an event within a defined age group in relation to the number of people in that group. Age-specific rate is calculated by dividing the number of people with the condition of interest in a specific age group and time period by the total number of people in the population in the same age group and time period. All rates by age group in this report are age-specific unless stated otherwise.

## Statistical significance testing in this report

When tests of statistical significance have been applied in a particular section, the statistical significance of the associations presented has been signalled in the text with the words significant, or not significant. Where the words significant or not significant do not appear in the text, then the associations described do not imply statistical significance or non-significance.

Several data sources are used in this report. In general they belong to one of two groups: 1) population surveys or 2) routine administrative datasets. The relevant statistical testing for each of these data sources are as follows:

**Population surveys:** Some of indicators reported on here are derived from data from national surveys where information from a sample has been used to make inferences about the population as a whole. In this context, statistical significance testing is appropriate and, where such information is available in published reports, it has been included in the text accompanying graphs and tables. In a small number of cases, information on statistical significance was not available, and any associations described do not imply statistical significance.

**Numbers derived from routine administrative data:** A large number of the indicators included in this report are based on data from New Zealand's administrative datasets, for example the National Mortality Collection, which captures information on all of the events occurring in a particular category.

**Rate ratios derived from routine administrative data:** To facilitate comparisons between different time periods or demographic factors, and for examining the data from New Zealand in a wider context, whenever measures of association (rate ratios) are presented in this report, 95% confidence intervals have been provided.[4]

# APPENDIX 3: DATA SOURCES

This report contains information derived from several national administrative datasets and population surveys. These are described briefly below, and limitations to be aware of when interpreting results drawn from these sources are outlined.

## National Minimum Dataset

The National Minimum Dataset (NMDS) is a national hospital discharge dataset and is maintained by the Ministry of Health. It is used for policy formation, performance monitoring, and research purposes, providing key information about the delivery of hospital inpatient and day patient health services both nationally and on a provider basis. It is also used for funding purposes.[5]

Information in the NMDS includes principal and additional diagnoses, procedures, external causes of injury, length of stay and sub-specialty codes; and demographic information such as age, ethnicity and usual area of residence. Data have been submitted by public hospitals electronically since the original NMDS was implemented in 1993, with additional data dating back to 1988 also included. The private hospital discharge information for publicly funded events has been collected since 1997. The current NMDS was introduced in 1999.[5]

## National Mortality Collection

The National Mortality Collection (MORT) is a dataset managed by the Ministry of Health, which contains information on the underlying cause, or causes, of death along with basic demographic data for all deaths registered in New Zealand since 1988. Fetal and infant death data are a subset of MORT, with cases in this subset having additional information on factors such as birthweight and gestational age.[6] Each of the approximately 28,000 deaths occurring in New Zealand each year is coded manually by Ministry of Health staff. For most deaths the Medical Certificate of Cause of Death provides the information required, although coders also have access to information from other sources such as Coronial Services, Police, NZ Transport Agency, the New Zealand Cancer Registry (NZCR), the Institute of Environmental Science and Research, and Water Safety NZ.[7]

## Birth Registration Dataset

Since 1995 all New Zealand hospitals and delivering midwives have been required to notify the Department of Internal Affairs within five working days of the birth of a live or stillborn baby. This applies to stillborn babies born at or more than 20 weeks gestation, or those weighing 400g or more; prior to 1995, only stillborn babies reaching more than 28 weeks of gestation required birth notification. Information on the hospital's notification form includes maternal age, ethnicity, multiple birth status, and the baby's sex, birthweight and gestational age. In addition, parents must jointly complete a birth registration form as soon as reasonable practicable after the birth, and within two years of delivery, which duplicates the above information with the exception of birthweight and gestational age. Once both forms are received by Internal Affairs the information is merged into a single entry. This two-stage process it is thought to capture 99.9% of births occurring in New Zealand and cross-checking at the receipting stage allows for the verification of birth detail.[8]

## National Maternity Collection

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 three data sources:[9,10]

- Claims for payment for primary maternity services provided by Lead Maternity Carers (LMCs) under Section 88 of the NZ Public Health and Disability Act 2000;
- Provision of (last resort) primary maternity services by DHB primary maternity teams (includes DHB caseload midwives, DHB primary midwifery teams, and shared care arrangements); and
- inpatient and day-patient hospital events during pregnancy, birth and the postnatal period for women giving birth and their babies from the NMDS (includes public and private hospitals and birthing centres)

Information contained on the LMC claim forms includes details on all women registered with a LMC, antenatal and postnatal factors (such as parity, and breastfeeding status). Subsequent changes to the Section 88 Notice have enabled collection of additional information such as smoking status and maternal weight.[11]

## Well Child/Tamariki Ora

Well Child/Tamariki Ora (WCTO) is a national programme with a focus on service provision for children and family/whānau. WCTO services are offered for all children from birth to up to five years of age, including: assessment services, care and support and health education.[12-14]

The WCTO dataset is a national registry of all children enrolled in the WCTO programme.[13] The WCTO dataset contains information on:[13,14]

- Child health status and needs assessment (including dental, vision, hearing, breastfeeding, immunisation status, etc), health service quality and accessibility, family violence, mental health in the family, smoking status in the family, and abuse and neglect;
- Demographic information by region, deprivation level and ethnicity.

The data is used by the Ministry of Health to monitor service coverage and quality. WCTO service providers submit six monthly reports, including NHI level direct reports to the Ministry of Health and DHB aggregated reports to the Ministry of Health. Reports direct to the Ministry of Health are managed by the Ministry and made publicly available through their website.[13]

## B4 School Check

The B4 School Check (B4SC) is a universal programme offered to all families with children turning four, and is the final core contact under the Well Child/Tamariki Ora schedule. The Check is designed to promote the health and well-being of four year olds by identifying and addressing any concerns about their health, behaviour, social and/or development, thereby ensuring they are healthy and have the ability to thrive at school. It replaced the School New Entrant check. Families are able to decline or opt-off the B4SC.

The B4SC information system (B4SC IS) is a national dataset managed by the Ministry of Health. It contains the information as documented during completion of the B4 School Check, including anthropometry, vision and hearing, oral health, development assessment (Parental Evaluation of Developmental Status; PEDS) and behaviour assessment (Strengths and Difficulties; SDQ) scores.

The Ministry of Health utilises the data to monitor and evaluate the programme for improving the health and wellbeing of children, particularly in relation to, coverage, referral to specialist services, follow-ups and/or retesting.[15]

## Data limitations

There are limitations when using any of these datasets. The following are of particular relevance to this report.

### *Clinical coding accuracy and coding changes over time*

The quality of data submitted to the administrative national datasets may vary. While the data for MORT and the Birth Registration Dataset are coded by single agencies, the clinical information held in the NMDS is entered by health providers before being collated by the Ministry of Health. In a 2001 review of the quality of coding in the data submitted to the NMDS, 2,708 events were audited over ten sites during a three-month period. Overall the audit found that 22% of events required a change in coding, although this also included changes at a detailed level. Changes to the principal diagnosis involved 11% of events, to additional diagnoses 23%, and to procedure coding, 11%. There were 1,625 external causes of injury codes, of which 15% were re-coded differently.[16] These findings were similar to an audit undertaken a year previously. While the potential for such coding errors must be taken into consideration when interpreting the findings of this report, the average 16% error rate indicated by the 2001 review may be an overestimate as, in the majority of the analyses undertaken in this report, only the principal diagnosis is used to describe the reason for admission.

Changes in the coding systems used over time may result in irregularities in time series analyses.[7] New Zealand hospitals use the clinical coding classification developed by the World Health Organization and modified by the National Centre for Classification in Health, Australia. The current classification is called The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM), the Australian Classification of Health Interventions (ACHI) and Australian Coding Standards

(ACS). The introduction of ICD-10-AM represented the most significant change in classification in over 50 years, expanding the number of codes from ~5,000 to ~8,000, to provide for recently recognised conditions and allow greater specificity about common diseases.

From 1988 until 1999, clinical information in the NMDS was coded using versions of the ICD-9 classification system. From July 1999 onwards, the ICD-10-AM classification system has been used. Back and forward mapping between the two systems is possible using predefined algorithms,[16] and for most conditions there is a good correspondence between ICD-9 and ICD-10-AM codes. Care should still be taken when interpreting time series analyses which include data from both time periods as some conditions may not be directly comparable between the two coding systems.

## *Variation in reporting hospitalisations to the NMDS*

Historically, there have been differences in the way New Zealand's 20 district health boards (DHBs) have reported their emergency department (ED) hospitalisations to the NMDS, which can affect the interpretation of hospitalisation data. Inconsistent recording of ED cases has resulted from differing definitions of the time spent in the ED, and at what point this time constitutes an admission. This is important in paediatrics where hospitalisations for acute onset infectious and respiratory diseases in young children are mainly of short duration. In addition, there are regional differences in treatment processes for paediatric emergency cases.

This report includes all ED day cases in its analyses of hospitalisations for medical conditions. This approach differs from that commonly used by the Ministry of Health when analysing NMDS hospital discharge data, which the Ministry of Health uses to minimise the impact of the inconsistent reporting of ED cases. Short stay ED events are often excluded from the Ministry's analyses to improve comparability between regions. However, as noted above, the treatment of children in acute cases differs from that of adults, and the inclusion of ED day cases is justified when considering hospitalisations for medical conditions, despite inconsistencies in the dataset. The Ministry of Health's practice of filtering out ED day cases for hospitalisations for injuries is followed in this report as it is considered that the processes for injury assessments are relatively consistent around the country.

Further information on the details of the inconsistencies can be seen in earlier reports by the NZCYES www.otago.ac.nz/ncyes

## *Changes in the way ethnicity information has been recorded over time*

Due to inconsistencies in the way ethnicity information was recorded in the health sector, and in census data before 1996, all ethnic group specific analyses in this report are for the year 1996 onwards. See Appendix 4 for a brief review of the changes in the recording of ethnicity information over the past 35 years in New Zealand.

# APPENDIX 4: DEMOGRAPHIC FACTORS

## Ethnicity data

Because of inconsistencies in the manner in which ethnicity information in New Zealand was collected prior to 1996, all ethnic group specific analyses presented in this report are for the 1996 year onwards, and reflect self-identified concepts of ethnicity. Details of the changes made in the census question on ethnicity, and why they were made, can be found on the Stats NZ website www.stats.govt.nz.

Unless otherwise specified, prioritised ethnic group has been used to ensure that each health event is only counted once. Despite significant improvements in the quality of ethnicity data in New Zealand's national health collections since 1996, care must still be taken when interpreting the ethnic-specific rates as the potential still remains for Māori and Pacific children and young people to be undercounted in our national data collections.

The authors of Hauora IV developed a set of adjusters which could be used to minimise the bias such undercounting introduced when calculating population rates and rate ratios. These, or similar, adjusters were not utilised in this report because previous research has shown that ethnicity misclassification can change over time and ethnic misclassification may vary significantly by district health board.[17,18] Adjusters developed using national level data (as in Hauora IV) may not be applicable to district health board level analyses, with separate adjusters needing to be developed for each.

In addition, the development of adjusters requires the linkage of the dataset under review with another dataset for which more reliable ethnicity information is available, and this process is resource-intensive and not without error, particularly if the methodology requires probabilistic linkage of de-identified data. The development of a customised set of period and age specific adjusters was seen as being beyond the scope of the current project. The data presented in this report may undercount Māori and Pacific children to a variable extent depending on the dataset used, and that in the case of the hospital admission dataset for Māori, this undercount may be as high as 5–6%.

## Socioeconomic deprivation

The NZ index of deprivation (NZDep) was first created using information from the 1991 census, and has been updated following each census. It is a small area index of social and material deprivation, and is used as a proxy for socioeconomic status. The main concept underpinning small area indices of deprivation is that the socioeconomic environment in which a person lives can confer risks or benefits which may be independent of their own social position within a community.[19] They are aggregate measures, providing information about the wider socioeconomic environment in which a person lives, rather than information about their individual socioeconomic status.

The latest index, NZDep2013, combines nine variables from the 2013 census to reflect eight dimensions of material and social deprivation, as shown in Box 1. Each variable represents a standardised proportion of people living in an area who lack a defined material or social resource. These are combined to give a score representing the average degree of deprivation experienced by people in that area. Individual area scores are ranked and placed on an ordinal scale from 1 to 10, with decile 1 reflecting the least deprived 10% of small areas and decile 10 reflecting the most deprived 10% of small areas.[20]

The advantage of the NZDep2013 is its ability to assign measures of socioeconomic status to the older population, the unemployed and to children, to whom income and occupational measures often do not apply, as well as to provide proxy measures of socioeconomic status for large datasets when other demographic information is lacking. Small area indices have limitations, however, as not all individuals in a particular area are accurately represented by their area's aggregate score. While this may be less of a problem for very affluent or very deprived neighbourhoods, in average areas, aggregate measures may be much less predictive of individual socioeconomic status.[19] Despite these limitations, the NZDep2013 has been shown to be predictive of mortality and morbidity from a number of diseases in New Zealand.

Box 1 Variables used in the NZDep2013

| Dimension | Variable in order of decreasing weight in the index |
|---|---|
| Communication | People aged < 65 with no access to the Internet at home |
| Income | People aged 18–64 receiving a means tested benefit |
| Income | People living in equivalised* households with income below an income threshold |
| Employment | People aged 18–64 unemployed |
| Qualifications | People aged 18–64 without any qualifications |
| Owned home | People not living in own home |
| Support | People aged <65 living in a single parent family |
| Living space | People living in equivalised* households below a bedroom occupancy threshold |
| Transport | People with no access to a car |

*The setting of the household equivalised income threshold was based on two principles: 1) the proportion of the population identified as being socioeconomically deprived by the threshold should be broadly consistent with the other variables in the index, and 2) the threshold should be broadly consistent with other measures of income poverty[20]

# APPENDIX 5: CLINICAL CODES

The following are the codes associated with the conditions presented in this report.

| | | ICD-10-AM |
|---|---|---|
| **Fetal death** | | |
| | ***Main fetal underlying cause of death*** | |
| | Malnutrition or slow fetal growth | P05 |
| | Prematurity or low birthweight | P07.0, P07.2 |
| | Intrauterine hypoxia | P20.0 |
| | Congenital pneumonia | P23 |
| | Infections specific to perinatal period | P35–P39 |
| | Fetal blood loss | P50 |
| | Neonatal aspiration of meconium, amniotic fluid, or mucus | P240, P24.1 |
| | Polycythaemia neonatorum | P61.1 |
| | Hydrops fetalis (non-haemolytic disease) | P83.2 |
| | Congenital anomalies | Q00–Q99 |
| | Unspecified cause | P95, R99 |
| | ***Maternal cause of death (first, if present)*** | |
| | Incompetent cervix/premature rupture of membranes | P01.0, P01.1 |
| | Oligohydramnios | P01.2 |
| | Multiple pregnancy | P01.5 |
| | Placenta praevia/placental separation and haemorrhage | P02.0, P02.1 |
| | Other abnormalities of placenta | P02.2 |
| | Compression of umbilical cord | P02.5 |
| | Chorioamnionitis | P02.7 |
| | Maternal Hypertensive Disorders | P00.0 |
| | Placental transfusion syndromes | P02.3 |
| **Infant mortality** | | |
| | Extreme prematurity | P07.2 |
| | Intrauterine hypoxia or birth asphyxia | P20, P21 |
| | Other perinatal conditions | P00–P19; P22–P96 |
| | Congenital anomalies | Q00–Q99 |
| | SUDI: SIDS | R95 |
| | SUDI: unspecified | R96, R98, R99 |
| | SUDI: suffocation or strangulation in bed | W75 |
| | SUDI: inhalation of gastric contents or food | W78, W79 |
| | Inhalation of gastric contents | W78 |
| | Inhalation and ingestion of food causing obstruction of the respiratory tract | W79 |
| | Injury or poisoning | V01–Y36 |
| **Child mortality (1–4 year olds)** | | |
| | Injury and poisoning | V00–Y09 |
| | *Road traffic injuries* | V01–V06.x(1), V09.x(2, 3); V10–V18.x(4, 5, 9), V19.x(4, 5, 6, 9); V20–V28.x(4, 5, 9), V29.x(4, 5, 6, 9); V30–V38.x(5, 6, 7, 9), V39.x(4, 5, 6, 9); V40–V48.x(5, 6, 7, 9); V50–V58.x(5, 6, 7, 9); V60–V68.x(5, 6, 7, 9); V70–V78.x(5, 6, 7, 9); V82.x(1, 9), V83–V86.x(0, 1, 2, 3) |
| | Cancer | C00–D48 |
| | Congenital anomalies | Q00–Q99 |
| | Infectious and parasitic diseases | A00–B99 |
| | Nervous system disorders | G00–G99 |
| | Respiratory conditions | J00–J99 |
| | All other causes | all other codes |

| | Primary diagnosis | ICD-10-AM | ICD-9-CM |
|---|---|---|---|
| **Vaccine-targeted diseases** | | | |
| | Diphtheria | A36 | 032 |
| | Tetanus | A33, A34, A35 | 037, 771.3 |
| | Pertussis | A37 | 033 |
| | Polio (poliomyelitis) | A80 | 045 |
| | (Acute) Hepatitis B | B16 | 070 |
| | Haemophilus influenzae | B96.3 | 041.5, 038.41 |
| | Pneumococcal disease | J13, A40.3, B95.3 | 481, 038.2 |
| | Measles | B05 | 055 |
| | Mumps | B26 | 072 |
| | Rubella | B06 | 056 |
| | Gastroenteritis: Rotaviral | A08.0 | 008.61 |
| | Gastroenteritis: other viral | A08 | 008.6, 008.8 |
| | Gastroenteritis: non-viral | A00–A07 | 001–008 |
| | Gastroenteritis: Other or NOS | A09 | 009 |
| | Meningitis: bacterial | G00, G01 | 320 |
| | Meningitis: viral, other, NOS | A87, G02, G03 | 321, 322, 047 |
| | Meningococcal disease | A39 | 036 |
| | Tuberculosis | A15–A19 | 010–018 |
| | Varicella | B01 | 052 |
| | Other vaccine preventable diseases | P35.0, M01.4 | 771.0 |
| **Ambulatory care-sensitive conditions*** | | | |
| | (Acute) Rheumatic fever or (chronic) rheumatic heart disease | I00–I02, I05–I09 | 390–392,393–398 |
| | Asthma and wheeze | J45–J46, R06.2 | 493.00, 493.01 |
| | Bronchiectasis | J47 | 494 |
| | Constipation | K59.0 | 564.0 |
| | Dental conditions† | K02, K04, K05 | 521.0, 522, 523 |
| | Dermatitis and eczema | L20–L30 | 690–693, 698 |
| | Gastroenteritis | A02–A09, R11, K52.9 | 001–009, 787.0, 558.9 |
| | Gastro-oesophageal reflux (GORD) | K21 | 530.11, 530.81 |
| | Nutritional deficiency and anaemia | D50–D53, E40–E46, E50–E64 | 260–269, 280–281 |
| | Otitis media | H65–H67 | 381.0–381.4, 382 |
| | Respiratory infections - acute upper (excludes croup) | J00–J04, J06 | 460–463, 465, 464.0, 464.1, 464.2 |
| | Respiratory infections - pneumonia (bacterial or non-viral) | J13–J16, J18 | 481–483, 485, 486 |
| | Skin infections | H00.0, H01.0, J340, L00–L04, L08, L98.0 | 680–684, 685.0, 686, 910.(1,3,5,7,9)–917.(1,3,5,7,9), 919.(1,3,5,7,9) |
| | Vaccine preventable diseases (VPD): | | |
| | Neonatal or obstetric tetanus | A33, A34 | 771.3, 670.04 |
| | Pertussis (≥6 months) | A37 | 033 |
| | Diphtheria (≥6 months) | A36 | 032 |
| | Hepatitis B (≥6 months) | B16, B18.0, B18.1 | 070.2, 070.3 |
| | Polio (≥6 months) | A80 | 045 |
| | Tetanus (≥6 months) | A35 | 037 |
| | Measles, Mumps, Rubella (≥15 months) | B05, B06, B26, M01.4, P35.0 | 055, 056, 072, 056.71, 771.0 |
| | Tetanus (≥6 months) | A35 | 037 |
| | VPD ≥16 months: MMR | B05, B06, B26, M01.4 | 055, 056, 072, 056.71 |
| **Dental conditions** | | | |
| | Dental caries | K02 | |
| | Disorders of tooth development/eruption | K00 | |
| | Embedded/ impacted teeth | K01 | |
| | Other diseases of the teeth hard tissue | K03 | |
| | Diseases of the pulp/periapical tissue | K04 | |
| | Gingivitis/periodontal diseases | K05 | |
| | Other disorders of the gingiva/edentulous alveolar ridge | K06 | |
| | Dentofacial anomalies/malocclusion | K07 | |
| | Other disorders of the teeth or supporting structures | K08 | |

*Includes all acute admissions and arranged admissions that were admitted within 7 days. Waiting list admissions were excluded, except for dental hospitalisations. †includes waiting list admissions; ‡excludes croup. MMR: Measles, Mumps, Rubella

# References for appendices


1. Akobeng AK. 2005. Principles of evidence based medicine. *Archives of Disease in Childhood,* 90(8) 837. http://adc.bmj.com/content/90/8/837.abstract
2. Webb P, Pirozzo S. 2005. Essential epidemiology: An introduction for students and health professionals Cambridge: Cambridge University Press.
3. Eayres D. 2008. Technical briefing 3: Commonly used public health statistics and their confidence intervals. http://www.apho.org.uk/resource/item.aspx?RID=48457 accessed 16/11/2016
4. Rothman K. 2002. Epidemiology: An introduction New York: Oxford University Press.
5. Ministry of Health. 2013. National Minimum Dataset (hospital events): Data dictionary. Wellington: National Health Board Business Unit.
6. New Zealand Health Information Service. 2003. Mortality Collection data dictionary. Wellington: Ministry of Health.
7. New Zealand Health Information Service. 2004. Coder's Update.
8. Statistics New Zealand. 2003. Information about births. Wellington: www.stats.govt.nz
9. National Health Board Business Unit. 2011. National Maternity Collection Data Mart Data Dictionary. Wellington: Ministry of Health.
10. Ministry of Health. 2016. DHB Primary Maternity Service Data Collection System MAT ODS File Specification. Wellington: Ministry of Health.
11. Ministry of Health. 2017. Section 88 Primary Maternity Services Notice 2007. https://www.health.govt.nz/publication/section-88-primary-maternity-services-notice-2007 accessed November 2017.
12. Ministry of Health. 2015. Well Child/Tamariki Ora services. http://www.health.govt.nz/our-work/life-stages/child-health/well-child-tamariki-ora-services accessed November 2017.
13. Ministry of Health. 2014. Services for children and young people, Well Child / Tamariki Ora tier two services specification. Wellington: Ministry of Health.
14. Ministry of Health. 2016. Indicators for the Well Child / Tamariki Ora quality improvement framework. Wellington: Ministry of Health.
15. Ministry of Health. 2010. Access, use and disclosure policy for B4 school check information system users. Wellington: New Zealand Government.
16. New Zealand Health Information Service. 2002. 2001/2002 Ministry of Health Data Quality Audit Program. Coder's Update. 1-4
17. Robson B, Harris R. 2007. Hauora: Māori standards of health IV. A study of the years 2000-2005 Wellington: Te Ropu Rangahau Hauora e Eru Pomare.
18. Cormack D, Harris R. 2009. Issues in monitoring Māori health and ethnic disparities: An update. Wellington: Te Ropu Rangahau Hauora a Eru Pomare. http://www.otago.ac.nz/wellington/otago600097.pdf
19. Berkman L, Macintyre S. 1997. The measurement of social class in health studies: Old measures and new formulations. In Kogevinas M, Pierce N, et al. (Eds.), Social Inequalities and Cancer 51-64. Lyon: IARC Scientific Publications.
20. Atkinson J, Salmond C, Crampton P. 2014. NZDep2013 Index of Deprivation. Wellington: Department of Public Health, University of Otago. http://www.otago.ac.nz/wellington/otago069936.pdf