Diabetes in pregnancy 2014–2015

Appendix

Appendix: Methods and statistical notes

This document outlines the data source and statistical methods for analysing the data presented in the accompanying Diabetes in pregnancy 2014–2015 bulletin. The population-level data on mothers with diabetes in pregnancy and outcomes for mothers and babies using the National Perinatal Data Collection (NPDC) is available in the Diabetes in pregnancy report available at https://www.aihw.gov.au/reports/diabetes/diabetes-in-pregnancy-2014-2015/contents/summary.

National Perinatal Data Collection

The data in the *Diabetes in pregnancy* report are from the AIHW NPDC, a national population-based cross-sectional collection of data on pregnancy and childbirth.

The NPDC includes records of all births (live birth and stillbirth) of at least 20 weeks' gestational age or weighing 400 grams or more at birth. The exceptions are Victoria and Western Australia, where births are included if gestational age is at least 20 weeks or, if gestation is unknown, birthweight is at least 400 grams.

Perinatal data are collected after each birth by midwives or other birth attendants from clinical and administrative records and information systems, including records of antenatal care, the care provided during labour, and the delivery and care provided after the birth.

Each state and territory has its own form and/or electronic system for collecting data, which are forwarded to the relevant state and territory health department to form the state or territory perinatal data collection. A standardised extract of electronic data from each state and territory collection is provided to the AIHW annually.

In 2014, a standard specification was introduced for the provision of diabetes status and diabetes type information to the NPDC. The result of these changes means that data before 2014 cannot be combined with data collected after 2014.

Additionally, the change in data collection increased the capture of women with diabetes in pregnancy, so cannot be compared with previous years.

For Victoria, information about diabetes status and diabetes type are not currently available in a format comparable with the specifications for the NPDC, so data are not available, and are excluded from analysis.

Due to the small number of recorded cases of mothers with pre-existing diabetes during pregnancy, results presented in this report are based on 2 years of combined data, from 1 January 2014 to 31 December 2015 (2014–2015).

The number of women who gave birth and had diabetes in pregnancy was ascertained where a woman who gave birth was identified as having a history of pre-existing diabetes or a pregnancy complicated by gestational diabetes.

Mothers with responses for pre-existing type 1 diabetes, pre-existing type 2 diabetes, and pre-existing unspecified diabetes were classified as having pre-existing diabetes for analysis.

Responses for gestational diabetes and no diabetes were used to define these groups. Responses for 'no diabetes' and 'not stated' could not be distinguished for Western Australia, so women with 'not stated' responses were included in the no diabetes group for this analysis.

An additional 568 women were classified as 'Other type of diabetes mellitus' which can represent a diverse range of conditions. These women were excluded from the study cohort. There were also 19 women with 'Not stated diabetes type', and these women were excluded from the study.

Detailed information on completeness, accuracy and other aspects of data quality for the NPDC is available in the 2014 and 2015 data quality statement at http://meteor.aihw.gov.au/content/index.phtml/itemId/657522 and http://meteor.aihw.gov.au/content/index.phtml/itemId/681798.

Methods

Age-standardised proportions

Direct age-standardisation was used in this report to remove the differences in age structure from the analysis, and highlight the contributions of diabetes to differences in the occurrence of effects of pregnancy, labour, and delivery between diabetes in pregnancy status groups.

The NPDC data show that women with diabetes and those with no diabetes have significantly different age distributions.

Of all women who gave birth, those with pre-existing diabetes and gestational diabetes tend to be older than women with no diabetes in pregnancy.

Age-standardisation was used to eliminate the differences in age from the analysis, to highlight how diabetes contributes to differences in the occurrence of effects of pregnancy, labour, and delivery between diabetes in pregnancy status groups.

Aboriginal and Torres Strait Islander women who gave birth were younger than non-Indigenous or other Australian women who gave birth. So, age-standardising these groups removed the influence of older or younger maternal age, making comparisons of outcomes on the basis of Indigenous status more valid.

Proportions have been calculated by dividing the number of cases of a particular outcome in a single diabetes in pregnancy status group (for example, pre-existing diabetes) by the total number of women who gave birth in a single diabetes pregnancy status group.

Denominator populations used to calculate proportions have been derived using the total number of women who gave birth or total number of births by the relevant maternal diabetes type.

Age-standardised proportions have been calculated using the direct method, using the 30 June 2001 Australian female estimated resident population, based on the 2001 Census as the standard population.

Due to the small number of women with pre-existing diabetes, age groups for women aged 15–24 and 35–44 have been combined into 10-year groups, with 5-year age groups used for those aged 25–29 and 30–34.

Confidence intervals

In the *Diabetes in pregnancy 2014–2015* bulletin, 95% confidence intervals were calculated around age-standardised proportions, to determine whether differences between diabetes pregnancy status groups were significant. A difference was deemed statistically significant if the 95% confidence intervals of the age-standardised proportions did not overlap.

Confidence intervals have not been presented in the *Diabetes in pregnancy 2014–2015* bulletin.

Rate ratio

Rate ratios are presented in the supplementary data tables for the *Diabetes in pregnancy 2014–2015* bulletin.

Rate ratio provides a measure of the relative gap in rates between 2 populations. In this report, rate ratios were calculated by dividing the proportion of the study population (for example, women with pre-existing diabetes) with a particular outcome (for example, induced labour) by the proportion of the standard population (women without diabetes) with the same characteristic. The same method was used to compare the age-standardised proportions of the diabetes in pregnancy status groups with a particular outcome within a specific population group (for example, the lowest socioeconomic area).

A rate ratio of 1 indicates that the incidence of the characteristic is the same in the study population (women with diabetes) and standard (women with no diabetes) populations. Rate ratios of greater than 1 indicate higher incidence in the study population; rate ratios of less than 1 indicate lower incidence in the standard population.

Checking for confounders

Given the strong relationship between Indigenous status or smoking status and poorer maternal and perinatal outcomes, stratification by Indigenous status or smoking status was done to check for potential confounding.

Small numbers

Data presented in the supplementary data tables for the *Diabetes and pregnancy 2014–2015* bulletin have not been published, in line with guidelines for protecting the privacy of individuals, where:

- cell values were less than 5 individuals
- the denominator for an age group was less than 30 individuals for calculating age-standardised rates
- the numerator for an age group was less than 20 individuals for calculating age-standardised rates.

Exceptions to this are small numbers in 'Other' and 'Not stated' categories. The cell with small numbers and at least 1 other cell in the same row and column are suppressed to prevent back-calculation.

Where 'n.p.' (not published) has been used to protect confidentiality, the suppressed numbers are included in the totals. Rate ratios have not been presented where numbers are supressed.

Geography

Geographic data are based on the usual residence of the mother. In 2014 and 2015, the usual residence of the mother is based on Statistical Area Level 2 of the Australian Bureau of Statistics' Australian Statistical Geography Standard edition 2011 for all states and territories. The except is the Australian Capital Territory, where data by remoteness and socioeconomic

status are based on Statistical Local Area of the Australian Standard Geographical Classification edition 2011.

Remoteness area

This report uses the Australian Statistical Geography Standard Remoteness Structure, which groups geographic areas into 6 classes of remoteness area based on their relative access to services, using the Accessibility/Remoteness Index of Australia.

The 6 classes are:

- *Major cities*
- *Inner regional*
- *Outer regional*
- *Remote*
- *Very remote*
- *Migratory* (ABS 2013a).

Socioeconomic status

The Socio-Economic Indexes for Areas (SEIFA) are measures of socioeconomic status (SES) that summarise various socioeconomic variables associated with disadvantage. Socioeconomic disadvantage is typically associated with low income, high unemployment, and low levels of education.

The SEIFA index used in this report is the 2011 SEIFA Index of Relative Disadvantage (IRSD) developed by the Australian Bureau of Statistics for use at Statistical Area Level 2 (all states and territories except the Australian Capital Territory), and Statistical Local Area (Australian Capital Territory only).

Since the IRSD summarises only variables that indicate disadvantage, a low score indicates that an area has many low-income families, many people with little training, and many people working in unskilled occupations. So this area may be considered disadvantaged relative to other areas.

A high score implies that the area has few families with low incomes, and few people with little or no training, or working in unskilled occupations. These areas with high index scores may be considered less disadvantaged relative to other areas.

A high score reflects a relative lack of disadvantage rather than advantage, and the IRSD relates to the average disadvantage of all people living in a geographic area, and cannot be presumed to apply to all individuals living within the area.

Population-based Australian cut-offs for SEIFA quintiles have been used in this report. This method ranks the SEIFA scores for a particular geography (for example, Statistical Area Level 2) from lowest to highest, and the geographical areas are divided into 5 groups, with about 20% of the population in each group.

The most disadvantaged group is referred to as the *lowest socioeconomic areas* and the least disadvantaged group is referred to as the *highest socioeconomic areas*.

For further information on SEIFA, see ABS 2013b.

References

ABS (Australian Bureau of Statistics) 2013a. Australian Statistical Geography Standard (ASGS): Volume 5—remoteness structure, July 2011. Canberra: ABS.

ABS 2013b. Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011. Canberra: ABS.