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Summary

The National Health Performance Authority (the Authority) publishes two streams of reports: Healthy Communities and Hospital Performance reports. The Authority bases its performance reports on a set of indicators agreed by the Council of Australian Governments (COAG).

This technical supplement summarises the methods used to calculate descriptive statistics for the indicators presented in Healthy Communities: Child and maternal health in 2009–2012. It is assumed that readers of this supplement have technical expertise in the creation and use of health information.

Healthy Communities: Child and maternal health in 2009–2012 publishes statistics for 61 Medicare Local catchments across Australia and seven clusters of Medicare Locals called peer groups, on the following measures:

- Infant and young child mortality rates
- Low birthweight
- Smoking during pregnancy
- Antenatal visits in the first trimester.

This is the first report from the Authority that presents data at the local level for these four measures. The report compares results for each Medicare Local catchment with the results for Medicare Local catchments with similar geographic, demographic and socioeconomic circumstances. Where possible, data have been presented by Aboriginal and Torres Strait Islander status.

This technical supplement presents the specifications for each measure and information about the data sources:

- Australian Bureau of Statistics (ABS) Death Registrations Collection
- ABS Birth Registrations Collection
Introduction

Information in the report on access to antenatal care in the first trimester is intended to measure the effectiveness of health care services delivered in primary health care and other related maternity service settings.

An antenatal visit is an encounter between a pregnant woman and a midwife or doctor that is specifically intended to assess and improve maternal and fetal wellbeing throughout pregnancy and prior to labour and is important for positive child health outcomes.¹

By comparison, measures of infant and young child mortality, the proportion of babies that are of low birthweight and the proportion of women who smoke during pregnancy are reported as population health measures to provide context to local areas.

Measures presented

The report presents national information for the following measures at the local level for the calendar year periods shown:

- Infant and young child mortality rates in 2010–2012
- Percentage of all live singleton births in 2009–2011 that were of low birthweight
- Percentage of all live singleton births in 2007–2011 to Aboriginal and Torres Strait Islander women that were of low birthweight
- Percentage of women who gave birth in 2009–2011 and smoked during pregnancy
- Percentage of Aboriginal and Torres Strait Islander women who gave birth in 2007–2011 and smoked during pregnancy
- Percentage of women who gave birth in 2010–2011 and had at least one antenatal visit in the first trimester of pregnancy
- Percentage of Aboriginal and Torres Strait Islander women who gave birth in 2010–2011 and had at least one antenatal visit in the first trimester of pregnancy.

The methods used to calculate each of these measures are described in this technical supplement.

Geography

All measures are presented by Medicare Local catchment and seven clusters of Medicare Local catchments called peer groups. This enables fairer comparisons of individual Medicare Local catchments and also provides a summary of the variation across Australia’s diverse metropolitan, regional and rural populations by presenting aggregate results for each peer group.

The Authority identified seven peer groups on the basis of:

- Proximity of each Medicare Local to major metropolitan areas (using the ABS Australian Standard Geographic Classification, 2006 Remoteness Structure)
- Proximity to major hospitals (A1 public hospitals in the AIHW Public Hospital Peer Group classification, 2010–11)
- Socioeconomic status.

More information on Medicare Local peer groups can be found in Healthy Communities: Australians’ experiences with primary health care in 2010–11, Technical Supplement at www.myhealthycommunities.gov.au
Suppression of estimates

The Authority applies suppression protocols that are customised to each data source used in the report, to ensure confidentiality when reporting at local levels of geography. The suppression rules for the measures presented in Healthy Communities: Child and maternal health in 2009–2012 are described in this technical supplement.
Infant and young child mortality rates

Definitions

Infant and young child mortality is the death of a liveborn child before the age of 5 years.

Infant mortality is the death of a liveborn child before the age of 1 year.

Data sources

Infant and young child mortality rates were calculated using data from the ABS Death Registrations Collection and the ABS Birth Registrations Collection data for 2010, 2011, and 2012.

ABS births and deaths data contain administrative information supplied by the births, deaths and marriages registries in each state and territory. For further details on scope, coverage and registration of births and deaths refer to ABS Births, Australia, 2012 and ABS Deaths, Australia, 2012.2,3

Unit of measurement

Infant and young child mortality rates are reported as the number of deaths among children aged less than 5 years per 1,000 live births during the three calendar years from 1 January 2010 to 31 December 2012.

Infant mortality rates are reported as the number of deaths among liveborn infants aged less than 1 year per 1,000 live births during the three calendar years from 1 January 2010 to 31 December 2012.

The denominator for both measures is the number of live births reported during the three calendar years from 1 January 2010 to 31 December 2012. A live birth is the birth of a child who, after delivery, breathes or shows any other evidence of life such as a heartbeat.

For further information, refer to the indicator specification on METeOR.

Geography

Infant and young child mortality rates are presented in this report at Medicare Local catchment level for the total population. Deaths are attributed to the Medicare Local catchment in which the infant or young child usually resided, irrespective of where they died. Births are attributed to the Medicare Local catchment of usual residence of the mother regardless of where in Australia the birth occurred.

Infant and young child deaths at Medicare Local catchment level were compiled by the ABS based on Statistical Area Level 2 (SA2) of usual residence. Deaths that could not be allocated to a specific SA2 were allocated in proportion to the distribution of infant and young child deaths for all valid SA2s, i.e. those with a Medicare Local concordance, within each state and territory. This was done for each individual year and by sex. On average, less than 3% of deaths could not be directly allocated to a specific SA2 of usual residence. Deaths data at SA2 level were then mapped to Medicare Locals so that the sum of the Medicare Local totals matched the yearly total for Australia.

The same approach was used to compile births data at the Medicare Local catchment level. On average, less than 0.3% of births could not be directly allocated to a specific SA2 of usual residence.
Years of data

Numbers of deaths were reported as the average number of deaths for the three calendar years from 2010 to the end of 2012, and were calculated by dividing the total number of deaths over the three-year period by three, the number of years reported. Similarly, numbers of live births were reported as the average number of all live births for three calendar years from 2010 to the end of 2012. The average annual number of deaths and average number of live births over the three-year period have been rounded to the nearest whole number when presented in the report.

To determine how many years of data were appropriate for reporting infant and young child mortality rates, the Authority aimed to report the most recent data possible for each of the 61 Medicare Local catchments. Single years of data for the five calendar years from 2008 to 2012 were examined for variability over time, and this analysis indicated a decline in infant and young child mortality rates in many Medicare Local catchments over the five-year period, particularly from 2010 onwards. Mortality rates based on the three-year period 2010–2012 were then compared with those based on the five-year period 2008–2012, and mortality rates based on the three-year period were found to be sufficiently stable when compared to those based on the five-year period. It was therefore decided that the three years of data from 2010 to 2012 was sufficient to provide reliable infant and young child mortality rates at Medicare Local catchment level.

Suppression of estimates

The Census and Statistics Act 1905 requires that the ABS does not publish or disseminate statistical output in a manner that is likely to enable the identification of a particular person or organisation. This requirement means that the ABS must take care and make assurances that any statistical information about individual respondents cannot be derived from published data. Therefore, where necessary, infant and young child mortality rates based on small numbers of deaths have been suppressed to protect confidentiality.
Low birthweight, smoking during pregnancy and antenatal visits in the first trimester

Definitions

The World Health Organization defines low birthweight as a birthweight of less than 2,500 grams.4

Smoking during pregnancy is based on women who gave birth and reported smoking at any time during the pregnancy.

An antenatal visit is an intentional encounter between a pregnant woman and a midwife or doctor to assess and improve maternal and fetal wellbeing throughout pregnancy and prior to labour. An antenatal visit does not include a visit where the sole purpose of contact is to confirm the pregnancy, or those contacts that occurred during the pregnancy that related to other non-pregnancy related issues.1

An antenatal visit in the first trimester is defined as occurring within the first 13 weeks of pregnancy.

Data source

Data for the measures of low birthweight, smoking during pregnancy and antenatal visits in the first trimester were sourced from the Australian Institute of Health and Welfare’s (AIHW) National Perinatal Data Collection (NPDC).

The NPDC data are based on births reported to the perinatal data collection in each state and territory in Australia, and are compiled and reported on annually by AIHW’s National Perinatal Epidemiology and Statistics Unit. After each birth, midwives or other staff complete a notification form using information obtained from the mother and from the hospital or other records.5 Each state and territory has its own form and/or electronic system for collecting perinatal data. The completed notifications are forwarded to the relevant state and territory health department to form the state or territory perinatal data collection.

The NPDC consists of the Perinatal National Minimum Data Set as well as some additional data items. The Perinatal National Minimum Data Set is a specification for perinatal data elements for mandatory collection and reporting at the national level and was first specified in 1997.

Geography

Data at the Medicare Local catchment level have been compiled by applying geographic concordances to the NPDC data at the Statistical Local Area (SLA) level. For records where the SLA of usual residence overlapped Medicare Local catchment boundaries, the record was proportionally attributed to each Medicare Local catchment based on the percentage of the population of the SLA in the Medicare Local catchment.

The New South Wales (NSW) perinatal data collection gives women who give birth in NSW but live in another state or territory a proxy SLA that cannot be allocated to a Medicare Local catchment of usual residence. Therefore, data for these women are excluded from the report.
Based on additional data provided by the AIHW, a footnote has been included for each measure to indicate the number of women who lived in the Australian Capital Territory but gave birth in NSW. However, no additional data could be provided for other women who lived outside of NSW but gave birth in NSW. Other jurisdictions may provide proxy SLAs for births that occurred outside the jurisdiction, but these have been estimated to be insignificant and, at most, 0.2% of a jurisdiction’s total births for the period 1 January 2007 to 31 December 2011.

**Aboriginal and Torres Strait Islander mothers and their babies**

Data presented for Aboriginal and Torres Strait Islander mothers and their babies are influenced by the quality and completeness of recording Aboriginal and Torres Strait Islander status, which may vary across local areas. To ensure reliable reporting for Aboriginal and Torres Strait Islander mothers and their babies, data have been aggregated over a five-year period for low birthweight and smoking during pregnancy. For antenatal visits in the first trimester, data are currently only available for 2010 and 2011 so data for this indicator have been aggregated over these two calendar years for Aboriginal and Torres Strait Islander women.

**Unit of measurement**

**Low birthweight**

The percentages of live births that were of low birthweight are presented in this report at Medicare Local catchment level for:

- Liveborn singleton babies of all women who gave birth during the three calendar years from 1 January 2009 to 31 December 2011
- Liveborn singleton babies of Aboriginal and Torres Strait Islander women who gave birth during the five calendar years from 1 January 2007 to 31 December 2011.

Multiple births and stillbirths are excluded.

Births are attributed to the Medicare Local catchment in which the mother usually resided at the time of the birth, irrespective of where the birth occurred.

Data at Medicare Local catchment level exclude births to Australian non-residents, residents of external territories and women who could not be allocated to a Medicare Local catchment because their SLA of usual residence was not stated or was not valid.

For further information, refer to the indicator specification on METeOR.

**Smoking during pregnancy**

The percentages of women who gave birth and smoked during pregnancy are presented in this report at Medicare Local catchment level for:

- All women who gave birth during the three calendar years from 1 January 2009 to 31 December 2011
- Aboriginal and Torres Strait Islander women who gave birth during the five calendar years from 1 January 2007 to 31 December 2011.

A woman’s tobacco smoking status during pregnancy is self-reported. Women who smoked at any time during pregnancy are included.
All women who gave birth at any time during the three calendar years from 1 January 2009 to 31 December 2011 and all Aboriginal and Torres Strait Islander women who gave birth at any time during the five calendar years from 1 January 2007 to 31 December 2011 are included. Therefore, women who gave birth more than once during the relevant periods are counted for each birth.

Births include both live births and stillbirths of at least 20 weeks gestation or 400 grams birthweight.

Data are attributed to the Medicare Local catchment in which the mother usually resided at the time of the birth, irrespective of where the birth occurred.

State and territory differences in definitions and methods used for data collection affect the comparability of these data across state and territory jurisdictions and lower levels of geography within these jurisdictions. In particular, data on smoking during pregnancy are not available for women who gave birth in Victoria in 2007 or 2008. Therefore, the percentage of Aboriginal and Torres Strait Islander women who gave birth and smoked during pregnancy during the five calendar years from 1 January 2007 to 31 December 2011 does not include Aboriginal and Torres Strait Islander women who usually resided in Victoria and gave birth in Victoria in 2007 or 2008.

Data at Medicare Local catchment level exclude women whose smoking status was not stated, Australian non-residents, residents of external territories and women who could not be allocated to a Medicare Local catchment because their SLA of usual residence was not stated or was not valid.

For further information, refer to the indicator specification on METeOR.

**Antenatal visits in the first trimester**

The percentages of women who gave birth and had at least one antenatal visit in the first trimester are presented in this report at Medicare Local catchment level for:

- All women who gave birth during the two calendar years from 2010 to the end of 2011
- Aboriginal and Torres Strait Islander women who gave birth during the two calendar years from 2010 to the end of 2011.

Women who gave birth at any time during the two calendar years from 2010 to the end of 2011 are included. Therefore, women who gave birth more than once during the two-year period are counted for each birth.

Births include both live births and stillbirths of at least 20 weeks gestation or 400 grams birthweight.

State and territory differences in definitions and methods used for data collection affect the comparability of these data across state and territory jurisdictions and lower levels of geography within these jurisdictions. The following caveats apply to the data presented for 2010–2011 in the report:

- In Western Australia, gestational age at the first antenatal visit is reported by birth hospital, therefore data may not be available for women who attend their first antenatal visit outside the birth hospital
- In Tasmania, data on duration of pregnancy at the first antenatal visit was not reported by hospitals still using the paper-based form for collection of NPDC data, so these data should be interpreted with caution
In the Australian Capital Territory, the first hospital antenatal clinic visit is often reported as the first antenatal visit and, in many cases, earlier antenatal care provided by the woman’s GP is not reported.\textsuperscript{5}

Data are attributed to the Medicare Local catchment in which the mother usually resided at the time of the birth, irrespective of where the birth occurred.

Data at Medicare Local catchment level exclude women whose gestation at the first antenatal visit was not stated, Australian non-residents, residents of external territories and women who could not be allocated to a Medicare Local catchment because their SLA of usual residence was not stated or was not valid.

For further information, refer to the indicator specification on METeOR.

Reliability of percentages

NPDC data presented in the report are based on administrative data and therefore are not subject to sampling error. However, when the counts on which percentages have been calculated are small, the percentages may be subject to natural random variation. To quantify the random variation associated with NPDC data, variability bands were calculated using the standard method for calculating 95% confidence intervals for percentages:

$$\text{CI}(P)_{95\%} = P \pm 100 \times 1.96 \times \sqrt{\frac{P}{100} \left(1 - \frac{P}{100}\right) \frac{1}{n}}$$

where

P = the percentage

n = the number on which the percentage is based, i.e. the denominator.

The variability bands were used to calculate the Relative Standard Error (RSE) for each estimate and this information was used as one of the criteria for suppression of estimates. However, as the variability bands have not been used for prediction or to examine changes over time, they are not included in the report or published online (data).

Suppression of estimates

Results were suppressed for confidentiality where the numerator was less than 5 and for reliability where the denominator was less than 100.

Additional suppression rules based on the limits for RSE were developed and applied to ensure robust reporting of these data at small areas. For a dichotomous proportion, RSE has been defined as the ratio of the standard error and the minimum of the estimate and its complement (100% minus estimate). Data were suppressed where the RSE was 33% or greater or the variability band width was 33% or greater.
References


About the Authority

The National Health Performance Authority has been set up as an independent agency under the National Health Reform Act 2011. It commenced full operations in 2012.

Under the terms of the Act, the Authority monitors and reports on the performance of Local Hospital Networks, public and private hospitals, primary health care organisations and other bodies that provide health care services.

The Authority’s reports give all Australians access to timely and impartial information that allows them to compare fairly their local health care organisations against other similar organisations and against national standards.

The reports let people see, often for the first time, how their local health care organisations measure up against comparable organisations across Australia.

The Authority’s activities are also guided by a document known as the Performance and Accountability Framework agreed by the Council of Australian Governments. The framework contains a set of indicators that form the basis for the Authority’s performance reports.

The Authority’s role will include reporting on the performance of health care organisations against these indicators in order to identify both high-performing Local Hospital Networks, Medicare Locals and hospitals (so effective practices can be shared), and Local Hospital Networks and Medicare Local catchments that perform poorly (so that steps can be taken to address problems).

The Authority releases reports on a quarterly basis, and also publishes performance data on the MyHospitals website (www.myhospitals.gov.au), the MyHealthyCommunities website (www.myhealthycommunities.gov.au) and on www.nhpa.gov.au

The Authority consists of a Chairman, a Deputy Chairman and five other members, appointed for up to five years. Members of the Authority are:

- Ms Patricia Faulkner AO (Chairman)
- Mr John Walsh AM (Deputy Chairman)
- Dr David Filby PSM
- Professor Michael Reid
- Professor Bryant Stokes AM RFD (on leave)
- Professor Paul Torzillo AM
- Professor Claire Jackson.

The conclusions in this report are those of the Authority. No official endorsement from any Minister, department of health or health care organisation is intended or should be inferred.