

## 3. Methods

### Data sources

#### *The New South Wales Perinatal Data Collection*

The New South Wales Perinatal Data Collection (PDC), formerly known as the Midwives Data Collection, is a population-based surveillance system covering all births in NSW public and private hospitals, as well as home births. It encompasses all live births, and stillbirths of at least 20 weeks gestation or at least 400 grams birth weight.

The PDC relies on the attending midwife or doctor to complete a notification form when a birth occurs. The form, a copy of which is shown at Appendix 4, includes demographic items and items on maternal health, the pregnancy, labour, birth, and perinatal outcomes. Completed forms are sent to the Data Collections and Reporting Unit in the Demand and Performance Evaluation Branch of the NSW Ministry of Health, where they are compiled into the PDC database.

In 2009, 76% of PDC notifications were received electronically from hospital obstetric information systems. These notifications were received by secure upload to the state database or encrypted via email. There are several source systems that generate the PDC data. The largest source is the ObstetriX database, which supplies 44.4% of all PDC records and is used by all public hospitals in the following Local Health Districts: Northern Sydney, Central Coast, South Eastern Sydney, Illawarra Shoalhaven, Western Sydney; as well as some hospitals in the Hunter New England Local Health District, Southern Local Health District and Murrumbidgee Local Health District. The following systems also supply records to the PDC: Cerner (South Western Sydney Local Health District and Sydney Local Health District)—18.0%; Meditech, which supplies data for six Ramsay Private Hospitals (North Shore Private Hospital, Westmead Private Hospital, St George Private Hospital, Kareena Private Hospital, Figtree Private Hospital and Tamara Private Hospital), 9.1%; Sydney Adventist Hospital database, 2.0%; and Newcastle Private Hospital database, 2.0%.

The PDC receives notifications of women whose usual place of residence is outside NSW and who give birth in NSW. However, the PDC does not receive notifications of births outside NSW to women usually resident in NSW.

#### *The New South Wales Register of Congenital Conditions*

The NSW Register of Congenital Conditions, formerly known as the NSW Birth Defects Register, is a population based surveillance system established to monitor congenital conditions detected during pregnancy, at birth, or diagnosed in infants up to one year of age. The Register was established in 1990

and, under *NSW Public Health Act 1991*, from 1 January 1998 doctors, hospitals, and laboratories have been required to notify certain congenital conditions detected during pregnancy, at birth, or up to one year of life. The Register is administered by the Centre for Epidemiology and Research of the NSW Ministry of Health.

There are three types of conditions that are reported to the Register:

- Conditions that affect the growth, development and health of the baby that are present before birth, such as cleft lip, dislocated hip and problems with the development of the heart, lungs or other organs
- Conditions due to changes in the number of the baby's chromosomes, such as Down Syndrome
- Four conditions due to changes in the baby's inherited genetic information: cystic fibrosis, phenylketonuria, congenital hypothyroidism and thalassemia major.

The activities of the Register include: annual publication of information on congenital conditions in NSW; provision of information to health services to assist in service planning and monitoring of child health, and investigation of specific issues; provision of information in response to specific requests from the public, health professionals, and other government departments; and provision of data to the AIHW National Perinatal Epidemiology and Statistics Unit (NPESU) for monitoring of congenital conditions at a national level.

Sources of notifications to the Register include: the PDC, specialist paediatric hospitals, cytogenetic laboratories, and individual health care providers. The Register is supported by an advisory committee, comprising a panel of clinical experts representing the following specialities: genetics, dysmorphology, neonatology, obstetrics and gynaecology, midwifery, bioethics, and epidemiology; and a community representative from the Association of Genetic Support of Australasia.

Data for research purposes may be provided in 2 formats: aggregate information similar to that contained in this report, and data concerning individuals with identifying information removed. All requests for data should be submitted in writing to the Director, Centre for Epidemiology and Research. Requests for data concerning individuals for sufficiently important research purposes will be referred to the NSW Population and Health Services Research Ethics Committee. Procedures for release of personal information are described in the Ministry's Policy Directive PD2006-077 *Data Collections—Disclosure of unit record data held for research or management of health services* which is available on the NSW Ministry of Health's website at [www.health.nsw.gov.au](http://www.health.nsw.gov.au).

### **The NSW Admitted Patient Data Collection**

For this report data from the NSW Admitted Patient Data Collection (APDC) for public and private hospitals in NSW was linked to PDC data to produce information on type of birth according to mother's health insurance status. Approval for the linkage was obtained from the NSW Population and Health Services Research Ethics Committee. Record linkage was carried out by the Centre for Health Record Linkage ([www.cherel.org.au](http://www.cherel.org.au)).

The APDC covers demographic and episode related data for every inpatient that is separated from any public, private, and repatriation hospital, private day procedure centre, or public nursing home in NSW. Separation can result from discharge, transfer, death, or change in service category. The APDC is maintained by the Data Collections and Reporting Unit in the Demand and Performance Evaluation Branch of the NSW Ministry of Health.

### **NSW Maternal and Perinatal Committee**

The NSW Maternal and Perinatal Committee is a quality assurance committee established under the *NSW Health Administration Act 1982*, and is privileged under the Act to carry out confidential reviews of both maternal and perinatal deaths. Members are appointed by the Minister for Health.

The Committee reviews each maternal death to identify any possible avoidable factors and to determine whether the death was related to pregnancy (or its management) or whether it was incidental. The Committee also reviews perinatal deaths among live born babies, and stillbirths of at least 20 weeks gestation or at least 400 grams birth weight. The information obtained from these reviews assists in the development of policies aimed at improving the health of mothers and newborns in NSW. Information considered by the Committee is confidential.

### **Method for estimating level of reporting of Aboriginality among mothers and babies**

In 2009, the Aboriginality of the mother, rather than the baby, was reported to the PDC. Consequently, maternal Aboriginality was used for this analysis. The number of births reported to Torres Strait Islander mothers is quite small in NSW. Aboriginal and Torres Strait Islander mothers were therefore combined for this analysis.

Records of births reported to the PDC were linked to birth registration records of the NSW Registry of Births, Deaths and Marriages for births occurring in the 3-year period 2006–2008. Record linkage was carried out at the Centre for Health Record Linkage. The overall linkage rate was 91.3% of PDC records and 97.7% of birth registration records.

Capture–recapture methods are used to adjust estimates of counts to reflect ascertainment level or undercounting. Capture–recapture was carried out using the method described by McCarty et al.<sup>1</sup> Analysis was carried out using

SAS version 9.2. Analyses concerning geographic location were based on Local Health District of residence as reported to the PDC.

### **References**

1. McCarty DJ, Tull ES, Moy CS, Kwoh CK, LaPorte RE. Ascertainment corrected rates: Applications of Capture–Recapture Methods. *Int J Epidemiol* 1993; 22(3): 559–565.

### **Definitions**

#### **Aboriginal and Torres Strait Islander**

Women who identify themselves as Australian Aboriginal or Torres Strait Islander.

#### **Apgar score**

A numerical scoring system routinely administered one and five minutes after birth to evaluate the condition of the baby. The score ranges from 0–10 (10 being perfect). It takes account of 5 physical signs, each of which is assigned a component score of 0, 1 or 2: heart rate, respiration, muscle tone, reflexes, and colour.

#### **Augmentation**

Artificial rupture of the membranes or use of oxytocic drugs after spontaneous onset of labour.

#### **Birth weight**

The newborn infant's first bare weight in grams.

**Low birth weight:** birth weight less than 2,500 grams.

**Very low birth weight:** birth weight less than 1,500 grams.

**Extremely low birth weight:** birth weight less than 1,000 grams.

#### **Caesarean section**

Birth of the fetus through an abdominal incision. Elective caesarean section: a caesarean section (planned or unplanned) performed before the onset of labour. Emergency caesarean section: a caesarean section performed after the onset of labour, whether or not the onset of labour was spontaneous.

#### **Confinement**

Refers to a woman having given birth. In a multiple pregnancy, one confinement will result in more than one birth.

#### **Epidural**

Injection of analgesic agent outside the dura mater which covers the spinal canal; includes lumbar, spinal, and epidural anaesthetics.

#### **Episiotomy**

An incision of the perineum and vagina to enlarge the vulval orifice.

#### **Gestational age**

The duration of pregnancy in completed weeks from the first day of the last normal menstrual period. Where accurate

information on the date of the last menstrual period is not available, a clinical estimate of gestational age may be obtained from ultrasound during the first half of pregnancy or by examination of the newborn infant. The 'best estimate' is used in this report.

### *Induction of labour*

**Oxytocics–prostaglandins:** the initiation of labour by the use of oxytocic agents, prostaglandins, or their derivatives (oral, intravaginal or intravenous).

**ARM only:** the initiation of labour by artificial rupture of membranes.

**Oxytocics–prostaglandins and ARM:** both medical and surgical induction as defined above (combined medical and surgical induction).

### *Live birth*

The complete expulsion or extraction from its mother of a baby who, after being born, breathes or shows any evidence of life such as a heartbeat.

### *Neonatal death*

The death of a live born infant within 28 days of birth.

### *Neonatal mortality rate*

The number of neonatal deaths per 1,000 live births.

### *Parity*

The total number of live births and stillbirths of the mother before the pregnancy or birth under consideration.

### *Perinatal death*

A stillbirth or neonatal death.

### *Perinatal mortality rate*

The number of perinatal deaths (stillbirths and neonatal deaths) per 1,000 total births in a year (live births and stillbirths combined).

### *Perineal status*

**1st degree tear:** a perineal graze–laceration–tear involving: the fourchette, hymen, labia, skin, vagina, or vulva.

**2nd degree tear:** a perineal laceration or tear involving the pelvic floor or perineal muscles or vaginal muscles.

**3rd degree tear:** a perineal laceration–tear involving the anal sphincter or rectovaginal septum.

**4th degree tear:** a third degree perineal laceration or tear which also involves the anal mucosa or rectal mucosa.

### *Plurality*

The number of fetuses in utero at 20 weeks gestation that are subsequently born separately. On this basis pregnancy may be classified as single or multiple.

### *Premature infant*

An infant born before 37 completed weeks gestation.

### *Spontaneous abortion*

The spontaneous expulsion of a fetus less than 20 weeks gestation and less than 400 grams birth weight.

### *Stillbirth*

The complete expulsion or extraction from its mother of a product of conception of at least 20 weeks gestation or 400 grams birth weight who did not, at any time after birth, breathe, or show any evidence of life such as a heartbeat.

### *Termination of pregnancy*

A procedure intentionally performed to terminate a pregnancy before 20 completed weeks gestation.

## **Explanatory notes**

### *Breastfeeding*

From 2007, the PDC has collected information on infant feeding at the time of discharge from hospital (or discharge from care for home births) for all infants born in NSW. Infant feeding is reported via three tick-box categories: breastfeeding, expressed breastmilk and infant formula. More than one type of feeding may be reported by ticking multiple boxes. In this report, infant feeding is classified into three categories: full breastfeeding, which includes babies who were reported to be breastfed or to be receiving expressed breastmilk; any breastfeeding, which includes babies who were reported to be receiving breastmilk and infant formula; and no breastfeeding.

### *Rates of congenital conditions*

The Register of Congenital Conditions collects data pertaining to congenital conditions regardless of the outcome of pregnancy. This includes notifications of live births, stillbirths, terminations of pregnancy and spontaneous abortions. Rates are calculated using births (that is, live births and stillbirths) as the denominator, because denominator populations for pregnancies less than 20 weeks gestation are unknown. The numerators are described in the relevant sections.

The source of denominator population data on births is the PDC. The PDC was selected because its definitions are consistent with those applied by the Register of Congenital Conditions.

Differences in rates of conditions published by the Register of Congenital Conditions compared to interstate registers may be due to differences in coding practices, in categories of conditions included in each register and differences in the upper age limit for notification of cases.

### *Place of residence of mother*

The mother's usual residence was the basis for coding to statistical local areas and NSW Local Health Districts.

### *Labour*

The category *labour—spontaneous with oxytocics–prostaglandins* was used where labour was augmented with artificial rupture of membranes as well as oxytocics or prostaglandins.

### *Maternity service role delineation levels*

In NSW, role delineation forms part of service planning to assist in describing the complexity of services required for the needs of the population. Local Health Districts are responsible for determining the appropriate role delineation of services for health care facilities within the network of services in that Local Health District. The process of role delineation is part of the process which responds to the needs of the population and takes into account the clinical networks within the Local Health Districts.

Role delineation levels are determined for a range of services provided at a health facility including; emergency, medical, surgical, maternity, integrated community and hospital, community based services, as well as support services; such as pharmacy, diagnostic imaging and pathology. The process determines the support services, staff profile, safety standards and requirements to ensure that clinical services are provided safely and with appropriate support. Accordingly, the criteria for each role level listed below are used in conjunction with requirements for a range of support services.

**Level 1:** Postnatal only. Normal post-partum mothers and babies delivered elsewhere returned for post-natal care provided there are no complications. Mothercraft nurses and RNs with post-graduate qualifications and/or experience specific to the needs of the service. Access to midwives with current clinical experience preferable. Nursing and midwifery education programs available, specific to the needs of the service. Has Level 1 Neonatal Service. Quality improvement activities. Interpreters as per Circular 94/10.

**Level 2:** Normal risk delivery only. As Level 1. Plus able to cope with sudden unexpected complications until transfer. Has 24 hour access to Medical Officers on site or available within 10 minutes. NUM is desirable for general ward. Midwives available. Continual education programs for all clinical staff in neonatal and adult resuscitation methods and the management of obstetric emergencies (as per Circular 99/86). Has Level 2 Neonatal Service. Links with units at higher levels of service, for referrals and transfers, consistent protocols and continuing education. Strategies in place to ensure ongoing competency of all providers of maternity care. Has more than 80 deliveries per year, or has Medical Practitioners complying with the RACGP/RACOG "Recommended Guidelines relating to Hospital Access and Delineation of Clinical Privileges in Obstetrics for GPs". (If minimum caseload cannot be achieved, considerations may be made for the degree of geographic isolation). Has Level 2 General Surgery. Formal quality improvement program. Formal protocols and referral links to allied health and psychiatry services. Has established referral links to higher levels of care and expertise, including specialist medical, nursing and midwifery services.

**Level 3:** As Level 2 plus may deliver selected moderate risk pregnancies (>36 week gestation) in consultation. Access to obstetrician/s for consultation. Has Accredited Medical Practitioners to provide simultaneous care of mother and neonate in theatre.

Specialist anaesthetist (may be GP anaesthetist credentialed for obstetric anaesthesia) and an additional Accredited Medical Practitioner in new born paediatrics. Sufficient Accredited Medical Practitioners (may be GP anaesthetist credentialed for obstetric anaesthesia) and General Surgeon (may be accredited Medical Practitioner in obstetrics) credentialed for lower segment caesarean section (LSCS). Has NUM. Midwives on all shifts. Some RNs with experience in neonatal care and/or having or undertaking relevant post-basic studies.

**Level 4:** As Level 3 plus care for mothers and babies (>34 weeks gestation) at moderate risk and elective LSCS. Obstetricians, Paediatricians and Specialist Anaesthetists on call 24 hours. Accredited Medical Practitioners on site 24 hours. Has NUM and experienced RNs. Experienced midwives on all shifts. Established links with CNC and/or CNE in midwifery and neonatal nursing. Has a minimum of Level 3 Neonatal Service. Allied health professionals and liaison psychiatry available.

**Level 5:** As Level 4 plus may deliver selected high risk pregnancies. Has Level 4 Neonatal Service. CNCs and/or CNE in midwifery on site.

**Level 6:** Care of normal, moderate and high risk deliveries. Obstetric Registrar on site 24 hours. Anaesthetic Registrar on site 24 hours and available exclusively for obstetrics for hospitals with more than 3000 births per year. Obstetricians may have specific subspecialties/skills/training. Access to foeto-maternal specialist. May participate on High Risk Pregnancy and Foeto-Maternal Advisory Line (PAL) roster. Experienced midwives on all shifts. Capacity to provide high ratio of nurse/patient care for women with acute complications with pregnancy or birth. 24 hour access to ultrasound services and reporting. CTG monitoring available with capacity to carry out fetal scalp pH in labour ward. Operating suite staff on site. Capacity to carry out caesarean section within 30 minutes. Usually a specialist supra regional unit or statewide role. The lead hospital within a defined network, in which the combined total is at least 3000 births per year. Has Level 5 Neonatal Service. 24 hour access to liaison psychiatry and allied health services. Full-time CNC and/or CNE in midwifery.

Note: Minimum levels of support services as well as definitions of risk and staff details are outlined in the Guide to the Role Delineation of Health Services Third Edition (2002).

### *Type of birth*

The 'vaginal breech' category covers all forms of vaginal breech birth, including forceps to the after coming head.

### *Perinatal mortality rate*

Perinatal deaths include deaths reported to the PDC only. As the PDC form is completed at discharge or transfer of the baby, deaths occurring after this time may not be reported to the PDC. Birth and perinatal death registration data held by the Australian Bureau of Statistics (ABS) give the most complete ascertainment of perinatal deaths for calculation of rates.

Map of NSW Local Health Districts

