A close-up photograph of several hands, including a baby's hand, being held together in a supportive grip. The image is partially obscured by a large purple triangle that covers the left and bottom portions of the page.

# Victorian perinatal services performance indicators

2014-15



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Available at <https://www2.health.vic.gov.au/hospitals-and-health-services/patient-care/perinatal-reproductive/maternity-newborn-services>

(1606019)

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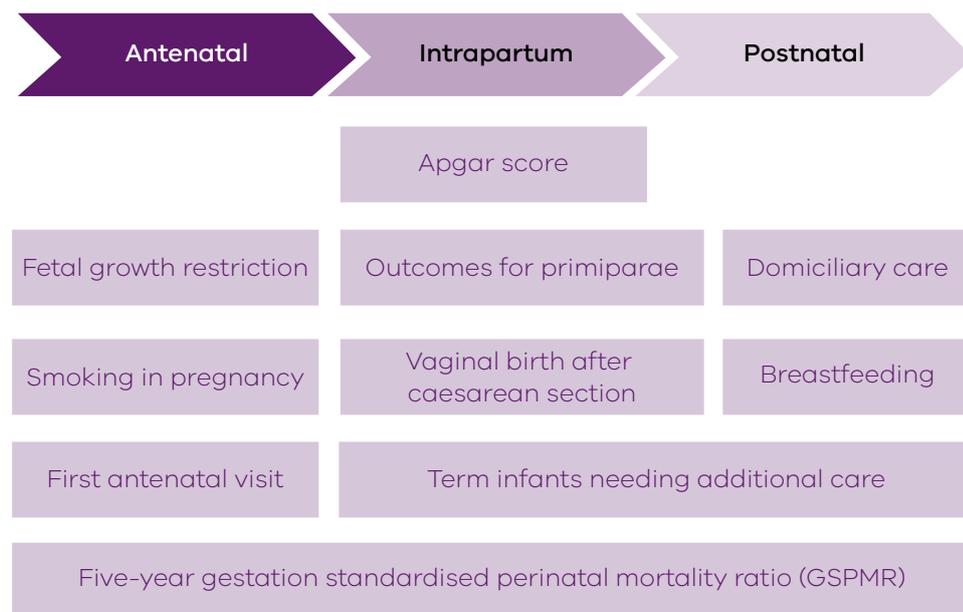
## About this report

Monitoring and reporting on the outcomes and experiences of women and their babies during pregnancy and childbirth in Victorian health services is a key Victorian Government commitment.

This report contains data on 10 key performance areas (and 17 performance indicators) of perinatal care in Victorian health services. The indicators span the antenatal, intrapartum and postnatal periods (see Figure 1). The report captures the care provided by public and private hospitals at the statewide level, as well as the individual public hospital level.

The indicators in this report are currently accepted as key areas for monitoring the quality of care provided to mothers and babies. Consumer information is included for each indicator.

**Figure 1: Schema of perinatal performance indicators**



## Benchmarking for quality and safety

This report provides benchmarking data for individual public<sup>1</sup> health services and the Department of Health and Human Services to identify best practice and the relative performance of health services in relation to maternity and newborn care.

Benchmarking is used to evaluate quality and safety in healthcare and can be either internal (to identify best practice within a health service and/or to compare practice over time) or externally focused. Like this report, external benchmarking (sometimes called competitive benchmarking) allows health services to assess their performance, identify best practice in the industry and discover improvements that have been successful in other organisations that will in turn improve their performance.

The statewide public hospital rate and, where possible, statewide private hospital rate are provided for each indicator. The statewide rates do not represent the desired target

<sup>1</sup> Data for individual Victorian private hospitals is intended for publication in future reports.

or expectation. In most cases, further improvements in performance are achievable and expected. Table 1 provides a summary of the purpose and expected outcomes of each indicator.

Outlier services (those that differ from the majority of services) are presented using interquartile ranges, with results in the lower and upper quartiles highlighted in either red (for least favourable results) or green (for most favourable results). All other results are presented as orange.

The Department of Health and Human Services will work with the least performing health services to understand the drivers for the reported performance, identify opportunities for improvement and share positive examples across services where appropriate.

Continuous improvement in the healthcare sector is needed to deliver better health outcomes for all Victorians, and benchmarking can be a valuable tool for health services to achieve best practice but only when it is coupled with performance improvement activities.

Therefore, health services, irrespective of their sample size, should review and examine their performance to understand the factors contributing to their results and implement local initiatives to improve the outcomes and care provided.

During 2015–16 many health services reported local quality improvement initiatives in response to the report including: reviewing of clinical guidelines, practice and policies; conducting targeted clinical audits; implementing 'dashboards' to monitor selected maternity outcome data as close to real time as possible; and working more closely with clinical governance committees. Health services that are achieving best practice are expected to share their understanding and practices with others.

## Data sources and reporting rules

The data for this report is derived from:

- the Victorian Perinatal Data Collection (VPDC) by calendar year (2014): Indicators 1, 3, 4, 5, 7, 8, 9 and 10
- the Victorian Admitted Episodes Dataset (VAED) by financial year (2014–15): Indicators 2 and 6.

The VPDC<sup>2</sup> and the VAED<sup>3</sup> are routine health data collections managed by the Department of Health and Human Services. All public and private health services are required to submit data to both collections. Further information on the data sources and the business rules for each indicator can be found in Appendix 2.

In line with similar system-wide benchmarking reports, the data (all birth episodes and all death classifications) is generally available to analyse and report on six months after the close of the reporting period. As such, this report does not replace the need for

2 The VPDC manual, including data definitions, business rules and submission guidelines, is available at <<https://www2.health.vic.gov.au/hospitals-and-health-services/qualitysafety-service/consultative-councils/council-obstetric-paediatric-mortality/perinatal-data-collection>>.

3 The VAED manual, including data definitions, business rules and submission guidelines, is available at <<https://www2.health.vic.gov.au/hospitals-and-health-services/datareporting/health-data-standards-systems/data-collections/vaed>>.

health services to monitor their own performance in near real time, but it can provide an additional perspective (that is, how a service is performing relative to 'best practice' and to its peers).

When interpreting the data in this report, it is important to note the following:

1. Data is only reported when a health service has had a minimum of 10 possible occasions for an event (denominator). Therefore, not all health services are included in each indicator. For example, a hospital that has not had 10 standard primiparae women birth in the given year (denominator) will not be included in the results for Indicator 1. Separate reporting rules apply for the gestation standardised perinatal mortality ratio (GSPMR) (Indicator 5) due to the different calculation methods used (see Appendix 2).
2. It is noted that for some health services, results published in this report are based on relatively small numbers and are subject to variability. For this reason, results should be interpreted with caution.
3. Private patients who were admitted to a public hospital are reported in the public hospital results.
4. Although the statewide rates provided for each indicator are a suitable measure for comparing services, they do not necessarily represent the optimal or target rate. Best practice may be inferred from the best outcomes within a given capability level.
5. Hospitals are ordered by level of maternity service capability<sup>4</sup> as defined in the *Capability framework for Victorian maternity and newborn services* (Department of Health 2010) and then by decreasing numbers of birthing women within these levels. This ensures hospitals are grouped with similar services in terms of the complexity of patients they are able to manage and size. An overview of the levels of capability is provided at Figure 2. A detailed list of health service capability and total number of birthing women is provided at Appendix 4.
6. The interpretation of the GSPMR (Indicator 5) is complex, and a detailed explanation is provided on pages 49–52).

## Indicator set

The indicators in this report are reviewed periodically, with new indicators added in response to emerging issues and others retired when high levels of performance across Victorian health services are sustained.

The current indicator set reflects a balance set of indicators that have been reviewed to ensure they are fit for purpose,<sup>5</sup> robust and feasible (Health Information and Quality Authority 2013). In addition, the majority of indicators are outcome indicators (in the short term) that reflect 'the impact of services on the status of an individual or group' (Productivity Commission 2016, p. 10.50).

<sup>4</sup> Levels of care represented in this report are based on levels of care at the time of the reporting period.

<sup>5</sup> 'Fit for purpose' includes an assessment of whether each indicator is valid, reliable, evidence-based, sensitive, specific, relevant and timely.

Over the next 12 months, the Perinatal Safety and Quality Committee and the Department of Health and Human Services will be exploring the use of existing datasets to develop a new outcome indicator relating to access to antenatal care to replace the current Indicator 9. In addition, a new patient experience indicator is also planned for inclusion in the 2016–17 reporting period.

## What's new?

This 2014–15 report includes the following changes from the 2013–14 report.

### Potentially preventable postnatal readmissions

- Two shadow indicators are included to potentially replace the current Indicator 6 relating to postnatal referral in the 2015–16 reporting period, to better reflect the outcomes of postnatal care:
  - Potentially preventable readmission of mother within 28 days of discharge from birthing episode admission in Victorian public hospitals (see Figure 37)
  - Potentially preventable readmission of neonate within 28 days of discharge from birthing episode admission in Victorian public hospitals (see Figure 39).

### Gestation standardised perinatal mortality ratio (Indicator 5)

The visual representation of the GSPMR has been enhanced to:

- include a visual on the relative number of births between hospitals
- indicate more clearly the maternity service levels groupings
- reset of the numerical value of the ratio more accurately to 1 (rather than 100) where the observed number of perinatal deaths equals what would be expected
- show results for babies who are at least 32 weeks' gestation to better reflect potentially avoidable mortality, and because all except the specialist maternity services care for very pre-term babies.

### Population-attributable risk

- Further analysis on the GSPMR has been undertaken by including various statewide population-attributable risk (PAR) calculations. PARs quantify the contribution of selected risk factors for perinatal mortality and, as such, provide health services with important information to guide the most relevant areas for performance improvement.

### Information on trends

- The graphs that display the results for each indicator now show the direction of the result for each hospital compared with the previous reporting period. A green upward-facing arrow represents an improved result; a grey diamond represents an unchanged result and a red downward-facing arrow represents a poorer result.
- This report includes moving average trend data for the GSPMR for the four pooled five-year periods from 2007–2011 to 2010–2014.

**Table 1: Perinatal indicators and desired outcomes**

Indicator	Description	Desired outcome
<b>Indicator 1a</b>	Rate of induction in standard primiparae	Rates should be low and consistent for this low-risk group of women.
<b>Indicator 1b</b>	Rate of caesarean in standard primiparae	Variation in rates may indicate that clinical practice and/or system processes (and/or ascertainment for third- and fourth-degree perineal tears) may not be supported by evidence for best clinical practice.
<b>Indicator 1c</b>	Rate of third- and fourth-degree perineal tears in standard primiparae	
<b>Indicator 2</b>	Rate of term infants without congenital anomalies who require additional care	Rates should be low and consistent across peer-group hospitals, reflecting differing case mix.  Higher rates may indicate quality-of-care issues during labour and childbirth or suboptimal identification and/or management of complications during pregnancy.
<b>Indicator 3</b>	Rate of severe fetal growth restriction (FGR) in a singleton pregnancy undelivered by 40 weeks	Rates should be low and consistent across peer-group hospitals, reflecting differing case mix.  Health services should aim to improve methods for identifying and managing severe FGR.
<b>Indicator 4a</b>	Rate of women who planned a vaginal birth after a primary caesarean section	Rates should be high, with little variation across peer-group hospitals.
<b>Indicator 4b</b>	Rate of women who achieved a planned vaginal birth after a primary caesarean section	Unless contraindicated, women should be provided with the opportunity for vaginal birth after caesarean section (VBAC) and information to support decision making.
<b>Indicator 5</b>	Perinatal mortality ratio for babies born at 32 weeks or more (gestation standardised, excluding all terminations of pregnancy and deaths due to congenital anomalies) using five years' pooled data	Variation among hospitals is expected to be small.  Less favourable outliers must understand the extent of suboptimal performance issues and address these.
<b>Indicator 6</b>	Rate of women referred to postnatal domiciliary care or Hospital in the Home	Rates should be high.  Hospitals with poorer results should plan for improved performance.
<b>Indicator 7a and 7b</b>	Rate of smoking before (7a) and after (7b) 20 weeks' gestation	Rates should be low.  Services should ensure that data submitted against this indicator is reliable.

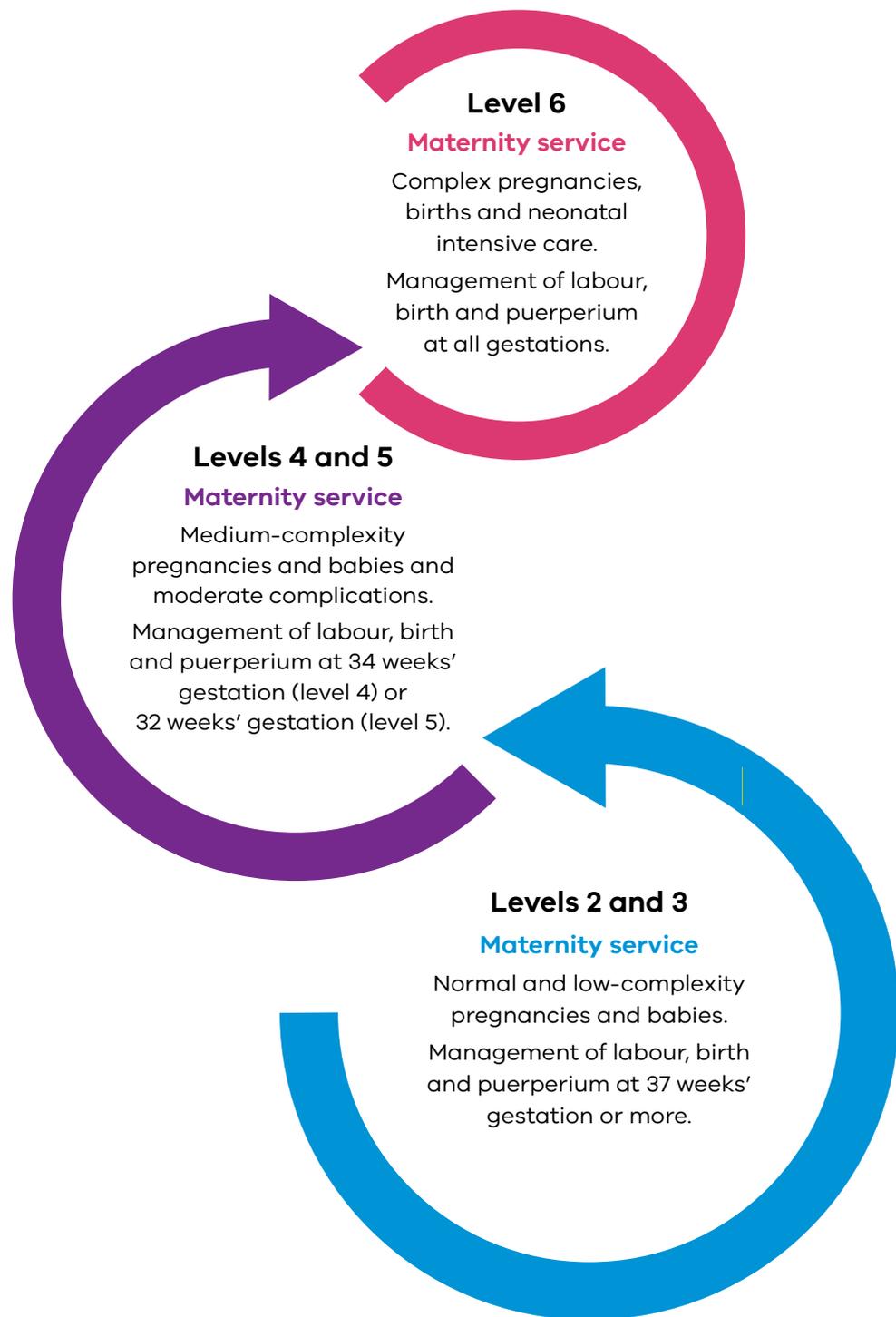
Indicator	Description	Desired outcome
<b>Indicator 8a</b>	Rate of breastfeeding initiation for babies born at 37+ weeks' gestation	Rates should be high and consistent among peer-group hospitals.
<b>Indicator 8b</b>	Rate of use of infant formula by breastfed babies born at 37+ weeks' gestation	Rates should be low and consistent among peer-group hospitals.
<b>Indicator 8c</b>	Rate of final feed being taken exclusively and directly from the breast by breastfed babies born at 37+ weeks' gestation	Rates should be high and consistent among peer-group hospitals.
<b>Indicator 9</b>	Rate of women who attend their first antenatal visit prior to 12 weeks' gestation (hospital or community)	Rates should be high. Services should ensure data submitted against this indicator is reliable and meets the VPDC business rules. The large variation among Victorian hospitals should be a focus for improvement at the local, regional or system level.
<b>Indicator 10</b>	Rate of term infants without congenital anomalies with an Apgar score < 7 at five minutes	Rates should be low and consistent among peer-group hospitals, reflecting differing casemix. This is an important indicator for longer term infant outcomes, and poorer results should be a priority area for performance improvement.

## About maternity and newborn capability levels

Maternity capability levels are used to create peer hospital groups for benchmarking.

The Victorian capability frameworks delineate the role and describe the service elements required at each level of maternity and newborn care within a statewide system service approach (Department of Health and Human Services 2015; Department of Health 2012). The frameworks set the minimum standards for six levels of care of increasing complexity. Each level identifies the workforce, infrastructure and clinical support services recommended for health services to deliver safe, effective and appropriate care (see Figure 2).

Figure 2: Levels of maternity/neonatal care



## Benchmarking for performance improvement

Variation in hospital performance may be due to factors unrelated to the clinical care provided to women and their babies. In addition, differences in casemix, models of service delivery, data collection and reporting processes can also contribute to variation across and between hospitals. Therefore, understanding a hospital's performance should take into account outcomes across all indicators.

Health service managers and clinicians should use this report to:

- track their own performance and trends, analysing local raw data more frequently if indicated
- compare their results with services of a similar profile (complexity and size)
- undertake ongoing local audits, including adverse event reviews through their perinatal mortality and morbidity committees
- perform local analysis of specific groups or cohorts of cases (for example, age profiles)
- identify priority areas for focus, and plan for performance improvement within a continuous quality framework
- evaluate improvement programs and provide feedback to relevant stakeholders
- disseminate results internally to build engagement with the maternity team
- provide education and support to staff and local communities
- collaborate with other regional hospitals and community/shared healthcare providers to improve practice and performance in the interests of all women birthing at the service or babies referred for care.

Each indicator has a list of recommended actions that should be undertaken by health services, particularly outlier services, to ensure ongoing performance improvement. In particular, outlier services should undertake:

- an assessment of their local capability and the processes to support regular clinical audits and the provision of performance data feedback to clinicians
- a multidisciplinary review of local clinical practice guidelines and protocols to ensure they are based on current evidence and research
- a review of organisational barriers that constrain continual practice improvement
- benchmarking with peer-group services and engage with hospitals achieving better outcomes to support local and regional improvement (this may include referral of results to their regional perinatal morbidity and mortality committee for expert multidisciplinary consideration)
- agree improvement goals and timelines and work with the Department of Health and Human Services to monitor performance and improvement initiatives over time.

# Data and results

## Key strengths

The following indicators have improved in the 2014–15 reporting period.

- **Indicator 1a:** The statewide public hospital rate of inductions of labour in standard primiparae remained constant at 2.9 per cent in 2012, 2013 and 2014; however, it has decreased from 4.2 per cent since 2008.
- **Indicator 6:** The statewide rate of women referred to postnatal home-based care and support has improved significantly since introduction of the indicator (92 per cent in 2008–09 to 98.9 per cent in 2014–15). Alternative indicators currently in development and proposed to replace this indicator in the 2015–16 reporting period are provided at Appendix 1.
- **Indicator 7:** The statewide public hospital rates of smoking during pregnancy before and after 20 weeks' gestation decreased in the 2014 reporting period (before 20 weeks: 13.3 per cent in 2013 to 12.6 per cent in 2014; after 20 weeks: 8.3 per cent in 2013 to 7.8 per cent in 2014).

## Key learnings and opportunities

The following outcomes suggest the need for health services to comprehensively review their practices and identify and actively plan for performance improvement, including improvements to data collection.

- **Indicator 1b:** The statewide rate of caesarean sections in standard primiparae increased slightly from 15.5 per cent in 2013 to 16.1 per cent in 2014.
- **Indicator 1c:** The statewide public hospital rate of severe perineal trauma in standard primiparae increased from 5.7 per cent in 2013 to 6.2 per cent in 2014. The statewide public hospital rate is almost double the rate occurring in private hospitals overall.<sup>6</sup>
- **Indicator 2:** There was significant variation across public hospitals in the rate of term infants without congenital anomalies who required additional care (0 to 21.8 per cent in 2014–15). The statewide public hospital rate has increased from 7.1 per cent in 2007–08 to 8.5 per cent in 2014–15. This may reflect quality of care during labour and birth and in the immediate neonatal period or the quality of data collection processes.
- **Indicator 3:** The rate of babies with severe FGR undelivered by 40 weeks' gestation is high in both public and private hospitals, and the statewide public hospital rate increased from 33.3 per cent in 2013 to 34.6 per cent in 2014. Given the associated risk of perinatal mortality with severe FGR as pregnancy advances, this remains a priority area for improved performance.
- **Indicator 4:** The rate of women planning for a vaginal birth following a primary caesarean section in public hospitals has been steadily decreasing since 2009 (30.3 per cent in 2009 to 27.4 per cent in 2014). The rate is significantly less in private hospitals (15.4 per cent in 2014).
- **Indicator 8:** There was significant variation between public and private hospitals in regard to the measures for successful breastfeeding. The rate of use of infant formula in breastfed babies born at greater than 37 weeks' gestation (Indicator 8b) requires attention by both public and private hospitals.

<sup>6</sup> Future work is planned, with the department and the Victorian Maternity and Newborn Clinical Network to improve awareness of prevention strategies and reduce variation in clinical practice. This includes consideration of clinical practice relating to episiotomies.

- **Indicator 9:** The statewide public hospital rate of women attending their first antenatal visit by 12 weeks' gestation has continued to decrease each year, from 31.9 per cent in 2009 to 20 per cent in 2014, but represent significant under-reporting. The rate is significantly higher for private hospitals (85.4 per cent in 2014). Accurately capturing data relating to antenatal care in the community is challenging for health services; however, improving data collection also requires hospitals' action and attention.
- **Indicator 10:** There was significant variation across public hospitals regarding Apgar score < 7 at five minutes, suggesting opportunities for improvement in the management of higher risk pregnancies, care provided during labour and birth and neonatal resuscitation. Appropriate and early triaging of higher complexity pregnancies may also be an area for improvement.

## Statewide outcomes

Table 2 summarises the statewide public and private hospital rates for the 2014–15 reporting period and the outlier rates (most favourable and least favourable cut-off rates). The statewide public hospital rates for the 2013–14 reporting period have also been provided for comparison.

Figures 3, 4 and 5 display combined results for (a) the standard primiparae, (b) breastfeeding and (c) the 32 weeks' GSPMR alongside management of FGR and newborn Apgar scores respectively. These combined results have been provided to allow comparison across a number of related measures.

**Table 2: Summary of statewide results, 2014–15**

Perinatal indicator	Statewide public 2014	Statewide private 2014	Outlier rate (least favourable)	Outlier rate (most favourable)	Statewide public 2013
<b>Indicator 1a:</b> Rate of induction in standard primiparae	2.9%	12.3%	≥ 4.1%	≤ 0%	2.9%
<b>Indicator 1b:</b> Rate of caesarean section in standard primiparae	16.1%	31.5%	≥ 23.7%	≤ 9.2%	15.5%
<b>Indicator 1c:</b> Rate of third- and fourth-degree perineal tears in standard primiparae giving birth vaginally	6.2%	3.3%	≥ 8.3%	≤ 0%	5.7%
<b>Indicator 2:</b> Rate of term infants without congenital anomalies who require additional care <sup>7</sup>	8.5%	N/A	≥ 8.4%	≤ 2.2%	8.4%
<b>Indicator 3:</b> Rate of severe fetal growth restriction (FGR) in a singleton pregnancy undelivered by 40 weeks	34.6%	29.9%	≥ 42.5%	≤ 25.3%	33.3%
<b>Indicator 4a:</b> Rate of women who planned for vaginal birth following a primary caesarean section	27.4%	15.4%	≤ 19.9%	≥ 31.5%	27.9%
<b>Indicator 4b:</b> Rate of women who achieved a planned vaginal birth following a primary caesarean section	54.2%	48.9%	≤ 45%	≥ 64.6%	53.2%
<b>Indicator 5:</b> Perinatal mortality ratio for babies born at 32 weeks or more (gestation standardised, excluding all terminations of pregnancy and deaths due to congenital anomalies) using five years' pooled data (2010–2014)	1.00	0.66	≥ 1.23	≤ 0.94	1.00

<sup>7</sup> Indicator 2 is derived from data collected in the VAED and is reported by financial year (2014–15).

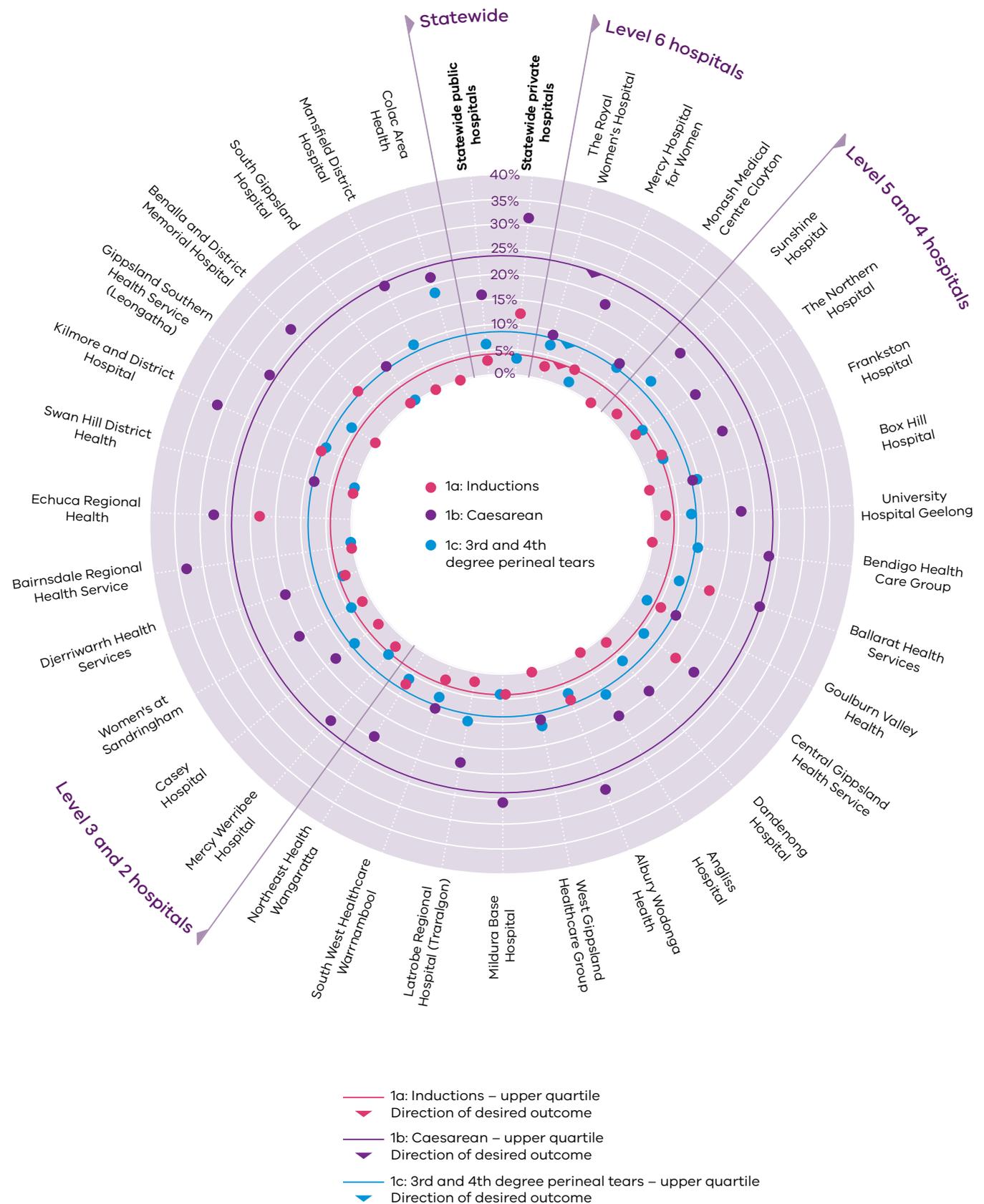
Perinatal indicator	Statewide public 2014	Statewide private 2014	Outlier rate (least favourable)	Outlier rate (most favourable)	Statewide public 2013
<b>Indicator 6:</b> Rate of women referred to postnatal domiciliary care or Hospital in the Home <sup>8</sup>	98.9%	N/A	≤ 96.1%	≥ 99.6%	98.5%
<b>Indicator 7a:</b> Rate of women smoking during pregnancy before 20 weeks' gestation	12.6%	1.7%	N/A	N/A	13.3%
<b>Indicator 7b:</b> Rate of women smoking during pregnancy after 20 weeks' gestation	7.8%	0.4%	N/A*	N/A*	8.3%
<b>Indicator 8a:</b> Rate of breastfeeding initiation for babies born at 37+ weeks' gestation	94.7%	96.7%	≤ 92.5%	≥ 95.8%	94.2%
<b>Indicator 8b:</b> Rate of use of infant formula by breastfed babies born at 37+ weeks' gestation	25.2%	39.5%	≥ 25.3%	≤ 10.1%	25.3%
<b>Indicator 8c:</b> Rate of final feed being taken exclusively and directly from the breast by breastfed babies born at 37+ weeks' gestation	80%	73.3%	≤ 81%	≥ 92.2%	79.7%
<b>Indicator 9:</b> Rate of women who attend their first antenatal visit prior to 12 weeks' gestation (hospital or community)	20%	85.4%	≤ 4.6%	≥ 42.9%	21.8%
<b>Indicator 10:</b> Rate of term infants without congenital anomalies with an Apgar score of < 7 at five minutes	1.5%	0.9%	≥ 1.9%	≤ 0.5%	1.6%

N/A – not applicable

\* Quartiles for this indicator have been calculated based on the relative reduction of smoking after 20 weeks' gestation at the health service compared with their rate before 20 weeks' gestation.

8 Indicator 6 is derived from data collected in the VAED and is reported by financial year (2014–15).

Figure 3: Outcomes for standard primiparae, 2014 (Indicators 1a, b and c)



### How to interpret this chart

This radar plot displays performance relating to the three sub-indicators of Indicator 1: Outcomes for standard primiparae. Each wedge of the radar provides 2014 results for individual public hospitals for:

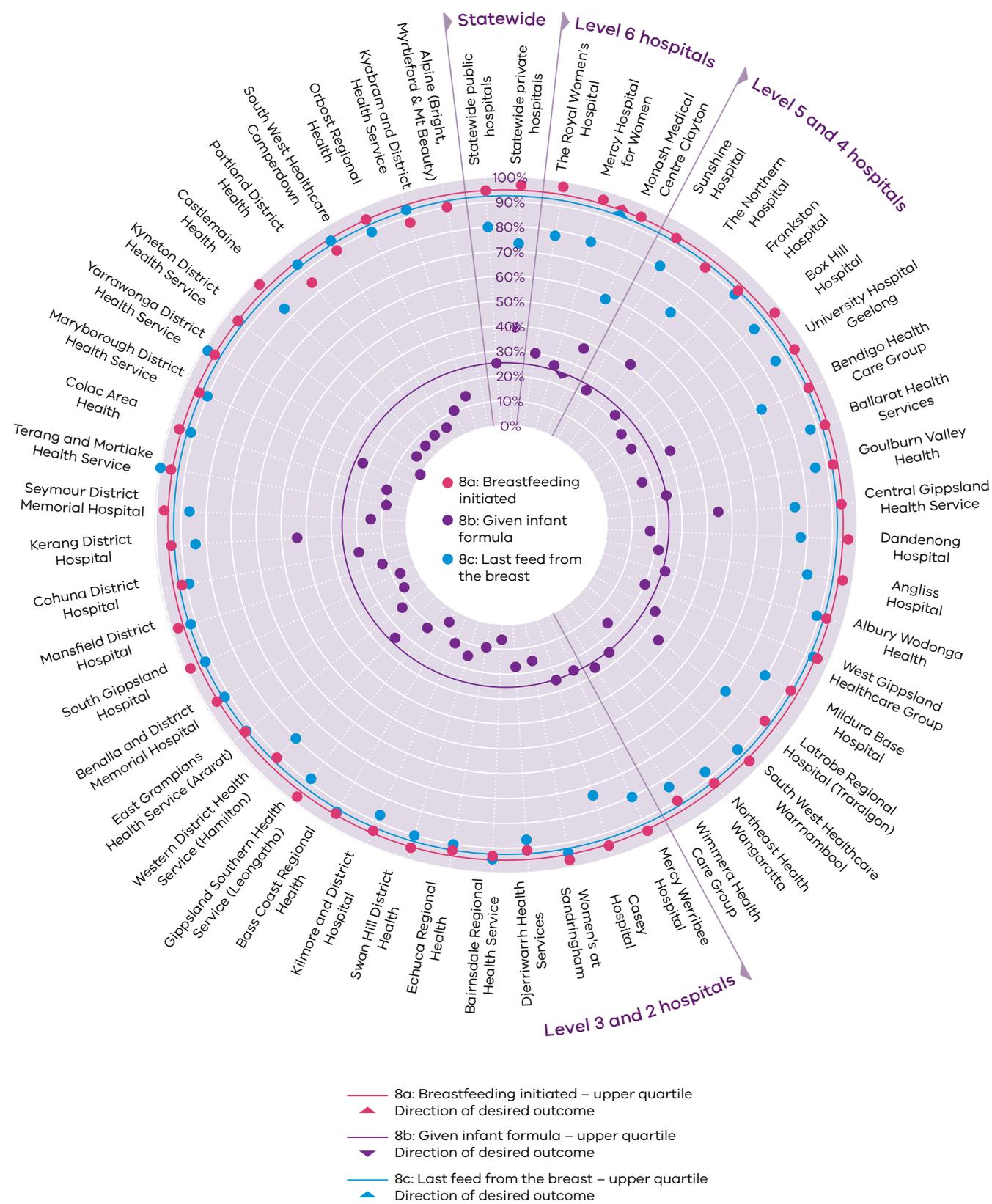
- Indicator 1a – rate of inductions of labour
- Indicator 1b – rate of caesarean section
- Indicator 1c – rate of third- and fourth-degree perineal tears.

Public hospitals are ordered clockwise by their capability level (decreasing complexity), then by the number of births. Results for each hospital are shown as a point on the radial axis, with increasingly better outcomes moving towards the centre. Each indicator is represented by a different coloured point, and statewide rates for public and private hospitals are provided at the top of the radar. The three coloured solid lines represent the least favourable quartile for each respective indicator (upper quartile).

The arrows highlight the direction of the desired outcome; therefore, results outside the corresponding upper quartile indicate a least performing outlier hospital relative to its peers and the statewide average.

This figure is not intended to imply a relationship between these outcomes. Only review at the local health service level can determine the extent to which these outcomes are affected by poor performance or unavoidable factors.

Figure 4: Breastfeeding in hospital, 2014 (Indicators 8a, b and c)



### How to interpret this chart

This radar plot displays performance relating to the three sub-indicators of Indicator 8: Breastfeeding in hospital. Each wedge of the radar provides 2014 results for individual public hospitals for:

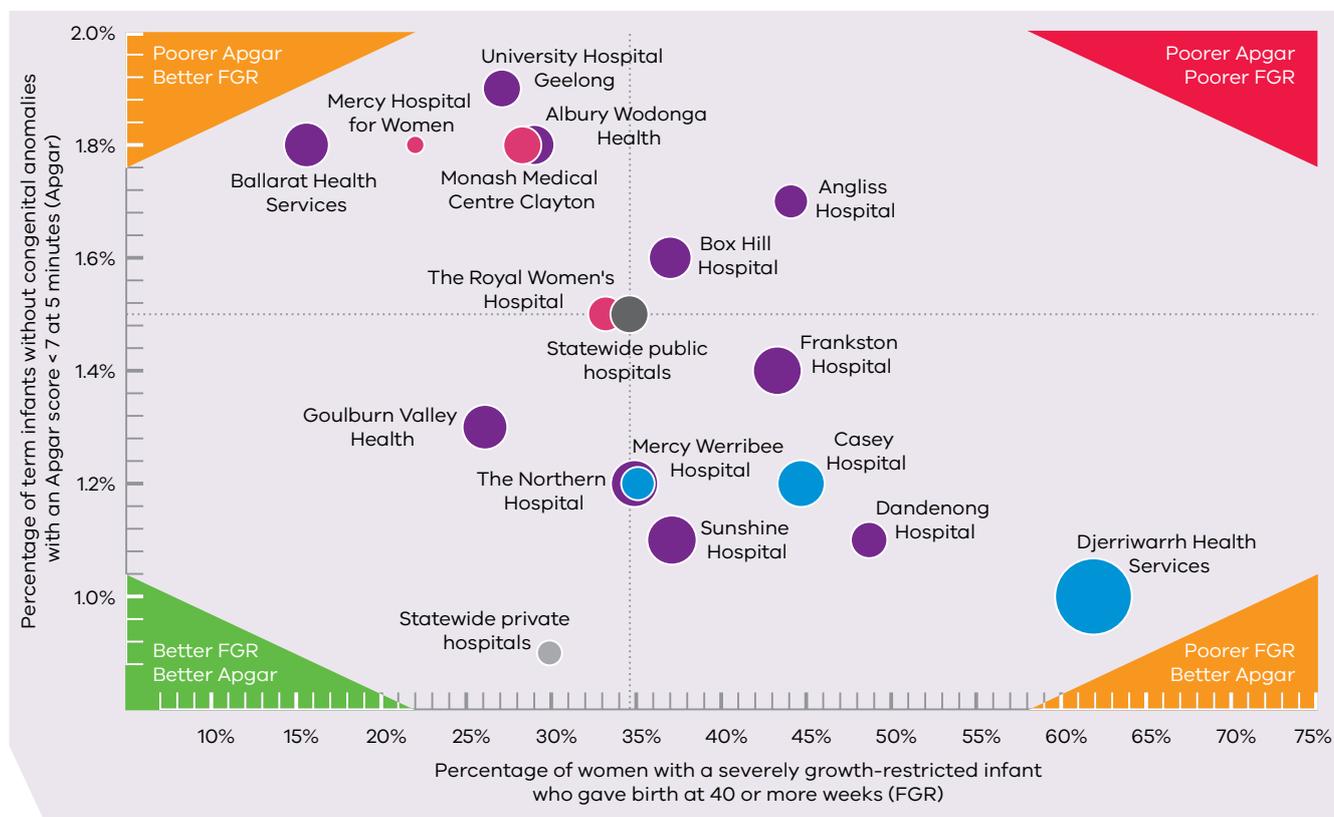
- Indicator 8a – rate of breastfeeding initiated
- Indicator 8b – rate of infant formula given
- Indicator 8c – rate of last feed from the breast.

Public hospitals are ordered clockwise by their capability level (decreasing complexity), then by the number of births. Results for each hospital are shown as a point on the radial axis. Each indicator is represented by a different coloured point, and statewide rates for public and private hospitals are provided at the top of the radar.

The three coloured solid lines represent the least favourable quartile for each respective indicator (8a lower quartile; 8b upper quartile; and 8c lower quartile).

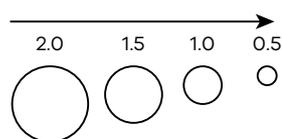
The arrows highlight the direction of the desired outcome; therefore, results outside the relevant quartile and not in the desired direction indicate a least performing outlier hospital relative to its peers and the statewide average.

**Figure 5: 32-week gestation standardised perinatal mortality ratio with results for fetal growth restriction and Apgar, 2014 (Indicators 3, 5 and 10)**



**Better GSPMR**

32-week GSPMR



**Colour coding**

- Level 6 hospitals
- Level 4 and 5 hospitals
- Level 2 and 3 hospitals
- Statewide public hospitals
- Statewide private hospitals

### **How to interpret this chart**

This bubble plot displays three different performance indicators relating to outcomes for babies. Each hospital is represented by a bubble, the size of which is proportional to Indicator 5: 32-week GSPMR. The statewide average GSPMR is 1.0 and hospitals with a higher ratio (less favourable outcome) have a larger bubble. Hospitals with a lower mortality ratio (more favourable outcome) have a smaller bubble.

The position of each hospital in relation to the horizontal axis represents the percentage of babies with severe FGR who are born at 40 or more weeks' gestation (Indicator 3). Hospitals with a higher percentage of FGR babies born at 40 or more weeks (less favourable outcome) are shifted further to the right.

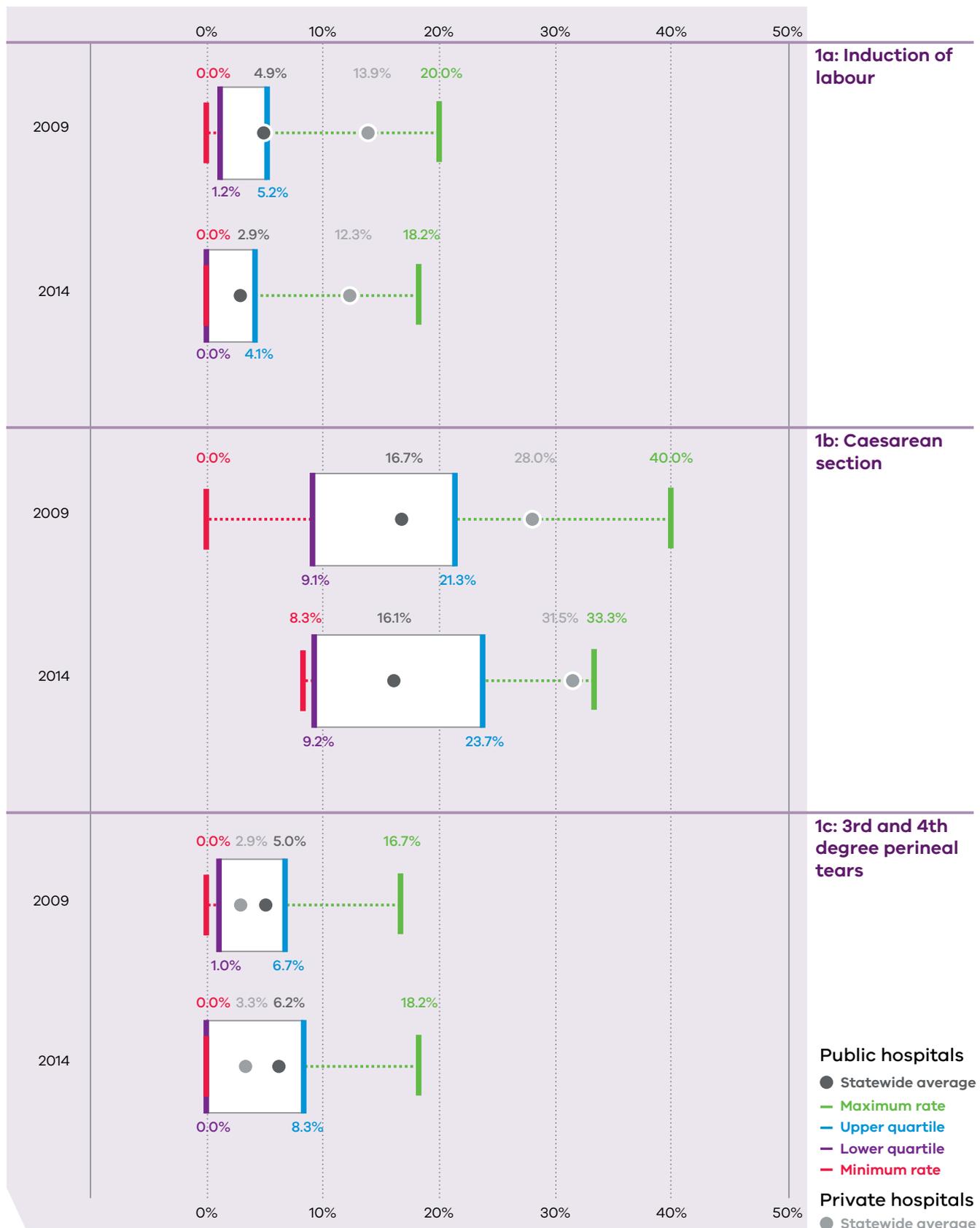
The position of each hospital in relation to the vertical axis represents the percentage of singleton, term infants without congenital anomalies with an Apgar score of < 7 at five minutes (Indicator 10). Hospitals with a less favourable Apgar score appear towards the top of the chart.

Although FGR is a major contributor to perinatal mortality, the interrelationships between the three indicators shown should be interpreted with caution. Only review at the local health service level can determine the extent to which these outcomes are affected by poor performance or unavoidable factors. Further information on the interpretation of the GSPMR is provided at page 49 and in Appendix 2.

### **Comparison of statewide performance over time**

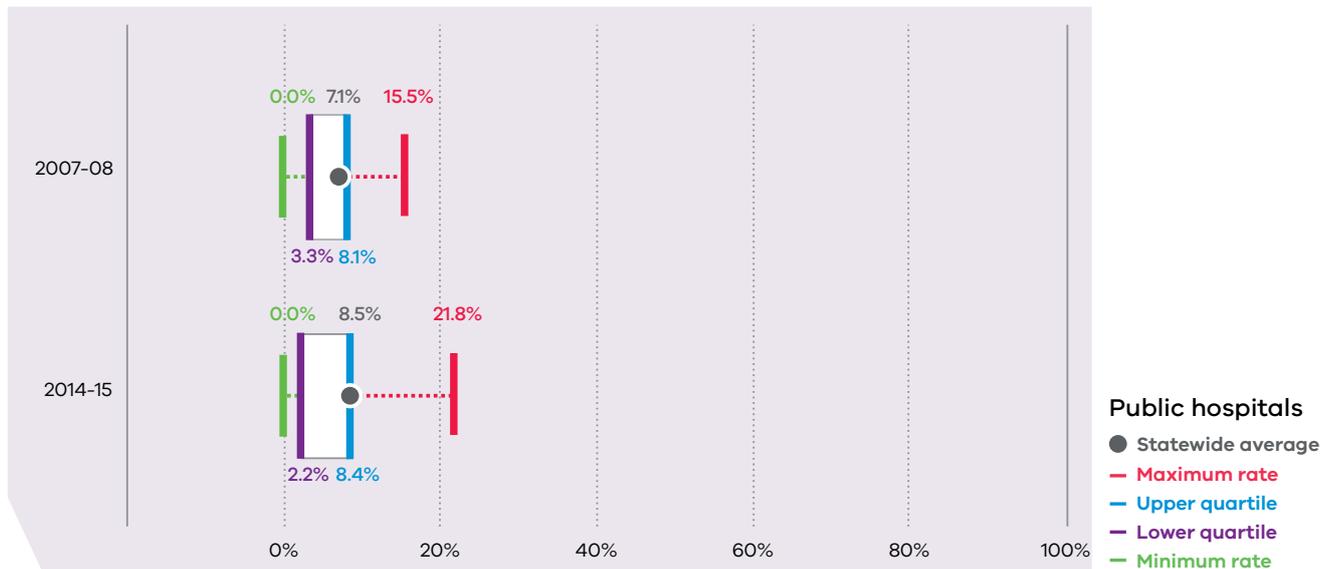
Figures 6–14 compare statewide performance for Indicators 1–6 and 8–10 over time.

**Figure 6: Statewide comparison of performance for outcomes for standard primiparae (Indicators 1a, 1b and 1c), 2009 and 2014**



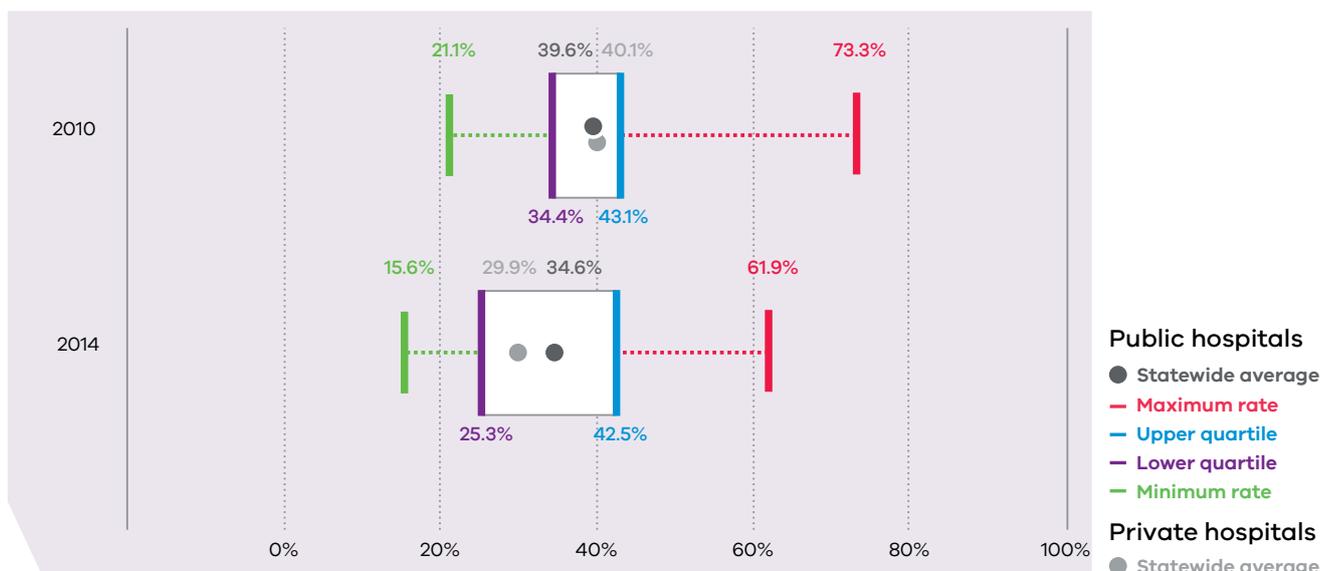
Note: the public hospital statewide average (the mean) is shown rather than the median.

**Figure 7: Statewide comparison of performance for term infants without congenital anomalies who require additional care (Indicator 2), 2007–08 to 2014–15**



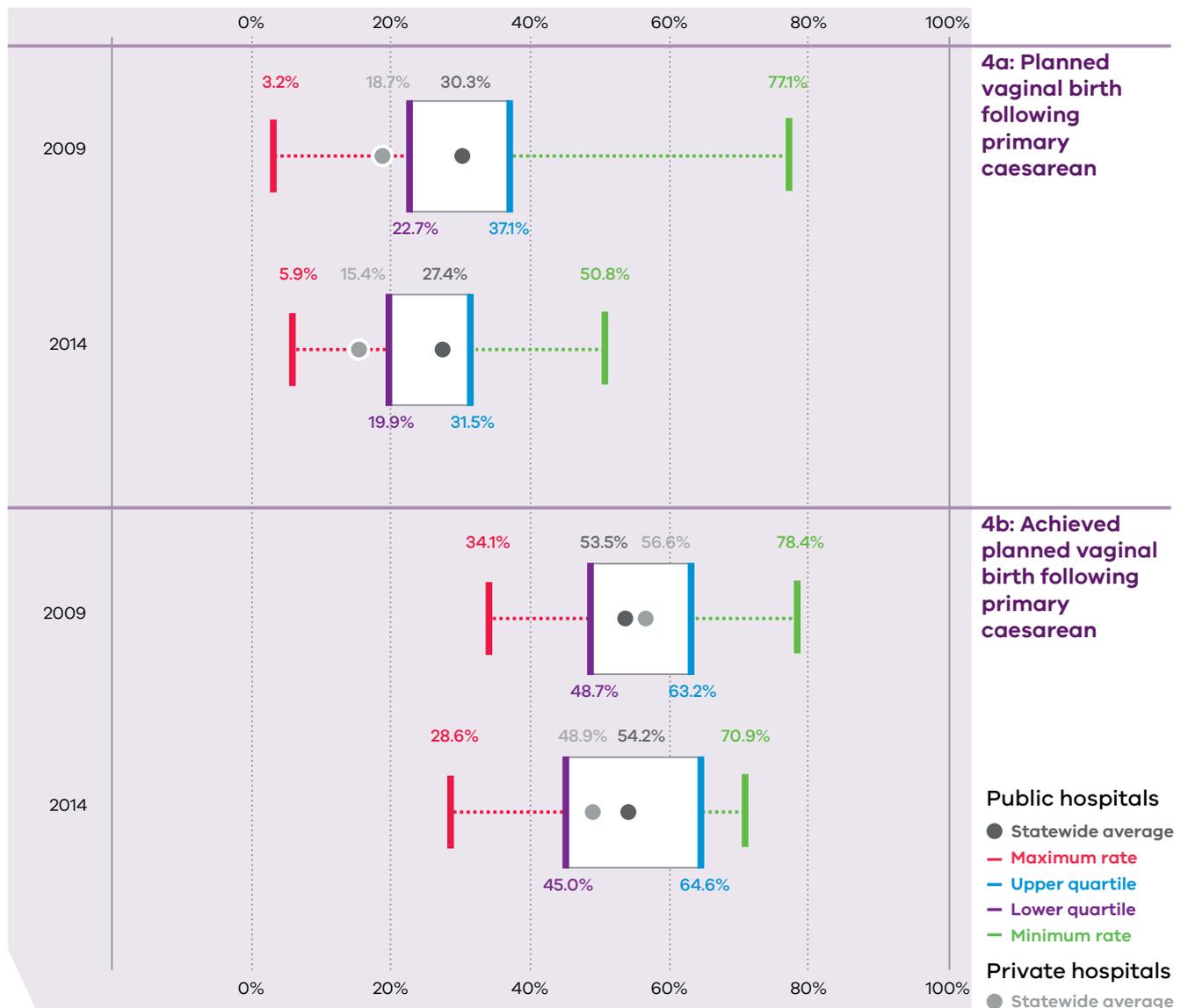
Note: the public hospital statewide average (the mean) is shown rather than the median.

**Figure 8: Statewide comparison of performance for severe fetal growth restriction, undelivered by 40 weeks (Indicator 3), 2009 to 2014**



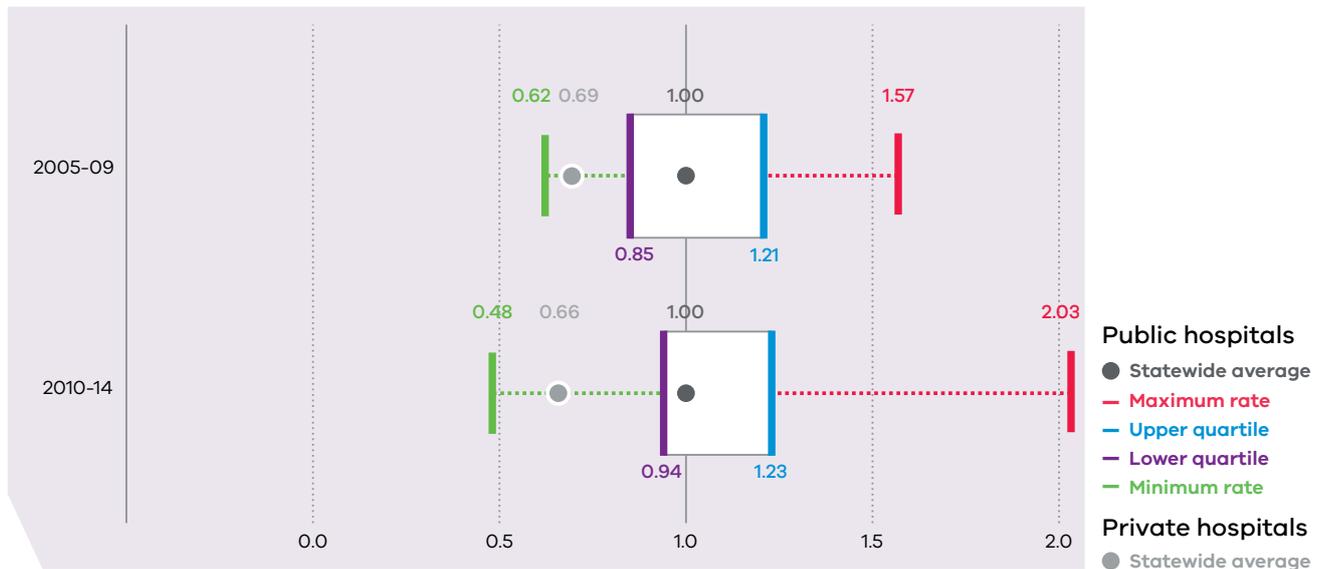
Note: the public hospital statewide average (the mean) is shown rather than the median.

**Figure 9: Statewide comparison of performance for vaginal births after primary caesarean section (Indicators 4a and 4b), 2009 to 2014**



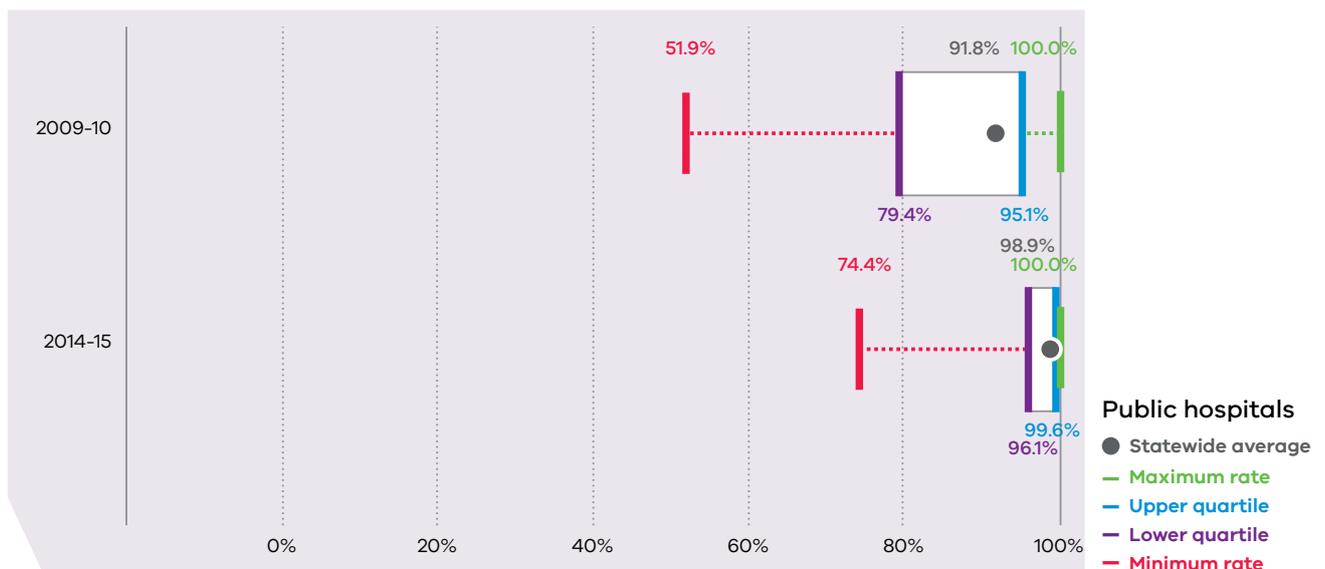
Note: the public hospital statewide average (the mean) is shown rather than the median.

**Figure 10: Statewide comparison of performance for gestation standardised perinatal mortality ratio at 32 weeks (Indicator 5), 2005–09 to 2010–14**



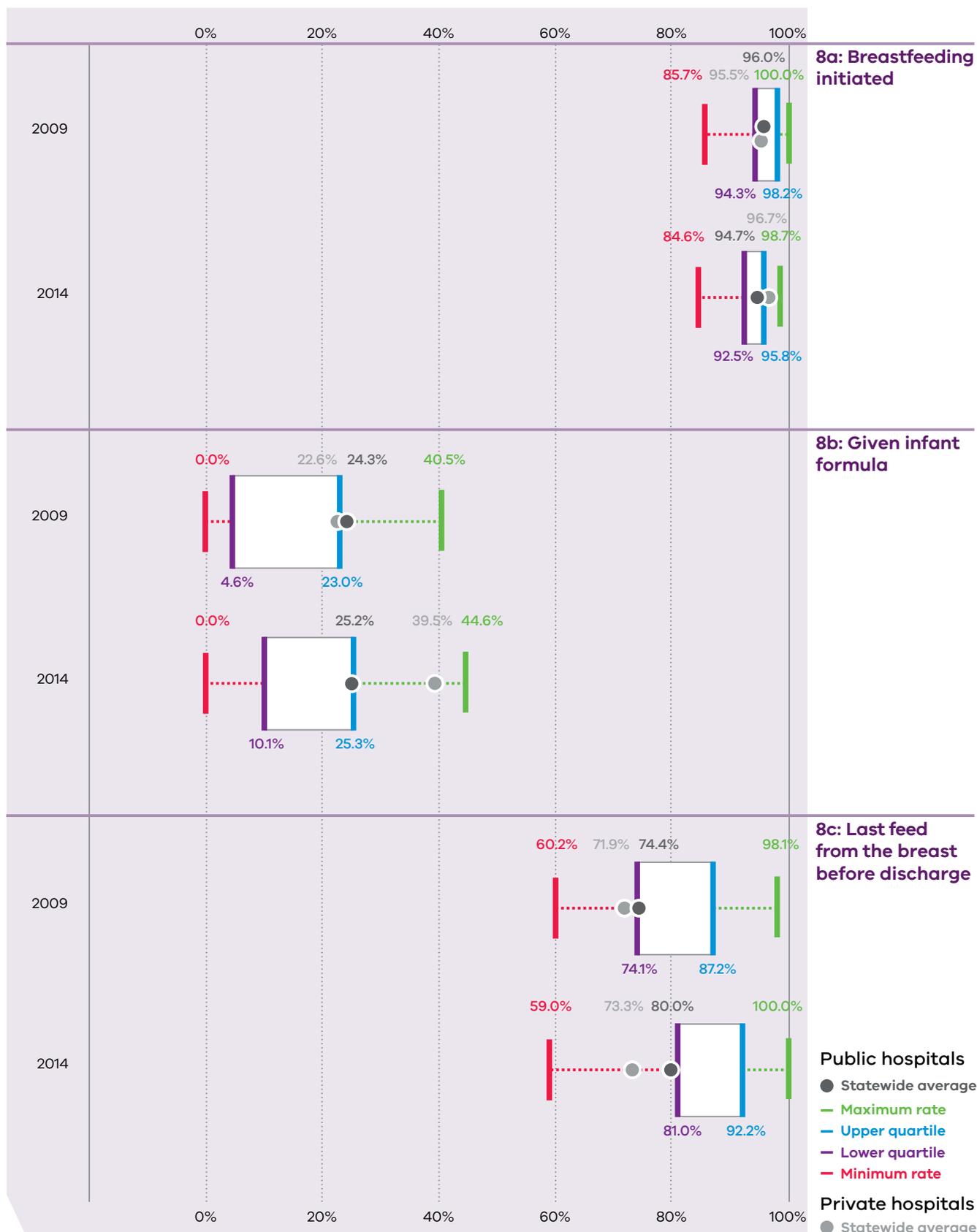
Note: the public hospital statewide average (the mean) is shown rather than the median.

**Figure 11: Statewide comparison of performance for referral to postnatal domiciliary care or Hospital in the Home (Indicator 6), 2009–10 to 2014–15**



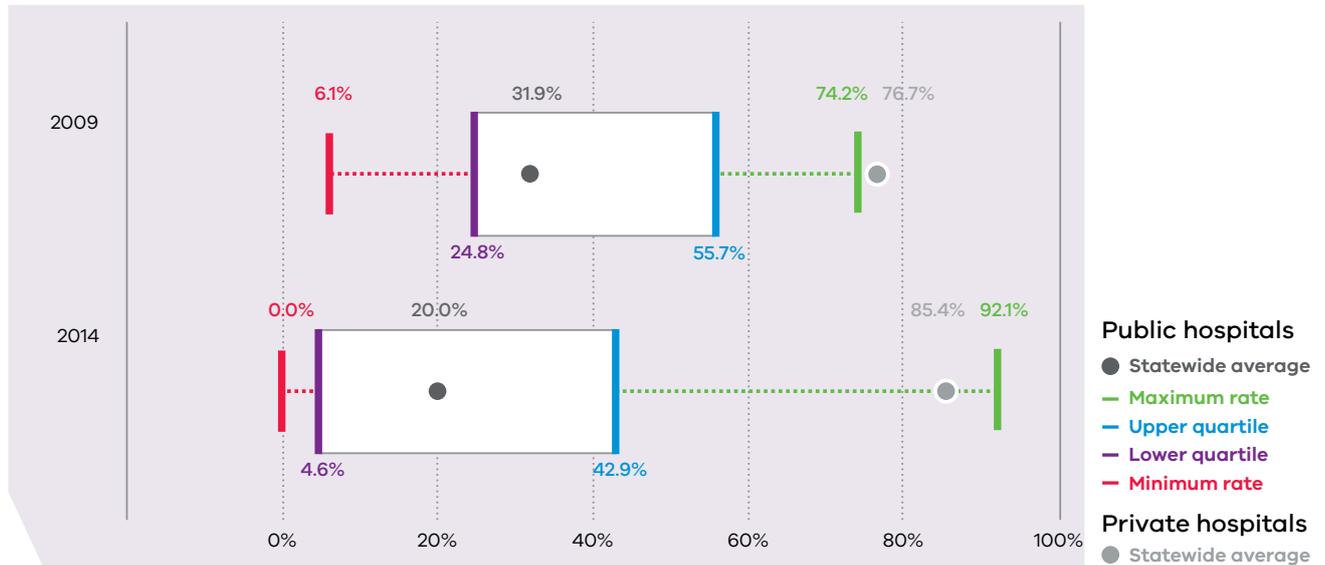
Note: the public hospital statewide average (the mean) is shown rather than the median.

**Figure 12: Statewide comparison of performance for rates of breastfeeding (Indicators 8a, 8b and 8c), 2009 to 2014**



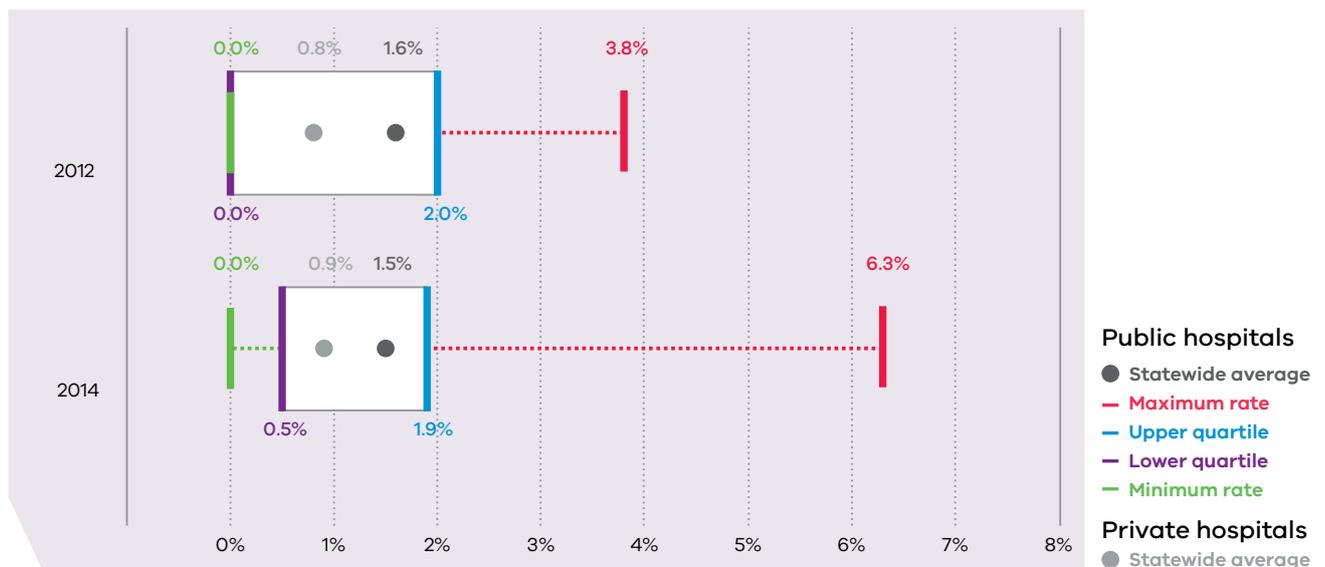
Note: the public hospital statewide average (the mean) is shown rather than the median.

**Figure 13: Statewide comparison of performance for first antenatal visit before 12 weeks' gestation (Indicator 9), 2009 to 2014**



Note: the public hospital statewide average (the mean) is shown rather than the median.

**Figure 14: Statewide comparison of performance for Apgar score < 7 at five minutes (Indicator 10), 2012 to 2014**



Note: the public hospital statewide average (the mean) is shown rather than the median.



# Indicators 1a, 1b and 1c: Outcomes for standard primiparae

## Purpose and rationale

The 'standard primipara' is the cohort of women with uncomplicated or low-risk pregnancies. The intervention and complication rates for this group of women should therefore be low and broadly consistent across hospitals.

This suite of indicators captures data on three important outcomes for standard primiparae in Victorian hospitals:

- Indicator 1a – rate of inductions in standard primiparae
- Indicator 1b – rate of caesarean section in standard primiparae
- Indicator 1c – rate of third- and fourth-degree perineal tears in standard primiparae.

Interhospital comparison of outcomes for standard primiparae (rather than all women giving birth) controls for differences in complexity of caseloads and therefore increases the validity of those comparisons.

The definition of a standard primipara and the inclusion criteria for the indicator set are outlined in Appendix 2.

## Clinical significance

Intervention(s) during labour and birth, particularly for women having their first birth, can occur at different stages and should be limited to women who have a clear medical (or psychosocial) indication.

Induction of labour can increase the need for instrumental vaginal birth or caesarean section.

For primiparous women, a caesarean section limits the potential to birth vaginally in future pregnancies and has other important consequences following birth and for future pregnancies. Therefore, safely reducing the number of primiparous women who have an induced labour may reduce the numbers who require birthing interventions overall.

Given that these women are expected to experience an uncomplicated or low-risk pregnancy, it is also expected that the rate of induction and caesarean section should, in most cases, be close to zero.

Some of the variation between hospitals may reflect incomplete reporting of complications of pregnancy or pre-existing maternal medical conditions that affected the pregnancy. However, services that are consistently above the statewide average for inductions of labour or caesarean birth, especially for this cohort of women, should audit their policies, procedures and practices to identify the underlying reasons and identify areas for improvement.

Third- and fourth-degree perineal tears are a significant birth-related complication that may lead to long-term disability or morbidity. Third- and fourth-degree tear rates may reflect the quality of intrapartum care or differences in how this data is reported and captured. Hospitals with high rates are encouraged to review their intrapartum practices, while those with very low rates may need to ensure staff are appropriately trained to identify and classify perineal tears.

## Observations on the data

### Indicator 1a: Inductions in standard primiparae

The statewide rate of standard primiparae having labour induced in public hospitals has remained unchanged since 2012, at 2.9 per cent.

Standard primiparae who give birth in private hospitals were more likely to have labour induced than those in public hospitals, and this is reflected in the significantly higher statewide rate for private hospitals of 12.3 per cent in 2014 (see Figure 15). This rate has slightly decreased from 13.8 per cent in 2013.

Women included in the standard primipara group have no apparent medical indication for induction of labour, and some hospitals had very low rates of (or no) inductions in this group. Some of the highest rates were in rural hospitals caring for small numbers of standard primiparae, and rates should be interpreted with caution due to the low sample size. These health services, however, should continue to review and address the reasons for these inductions using a quality performance improvement framework.

### Indicator 1b: Caesarean section in standard primiparae

The statewide rate of standard primiparae who gave birth by caesarean section in public hospitals in 2014 was 16.1 per cent. This rate has increased from 15.5 per cent in 2013.

As in previous years, standard primiparae in private hospitals were more likely than those in public hospitals to give birth by caesarean section (31.5 per cent and 16.1 per cent respectively). There was a slight decrease in the statewide rate for private hospitals from 33 per cent in 2013 to 31.5 per cent in 2014.

### Indicator 1c: Third- and fourth-degree perineal tears in standard primiparae

The statewide rate of standard primiparae with third- or fourth-degree perineal tears increased slightly from 5.7 per cent in 2013 to 6.2 per cent in 2014. While the rate in several individual hospitals has decreased, in others there was a marked increase, and there is large variation in rates across hospitals. It is not clear to what extent this reflects less favourable perineal outcomes versus better ascertainment that enables referral and appropriate management.

Fewer third- and fourth-degree perineal tears were reported in private hospitals than in public hospitals (3.3 per cent compared with 6.2 per cent respectively).

## Expectations for performance improvement

Hospitals with results in the upper quartile range (least favourable outliers) for Indicators 1a, 1b and 1c are expected to:

- undertake regular multidisciplinary audits and reviews of the indications for induction of labour and caesarean section (weekly or monthly, depending on the size of the service)
- ensure the information (verbal and written) provided to women regarding the benefits and risks of induction and caesarean section are based on scientific evidence

- undertake a review of the local booking, prioritisation and authorisation processes for induction of labour and caesarean section, including escalation in the absence of clinical indication
- consider processes to have a second peer review process for interventions
- ensure clinicians are competent in avoiding as well as identifying and classifying perineal tears
- arrange to verify a sample of unit records with the Department of Health and Human Services to ensure local coding of standard primipara is correct (when local data varies from rates published in this report).

The Department of Health and Human Services' Maternity and Newborn Clinical Network has published the *Victorian standard for induction of labour*, which is available on the department's website under 'Policies and guidelines' at <[www2.health.vic.gov.au/about/publications](http://www2.health.vic.gov.au/about/publications)>.

## Consumer summary

### Indicators 1a, 1b and 1c: Outcomes for standard primiparae

A standard primipara refers to a woman 20–34 years old who is giving birth for the first time. The woman is free of medical complications and is pregnant with a single baby that is growing normally and is born head-first between 37 and 40 weeks.

This indicator focuses on low-risk and uncomplicated pregnancies; therefore, medical intervention and the rate of complications during labour and birth for this group of women are expected to be low.

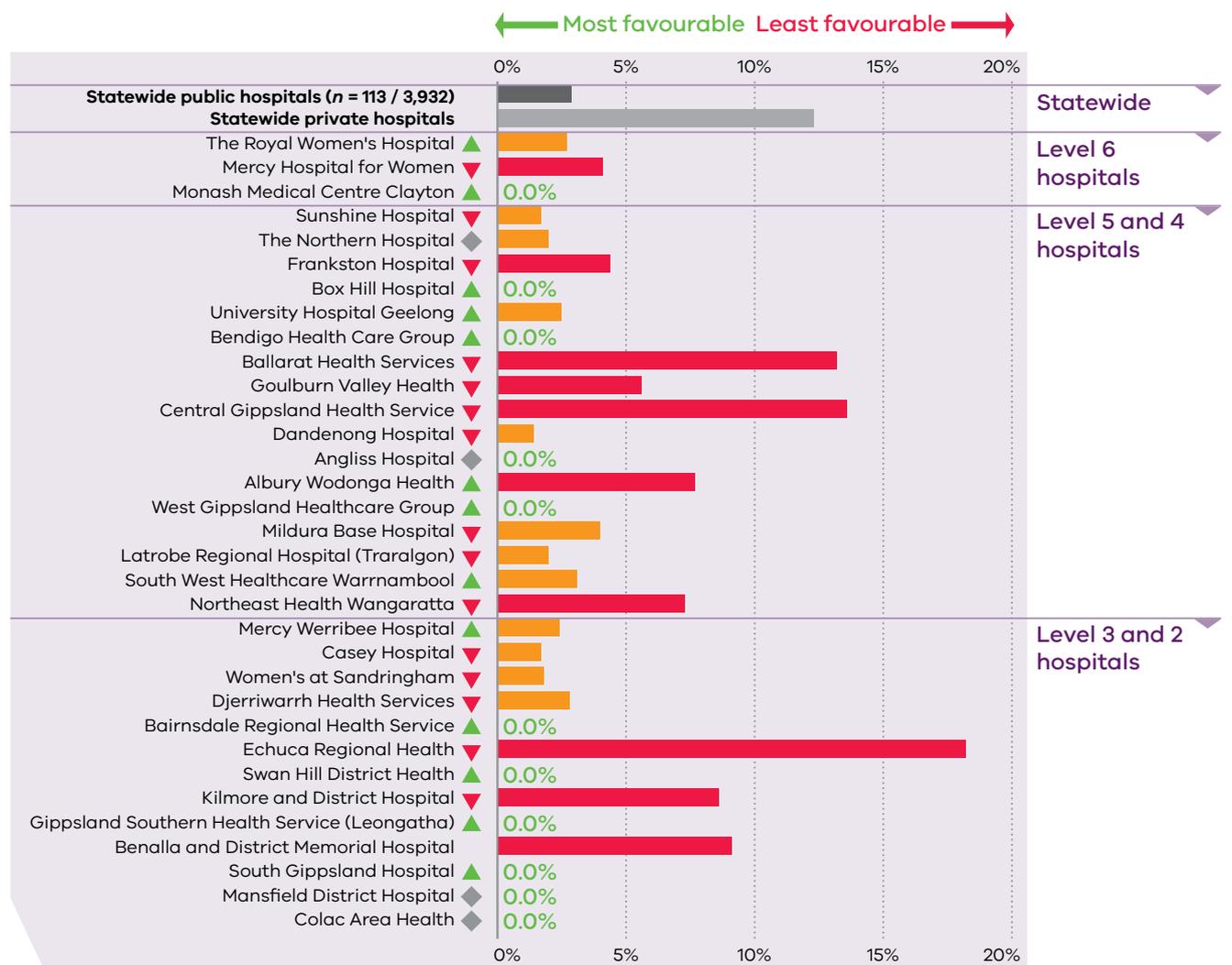
Induced labour and caesarean section can increase the risk of complications, lead to longer recovery times for women and affect future pregnancies. Therefore, hospitals with levels of medical intervention above the statewide rate are encouraged to review their practices and processes.

Complications such as third- and fourth-degree perineal tears after vaginal birth can cause long-term problems for women. Therefore, a low rate of third- and fourth-degree perineal tears after vaginal birth is desirable.

The data presented in this report indicates variation in practice across Victorian hospitals. Overall, private hospitals had higher rates of medical intervention (12.3 per cent for induction of labour; 31.5 per cent for caesarean section) than public hospitals (2.9 per cent for induction of labour; 16.1 per cent for caesarean section). The statewide rate of third- and fourth-degree tears after vaginal birth is, however, higher in public hospitals (6.2 per cent) than in private hospitals (3.3 per cent).

**Ask your health service about the level of organisational and clinical support provided to low-risk women to avoid unnecessary interventions and complications.**

**Figure 15: Indicator 1a: Rate of inductions of labour in standard primiparae in Victorian public hospitals, 2014**



**2014 result**

- Most favourable
- Non-outlying
- Least favourable

**Change from 2013 result**

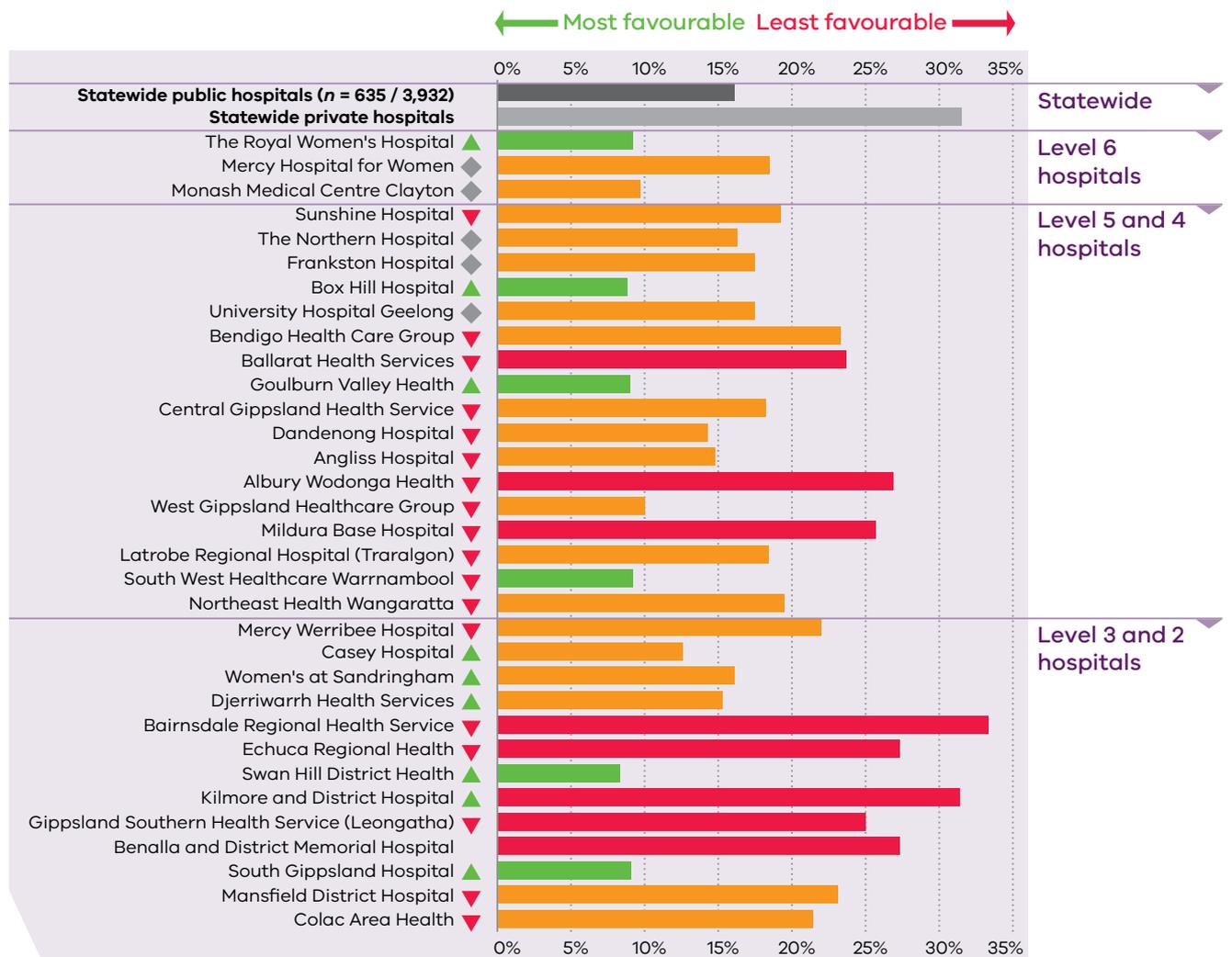
- ▲ Improved
- ◆ Unchanged
- ▼ Poorer

**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012	2011
Public hospitals	2.9% (0%; 4.1%)	2.9%	2.9%	4.2%
Private hospitals	12.3%	13.8%	12.6%	17.2%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published. An indicator result of 0.0% indicates that a health service met the reporting threshold of ≥ 10 cases in the denominator but did not have any cases in the numerator. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting. Only those services that had a published result in the 2013–14 reporting period will have a direction of change arrow shown on the graph.

**Figure 16: Indicator 1b: Rate of caesarean section in standard primiparae in Victorian public hospitals, 2014**



**2014 result**

- Most favourable
- Non-outlying
- Least favourable

**Change from 2013 result**

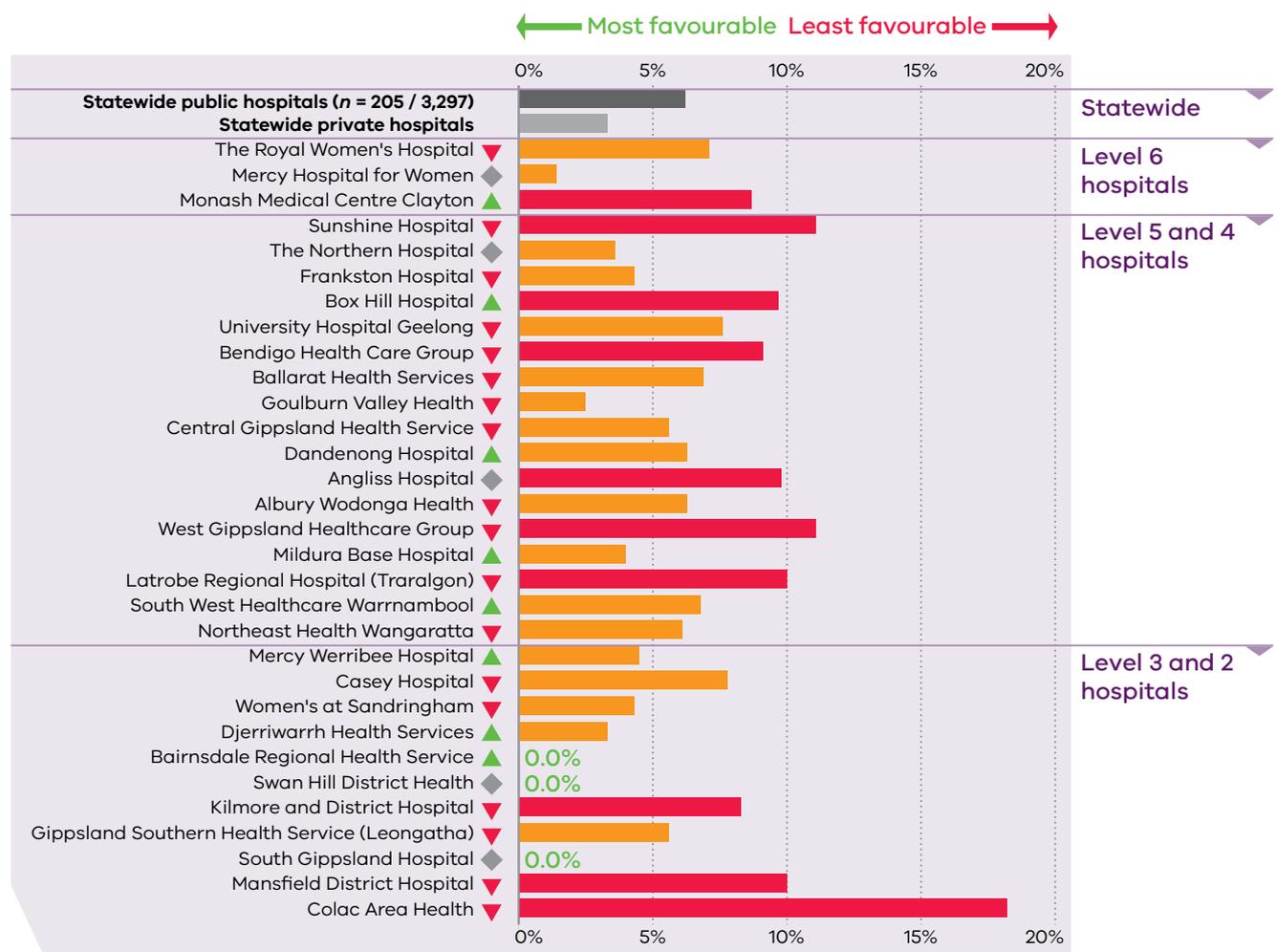
- Improved
- Unchanged
- Poorer

**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012	2011
Public hospitals	16.1 (9.2%; 23.7%)	15.5%	15.5%	16.1%
Private hospitals	31.5%	33%	29.6%	30.4%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting. Only those services that had a published result in the 2013–14 reporting period will have a direction of change arrow shown on the graph.

**Figure 17: Indicator 1c: Rate of third- and fourth-degree perineal tears in standard primiparae giving birth vaginally in Victorian public hospitals, 2014**



**2014 result**

- Most favourable
- Non-outlying
- Least favourable

**Change from 2013 result**

- ▲ Improved
- ◆ Unchanged
- ▼ Poorer

**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012	2011
Public hospitals	6.2% (0%; 8.3%)	5.7%	6.8%	5.9%
Private hospitals	3.3%	3.2%	2.9%	3.5%

Note: Health services that do not meet the reporting threshold of  $\geq 10$  cases in the denominator are not published. An indicator result of 0.0% indicates that a health service met the reporting threshold of  $\geq 10$  cases in the denominator but did not have any cases in the numerator. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting.

## Indicator 2: Term infants without congenital anomalies who require additional care

### Purpose and rationale

This indicator aims to highlight variations in the care required for term infants without congenital anomalies in Victorian hospitals. As such, it is concerned with the quality of perinatal care, with a primary focus on adverse events occurring during labour, birth and/or the immediate neonatal period that are principally due to avoidable factors.

A term infant without congenital anomalies includes those with low five-minute Apgar scores, birth trauma, early seizures, hypoxic ischaemic encephalopathy, FGR and sepsis. It also includes infants with more minor conditions, such as hyperbilirubinaemia.

The indicator is derived from newborn diagnostic-related groups and Australian Classification of Health Interventions procedure codes (National Centre for Classification in Health 2007) to identify term newborns requiring more than normal care. This may include babies who were admitted to a special care nursery or neonatal intensive care unit (see Appendix 2 for further information on the data specifications for this indicator).

Some of the variation occurring between health services may be a result of differences in reporting to the VAED. Health services should ensure there is accurate capture and reporting of diagnostic and treatment codes relevant to the newborn.

### Clinical significance

The infants included in this indicator are at least 37 weeks 0 days' gestation, have a birthweight of 2,500 grams or more and are born without congenital anomalies. Therefore, their need for additional medical care and treatment should be low. Higher rates may indicate quality-of-care issues during labour, birth or the immediate neonatal period.

### Observations on the data

The rate of term infants without congenital anomalies who required additional care in 2014–15 was 8.5 per cent, similar to 8.4 per cent in 2013–14. There was wide variation across public hospitals, ranging from zero to 21.8 per cent (see Figure 18).

Due to the large range, the upper quartile (outlier) threshold was 8.4 per cent, just short of the public statewide rate of 8.5 per cent (the statewide rate is the overall average, not the median percentile).

### Expectations for performance improvement

Health services should ensure there are adequate mechanisms to capture, review and report on adverse intrapartum events and outcomes.

Outlier services are expected to:

- undertake multidisciplinary reviews of adverse events and outcomes to identify areas for clinical practice or system improvement
- monitor the competency and confidence of their clinicians in fetal surveillance during labour and in neonatal resuscitation
- review the availability of senior clinicians to both supervise junior staff and be available to rapidly escalate care after hours.

## Consumer summary

### **Indicator 2: Term infants without congenital anomalies who require additional care**

Following birth, some babies will develop problems that require more than normal care. This may require admission to a special care nursery or neonatal intensive care unit.

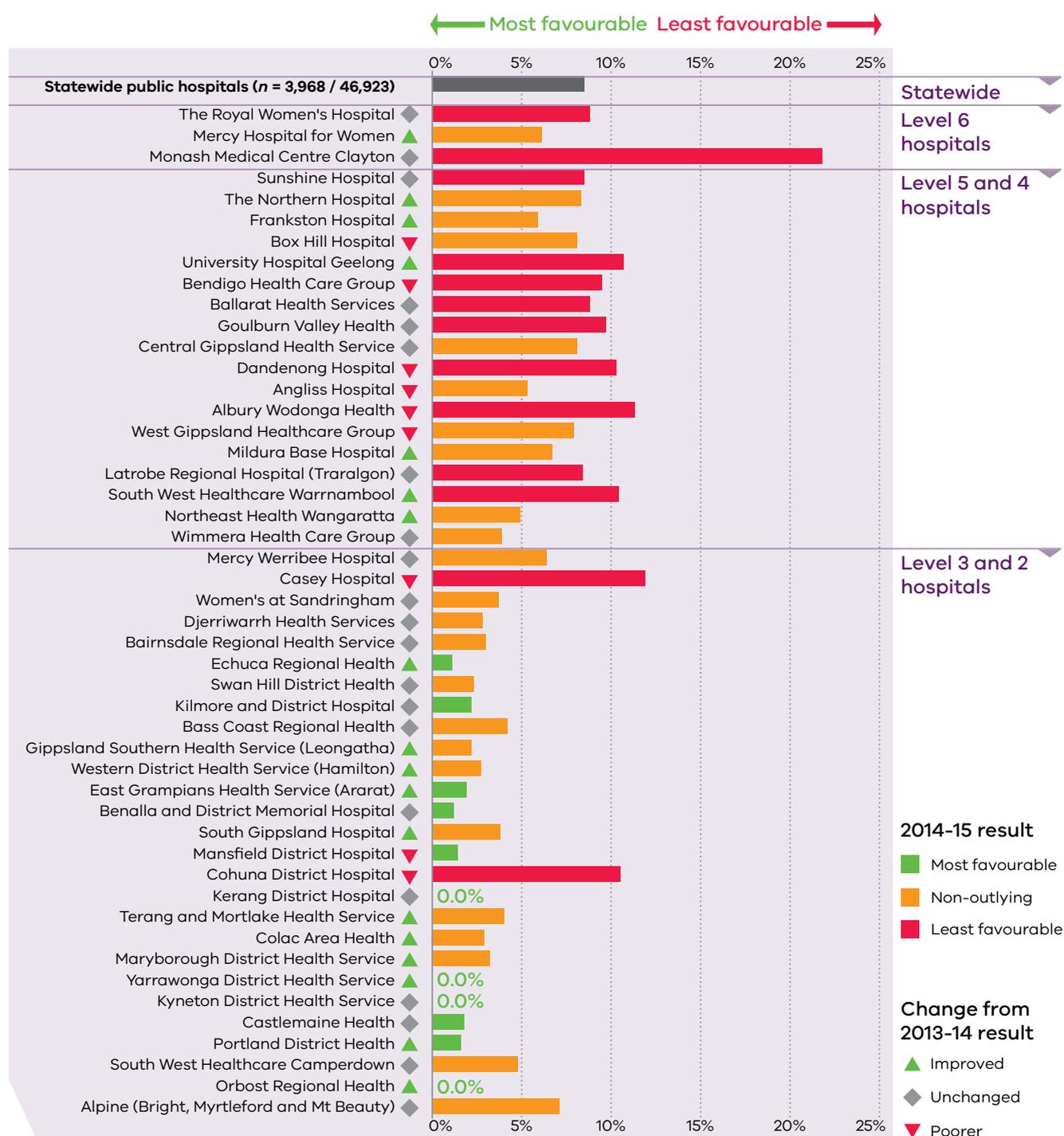
This indicator focuses on the quality of care during labour, birth and immediately following birth for babies born after 37 weeks without congenital anomalies.

In 2014–15, 8.5 per cent of infants born in public hospitals at more than 37 weeks and without congenital anomalies required additional care.

Health services should review their performance to determine whether there may be avoidable reasons for the higher care needs of babies.

**Ask your health service how they review unexpected events during labour and childbirth, how often this review is undertaken, and how they report on service improvement.**

**Figure 18: Indicator 2: Rate of term infants without congenital anomalies who require additional care in Victorian public hospitals, 2014–15**



**Statewide rates**

	2014-15 (quartiles: lower; upper)	2013-14	2012-13	2011-12
<b>Public hospitals</b>	8.5% (2.2%; 8.4%)	8.4%	8%	8.4%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published. An indicator result of 0.0% indicates that a health service met the reporting threshold of ≥ 10 cases in the denominator but did not have any cases in the numerator. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting. The statewide public hospital rate is the overall average, not the median percentile.



## Indicator 3: Severe fetal growth restriction (FGR)

### Purpose and rationale

The purpose of this indicator is to identify the proportion of severely growth-restricted singleton babies who are not born by 40 weeks' gestation. For this indicator, a baby is considered to be severely growth restricted when their birthweight is below the third centile for gestation, sex and plurality.

### Clinical significance

Severe FGR is associated with increased risk of perinatal mortality and morbidity, admission to special care or neonatal intensive care nurseries and long-term health consequences. The risk of mortality for a severely growth-restricted baby increases as the pregnancy advances.

Growth-restricted babies should be identified during the antenatal period to allow medical management and appropriate timing of the birth before 40 weeks' gestation. Detection of severe FGR during pregnancy would be expected to reduce the increased risk of mortality and morbidity.

### Observations on the data

In 2014, 34.6 per cent of singleton babies with severe growth restriction were born at 40 or more weeks' gestation in Victorian public hospitals. This rate has increased slightly from 33.3 per cent in 2013; however, the data indicates wide variation between hospitals, ranging from 15.6 per cent to 61.9 per cent.

In 2014 there was a slightly higher proportion of severely growth-restricted babies undelivered at 40 weeks' gestation in public hospitals than private hospitals (see Figure 19).

### Expectations for performance improvement

All hospitals, in particular those with results in the upper quartile range (least favourable outliers), are expected to:

- monitor their rates at a regular interval (monthly or quarterly depending on the size of the service) including the possible reasons for the lack of detection
- provide direct feedback to clinicians following multidisciplinary case review
- monitor the competency and confidence of clinicians in assessing fetal wellbeing during pregnancy
- review and update local FGR policies to ensure there is a clear course of action based on the risk factors
- ensure women with higher risk pregnancies are referred to the most appropriate level of service, within or outside of the organisation.

## Consumer summary

### **Indicator 3: Rate of severe fetal growth restriction (FGR) in a singleton pregnancy, undelivered by 40 weeks**

FGR refers to poor growth of a baby during pregnancy. Severe FGR is associated with increased risk of death and long-term health consequences for babies; therefore, it is recommended that severely growth-restricted babies are identified and born before 40 weeks' gestation. This indicator is concerned with babies with severe FGR who were not born before 40 weeks' gestation, reflecting poor identification and/or management.

The data presented in this report indicates that a high number of severely growth-restricted babies born in public (34.6 per cent) and private hospitals (29.9 per cent) were not born before 40 weeks' gestation.

Although this is a challenging issue for healthcare providers, the data suggests an immediate need for Victorian hospitals to improve methods for identifying and managing severe FGR.

**Ask your health service about the risk factors for FGR, and let them know if you are concerned about your baby's growth, movement or wellbeing during pregnancy.**

**Figure 19: Indicator 3: Rate of severe fetal growth restriction (FGR) in a singleton pregnancy undelivered by 40 weeks, 2014**



**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012	2011
Public hospitals	34.6% (25.3%; 42.5%)	33.3%	39.4%	39.1%
Private hospitals	29.9%	38.2%	31.9%	41.7%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published. Quartiles for this indicator are calculated based on only those public health services that meet the criteria for public reporting.



# Indicators 4a and 4b: Vaginal births after primary caesarean section

## Purpose and rationale

This indicator identifies the proportion of women who planned for a vaginal birth after a primary caesarean section (a 'VBAC') (Indicator 4a) and those who achieved a planned-term VBAC (Indicator 4b).

Each woman who has had a previous caesarean section must be assessed to determine if there are any contraindications to her planning a VBAC for subsequent births. If there are none, and appropriate clinical support is available and provided by the hospital, women should be encouraged to plan a VBAC and be offered factual information about the risks and benefits.

A planned VBAC should be conducted in a suitability staffed and equipped delivery suite with continuous intrapartum care and monitoring and with available resources for urgent caesarean section and advanced neonatal resuscitation, should complications occur (Royal Australian and New Zealand College of Obstetricians and Gynaecologists 2015). Not all hospitals in Victoria offer VBAC, and those that do not have been excluded from the indicator.

## Clinical significance

Approximately one-third of all babies in Victoria are born by caesarean section. While many of these procedures are necessary and improve outcomes for women and babies, having a caesarean section can prolong recovery from the birth, increase the small risk of serious morbidity after the birth and increase the risk of major complications in subsequent pregnancies (particularly problems with implantation of the placenta). For health services, caesarean section procedures require additional resources and costs.

Reducing the number of avoidable caesarean sections minimises these problems. There are two main strategies to achieve this:

- preventing a woman's first caesarean section (having a caesarean section for the first birth greatly increases the risk of needing a caesarean in subsequent births)
- encouraging women who have had a prior caesarean section to safely attempt a subsequent VBAC and supporting them to achieve this (Royal Australian and New Zealand College of Obstetricians and Gynaecologists 2015).

The safety of women and babies is paramount, and sound clinical judgement is required to differentiate the avoidable from the unavoidable first caesarean section and to assess women with a prior caesarean section for whom a plan for a VBAC is appropriate.

## Observations on the data

The proportion of women planning a VBAC in public hospitals has remained stable (27.4 per cent in 2014; 27.9 per cent in 2013). There was wide variation across public hospitals, ranging from a rate of 5.9 per cent to 50.8 per cent.

Similarly to previous years, fewer women attending private hospitals planned a VBAC than in public hospitals (15.4 per cent and 27.4 per cent respectively) (see Figure 20).

In 2014 the proportion of women in public and private hospitals who achieved a planned VBAC increased slightly compared with 2013 (54.2 and 53.2 per cent respectively).

There was again wide variation in rates across public hospitals, ranging from around 28.6 per cent to 70.9 per cent (see Figure 21).

## Expectations for performance improvement

Health services with results in the lower quartile range (least favourable outliers) are expected to:

- report on the capability of the service to offer a VBAC to women without contraindications
- undertake a review of the VBAC pathway offered and report on identified deficiencies to assessing facilities, specialists or standards of care
- ensure the information (verbal and written) provided to women regarding the benefits and risks of VBAC are based on scientific evidence.

### Consumer summary

#### Indicator 4: Vaginal births after primary caesarean section

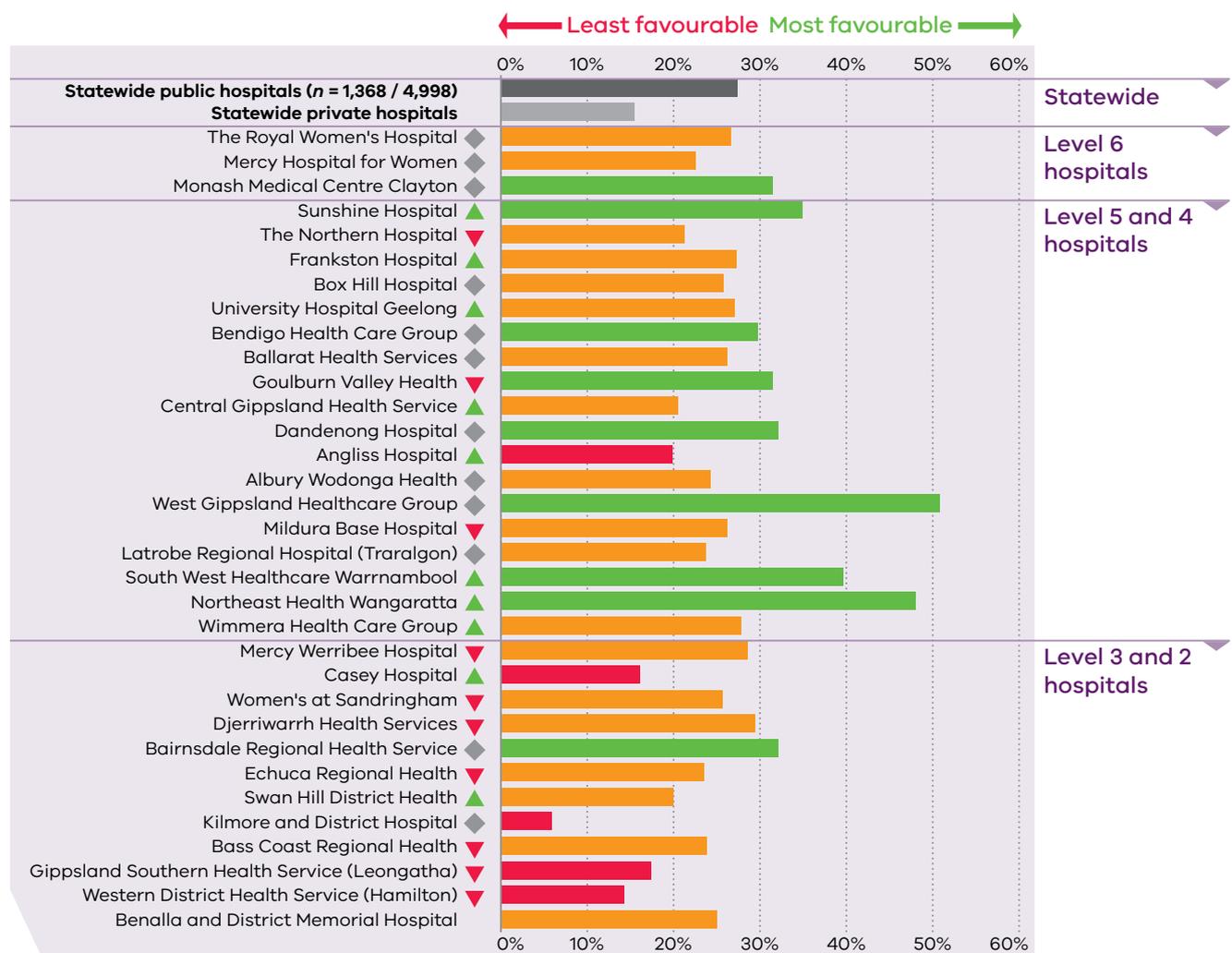
Caesarean section can be a life-saving procedure. However, it is associated with greater health risks for both the woman and her baby and should only be considered when medically indicated. Having a caesarean section for the first birth greatly increases the risk of needing a caesarean section in subsequent births. Additionally, the risk of severe complications increases significantly with each caesarean section.

For women who have had a previous caesarean section, it is important to determine whether it is medically safe to attempt a vaginal birth. This indicator looks at the rate of women who have had one prior birth that was a caesarean and who plan a VBAC, and the proportion of those who plan a VBAC who actually do give birth vaginally.

The data presented in this report indicates variation in practice across Victorian hospitals. Overall, the number of women who planned a VBAC was greater in public (27.4 per cent) than private hospitals (15.4 per cent). Of these women, 54.2 per cent compared with 48.9 per cent who gave birth in a public and private hospital respectively achieved a VBAC.

**Ask your health service about the level of organisational and clinical support provided to women wishing to safely follow the VBAC pathway.**

**Figure 20: Indicator 4a: Rate of women who planned for vaginal birth following a primary caesarean section in Victorian public hospitals, 2014**



**2014 result**

- Most favourable
- Non-outlying
- Least favourable

**Change from 2013 result**

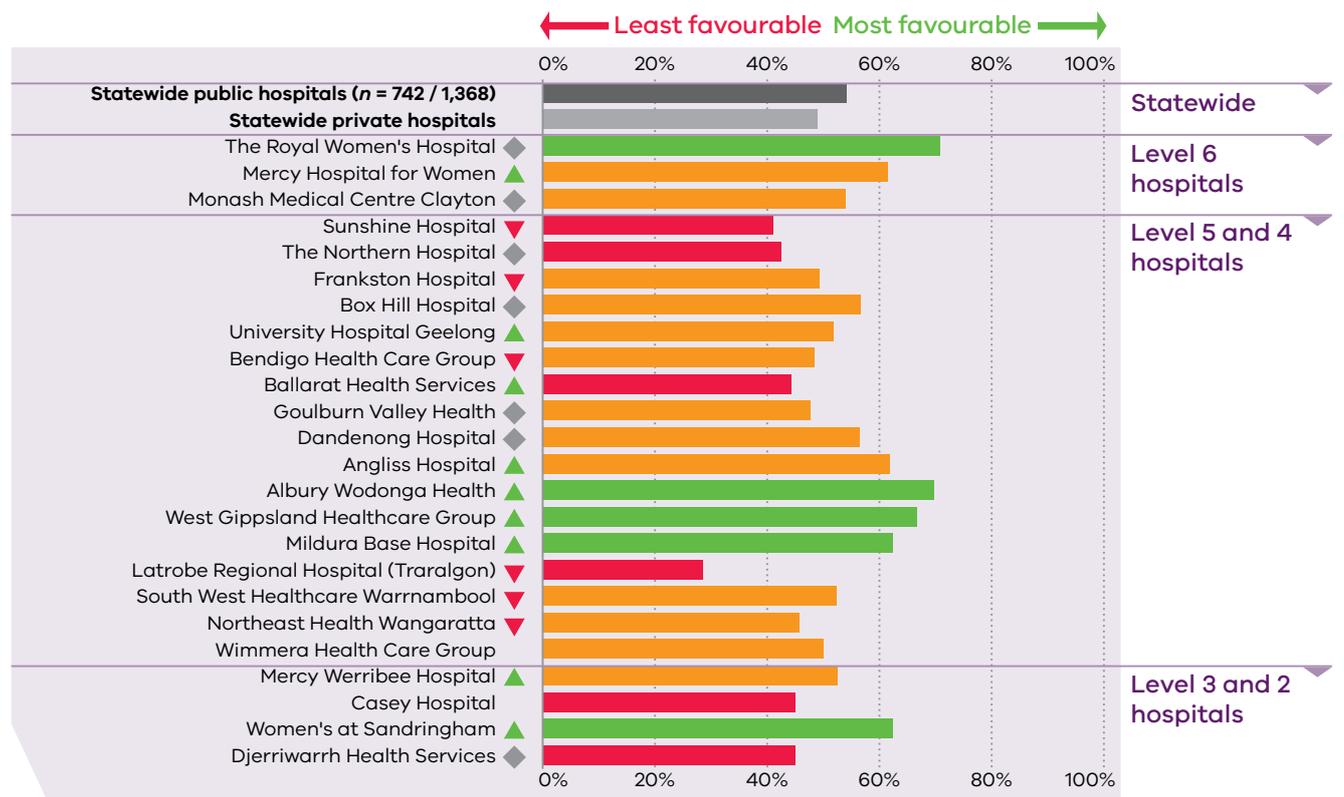
- Improved
- Unchanged
- Poorer

**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012	2011
Public hospitals	27.4% (19.9%; 31.5%)	27.9%	29.1%	29.4%
Private hospitals	15.4%	15.6%	16%	17%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published.

**Figure 21: Indicator 4b: Rate of women who achieved a planned vaginal birth following a primary caesarean section in Victorian public hospitals, 2014**



**2014 result**

- Most favourable
- Non-outlying
- Least favourable

**Change from 2013 result**

- ▲ Improved
- ◆ Unchanged
- ▼ Poorer

**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012	2011
Public hospitals	54.2% (45%; 64.6%)	53.2%	53.9%	46%
Private hospitals	48.9%	50.5%	51.7%	50.9%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published.

## Indicator 5: Five-year (2010–2014) gestation standardised perinatal mortality ratio

### Perinatal mortality

Perinatal mortality includes fetal deaths (stillbirths) and deaths of liveborn babies within the first 28 days after birth (neonatal deaths). Victoria and Australia experience one of the lowest maternal and perinatal mortality rates internationally.

Although perinatal mortality rates have fallen since 2009, there remain groups of women with a higher risk of losing a baby including:

- Aboriginal and Torres Strait Islander women
- women born in North Africa, the Middle East or southern and central Asia
- women who have had multiple pregnancies
- women whose babies are born pre-term or with FGR.

Important risk factors for perinatal mortality are: maternal weight; substance abuse including cigarette smoking; socioeconomic status; access to antenatal care; pre-existing illness such as diabetes and hypertension; and ethnicity.

Contributing or preventable factors may occur in a small number of cases. High-quality, expert review by health services is important to improve the overall safety and quality of care provided to women and babies and to share the lessons learnt.

Almost all perinatal deaths are due to factors during pregnancy and childbirth.

The leading causes are congenital anomalies, pre-term birth, FGR and intrapartum haemorrhage, reflecting trends nationally (Hilder et al. 2014) and in the UK (Centre for Maternal and Child Enquiries 2009).

### What is the gestation standardised perinatal mortality ratio (GSPMR)?

The GSPMR compares the perinatal mortality rates at individual public hospitals with the overall statewide public hospital rate. Due to the overall small number of perinatal deaths, it is calculated over a five-year period. While this may be considered a fairly crude statistic, it is valuable because it provides a 'first look' into perinatal mortality patterns across Victoria.

The GSPMR is complex, has limitations and must be interpreted with caution. The rate cannot tell us about the avoidability of perinatal deaths. Instead, this is a role that must be undertaken by a multidisciplinary panel, formed locally to consider individual circumstances.

Publishing the GSPMR allows hospitals to learn from each other and improves the transparency of reporting of outcomes for Victorian public hospitals.

## Interpretation

The statewide public hospital rate (the reference population) is set at '1'. Therefore, a ratio (or rate) over 1 indicates that the service had more deaths than the statewide rate. A rate below 1 indicates the perinatal mortality is less than the statewide rate. For example, an individual hospital with a rate of:

- 0.5 has a perinatal mortality that is half the statewide rate
- 1 has a perinatal mortality that is equal to the statewide rate
- 1.5 has a perinatal mortality that is 50 per cent above the statewide rate
- 2 represents perinatal mortality that is double the statewide rate.

These rates are about babies who died after 32 weeks of gestation, as most of the state maternity services have a maternity capability level below 5 or a newborn level below 4, and do not provide planned services for babies born before 32 weeks of gestation.

## What is included or excluded in the GSPMR?

The GSPMR data is reported by the birth hospital and:

- includes babies who died after 32 weeks of gestation (stillbirths or babies who died within the first 28 days of life)
- excludes deaths from congenital anomalies and all terminations of pregnancy
- takes into account the gestation of the babies born at each service.

## What does the GSPMR tell us?

The GSPMR:

- identifies the public hospitals in Victoria where stillborn babies and babies who die within the first 28 days of life are born (however this may not be where the baby died)
- allows comparison of public hospitals of similar capability and size
- indicates the difference between the statewide private hospital average and the statewide public hospital average. However, the differences in casemix between the two sectors should be noted
- adjusts for the most important risk of perinatal death, which is gestation
- shows where there is variation in perinatal mortality rates for hospitals of similar capability or size
- provides a focus for maternity services to undertake detailed reviews of the outcomes for the babies born in their service, and to identify opportunities to improve their care.

## What can't the GSPMR tell us?

The GSPMR does not include:

- statewide or individual hospital perinatal mortality rates
- reasons for the deaths or how the babies died (a baby may have died before arriving at the birth hospital, while in the hospital or following discharge from hospital, for example, due to SIDS, a car accident or injury)
- whether the death could have been avoided
- if the care around the time of death was provided by a different hospital (transfer) or health professional than the birth hospital
- where the baby died (it only tells us where the baby was born)
- the safety of a maternity service.

### The GSPMR also:

- does not show the contribution of important risk factors associated with perinatal mortality, such as obesity, smoking or pre-existing illness of the mother, low socioeconomic status and some ethnic groups (in this year's report, population attributable risk for the GSPMR has been calculated to provide this information)
- attributes the death to the birth hospital, even if the baby died outside of the hospital or the mother received pregnancy care elsewhere.

Additional information on population attributable risks associated with the GSPMR is provided on pages 53 to 60.

## Purpose and rationale

The GSPMR is a measure of perinatal mortality that compares the observed perinatal mortality rate at individual hospitals with what would be expected, taking into account the gestation of the babies born there. It is a partially risk-adjusted calculation, enabling hospitals with higher proportions of babies born at lower gestations (and therefore higher likelihood of perinatal mortality) to be validly compared with hospitals that have a different casemix. Pooling the data over five-year periods adds stability to the data and reduces the risk of over interpretation of chance fluctuations.

Indicator 5 provides a broad comparative measure of perinatal mortality rates across hospitals. It captures the GSPMR for those babies born at 32 or more weeks' gestation, which is relevant for the majority of hospitals that do not normally care for babies born before 32 weeks' gestation, beyond the provision of immediate emergency care and transfer to a higher capability service.

Any deaths related to congenital anomalies and terminations of pregnancy are excluded from this data to better represent deaths that may be avoidable.

A high GSPMR warrants hospitals to identify preventable factors related to care that may have contributed to adverse outcomes.

A GSPMR of 1 indicates that the observed number of perinatal deaths at that hospital is exactly what would be expected, considering the gestation of babies born there.

**It is important to note that the statewide rate does not necessarily represent the optimal or clinically appropriate rate for perinatal mortality, and conclusions about whether perinatal deaths were avoidable or the safety of a maternity service cannot be determined from the GSPMRs.**

Figure 22 provides a visual representation of the variation in perinatal mortality occurring across Victorian public hospitals when compared with the statewide public hospital rate.

## Clinical significance

Variation in the GSPMR may be due to differences in the health or socioeconomic status of women but may also relate to the quality of care and care delivery systems. While the cause of a persistently high GSPMR is likely to be multifactorial, it is expected that hospitals will closely analyse their relative performance and investigate possible causes to optimise the outcomes for women and babies.

## Observations on the data

Based on pooled data from 2010 to 2014, the GSPMR for babies born at 32 weeks or more ranged from 0.48 to 2.03. This reflects ratios that are about half to double the statewide public hospital perinatal mortality rate.

The statewide private hospital perinatal mortality ratio result is about 30 per cent less than the statewide public hospital perinatal mortality ratio from 32 weeks' gestation. This reflects, at least in part, the less disadvantaged populations using private maternity care and the higher risk women and babies being seen in the public hospital system.

## Expectations for performance improvement

The *Department of Health and Human Services policy and funding guidelines 2016* (Department of Health and Human Services 2016) requires all health services to review perinatal deaths in accordance with the Perinatal Society of Australia and New Zealand's (2009) *Clinical practice guideline for perinatal mortality*. All hospitals should have formal processes to review all perinatal deaths, identifying avoidable factors, opportunities for improvement in care processes and organisational systems such as staff availability, supervision and skill mix.

Regional perinatal mortality and morbidity committees are being established across Victoria to systematically review and audit all deaths and other clinical outcomes for mothers and babies in their region. The regional committees do not replace the existing requirements of health services to investigate and report adverse outcomes. Instead, they act as another layer of review for rural health services, which will benefit those that do not have the critical mass and expertise to undertake this work independently.

All perinatal deaths are required to be reported to the Consultative Council on Obstetric and Paediatric Mortality and Morbidity (CCOPMM) within the time period specified by the CCOPMM.<sup>9</sup>

All health services are also required to develop organisation-wide strategies approved by the health service executive to address contributing factors (if identified) and report on their implementation.

Health services with higher than expected perinatal mortality (a GSPMR greater than 1) are also required to report their mortality review findings and recommendations to the CCOPMM.

It should be noted that because the GSPMR is derived from data pooled for five-year periods, as hospitals introduce practice improvements to lower their GSPMR, improvements in the ratio may not be observed until three to four years later.

<sup>9</sup> Further information on the legislated functions of the CCOPMM can be found at <[http://www.austlii.edu.au/au/legis/vic/consol\\_act/phawa2008222/](http://www.austlii.edu.au/au/legis/vic/consol_act/phawa2008222/)>.

## Consumer summary

### Indicator 5: Five-year (2010–2014) gestation standardised perinatal mortality ratio

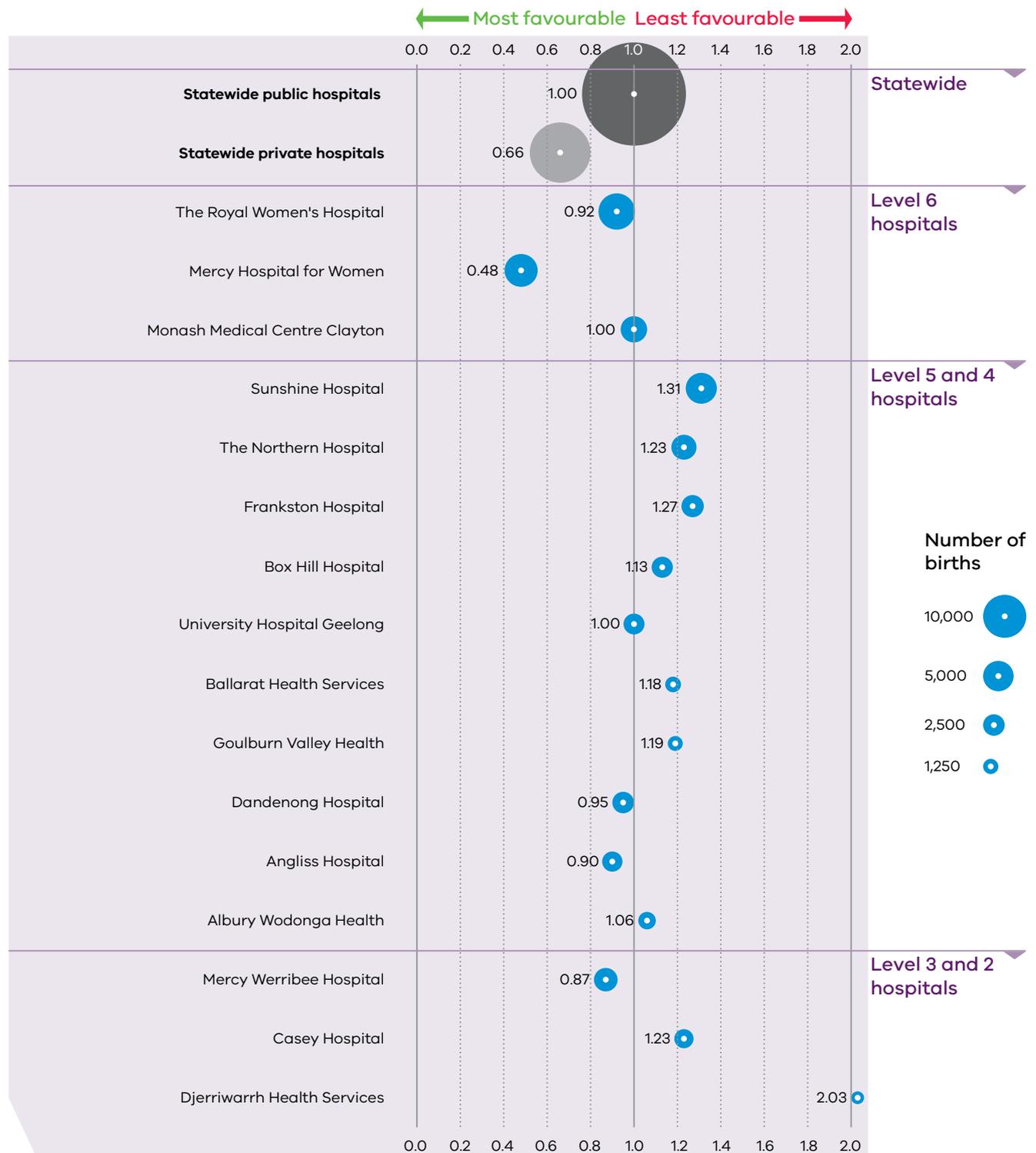
Victoria and Australia experience one of the lowest perinatal mortality rates internationally. However, having a robust system for identifying contributing or preventable factors and sharing lessons learnt is important for improving the safety and quality of hospitals. Hospitals are required to review all perinatal deaths.

Gestation is an important risk factor for perinatal mortality. GSPMR provides a broad and impartial method of comparing the rate of death of babies born in hospitals based on their age (in weeks) at birth. The ratio allows hospitals to consistently compare the rate of death of babies born at their service with the rate at all other hospitals in Victoria.

It is important to note that there are many factors that can lead to the death of a baby. It is also important to note that the GSPMR does not take into account all risk factors that can lead to the death of a baby. This and other limitations to the indicator mean that it should be interpreted with caution.

The data presented in this report indicates there is variability in the rate of death of babies born in public hospitals from 32 weeks. A GSPMR of 1 indicates that the observed number of perinatal deaths at a hospital is what would be expected. A higher GSPMR warrants hospitals to review each case so that they can identify and address contributing or preventable factors.

**Figure 22: Indicator 5: Perinatal mortality ratio for babies born at 32 weeks or more (gestation standardised, excluding all terminations of pregnancy and deaths due to congenital anomalies) using five years' pooled data in Victorian public hospitals, 2010–2014**



**Statewide rates**

	2010-2014 (quartiles: lower; upper)
Public hospitals	1.00 (0.94; 1.23)
Private hospitals	0.66

Note: Excludes termination of pregnancy, deaths due to congenital anomalies and fetus papyraceus. In interpreting these ratios, conclusions cannot be drawn about the avoidability of any of these deaths. Quartiles for this indicator are calculated based on only those public health services that meet the criteria for public reporting.

# Population-attributable risk for perinatal mortality

Perinatal mortality includes fetal deaths (stillbirths) and deaths of liveborn babies within the first 28 days after birth (neonatal deaths).

Although overall perinatal mortality rates have fallen since 2009, there are subgroups of women with a higher risk of losing a baby.

Using a statistical method called population-attributable risk (PAR), calculations can help hospitals to understand which perinatal mortality risk factors are most important for their community.

## What is population attributable risk?

Population attributable risk (PAR) can measure the impact of a risk factor on an outcome of disease or death. In this report, PARs have been calculated to assess how much of a reduction in perinatal mortality (the number of stillbirths and deaths within the first 28 days of life) would occur if the exposure to, and/or prevalence of, a risk factor is eliminated or managed effectively.

There are many risk factors affecting mothers and babies that contribute to perinatal mortality and individual risk factors may interact with each other to impact the overall risk of perinatal mortality (PAR for these individual risk factors often overlap and may add up to more than 100).

PAR can assist health services to understand which perinatal mortality risk factors are the most important for the women who receive care and/or birthing assistance at their service.

## Risk factors for perinatal mortality

PAR for perinatal mortality has been calculated for a number of risk factors, including:

- maternal obesity (body mass index (BMI)  $\geq 35$  kg/m<sup>2</sup>)
- mothers who are smokers in the second half of pregnancy
- mothers who are younger than 20 years old
- mothers being 35 years or older
- the mother's country of birth
- twin or higher order births
- lowest socioeconomic quintile (based on the mother's place of residence)
- birthweight below the third centile (severe fetal growth restriction) that remained undetected before birth
- extreme prematurity (< 32 weeks gestation) and prematurity (< 37 weeks gestation)
- mother has pre-existing diabetes, also called pre-gestational diabetes (type 1 and type 2 diabetes)
- the Indigenous status of the mother.

## Benefits of PAR

PAR identifies the risk factors that contributed most to the perinatal deaths and can be used to provide a focus for quality improvement activities to reduce perinatal mortality.

## Limitations of PAR

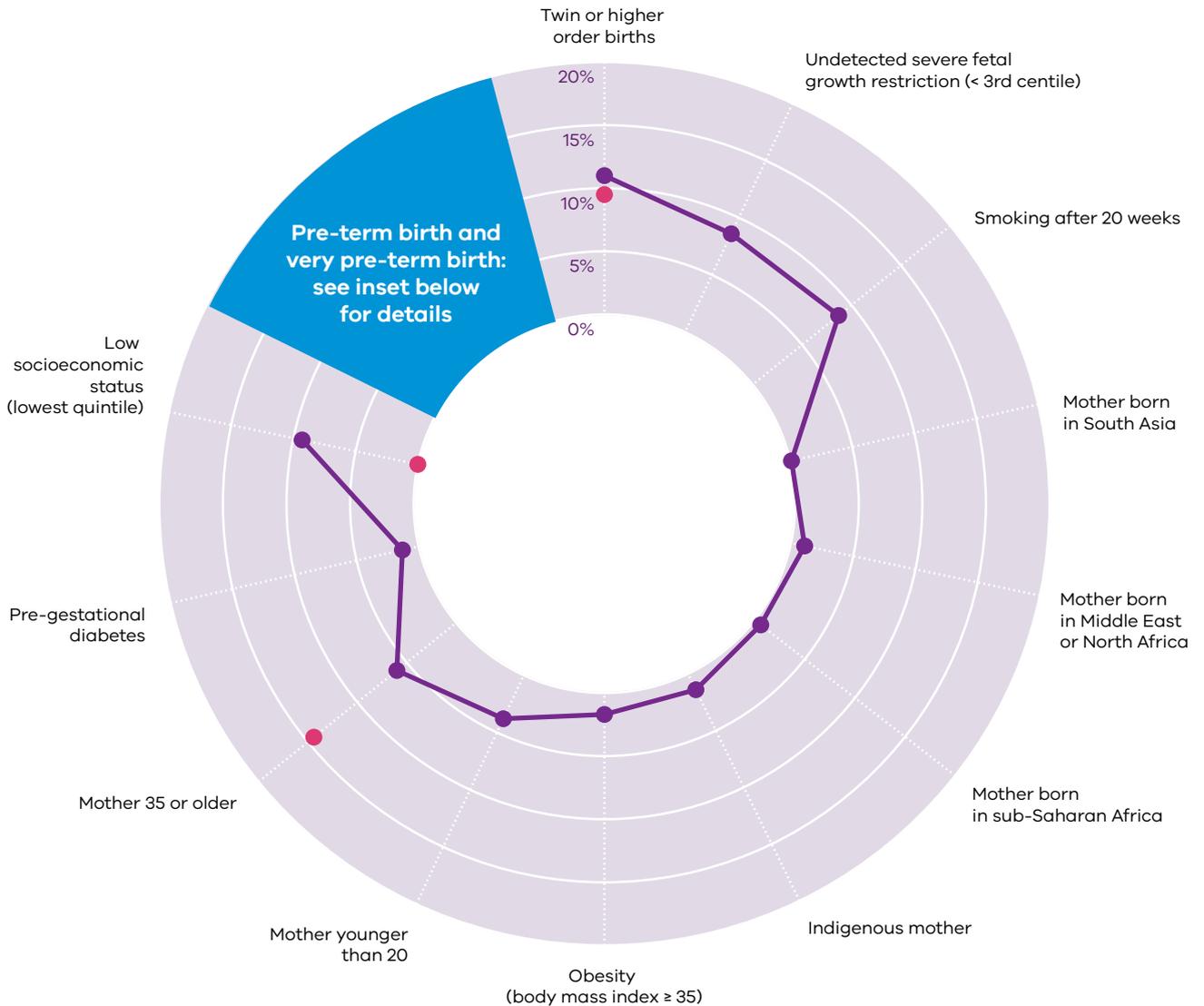
The PAR only relates to the direct and unilateral relationship or contribution of the specific risk factor in relation to the outcome (perinatal mortality), and does not adjust for other associated risk factors. For example, the effect of prematurity on perinatal mortality is not adjusted for twin births.

## Results

The following example PARs for 2013 and 2014, including interpretation of the findings, have been provided:

- all private hospitals compared with the statewide public hospital PAR (see Figure 23)
- all metropolitan public hospitals compared with the statewide public hospital PAR (see Figure 24)
- all regional/rural public hospitals compared with the statewide public hospital PAR (see Figure 25)
- all level 5 and 6 public hospitals compared with the statewide public hospital PAR (see Figure 26)
- all level 3 and 4 public hospitals compared with the statewide public hospital PAR (see Figure 27)
- an example hospital (de-identified) compared with the statewide public hospital PAR (see Figure 28).

**Figure 23: Population-attributable risks for selected perinatal mortality risk factors for all private hospitals compared with the statewide public hospital population-attributable risk, 2013 and 2014**



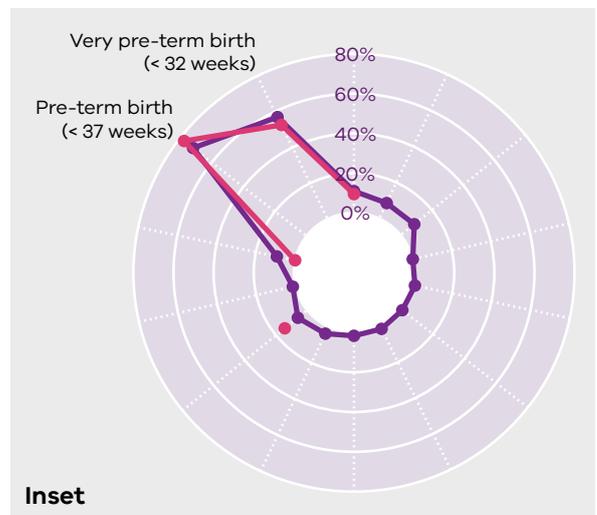
- All public hospitals
- All private hospitals

**Notes**

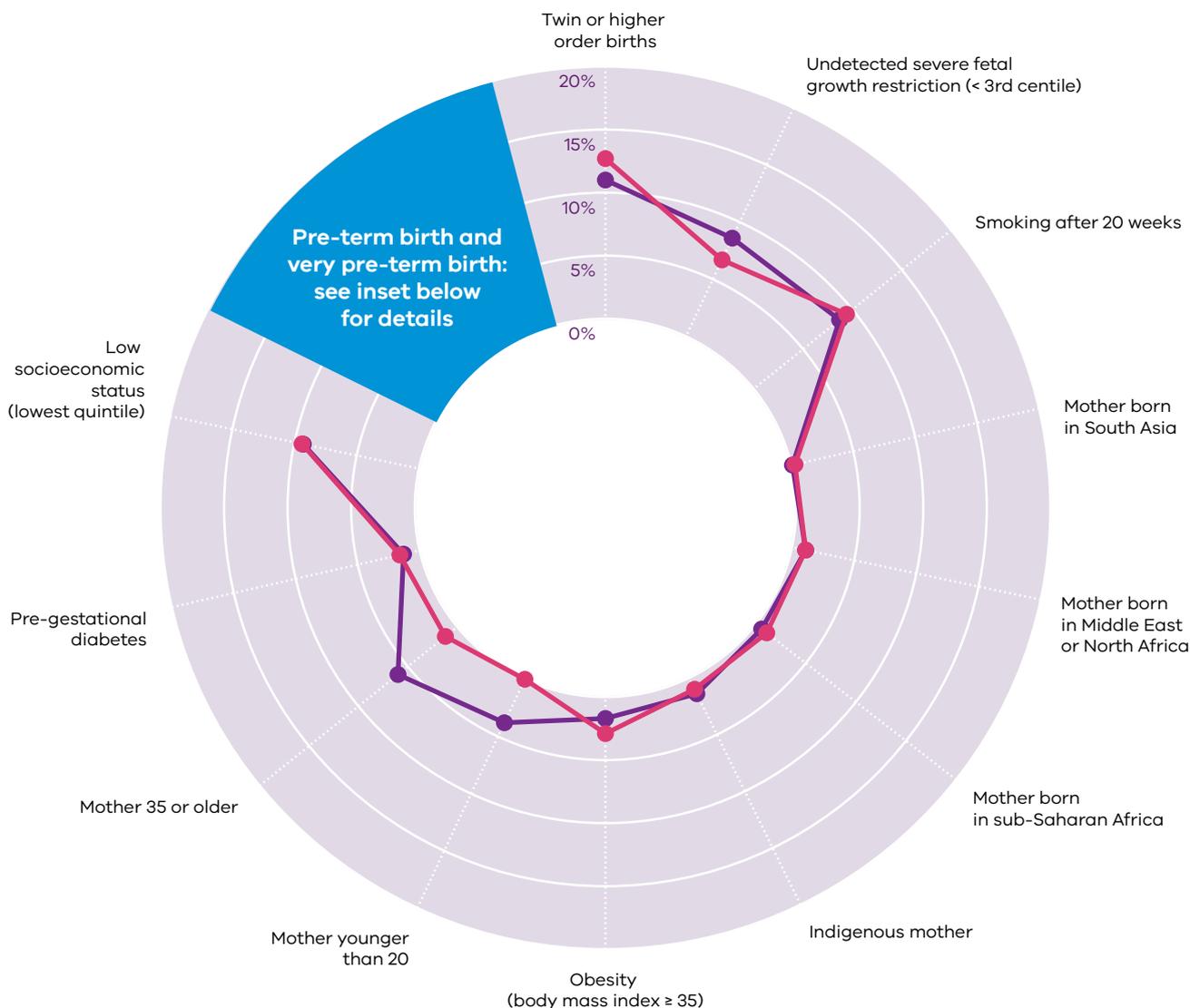
Excludes terminations of pregnancy, deaths due to congenital anomalies and babies with birthweight < 150g.  
 No result reported if fewer than 5 deaths identified in the risk group.  
 The GSPMR (Indicator 5) forms the basis for the calculation of the PAR.

**Observations on the data**

Figure 23 shows that in 2013 and 2014, prematurity, multiple births and maternal age (≥ 35 years) were the most significant contributors to perinatal mortality in private hospitals overall.  
 For statewide public hospitals overall, prematurity, multiple births, undetected severe FGR (< 3rd centile), smoking after 20 weeks' gestation, maternal age (< 20 years and ≥ 35 years) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality.



**Figure 24: Population-attributable risks for selected perinatal mortality risk factors for all metropolitan public hospitals compared with the statewide public hospital population-attributable risk, 2013 and 2014**



- All public hospitals
- Metropolitan public hospitals

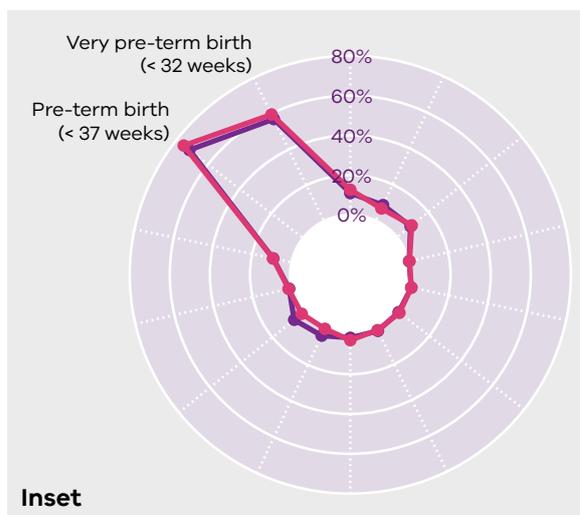
**Notes**

Excludes terminations of pregnancy, deaths due to congenital anomalies and babies with birthweight < 150g.  
 No result reported if fewer than 5 deaths identified in the risk group.  
 The GSPMR (Indicator 5) forms the basis for the calculation of the PAR.

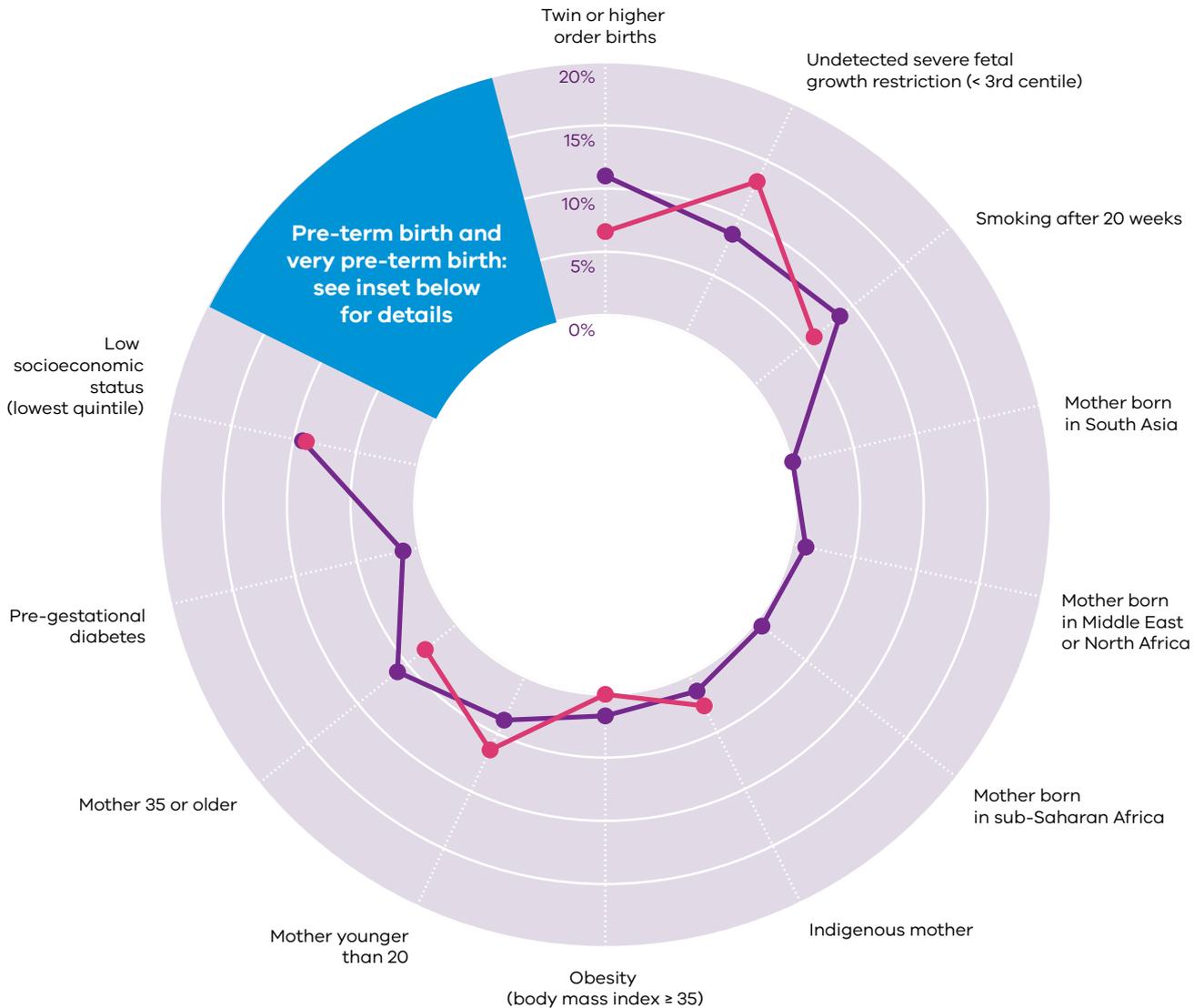
**Observations on the data**

Figure 24 shows that in 2013 and 2014, prematurity, multiple births, undetected severe FGR (< 3rd centile), maternal smoking after 20 weeks' gestation, obesity (BMI > 35 kg/m<sup>2</sup>) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality in metropolitan public hospitals overall.

For statewide public hospitals, prematurity, multiple births, undetected severe FGR (< 3rd centile), smoking after 20 weeks' gestation, maternal age (< 20 years and ≥ 35 years) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality.



**Figure 25: Population-attributable risks for selected perinatal mortality risk factors for all rural and regional public hospitals compared with the statewide public hospital population-attributable risk, 2013 and 2014**



- All public hospitals
- Regional/rural public hospitals

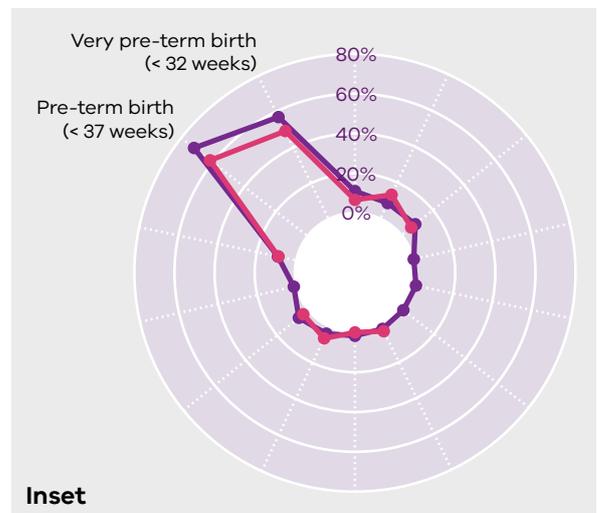
**Notes**

Excludes terminations of pregnancy, deaths due to congenital anomalies and babies with birthweight < 150g.  
 No result reported if fewer than 5 deaths identified in the risk group.  
 The GSPMR (Indicator 5) forms the basis for the calculation of the PAR.

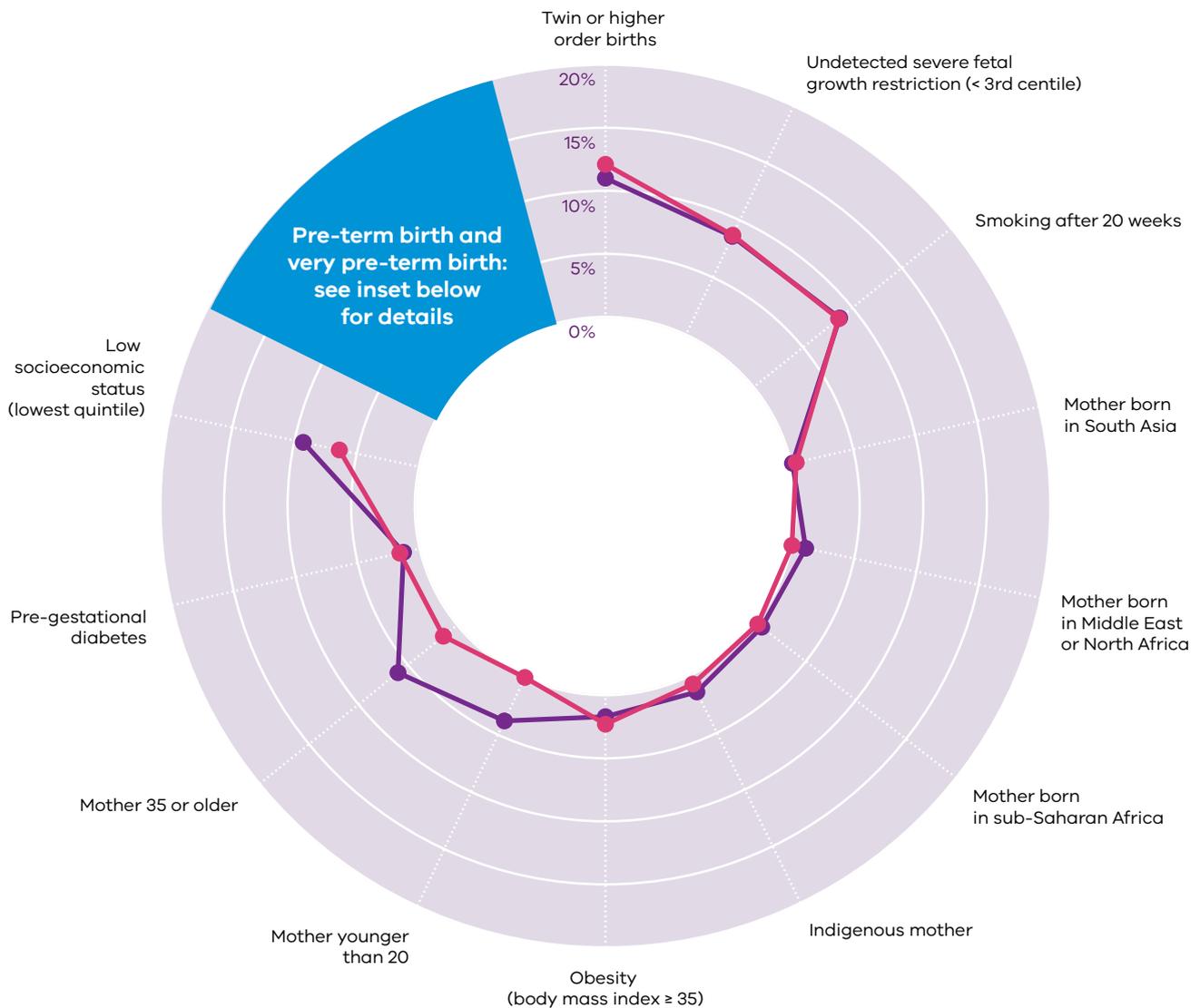
**Observations on the data**

Figure 25 shows that in 2013 and 2014, prematurity, multiple births, undetected severe FGR (< 3rd centile), maternal smoking after 20 weeks' gestation, indigenous status of mother, maternal age (< 20 years and ≥ 35 years) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality in rural and regional public hospitals overall.

For statewide public hospitals, prematurity, multiple births, undetected severe FGR (< 3rd centile), maternal smoking after 20 weeks' gestation, maternal age (< 20 years and ≥ 35 years) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality.



**Figure 26: Population-attributable risks for selected perinatal mortality risk factors for all level 5 and 6 public hospitals compared with the statewide public hospital population-attributable risk, 2013 and 2014**



- All public hospitals
- Level 5 and 6 public hospitals

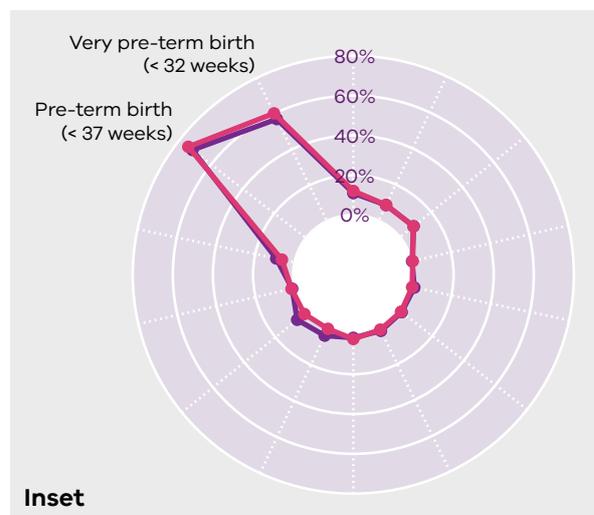
**Notes**

Excludes terminations of pregnancy, deaths due to congenital anomalies and babies with birthweight < 150g.  
 No result reported if fewer than 5 deaths identified in the risk group.  
 The GSPMR (Indicator 5) forms the basis for the calculation of the PAR.

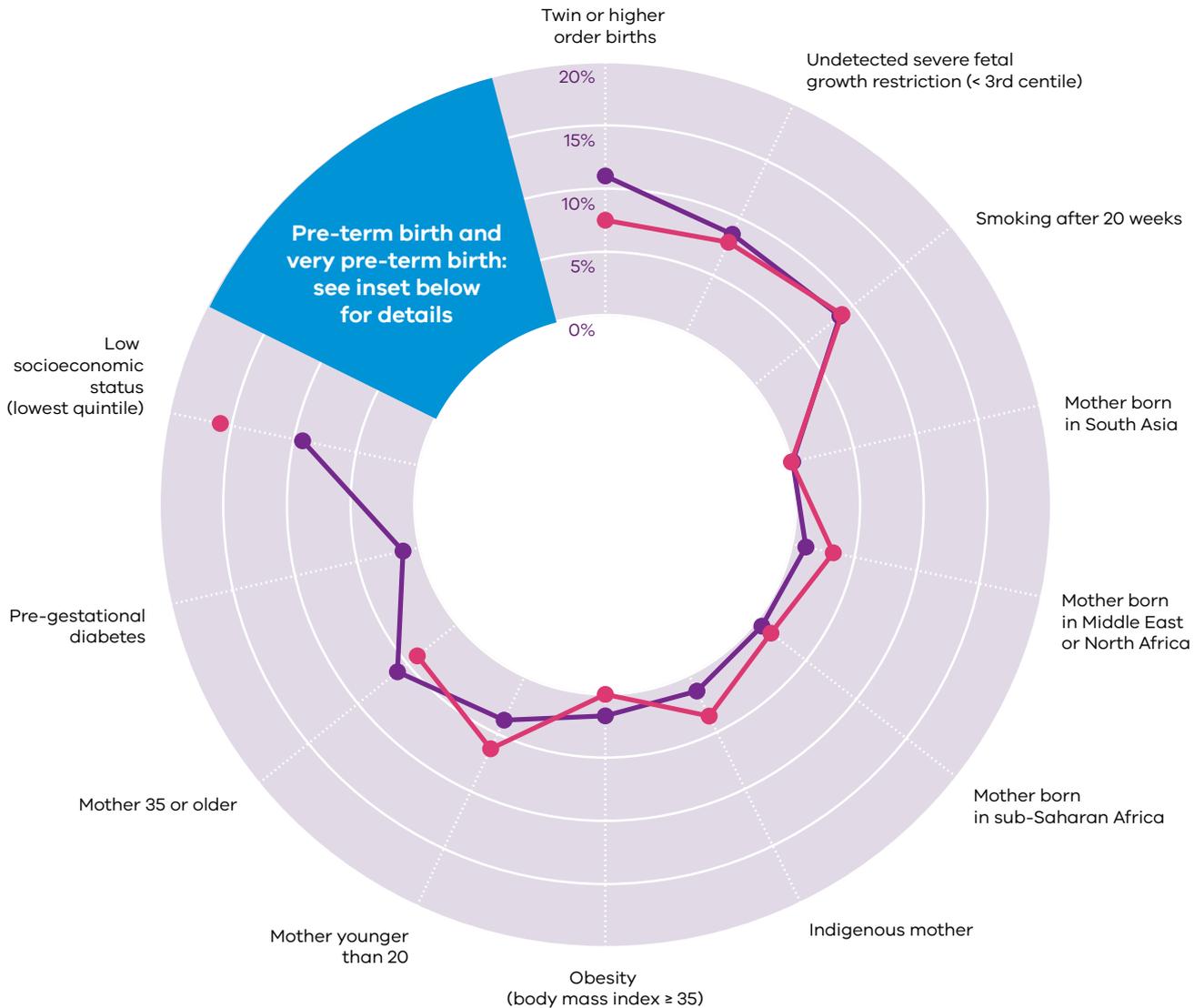
**Observations on the data**

Figure 26 shows that in 2013 and 2014, prematurity, multiple births, undetected severe FGR (< 3rd centile), maternal smoking after 20 weeks' gestation, obesity (BMI > 35 kg/m<sup>2</sup>) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality for level 5 and 6 public hospitals.

In all statewide public hospitals, prematurity, multiple births, undetected severe FGR (< 3rd centile), maternal smoking after 20 weeks' gestation, maternal age (< 20 years and ≥ 35 years) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality.



**Figure 27: Population-attributable risks for selected perinatal mortality risk factors for all level 3 and 4 public hospitals compared with the statewide public hospital population-attributable risk, 2013 and 2014**



- All public hospitals
- Level 3 and 4 hospitals

**Notes**

Excludes terminations of pregnancy, deaths due to congenital anomalies and babies with birthweight < 150g.  
 No result reported if fewer than 5 deaths identified in the risk group.  
 The GSPMR (Indicator 5) forms the basis for the calculation of the PAR.

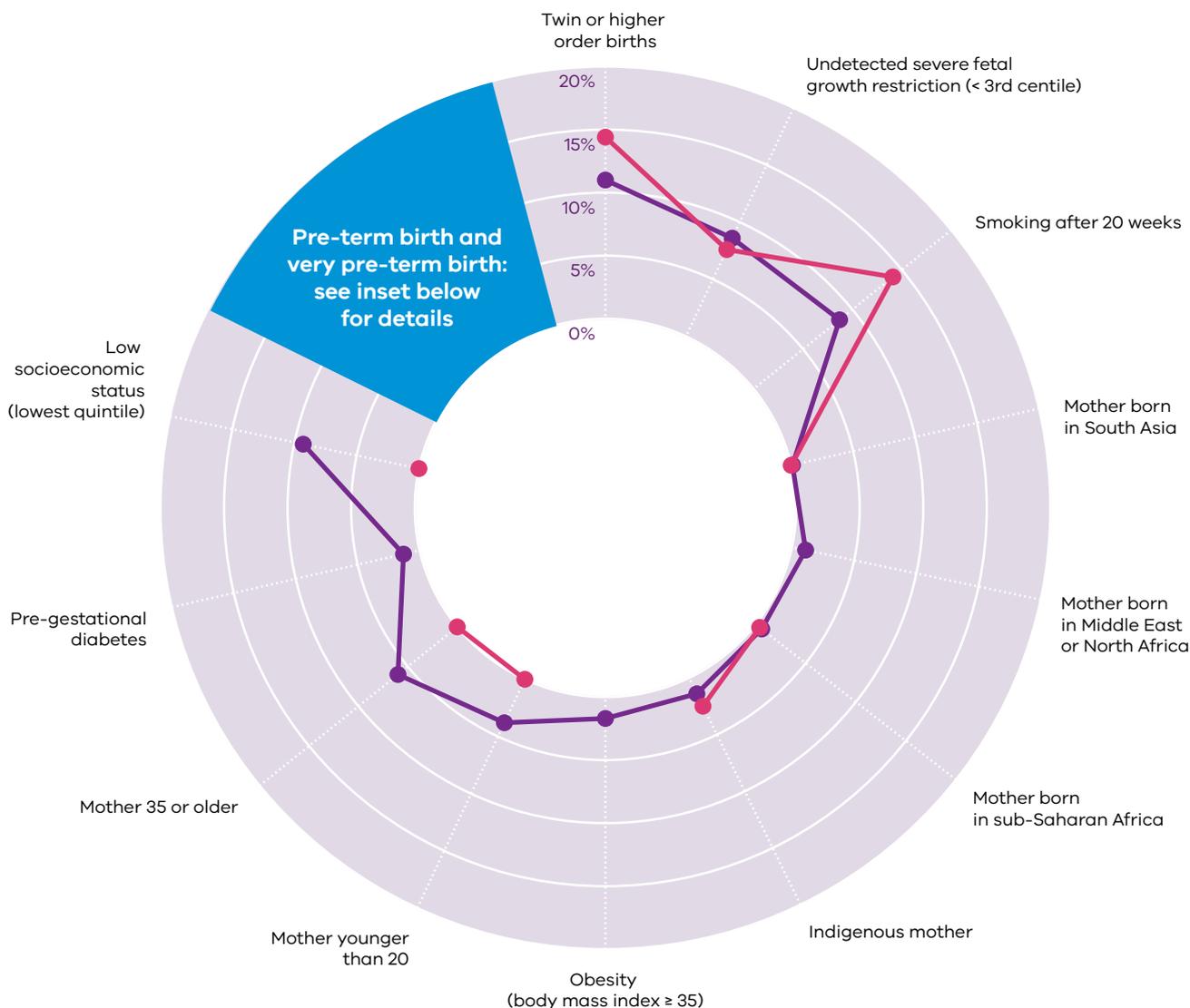
**Observations on the data**

Figure 27 shows that in 2013 and 2014, prematurity, multiple births, undetected severe FGR (< 3rd centile), maternal smoking after 20 weeks' gestation, maternal birth in Middle East or North Africa and in sub-Saharan Africa, indigenous status of mother, maternal age (< 20 years and ≥ 35 years) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality in level 3 and 4 public hospitals.

In all statewide public hospitals, prematurity, multiple births, undetected severe FGR (< 3rd centile), maternal smoking after 20 weeks' gestation, maternal age (< 20 years and ≥ 35 years) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality.



**Figure 28: Population-attributable risks for selected perinatal mortality risk factors for 'Hospital X' (mock) compared with the statewide public hospital population-attributable risk, 2013 and 2014**



- All public hospitals
- Example hospital

**Notes**

Excludes terminations of pregnancy, deaths due to congenital anomalies and babies with birthweight < 150g.

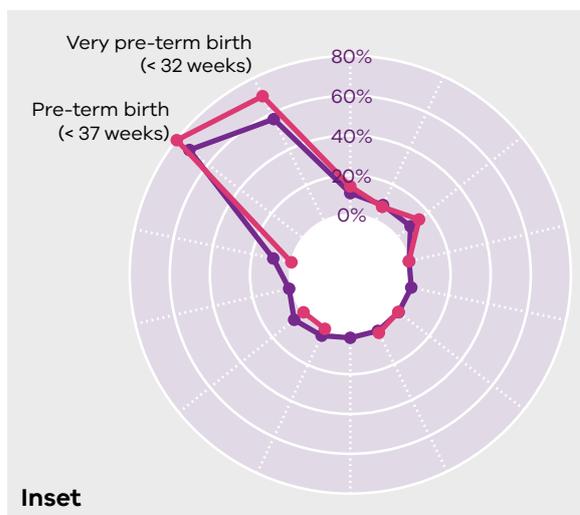
No result reported if fewer than 5 deaths identified in the risk group.

The GSPMR (Indicator 5) forms the basis for the calculation of the PAR.

**Observations on the data**

Figure 28 shows that in 2013 and 2014, prematurity, multiple births, undetected severe FGR (< 3rd centile), maternal smoking after 20 weeks' gestation and indigenous status of mother were the most significant contributors to perinatal mortality in 'Hospital X'.

In all statewide public hospitals, prematurity, multiple births, undetected severe FGR (< 3rd centile), maternal smoking after 20 weeks' gestation, maternal age (< 20 years and ≥ 35 years) and low socioeconomic status (lowest quintile) were the most significant contributors to perinatal mortality.



## Indicator 6: Referral to postnatal domiciliary care or Hospital in the Home

### Purpose and rationale

This indicator assesses the proportion of women referred to home-based (domiciliary) postnatal care or Hospital in the Home following discharge from hospital. The target for all Victorian public hospitals is 100 per cent.

Home-based models of postnatal care are being used to assist women to transition from hospital to home and to provide care and advice in the most appropriate care setting. The *Postnatal care program guidelines for Victorian health services* (Department of Health 2012) outlines the Victorian Government's expectations of public hospitals in delivering postnatal care.

This indicator is limited by its focus on whether women are referred to postnatal home-based care rather than whether postnatal home-based care is received and the quality of this care. For this reason, this indicator will be retired in 2015–16 and replaced with a more meaningful measure of postnatal care.

The Department of Health and Human Services has been exploring a measure of preventable readmissions (for mother and baby) within 28 days of discharge from hospital, which is aimed at providing a more robust approach to monitoring the quality and effectiveness of postnatal care.

Further information and an example of this indicator 'in development' is provided at (Appendix 1).

### Clinical significance

Postnatal care begins immediately after birth and aims to assist women to recuperate from the birthing process, provide breastfeeding and parenting education and support, and deliver clinical care to promote the physical and psychological health and wellbeing of the woman and her baby.

The average length of inpatient stay for a public hospital birth episode is approximately two days for an uncomplicated vaginal birth and four days for a caesarean birth (without major complications). Following discharge, the hospital that provided the intrapartum care must offer women at least one postnatal home-based visit. Additional home visits are provided on the basis of individual clinical and psychosocial needs, as well as the model of care provided by the hospital.

### Observations on the data

In 2014–15, 98.9 per cent of women who gave birth in a public hospital were referred for at least one postnatal home-based visit (see Figure 29). This result is the highest statewide level ever reported.

Hospitals with lower rates were located in rural areas. This may be due to longer inpatient stays (and therefore immediate transfer of care to maternal and child health services) or the greater time and cost associated with travelling long distances to deliver home visits.

Hospitals with low rates should identify the contributing factors and consider options for improving referral and access to home-based postnatal care services to ensure women and their families are well supported following discharge from hospital.

## Consumer summary

### Indicator 6: Referral to postnatal domiciliary care or Hospital in the Home

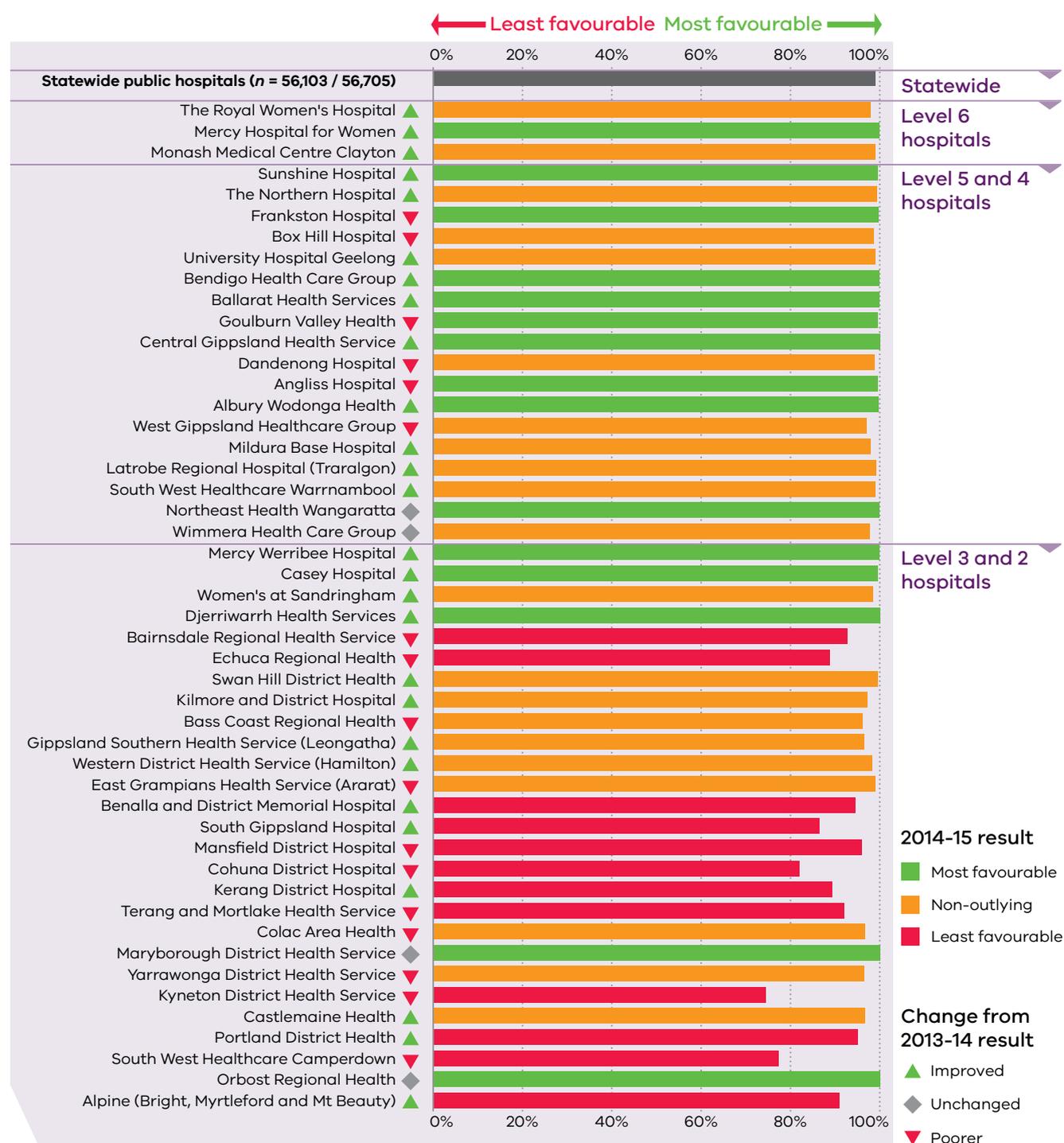
Postnatal care begins immediately after birth and may include routine clinical examination of the woman and her baby and support for infant feeding and parenting.

Postnatal care may be provided in hospital, in a community-based setting (for example, through a GP or maternal and child health service), or in the woman's home. All women who give birth in a Victorian public hospital must be offered a home visit by a qualified health professional. This indicator measures the percentage of women referred for home-based postnatal care. The target for all Victorian public hospitals is 100 per cent.

Of the women who gave birth in a public hospital in 2014–15, 98.9 per cent were offered a home visit during the postnatal period. Some rural hospitals may have difficulty providing home-based postnatal care to all women due to travel distances and may therefore provide this care in hospital.

**Ask your health service about the care and support they offer or arrange following the birth of your baby, including in-home services.**

**Figure 29: Indicator 6: Rate of women referred to postnatal domiciliary care or Hospital in the Home in Victorian public hospitals, 2014–15**



### Statewide rates

	2014-15 (quartiles: lower; upper)	2013-14	2012-13	2011-12
Public hospitals	98.9% (96.1%; 99.6%)	98.5%	97.3%	96.2%

Note: Health services that do not meet the reporting threshold of  $\geq 10$  cases in the denominator are not published. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting.



## Indicator 7a and 7b: Smoking during pregnancy

### Purpose and rationale

This indicator indirectly assesses the performance of health services in providing smoking cessation advice, assistance and follow-up during the antenatal period to reduce both the rate of smoking among pregnant women and the risk of smoking-associated adverse health outcomes for babies.

The data presented in this report relates to the rate of women smoking during pregnancy prior to and after 20 weeks' gestation.

### Clinical significance

Women who smoke while pregnant have an increased risk of ectopic pregnancy, miscarriage, placenta praevia and pre-term labour, and are more likely to give birth to a low-birthweight baby compared with non-smokers.

Low-birthweight babies are more vulnerable to infection and other short- and long-term health problems. The damaging effects of maternal cigarette smoking on the fetus include reduction of oxygen supply, restricted growth and development, increased risk of cleft lip and cleft palate, and increased heart rate and disruption of the baby's breathing movements in utero (Quit Victoria 2013).

Smoking in pregnancy is a preventable cause of obstetric and fetal complications. Pregnancy is therefore an important time for health professionals to help women to quit smoking, particularly given that women are motivated to protect their baby's health.

Effective interventions are multifaceted and based on individual needs and circumstances. Pregnant women should be regularly assessed and counselled on the serious health impact of smoking (Passey et al. 2013). Support services including advice and targeted activities such as offering incentives to encourage smoking cessation have also been found to be effective (Lumley et al. 2009).

### Observations on the data

Figure 30 shows that the statewide public hospital rate of smoking before 20 weeks' gestation has improved since reporting began in 2009 (14.8 per cent in 2009 to 12.6 per cent in 2014). However, the rate of smoking after 20 weeks' gestation has slightly increased over time (5.6 per cent in 2009 to 7.8 per cent in 2014).

The percentage of women who quit smoking after 20 weeks' gestation ranged from 1.6 per cent to 33.8 per cent. The large variation across hospitals warrants attention by health services and health professionals providing antenatal care (general practitioners, obstetricians and midwives). Implementing effective smoking cessation interventions during pregnancy is an important public health measure and component of maternity care.

Substantially fewer women attending private hospitals smoke during pregnancy.

## Expectations for performance improvement

- Health services with results in the upper quartile range (least favourable outliers) are expected to undertake regular multidisciplinary reviews of smoking cessation interventions provided to women including, but not limited to:
- examining the smoking cessation interventions they provide to women antenatally and identifying gaps in their service provision
- monitoring the competency and confidence of clinicians in providing smoking cessation advice and interventions
- developing and reporting on strategies to improve rates to the health service executive.

### Consumer summary

#### Indicator 7: Smoking during pregnancy

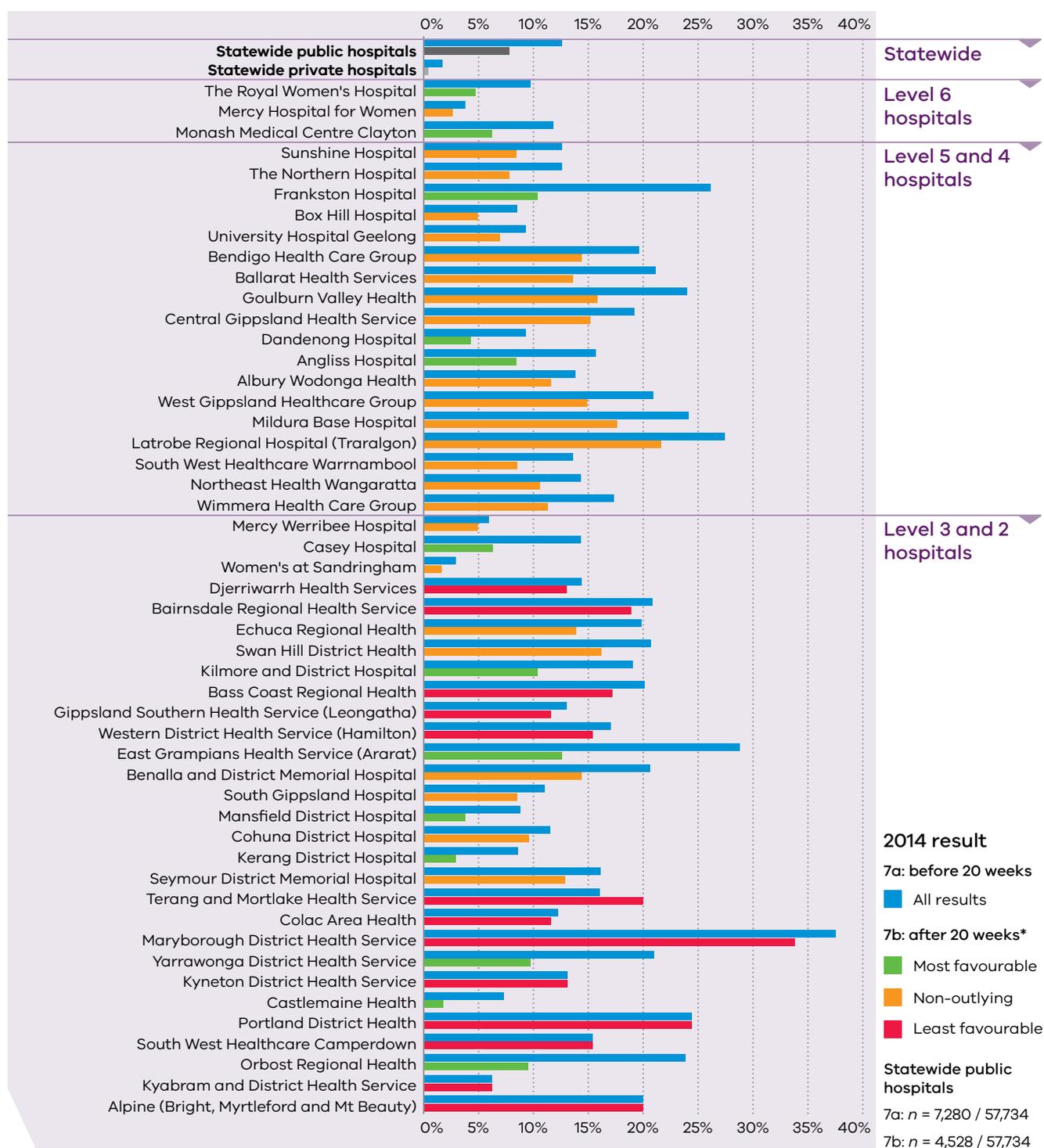
Smoking during pregnancy is strongly associated with poor health outcomes for women and their babies. Interventions such as education and support programs offered by hospitals can help pregnant women to stop smoking.

This indicator measures the rate of women who smoked in early pregnancy (before 20 weeks) compared with later pregnancy (after 20 weeks) to identify the effectiveness of smoking cessation interventions offered by hospitals.

Overall, the rate of smoking among women who gave birth in a public hospital decreased from 12.6 per cent in early pregnancy (before 20 weeks) to 7.8 per cent after 20 weeks. Women who gave birth in private hospitals were less likely to smoke both in early pregnancy (1.7 per cent) and later pregnancy (0.4 per cent).

**Ask your health service about the level of support they provide during pregnancy to help women stop smoking.**

**Figure 30: Indicator 7a and 7b: Rate of women smoking during pregnancy (before 20 weeks and after 20 weeks' gestation) in Victorian public hospitals, 2014**



**Statewide rates**

		2014	2013	2012	2011
Public hospitals	7a) Before 20 weeks	12.6%	13.3%	14.1%	14.8%
	7b) After 20 weeks	7.8%	8.3%	7.6%	6.9%
Private hospitals	7a) Before 20 weeks	1.7%	2.1%	2.7%	3%
	7b) After 20 weeks	0.4%	0.4%	0.4%	1%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published.

\* Quartiles for this indicator have been calculated based on the relative reduction of smoking after 20 weeks' gestation at the health service compared with their rate before 20 weeks' gestation.



# Indicators 8a, 8b and 8c: Breastfeeding in hospital

## Purpose and rationale

This suite of indicators assesses the initiation of breastfeeding in Victorian hospitals:

- Indicator 8a – rate of breastfeeding initiation in term babies
- Indicator 8b – rate of use of infant formula in term breastfed babies
- Indicator 8c – rate of final feed exclusively from the breast for term breastfed babies.

There are short- and long-term health benefits for women and their babies associated with breastfeeding, and health services are responsible for promoting, protecting and supporting breastfeeding. *The Australian national breastfeeding strategy 2010–2015* (Australian Health Ministers' Conference 2009) encourages the monitoring of breastfeeding initiation and duration rates. The World Health Organization (2011) encourages exclusive breastfeeding for babies to six months of age and continued breastfeeding up to two years or beyond.

This indicator is limited by its focus on breastfeeding rates during the hospital admission and does not capture data on whether breastfeeding is maintained in the longer term.

A longitudinal study of Australian children conducted in 2004 found that while 92 per cent of babies were initially breastfed, by one week, only 80 per cent were fully breastfed, and this decreased to 56 per cent at three months and 14 per cent at six months (Australian Institute of Family Studies 2008). This indicates the need for ongoing breastfeeding support for women following discharge from hospital.

## Clinical significance

Breastfeeding provides optimal nourishment for a growing baby's physical, cognitive and immunological development and is known to improve the bond between mother and baby.

Babies who are breastfed have a reduced risk of respiratory illnesses and infections of the ear and gastrointestinal tract. Breastfeeding has also been shown to protect babies from sudden infant death syndrome (SIDS) and diabetes and heart disease later in life (Ip et al. 2007). Women who have breastfed have lower rates of cancer of the breast and ovaries, type 2 diabetes and obesity (Ip et al. 2007; Neville et al. 2014).

Clinicians should encourage women to recognise when their babies are ready to breastfeed and offer help if needed. In addition, providing mothers with accurate information about the importance of breastfeeding to their health and the health of their baby can result in changes in infant feeding decisions. Health promotion efforts should emphasise the importance of breastfeeding for normal growth and development, as well as the risks and costs associated with premature weaning (Berry & Gribble 2008).

There are a variety of reasons why women are less likely to breastfeed. The Baby Friendly Hospital Initiative (World Health Organization 2009) provides information and support to hospitals and community healthcare facilities to encourage exclusive breastfeeding and improve infant health.

Pre-term babies (those born at less than 37 weeks' gestation) can experience difficulties breastfeeding and hence have been excluded from this indicator suite.

Some obstetric interventions may affect a baby's ability to suck effectively from the breast, which may in turn be associated with early cessation of breastfeeding. Providing infant formula as an alternative to breast milk is also associated with early cessation of breastfeeding.

It is important to note that some health services provide care to more babies with a medical indication for the use of formula than other services and this will affect their rates.

## Observations on the data

### **Indicator 8a: Rate of breastfeeding initiation for babies born at 37+ weeks' gestation**

In 2014, 94.7 per cent of women who gave birth at 37 or more weeks' gestation in a public hospital put the baby to the breast or attempted to express breast milk at least once. This rate is relatively consistent across public and private hospitals (see Figure 31).

### **Indicator 8b: Rate of use of infant formula by breastfed babies born at 37+ weeks' gestation**

In 2014 a high proportion of term breastfed babies were given infant formula in hospital (25.2 per cent in public hospitals and 39.5 per cent in private hospitals) (see Figure 32). This rate varies significantly between hospitals, including those providing a similar level of care.

### **Indicator 8c: Rate of final feed being taken exclusively and directly from the breast by breastfed babies born at 37+ weeks' gestation**

Figure 33 shows that 80 per cent of term breastfed babies in public hospitals had their last feed before discharge entirely from the breast with no complementary expressed breast milk or formula. The rate varies markedly between services. Around 73 per cent of term breastfed babies in private hospitals achieved this.

## Expectations for performance improvement

Outlier services are expected to:

- examine where their policies and practices do not align with the Department of Education and Early Childhood Development's (2014) *Promoting breastfeeding – Victorian breastfeeding guidelines*
- analyse the factors associated with reduced rates of breastfeeding in hospital and ensure additional support is available or accessible, particularly for vulnerable groups of women
- regularly audit the rationale for using formula in breastfed babies in hospital
- ensure the use of formula for breastfed babies is limited to those who have a clear medical indication
- assess and monitor the competency and confidence of clinicians in providing breastfeeding support and education

- ensure women, including those of linguistically diverse backgrounds, are provided with ready access to accurate and appropriately translated verbal and written information about the importance of breastfeeding to the health of their baby
- develop and report on strategies to improve breastfeeding rates to the health service executive.

## Consumer summary

### Indicators 8a, 8b and 8c: Breastfeeding

Breastfeeding is important for a baby's growth and development. It is also important for the long-term health of mothers.

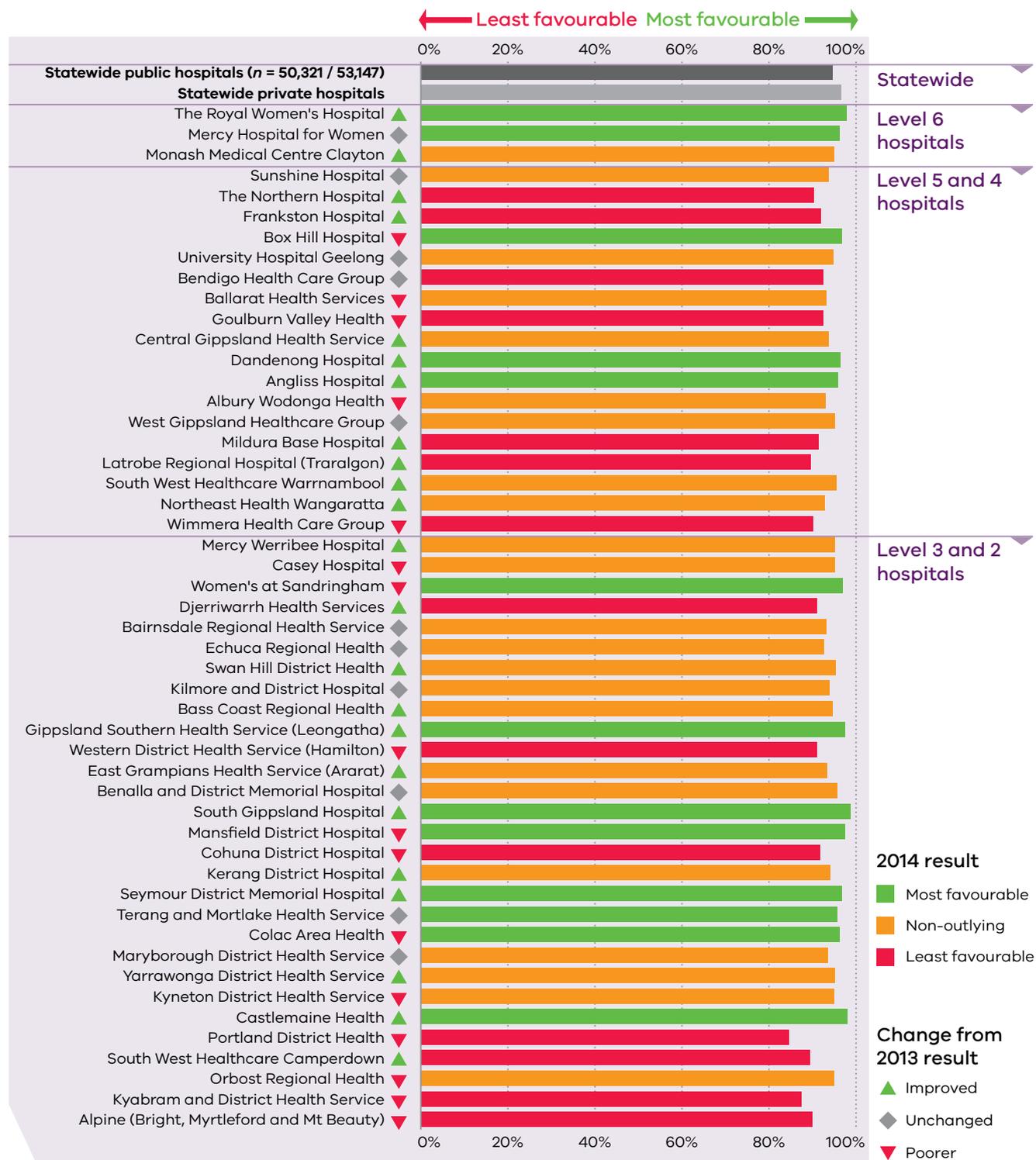
The World Health Organization encourages exclusive breastfeeding for babies to six months of age and continued breastfeeding up to two years or beyond. Health professionals are responsible for encouraging and supporting breastfeeding, wherever possible.

This indicator aims to identify whether women choose to breastfeed and the effectiveness of infant feeding support provided by hospitals in the immediate postnatal period.

The data presented in this report shows that the vast majority of women in Victorian hospitals initiate breastfeeding (94.7 per cent in public hospitals; 96.7 per cent in private hospitals) and are fully breastfeeding at the time of discharge from hospital (80 per cent in public hospitals; 73.3 per cent in private hospitals). There is, however, an opportunity for hospitals to review their use of infant formula for breastfed babies born at more than 37 weeks (25.2 per cent in public hospitals; 39.5 per cent in private hospitals).

**Ask your health service about the evidence-based policies they have in place to support successful long-term breastfeeding.**

**Figure 31: Indicator 8a: Rate of breastfeeding initiation for babies born at 37+ weeks' gestation in Victorian public hospitals, 2014**

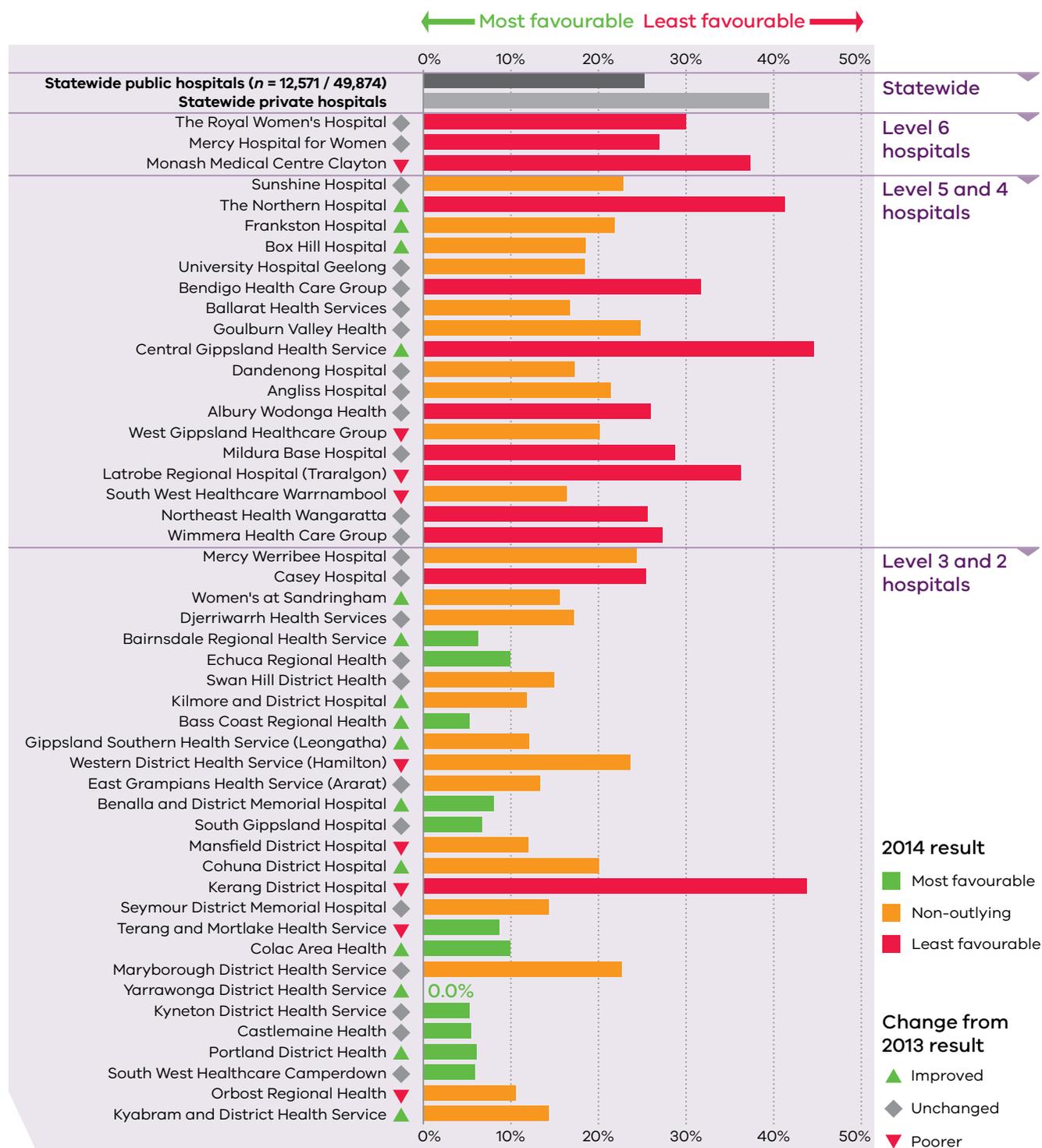


**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012	2011
Public hospitals	94.7% (92.5%; 95.8%)	94.2%	93.9%	94.2%
Private hospitals	96.7%	96.3%	96.5%	96.5%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting.

**Figure 32: Indicator 8b: Rate of use of infant formula by breastfed babies born at 37+ weeks' gestation in Victorian public hospitals, 2014**

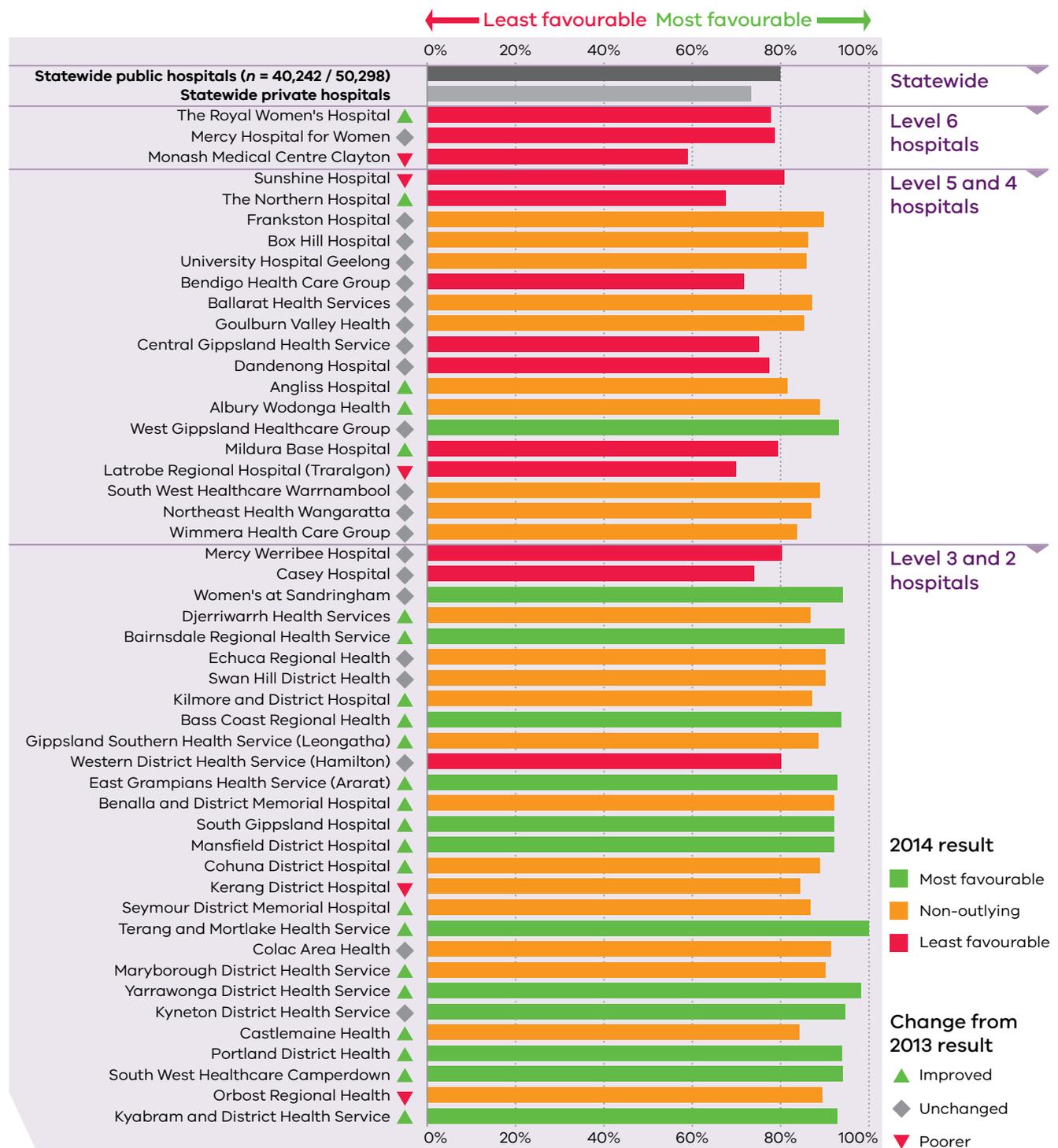


**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012	2011
Public hospitals	25.2% (10.1%; 25.3%)	25.3%	25.2%	24.1%
Private hospitals	39.5%	38.6%	36.7%	35.4%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published. An indicator result of 0.0% indicates that a health service met the reporting threshold of ≥ 10 cases in the denominator but did not have any cases in the numerator. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting.

**Figure 33: Indicator 8c: Rate of final feed being taken exclusively and directly from the breast by breastfed babies born at 37+ weeks' gestation in Victorian public hospitals, 2014**



### Statewide rates

	2014 (quartiles: lower; upper)	2013	2012	2011
<b>Public hospitals</b>	80% (81%; 92.2%)	79.7%	80.1%	82.5%
<b>Private hospitals</b>	73.3%	74.5%	75.2%	77.7%

Note: Health services that do not meet the reporting threshold of  $\geq 10$  cases in the denominator are not published. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting.

## Indicator 9: Access to antenatal care

### Purpose and rationale

This indicator explores the rate of women who have their first antenatal visit prior to 12 weeks' gestation with a maternity care provider, which may occur in the community (general practitioners, midwives or obstetricians practising privately **or** at a community health centre) or at a public hospital.

The first antenatal visit is considered to be the first visit to a midwife or doctor arranged specifically for the purpose of providing maternity care. It excludes visits for confirmation of pregnancy and medical visits for incidental problems while pregnant.

Health services should refer to Appendix 2 of this report and the *Victorian perinatal data collection manual* (sections 1 to 5, available by searching the department's website at: [www2.health.vic.gov.au](http://www2.health.vic.gov.au)) for further information on the business rules for this indicator.

### Clinical significance

The *Clinical practice guidelines: antenatal care – module II* (Australian Health Minister's Advisory Council 2014) recommend that women attend their first antenatal visit within the first 10 weeks of pregnancy. This provides an opportunity to identify clinical and other risks to women and their babies as well as to develop a care plan that meets the individual health and social needs of the woman throughout her pregnancy and the postnatal period. Late access to antenatal care may be associated with poorer health and wellbeing outcomes for women and their babies.

### Observations on the data

In 2014, 20 per cent of women who gave birth in a public hospital had their first antenatal visit recorded as occurring before 12 weeks' gestation. This represents a 1.9 per cent decrease since 2013 and a 5.6% decrease since 2011.

The data indicates wide variation between public hospitals. In some individual public hospitals very few women were seen before 12 weeks, while in others the majority were seen before 12 weeks (see Figure 34). Markedly more women in private hospitals had their first visit before 12 weeks.

In practice a large number of women have their first antenatal visit with a general practitioner and this visit includes their first-trimester combined screening test. As 65 per cent of Victorian women who gave birth in 2015–16 accessed the first-trimester combined screening test during 2015, the data reported for the antenatal care reported to the VPDC is significantly underreporting this care.

This indicates a pressing need for hospitals to review and subsequently improve their data collection processes and more consistently record care provided in the community.

## Expectations for performance improvement

Given that the statewide public hospital rate of women who attended their first antenatal appointment before 12 weeks' gestation decreased in 2014 compared with 2013, there is an imperative for all hospitals to:

- review their processes for capturing and recording reliable data, particularly where antenatal care is provided in the community
- improve education of maternity staff about how to record this data accurately by asking about antenatal care by a general practitioner
- develop strategies to address the factors impeding access to early antenatal care and report on this to the health service executive
- identify high-risk women who may require a more focused approach to ensure early and ongoing access to antenatal care
- agree on local targets to guide incremental improvement and monitor progress
- explore links between access to and quality of antenatal care to outcomes on other indicators of performance.

### Consumer summary

#### Indicator 9: Initiation of antenatal care

Antenatal care refers to the period between conception and birth.

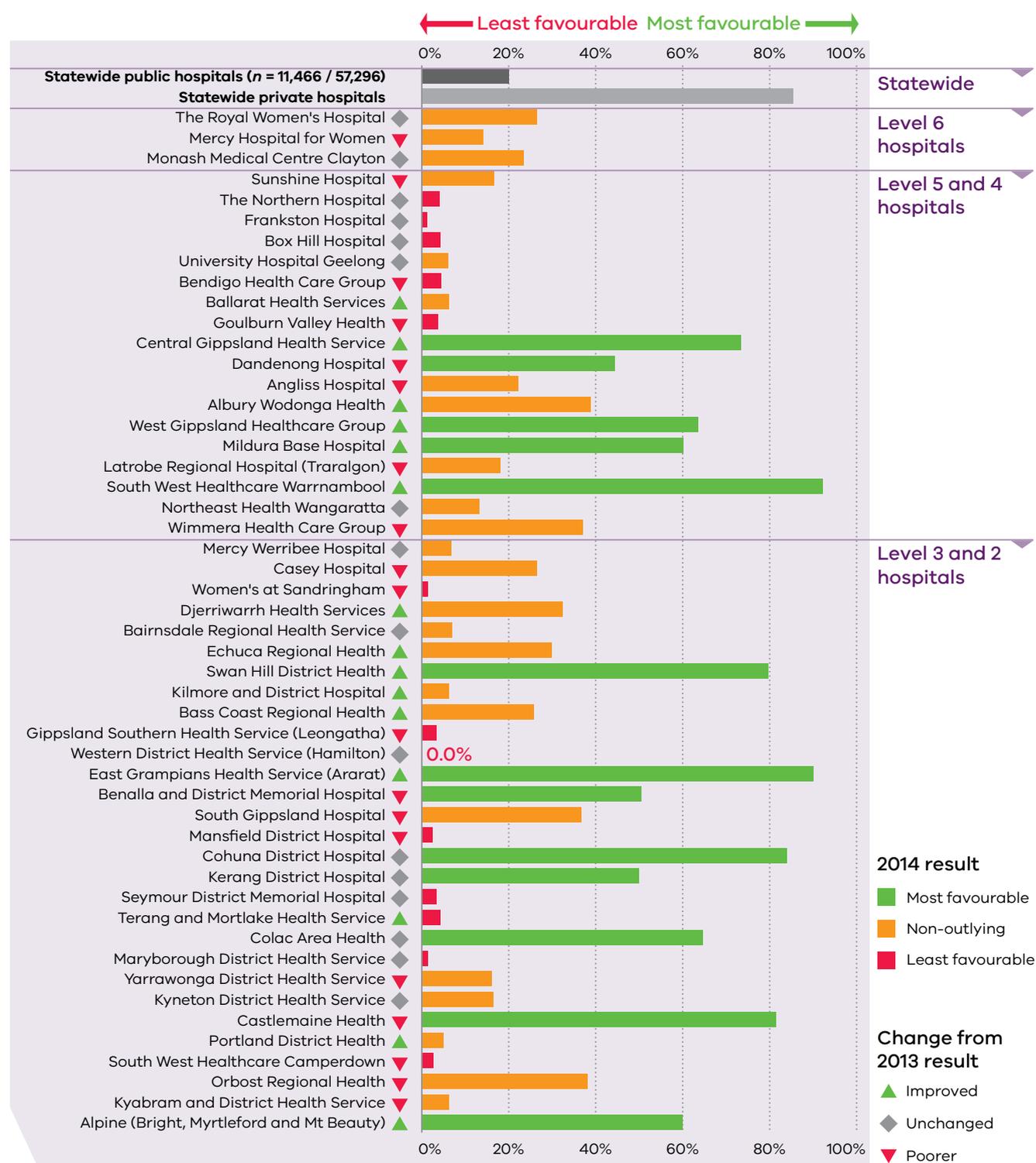
It is recommended that women attend their first antenatal appointment within the first 10 weeks of pregnancy. Early access to antenatal care is important to identify and manage risks to the health of a woman and the development of her baby.

This indicator measures the rate of women who attended an antenatal appointment within the first 12 weeks of their pregnancy.

The data presented in this report indicates that 20 per cent of women who gave birth in a public hospital attended their first antenatal appointment before 12 weeks compared with 85.4 per cent of women who gave birth in a private hospital. Accurate data collection relating to antenatal care occurring outside of the hospital and in the community appears to be a factor that requires hospitals' attention and action.

**Understanding a hospital's performance should take into account outcomes across all indicators.**

**Figure 34: Indicator 9: Rate of women who attend their first antenatal visit prior to 12 weeks' gestation (hospital or community), 2014**



**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012	2011
Public hospitals	20.0% (4.6%; 42.9%)	21.8%	25.6%	25.6%
Private hospitals	85.4%	84.1%	84.4%	81.5%

Note: Health services that do not meet the reporting threshold of ≥ 10 cases in the denominator are not published. An indicator result of 0.0% indicates that a health service met the reporting threshold of ≥ 10 cases in the denominator but did not have any cases in the numerator. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting.



## Indicator 10: Apgar score less than 7 at five minutes

### Purpose and rationale

This indicator measures the wellbeing of babies at birth. It is used as a proxy for the quality of intrapartum care and to a large extent the quality of resuscitation measures undertaken on the infant following birth. The Apgar score is a validated measure for adverse long-term outcomes in infants.

### Clinical significance

Singleton infants who are more than 37 weeks' gestation, without congenital anomalies, are expected to be born in good condition, show healthy physiological adaptation to birth and not require significant resuscitation measures. The Apgar score is an assessment of a newborn's wellbeing at birth based on five physiological attributes at one and five minutes (and longer if applicable): colour (circulation), breathing, heart rate, muscle tone and reflexes.

Each attribute is given a score of 0, 1 or 2, with a total minimum score of 0 (indicating no or greatly diminished signs of life) and a maximum score of 10. An Apgar score below 7 at five minutes indicates a baby who requires ongoing resuscitation measures or additional care that may be due to avoidable factors during labour, childbirth or resuscitation.

### Observations on the data

In 2014 a five-minute Apgar score less than 7 was reported for 1.5 per cent of singleton, term babies without congenital anomalies in public hospitals overall and 0.9 per cent in private hospitals. These rates have remained stable since reporting of this indicator commenced in 2012.

Thirteen individual public hospitals reported rates of 1.9 per cent or more, with some rural hospitals reporting higher rates than metropolitan hospitals (see Figure 35).

### Expectations for performance improvement

Hospitals with results in the upper quartile range should ensure there are adequate mechanisms to capture, review and report on adverse intrapartum and neonatal resuscitation events and outcomes.

- Hospitals with results in the highest quartile range (least favourable outliers) are expected to:
- undertake multidisciplinary reviews of adverse events and outcomes to identify areas for clinical practice or system improvement
- monitor the competency and confidence of clinicians in fetal surveillance during labour and in neonatal resuscitation
- review the availability of senior clinicians to both supervise junior staff and be available to rapidly escalate care after hours
- ensure women with a higher risk of complications are referred to appropriate specialist services antenatally.

## Consumer summary

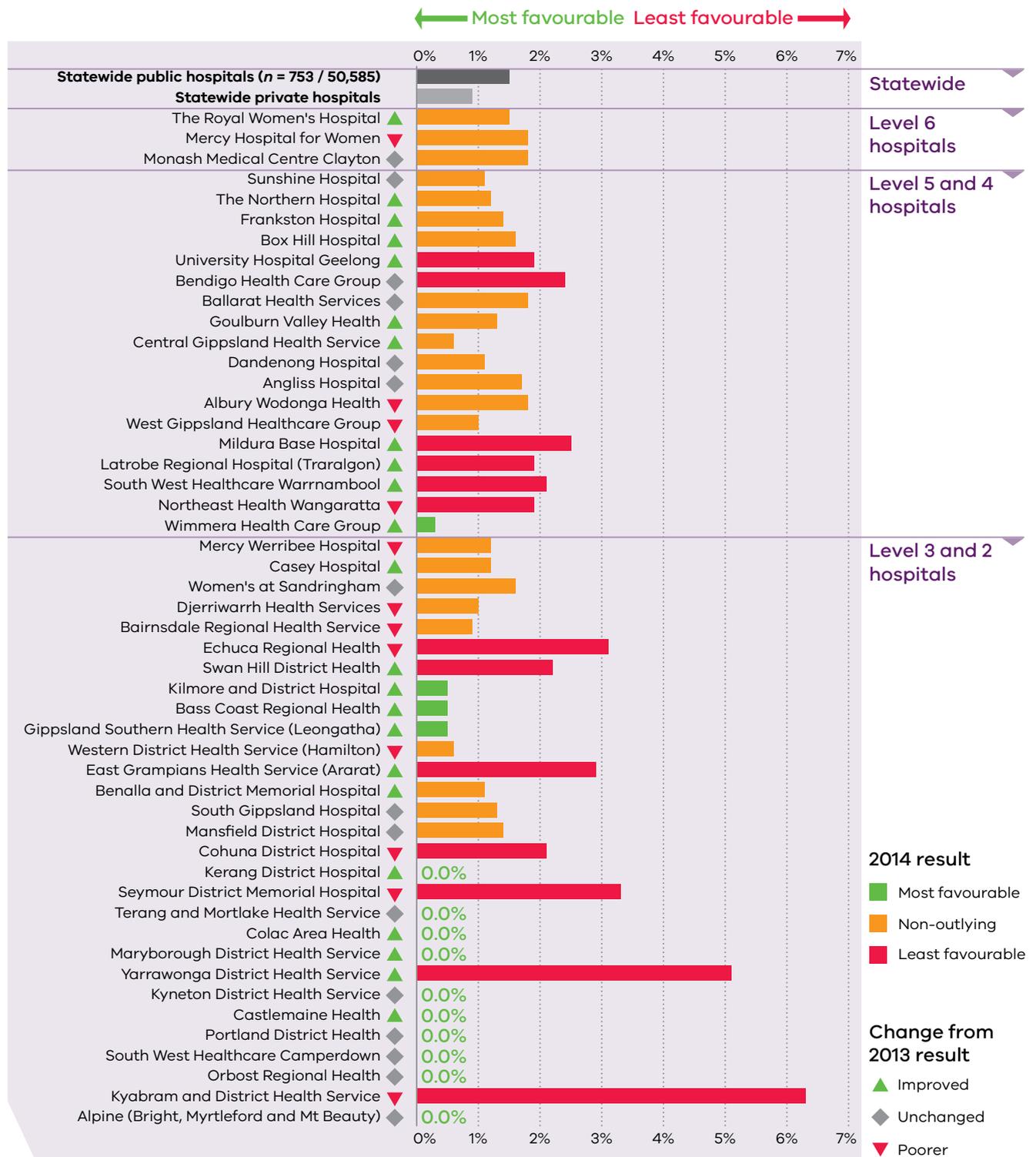
### **Indicator 10: Singleton, term infants without congenital anomalies with an Apgar score less than 7 at five minutes**

The Apgar score is an assessment of a baby's health at one minute and five minutes after birth. The maximum score is 10. An Apgar score of less than 7 at five minutes after birth indicates a baby who requires resuscitation and may lead to poor health outcomes longer term.

The data presented in this report indicates that 1.5 per cent of singleton babies born after 37 weeks in public hospitals had an Apgar score below 7 at five minutes after birth compared with 0.9 per cent of babies born after 37 weeks in private hospitals.

Ask your health service how they review unexpected events during labour and childbirth, how often this review is undertaken and how they report on service improvements.

**Figure 35: Indicator 10: Rate of term infants without congenital anomalies with an Apgar score less than 7 at five minutes in Victorian public hospitals, 2014**



**Statewide rates**

	2014 (quartiles: lower; upper)	2013	2012
Public hospitals	1.5% (0.5%; 1.9%)	1.6%	1.6%
Private hospitals	0.9%	0.9%	0.8%

Note: Health services that do not meet the reporting threshold of  $\geq 10$  cases in the denominator are not published. An indicator result of 0.0% indicates that a health service met the reporting threshold of  $\geq 10$  cases in the denominator but did not have any cases in the numerator. Quartiles for this indicator are calculated based on all public health services, regardless of whether they meet the criteria for public reporting.



## Appendix 1: Indicators in development

The Department of Health and Human Services and the Perinatal Safety and Quality Committee are currently exploring alternative methods for measuring the quality of care provided after birth, both prior and following discharge from the birth episode.

The following two indicators are in development. When finalised they will replace Indicator 6 regarding the rates of referral to postnatal domiciliary care. As such, the indicator (including its business rules and definitions) are subject to change. Health services will be engaged throughout the development of the new indicator and will be provided with opportunities to contribute to the development process.

### **Alternative Indicator 6a: Potentially preventable readmission of a mother within 28 days of discharge from a birthing episode admission in a Victorian public hospital**

#### **Purpose and rationale**

Unplanned readmission is a common indicator for hospital performance, with readmission indicators established for a number of Victorian clinical care streams including acute cardiac care, orthopaedic and acute mental health.

Potentially preventable unplanned readmission during the postnatal period represents a deviation from the normal course of postnatal recovery and may result from poor intrapartum or postnatal care.

For the purposes of this indicator:

- Intrapartum care refers to the period of care during the third stage of labour.
- Postnatal care refers to the first 28 days after birth.

An unplanned readmission is defined as an admission with a diagnosis that should be prevented through good-quality care during the contacts listed above. Readmissions that are associated with a condition(s) that manifests after discharge without any indication of its presence prior to discharge are excluded. This also applies to conditions that cannot be prevented (or managed) by providing information, home-based care or care in the community. Furthermore, planned readmission or transfer to another health service following the birth are also excluded.

The readmission rate will be calculated for the hospital that discharged the mother from the birth episode. The rate includes admissions to any Victorian health service after birth, not just a readmission to the birthing service.

#### **Definitions**

Readmissions that meet the criteria for inclusion are attributed to the health service that provided admitted postnatal care prior to discharge.

#### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 6a:</b> Potentially preventable readmission of a mother within 28 days of discharge from a birthing episode admission in a Victorian public hospital	The number of women readmitted to any health service with a preventable readmissions diagnosis within 28 days.	The number of women provided with admitted postnatal care prior to discharge.

Potentially preventable readmissions are limited to the following cohort of primary diagnoses:

- O722 – Delayed and secondary postpartum haemorrhage
- O860 – Infection of obstetric surgical wound
- O85 – Puerperal sepsis
- O9120 – Non-purulent mastitis without attachment difficulties
- Z466 – Fitting and adjustment of urinary device
- O894 – Spinal epidural headache during puerperium
- O901 – Disruption of perineal obstetric wound
- O149 – Pre-eclampsia (unspecified)
- O16 – Unspecified maternal hypertension
- O9903 – Anaemia complicating childbirth and the puerperium
- O731 – Retained portion placenta and membranes without haemorrhage
- O721 – Other immediate postpartum haemorrhage
- O902 – Haematoma of obstetric wound
- O862 – Urinary tract infection following delivery
- O900 – Disruption of caesarean section wound
- Z391 – Care and examination of lactating mother
- O13 – Gestational hypertension
- N390 – Urinary tract infection (site not specified)
- O9121 – Non-purulent mastitis with attachment difficulty
- F531 – Severe mental and behavioural disorder associated with puerperium (not elsewhere classified)
- F530 – Mild mental and behavioural disorder associated with puerperium (not elsewhere classified)
- G971 – Other reaction to spinal and lumbar puncture
- R509 – Fever (unspecified)
- R33 – Retention of urine
- O152 – Eclampsia in the puerperium
- O720 – Third-stage haemorrhage.

#### Data source

Data is submitted by public health services to the Victorian Admitted Episodes Dataset (VAED) and is reported by financial year.

### **Observations on the data**

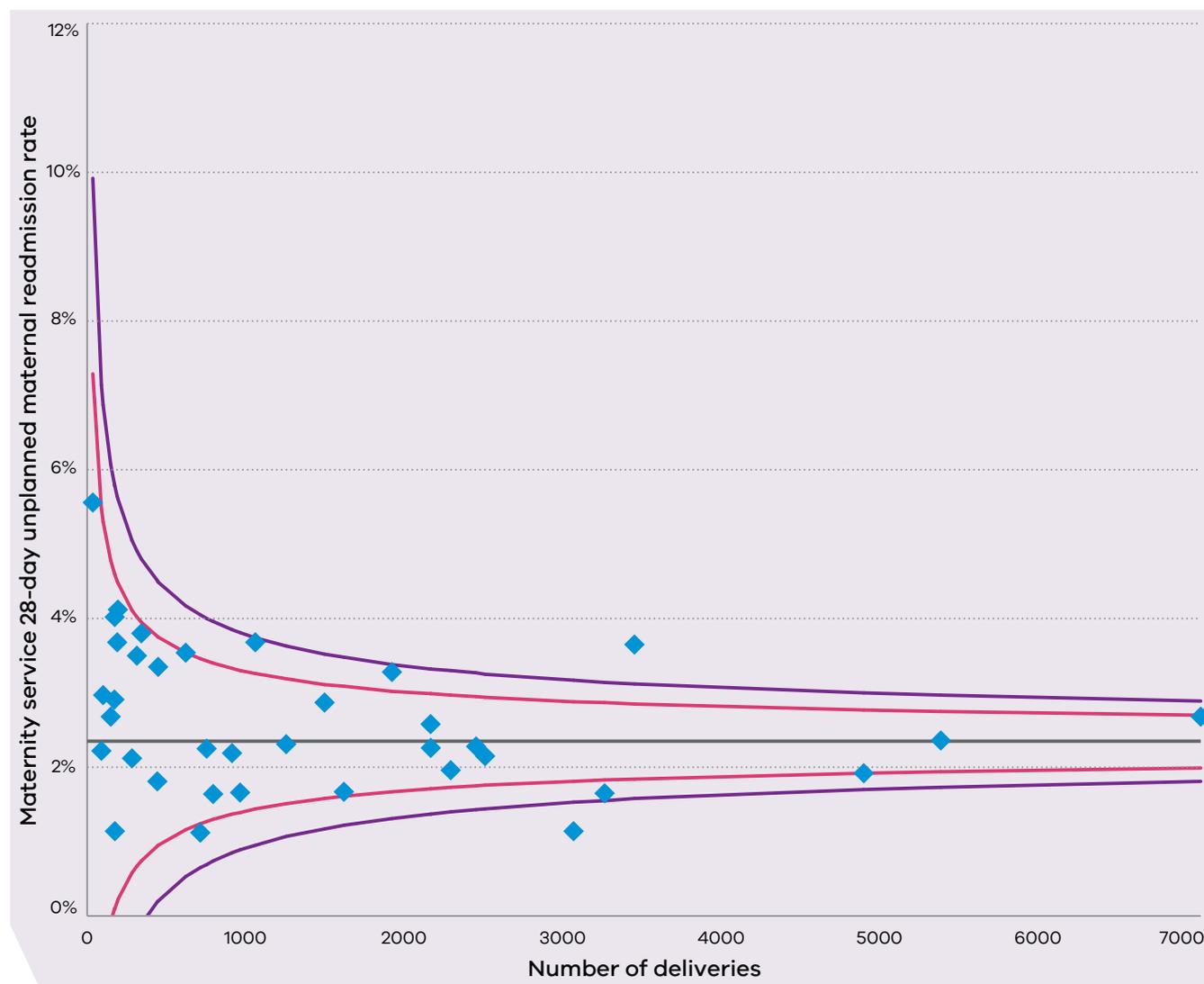
The statewide rate of women being readmitted within 28 days of discharge for potentially preventable reasons was 2.3 per cent in 2014–15. There was wide variation across public hospitals, ranging from zero to 5.6 per cent. Thirteen individual public hospitals reported rates of 3.2 per cent or more, with some rural hospitals reporting higher rates than metropolitan hospitals (see Figure 37).

### **Presentation of funnel plots**

Other Victorian readmission indicators often use funnel plots to graphically present the distribution of health service rates. The advantage of using a funnel plot is that it allows the size of the maternity service and the number of deliveries to be taken into account.

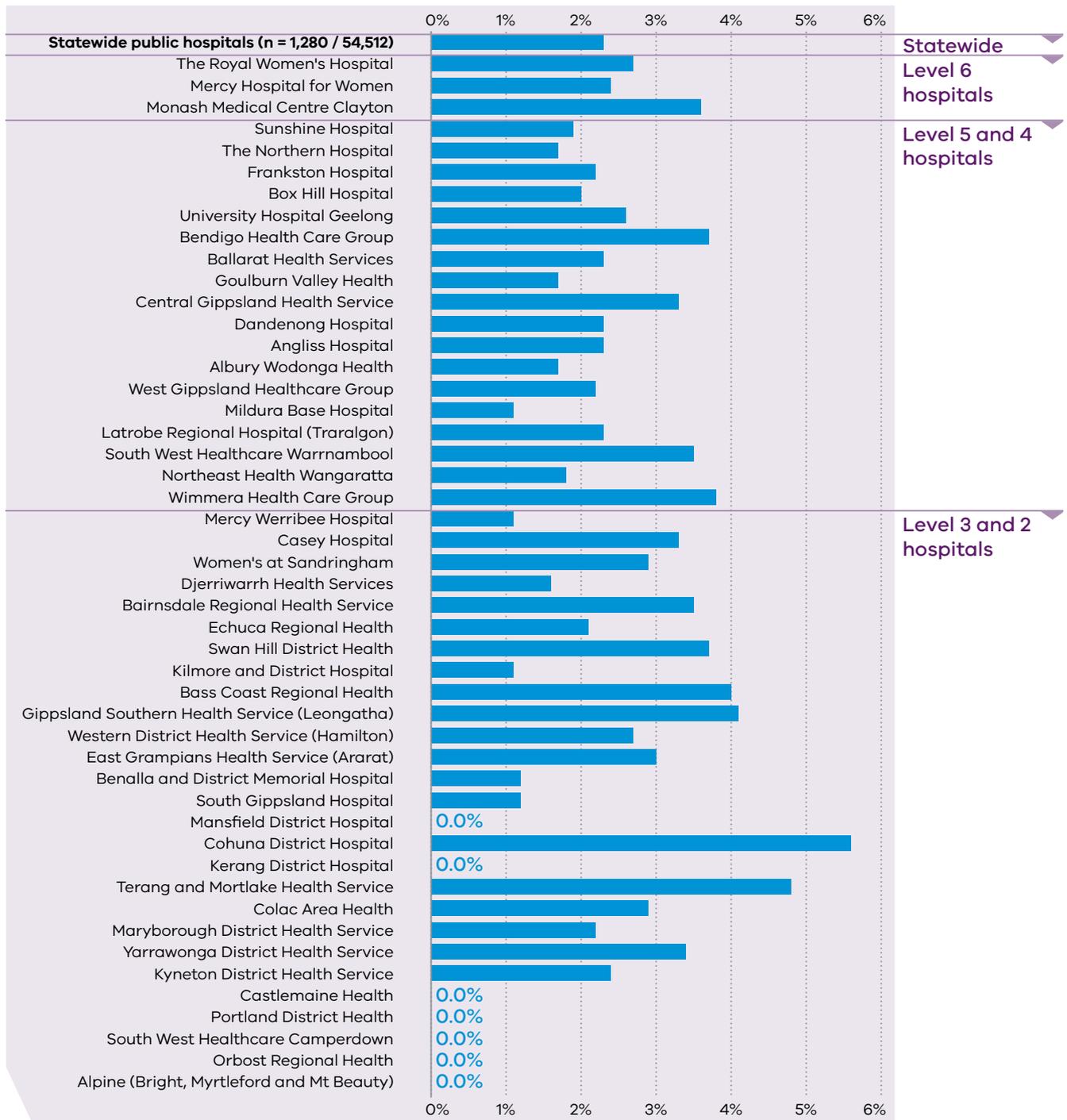
The control limits used in the funnel plots allow the reader to note services that vary from the expected statewide mean to such an extent that the variance is beyond that which could be accredited to chance alone. Although outliers could be identified in this way, the intention of the graph presented as Figure 36 is to observe substantial systematic (non-random) differences between Victorian public maternity services. The same methodology is also used in similar international indicators, notably those in the *Patterns of maternity care in English NHS trusts 2013/14* (Royal College of Obstetricians and Gynaecologists 2016).

**Figure 36: Indicator 6a: Funnel plot for the potentially preventable readmission of a mother within 28 days of discharge from a birthing episode admission in a Victorian public hospital, 2014–15**



- 99.7 per cent upper and lower limits
- 95 per cent upper and lower limits
- Statewide rate for public hospital maternity services
- ◆ 28-day maternal readmission rates for public hospital maternity services

**Figure 37: Indicator 6a: Potentially preventable readmission of a mother within 28 days of discharge from a birthing episode admission in a Victorian public hospital, 2014–15**



**Statewide rate**

2014-15	
Public hospitals	2.3%

Note: Health services that do not meet the reporting threshold of  $\geq 10$  cases in the denominator are not published. An indicator result of 0.0% indicates that a health service met the reporting threshold of  $\geq 10$  cases in the denominator but did not have any cases in the numerator.

## Alternative indicator 6b: Potentially preventable readmission of a neonate within 28 days of discharge a birthing episode admission in a Victorian public hospital

### Purpose and rationale

Unplanned readmission is a common indicator for hospital performance, with readmission indicators established for a number of Victorian clinical care streams including acute cardiac care, orthopaedic and acute mental health.

Potentially preventable unplanned readmission during the postnatal period represents a deviation from the normal course of postnatal recovery and may result from poor intrapartum or postnatal care.

For the purposes of this indicator:

- Intrapartum care refers to the period of care during the third stage of labour.
- Postnatal care refers to the first 28 days after birth.

An unplanned readmission is defined as an admission with a diagnosis that should be prevented through good-quality care in the contacts listed above. Readmissions that are associated with a condition(s) that manifests after discharge without any indication of its presence prior to discharge are excluded. This also applies to conditions that cannot be prevented (or managed) by providing information, home-based care or care in the community. Furthermore, planned readmission or transfer to another health service following the birth are also excluded.

The readmission rate will be calculated for the hospital that discharged the mother from the birth episode. The rate includes admissions to any Victorian health service after birth, not just a readmission to the birthing service.

### Definitions

Readmissions that meet the criteria for inclusion are attributed to the health service that provided admitted postnatal care prior to discharge.

### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 6b:</b> Potentially preventable readmission of a neonate within 28 days of discharge from a birthing episode admission in a Victorian public hospital	The number of neonates readmitted to any health service with a preventable readmissions diagnosis within 28 days	The number of neonates provided with admitted postnatal care prior to discharge

Potentially preventable readmissions are limited to the following cohort of primary diagnoses:

- P599 – Neonatal jaundice (unspecified)
- R634 – Abnormal weight loss
- P929 – Feeding problem of newborn (unspecified)

- R628 – Other lack of expected normal physiological deviation
- P369 – Bacterial sepsis of newborn (unspecified)
- P928 – Other feeding problems of newborn
- P590 – Neonatal jaundice with pre-term delivery
- P598 – Neonatal jaundice from other specific causes
- P0732 – Other pre-term infant  $\geq$  32 weeks' gestation but  $<$  37 completed weeks
- P551 – ABO isoimmunisation of fetus and newborn
- Z0371 – Observation of newborn for suspected infectious condition
- P2840 – Apnoea of newborn, unspecified
- P282 – Cyanotic attacks of newborn
- A870 – Enteroviral meningitis
- P38 – Omphalitis newborn with or without mild haemorrhage
- P741 – Dehydration of newborn
- P809 – Hypothermia of newborn unspecified
- P90 – Convulsions of newborn.

### **Data source**

Data is submitted by public health services to the VAED and is reported by financial year.

### **Observations on the data**

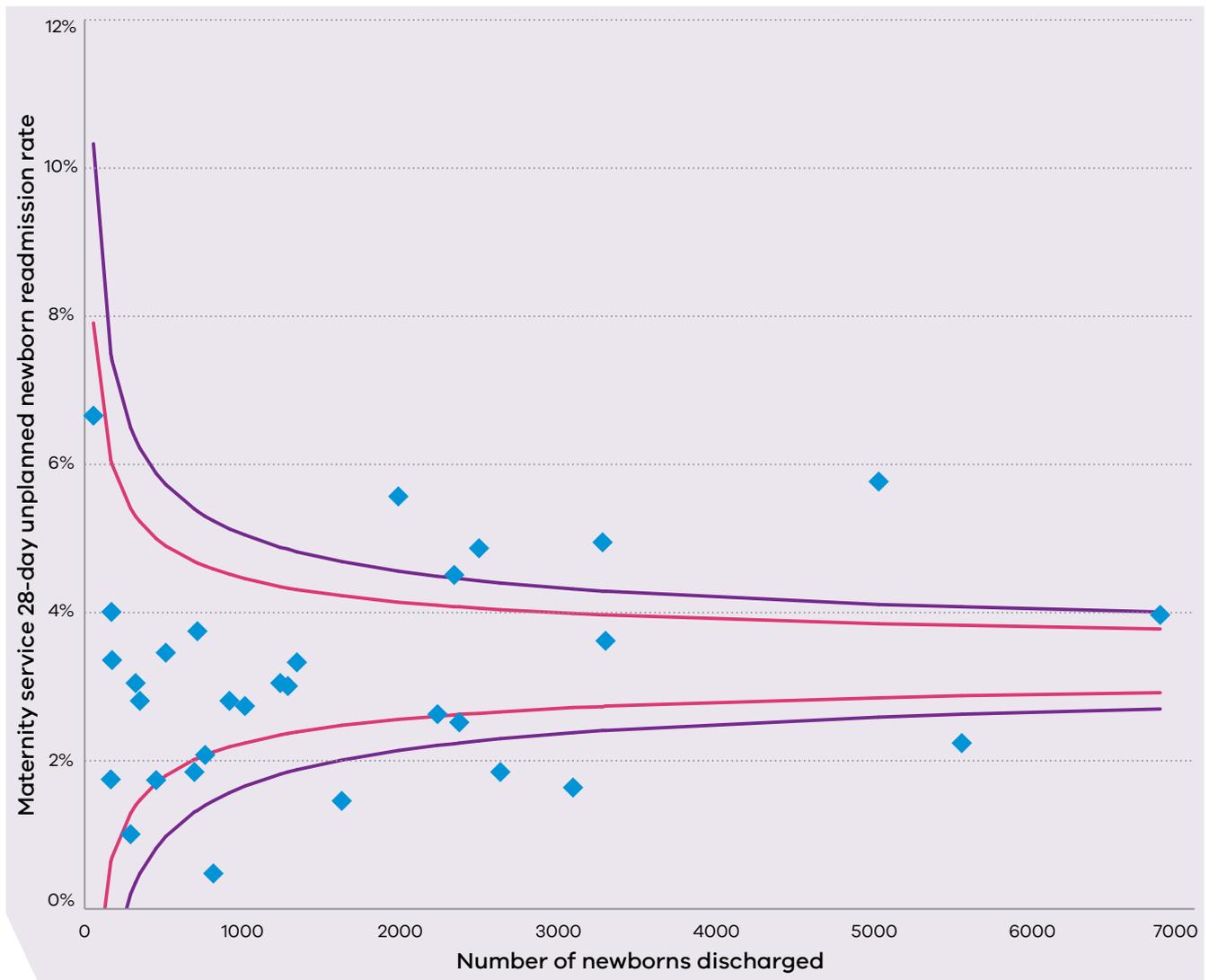
The statewide rate of newborns being readmitted within 28 days of discharge for potentially preventable reasons was 3.4 per cent in 2014–15. There was wide variation across public hospitals, ranging from zero to 5.8 per cent (see Figure 38). Thirteen individual public hospitals reported rates of 3.3 per cent or more, with some rural hospitals reporting higher rates than metropolitan hospitals (see Figure 39).

### **Presentation of funnel plots.**

Other Victorian readmission indicators often utilise funnel plots to graphically present the distribution of health services rates. The advantage of using a funnel plot is that it allows the size of the maternity service and the number of deliveries to be taken into account.

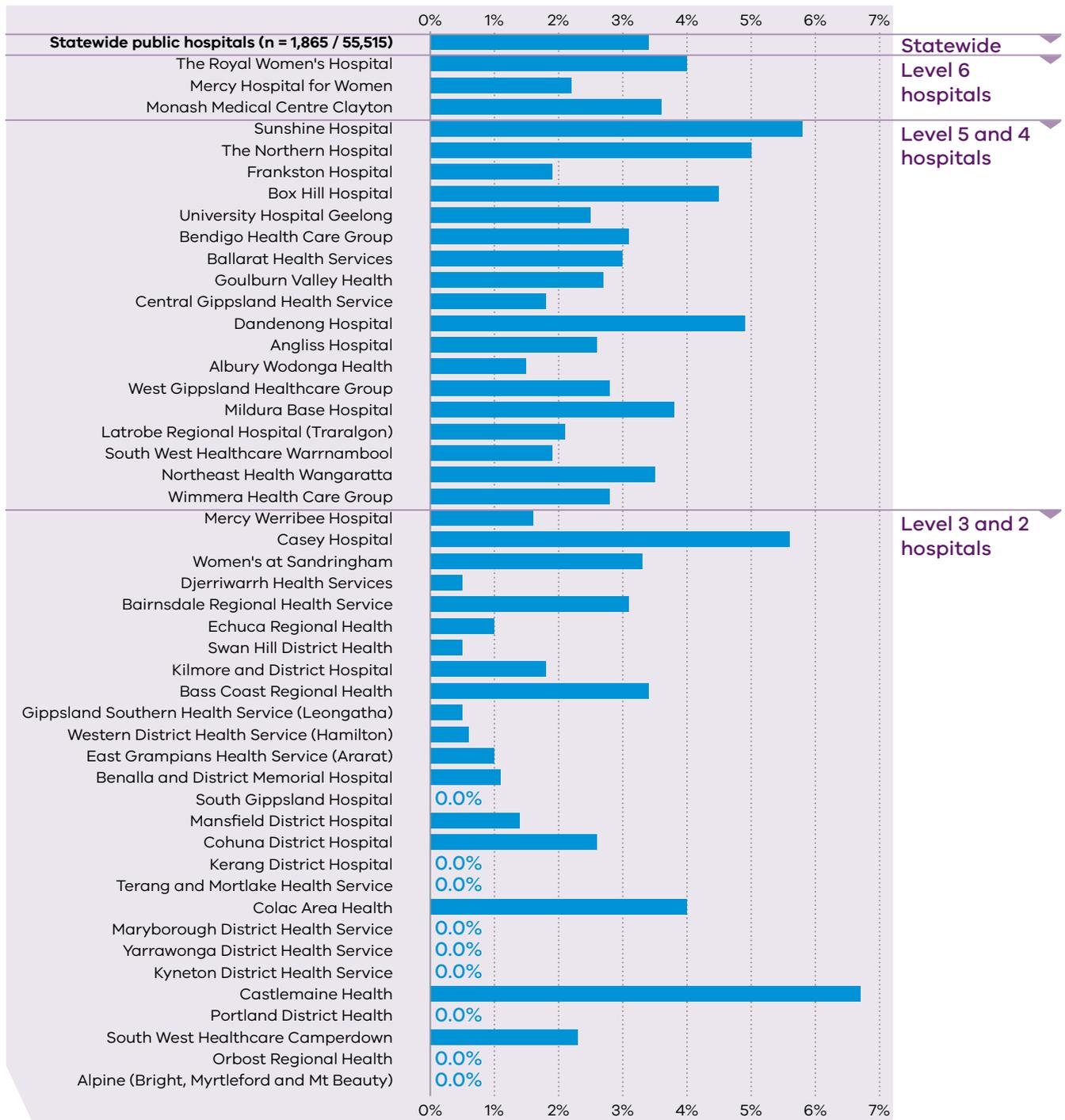
The control limits used in the funnel plots allow the reader to note services that vary from expected state-wide mean to such an extent that the variance is beyond that which could be accredited to chance alone. Although outliers could be identified in this way, the intention of the graph presented below is to observe substantial systematic (non-random) differences between Victorian public maternity services. The same methodology is also used in similar international indicators, notably those in the *Patterns of maternity care in English NHS trusts 2013/14* (Royal College of Obstetricians and Gynaecologists 2016).

**Figure 38: Indicator 6b: Funnel plot for a potentially preventable readmission of a neonate within 28 days of discharge a birthing episode admission in a Victorian public hospital, 2014–15**



- 99.7 per cent upper and lower limits
- 95 per cent upper and lower limits
- Statewide rate for public hospital maternity services
- ◆ 28-day newborn readmission rates for public hospital maternity services

**Figure 39: Indicator 6b: Potentially preventable readmission of a neonate within 28 days of discharge from a birthing episode admission in a Victorian public hospital, 2014–15**



**Statewide rate**

2014-15	
Public hospitals	3.4%

Note: Health services that do not meet the reporting threshold of  $\geq 10$  cases in the denominator are not published. An indicator result of 0.0% indicates that a health service met the reporting threshold of  $\geq 10$  cases in the denominator but did not have any cases in the numerator.



## Appendix 2: Definitions and data sources

### Indicator 1: Outcomes for standard primiparae

#### Definition:

The standard primipara is defined as a woman who is 20–34 years of age, giving birth for the first time, free of obstetric and specified medical complications and pregnant with a singleton pregnancy of gestation 37 weeks 0 days to 40 weeks six days, with a not-small-for-gestational-age (greater than the 10th centile) infant and a vertex presentation.

#### Data source:

Victorian Perinatal Data Collection (VPDC)

Data from the VPDC is reported by calendar year from 1 January 2014 to 31 December 2014.

This data is routinely submitted by each health service on each birth.

The indicators are derived using the following VPDC variables: 'Parity', 'Maternal age', 'Plurality', 'Estimated gestational age', 'Birth presentation', 'Obstetric complications-ICD-10-AM code', 'Maternal medical conditions-ICD-10-AM code', 'Indication for induction-ICD-10-AM code', 'Indications for operative delivery-ICD-10-AM code', 'Birthweight', 'Labour type', 'Method of birth', 'Perineal/genital laceration – degree/type'.

The inclusion criteria for the standard primipara are revised each year based on the data reported to the VPDC as code or text. This review ensures that some women who would have been identified as standard primiparae, but in fact have a condition that should exclude them, are accounted for.

#### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 1a:</b> Rate of inductions in standard primiparae in Victorian public hospitals	The number of standard primiparae who give birth undergoing induction of labour	The number of standard primiparae
<b>Indicator 1b:</b> Rate of caesarean section in standard primiparae in Victorian public hospitals	The number of standard primiparae who give birth undergoing caesarean section	The number of standard primiparae
<b>Indicator 1c:</b> Third- and fourth-degree perineal tears in standard primiparae giving birth vaginally in Victorian public hospitals	The number of standard primiparae who give birth vaginally and sustain a third- or fourth-degree tear	The number of standard primiparae who give birth vaginally

## Indicator 2: Rate of term infants without congenital anomalies who require additional care

### Definition:

An inborn term infant is defined as an infant born at the reporting hospital at gestational age of 37 weeks or more. Term infants without congenital anomalies who require additional care are classified as newborns that:

- are not less than 37 weeks 0 days' gestation
- weigh not less than 2,500 grams
- are without congenital anomalies
- are grouped to Victorian diagnostic-related groups (VIC-DRGs) representing the need for more than normal care (see list of VIC-DRGs provided below).

Exclusions are:

- babies born at another hospital
- pre-term newborn babies
- infants with congenital anomalies
- birthweight less than 2,500 grams
- stillborn babies
- readmission (separation not related to the birth episode).

The denominator for the 2014–15 reporting period is episodes grouped to the following Version 7.0 VIC-DRGs :

- P68A (v7): Neonate, AdmWt  $\geq$ 2500g W/O Sig OR Proc  $\geq$ 37 Comp Wks Gest W Mult Major Probs
- P68B (v7): Neonate, AdmWt  $\geq$ 2500g W/O Sig OR Proc  $\geq$ 37 Comp Wks Gest W Major Problem
- P68C (v7) Neonate, AdmWt  $\geq$ 2500g W/O Sig OR Proc  $\geq$ 37 Comp Wks Gest W Other Problem
- P68D (v7) Neonate, AdmWt  $\geq$ 2500g W/O Sig OR Proc  $\geq$ 37 Comp Wks Gest W/O Problem
- P06A Neonate, Admission weight  $>$  2499g with Significant Operating Room Procedure with Multi Major Problems
- P06B Neonate, Admission weight  $>$  2499g with Significant Operating Room Procedure without Multi Major Problems
- P60A Neonate, Died or Transferred  $<$  5 days of admission, without Significant Operating Room Procedure, Newborn
- P60B Neonate, Neonate W/O Sig OR Proc, Died or Transferred to Acute Facility Sameday.

### Data source:

Victorian Admitted Episodes Dataset (VAED).

Data from the VAED is reported by financial year from 1 July 2014 to 30 June 2015.

### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 2:</b> Rate of term infants without congenital anomalies who require additional care in Victorian public hospitals	The number of inborn term infants without birth defects grouped to VIC-DRG P68A, P68B, P68C, P06A, P06B, P60A <sup>#</sup> and P60B <sup>#</sup>	The number of inborn term infants without congenital anomalies grouped to VIC-DRG P68A, P68B, P68C, P68D, P06A, P06B, P60A <sup>#</sup> and P60B <sup>#</sup>

# All newborns initially grouped to P60A and P60B were regrouped to the next logical VIC-DRG following removal of the separation mode 'Died or Transferred' and replaced with the separation mode of 'Home'. This was done so that only those babies in P60A and P60B who require additional care are counted in the numerator. To include the whole of P60A and P60B in the numerator would overestimate the rate of newborns requiring additional care, as some healthy newborns are transferred for other reasons.

## Indicator 3: Severe fetal growth restriction (FGR)

### Definition:

Severe FGR is defined as a birthweight less than the third centile for gestation and sex whether liveborn or stillborn.

Exclusions are:

- babies without severe FGR
- multiple births.

### Data source:

Victorian Perinatal Data Collection.

Data from the VPDC is reported by calendar year from 1 January 2014 to 31 December 2014.

This data is routinely collected for all births from each health service.

The indicator is derived using the following VPDC variables: 'Baby sex', 'Gestation', 'Birth weight', 'Plurality' and 'Birth status'.

### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 3:</b> Rate of severe FGR in a singleton pregnancy undelivered by 40 weeks in Victorian public hospitals	Birth at 40 or more weeks' gestation of a singleton baby with severe FGR	All singleton births (live and stillborn) with severe FGR

## Indicator 4: Vaginal births after primary caesarean section

### Definition:

The way this indicator is defined may differ from other vaginal birth after caesarean (VBAC) indicators. Primary caesarean is often defined as the first ever caesarean regardless of parity, whereas this indicator selects only prior caesareans in primiparae.

The VPDC collects outcomes for women at term whose only previous birth was a caesarean section; any of these woman who entered labour and did not have a subsequent planned caesarean is assumed to have planned a VBAC. Not all hospitals in Victoria offer VBAC, and those that do not have been excluded from the indicator.

### Data source:

Victorian Perinatal Data Collection

Data from the VPDC is reported by calendar year from 1 January 2014 to 31 December 2014.

This data is routinely collected for all births from each health service.

The indicators are derived using the following VPDC variables: 'Parity', 'Total number of previous caesareans', 'Plurality', 'Estimated gestational age', 'Labour type' and 'Method of birth'.

### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 4a:</b> Rate of women who planned for vaginal birth following a primary caesarean section in Victorian public hospitals	The number of women (para 1 and at term with a singleton pregnancy) whose previous birth was a caesarean section and who enter labour with a plan for a vaginal birth	The number of women (para 1 and at term with a singleton pregnancy) whose previous birth was a caesarean section
<b>Indicator 4b:</b> Rate of women who achieved a planned vaginal birth following a primary caesarean section in Victorian public hospitals	The number of women (para 1 and at term with a singleton pregnancy) whose previous birth was a caesarean and who enter labour with a plan for a vaginal birth and who achieve a vaginal birth	The number of women (para 1 and at term with a singleton pregnancy) whose previous birth was a caesarean and who enter labour with a plan for a vaginal birth

## Indicator 5: Five-year gestation standardised perinatal mortality ratio (GSPMR)

### Definition:

The GSPMR is standardised according to the gestational age-specific perinatal mortality rates of the total population in Victorian public hospitals. The standardisation does not adjust for interhospital transfers, and deaths are ascribed to the birth hospital regardless of the timing of the death in relation to the transfer.

In interpreting these ratios, conclusions cannot be drawn about the avoidability of these deaths. This needs to be undertaken by expert perinatal mortality and review panels at the local level.

The data in this report:

- is calculated from five years of pooled data between 2010 and 2014
- is standardised using gestational age
- excludes births earlier than 32 weeks 0 days
- excludes birthweights less than 150 g regardless of gestation
- excludes all deaths due to congenital anomalies and all terminations of pregnancy.

These exclusions provide a more sensitive indicator to reflect the quality of care. Hospitals are only reported where they have had five or more perinatal deaths in any of the five pooled years.

The GSPMR is presented with data for public hospitals being shown in relation to the statewide public hospital perinatal mortality rate as the standard or reference population.

A GSPMR of 1 indicates that the observed number of perinatal deaths at that hospital is exactly what would be expected, considering the gestation of babies born there. The statewide rate (1) does not necessarily represent the optimal or clinically appropriate rate for perinatal mortality.

### Data source:

Victorian Perinatal Data Collection.

Data from the VPDC is reported by calendar year from 1 January 2014 to 31 December 2014.

This data is routinely collected for all births from each health service.

**Numerator/denominator:**

Indicator	Observed	Expected
<b>Indicator 5:</b> Perinatal mortality ratio for babies born at 32 weeks (gestation standardised, excluding all terminations of pregnancy and deaths due to congenital anomalies) using five years' pooled data in Victorian public hospitals (32 weeks or more GSMPR)	Observed perinatal deaths from 32 weeks 0 days (by weeks' gestation at birth)	Expected perinatal deaths from 32 weeks 0 days (by weeks' gestation at birth)

The adjusted GSMPR is calculated and applied to all public hospitals having five or more observed perinatal deaths in any of the included calendar years (2010–2014).

## Indicator 6: Referral to postnatal domiciliary care or Hospital in the Home

### Definition:

Note: A new separation referral code was introduced in the VAED in 2012–13 to capture the rate of women who decline referral to domiciliary postnatal care in the home. This code captures those women who were offered domiciliary care but declined the service.

This has **not** been included in the indicator. That is, women who refused postnatal care have been included in the denominator and are not counted in the numerator. Therefore, results are underestimated.

### Data source:

Victorian Admitted Episodes Dataset.

Data from the VAED is reported by financial year from 1 July 2014 to 30 June 2015.

### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 6:</b> Rate of women referred to postnatal domiciliary care or Hospital in the Home in Victorian public hospitals	Number of women giving birth referred to postnatal domiciliary care or Hospital in the Home	Number of women giving birth excluding women transferred to another hospital

## Indicator 7: Smoking during pregnancy

### Data source:

Victorian Perinatal Data Collection.

Data from the VPDC is reported by calendar year from 1 January 2014 to 31 December 2014.

This data is routinely collected for all births from each health service. Data collection may require collaboration with shared care or community-based providers, including shared documentation systems.

The indicators are derived using the following VPDC variables: 'Maternal smoking at less than 20 weeks' and 'Maternal smoking at more than or equal to 20 weeks'.

### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 7a:</b> Rate of women smoking during pregnancy (before 20 weeks' gestation) in Victorian public hospitals	Number of women who gave birth who identified as smoking before 20 weeks' gestation	All women who gave birth
<b>Indicator 7b:</b> Rate of women smoking during pregnancy (after 20 weeks' gestation) in Victorian public hospitals	Number of women who gave birth who identified as smoking at or after 20 weeks' gestation	All women who gave birth

## Indicator 8: Breastfeeding

### Data source:

Victorian Perinatal Data Collection.

Data from the VPDC is reported by calendar year from 1 January 2014 to 31 December 2014.

This data is routinely submitted by each health service on each birth.

The indicators are derived using the following VPDC variables: 'Breastfeeding attempted', 'Formula given in hospital', 'Last feed before discharge taken exclusively from the breast', 'Estimated gestational age' and 'Birth status'.

### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 8a:</b> Rate of breastfeeding initiation for babies born at 37+ weeks in Victorian public hospitals	The number of women giving birth at 37 or more weeks' gestation attempting to breastfeed at least once (regardless of the success of the attempt)	The number of women giving birth at 37 or more weeks' gestation
<b>Indicator 8b:</b> Rate of use of infant formula by breastfed babies born at 37+ weeks in Victorian public hospitals	The number of babies born at 37 or more weeks' gestation whose mother initiated breastfeeding and was given infant formula in hospital	The number of babies born at 37 or more weeks' gestation whose mother initiated breastfeeding
<b>Indicator 8c:</b> Rate of final feed being taken exclusively and directly from the breast by breastfed babies born at 37+ weeks' gestation in Victorian public hospitals	The number of babies born at 37 or more weeks' gestation whose mother initiated breastfeeding and who fed directly and entirely from the breast at the last feed before discharge	The number of babies born at 37 or more weeks' gestation whose mother initiated breastfeeding

## Indicator 9: Initiation of antenatal care

### Definition:

The first antenatal visit is the first visit to a midwife or doctor (hospital or community) arranged specifically for the purpose of providing maternity care. It excludes visits for confirmation of pregnancy unless some maternity care is provided (for example, referral for first-trimester screening) and medical visits for incidental problems while pregnant.

### Data source:

Victorian Perinatal Data Collection.

Data from the VPDC is reported by calendar year from 1 January 2014 to 31 December 2014.

This data is routinely collected for all births at each health service.

The indicator is derived using the VPDC variable: 'Gestational age at first antenatal visit'.

### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 9:</b> Rate of women attending their first antenatal visit prior to 12 weeks' gestation	The number of women who gave birth and who attended antenatal care prior to 12 weeks' gestation with a maternity care provider (excluding visits for confirmation of pregnancy only and medical visits for incidental problems while pregnant). Includes antenatal care provided in the community (e.g. shared care.)	The number of women who gave birth

## Indicator 10: Term infants without birth anomalies with an Apgar score less than 7 at five minutes

Exclusions: Infants born at less than 37 weeks' gestation, infants born with congenital anomalies, multiple births, stillbirths and babies born before arrival at hospital.

### Data source:

Victorian Perinatal Data Collection.

Data from the VPDC is reported by calendar year from 1 January 2014 to 31 December 2014.

This data is routinely collected for every birth at each health service.

The indicator is derived using the following VPDC variables: 'Apgar score at 5 minutes', 'Estimated gestational age', 'Birth status', 'Birth plurality', 'Setting of birth actual' and 'Congenital anomalies indicator'.

### Numerator/denominator:

Indicator	Numerator	Denominator
<b>Indicator 10:</b> Rate of term infants without congenital anomalies with an Apgar score of less than 7 at five minutes in Victorian public hospitals	The number of inborn, singleton, liveborn, term infants without congenital anomalies with an Apgar score less than 7 at five minutes	The number of inborn, singleton, liveborn term infants without congenital anomalies

## Appendix 3: Key terms

<b>Antenatal</b>	Before birth – the period between conception and birth. Also called 'prenatal'.
<b>Apgar score</b>	The Apgar score is a measure of the baby's skin colour, spontaneous activity, reflex activity, pulse rate and respiration at specific times after birth.
<b>Assisted vaginal birth</b>	One of the methods that may be used to speed up a birth. Assisted vaginal birth is performed either by using forceps (special large curved tongs placed around the baby's head to assist movement through the birth canal) or vacuum extraction (gentle suction applied following placement of a large suction cap on the baby's head).
<b>Caesarean section</b>	A surgical operation by which the fetus is extracted through an incision in the abdominal and uterine walls.
<b>Congenital anomaly</b>	An anomaly of prenatal origin arising from conception or occurring before the end of pregnancy. This includes structural, functional, genetic, chromosomal and biochemical anomalies.
<b>Domiciliary care</b>	Postnatal care provided in the woman's home.
<b>Expected</b>	The number of deaths that are predicted to occur based on the number of births at each week of gestation at the hospital and the statewide rate of perinatal deaths.
<b>Fetal growth restriction (FGR)</b>	Birthweight below the 10th centile for gestational age, plurality and sex. Severe FGR is defined as a birthweight less than the 3rd centile.
<b>Fourth-degree tear</b>	A tear of the perineum into the anal sphincter, which extends to the lining of the anus.
<b>Gestation</b>	The number of weeks of pregnancy calculated from the first day of the mother's last normal menstrual period.
<b>Induction of labour</b>	Sometimes it is necessary to help the process of labour to begin. Any method that does this is called 'induction'.
<b>Intrapartum</b>	During labour.
<b>Live birth</b>	The birth of a baby, at any stage of maturity, who has breathed or shown other signs of life after being born.
<b>Maternity care provider</b>	The clinician who provides most occasions of antenatal care and is expected to be primarily responsible for making decisions regarding intrapartum care.
<b>Neonatal</b>	Newborn; from birth until the 28th day.
<b>Observed</b>	The sum of actual number of perinatal deaths at each week of gestation.
<b>Perinatal</b>	The period before, during and after birth – antenatal, intrapartum and postnatal periods.
<b>Perineal tear</b>	A tear or rupture of the pelvic floor and associated structures.
<b>Postnatal</b>	After birth.
<b>Pre-term</b>	Prior to 37 weeks' gestation.
<b>Primipara</b>	A woman who has given birth for the first time.

<b>Standard primipara</b>	A woman, 20–34 years of age, who has given birth for the first time, free of obstetric and specific medical complications and is pregnant with a singleton pregnancy of gestation between 37 weeks 0 days and 40 weeks six days, with a non-small-for-gestational-age (greater than 10th centile) infant and a head-first (cephalic) presentation.
<b>Stillbirth</b>	The birth of an infant of at least 20 weeks' gestation or, if gestation is unknown, weighing at least 400 grams, who shows no signs of life at birth.
<b>Term infant</b>	An infant born between 37 and 42 weeks' gestation.
<b>Third-degree tear</b>	A tear of the perineum into the anal sphincter that does not extend to the lining of the anus.
<b>Vaginal birth</b>	A birth of a baby via the vagina whether or not it was assisted.
<b>Vaginal birth after caesarean (VBAC)</b>	Vaginal birth after caesarean; a woman who has a normal vaginal birth, forceps birth or ventouse birth following a previous caesarean birth.

## Appendix 4: Total women and babies, 2014

**Table 3: Total number of women and babies, by place of birth, 2014**

Health service	Maternity capability level of service	Number of women	Number of babies
The Royal Women's Hospital	6	7,149	7,332
Mercy Hospital for Women	6	5,863	6,019
Monash Medical Centre Clayton	6	3,743	3,886
Sunshine Hospital	5	5,170	5,230
The Northern Hospital	5	3,378	3,411
Frankston Hospital	5	2,670	2,699
Box Hill Hospital	5	2,405	2,428
University Hospital Geelong	5	2,352	2,372
Bendigo Health Care Group	5	1,338	1,361
Ballarat Health Services	5	1,327	1,348
Goulburn Valley Health	5	1,201	1,214
Central Gippsland Health Service	5	427	436
Dandenong Hospital	4	2,507	2,507
Angliss Hospital	4	2,207	2,222
Albury Wodonga Health	4	1,645	1,671
West Gippsland Healthcare Group	4	940	952
Mildura Base Hospital	4	860	872
Latrobe Regional Hospital (Traralgon)	4	811	817
South West Healthcare Warrnambool	4	745	759
Northeast Health Wangaratta	4	545	552
Wimmera Health Care Group	4	353	360
Mercy Werribee Hospital	3	2,990	3,012
Casey Hospital	3	1,976	1,976
Women's at Sandringham	3	1,471	1,474
Djerriwarrh Health Services	3	887	888
Bairnsdale Regional Health Service	3	360	361
Echuca Regional Health	3	303	305
Swan Hill District Health	3	222	223
Kilmore and District Hospital	3	221	221
Bass Coast Regional Health	3	209	209
Gippsland Southern Health Service (Leongatha)	3	207	207
Western District Health Service (Hamilton)	3	182	184

Health service	Maternity capability level of service	Number of women	Number of babies
East Grampians Health Service (Ararat)	3	111	111
Benalla and District Memorial Hospital	3	97	97
South Gippsland Hospital	3	82	82
Mansfield District Hospital	3	80	80
Cohuna District Hospital	3	52	53
Kerang District Hospital	3	35	35
Seymour District Memorial Hospital	3	31	31
Terang and Mortlake Health Service	3	25	25
Colac Area Health	2	164	164
Maryborough District Health Service	2	80	80
Yarrawonga District Health Service	2	62	62
Kyneton District Health Service	2	61	61
Castlemaine Health	2	55	55
Portland District Health	2	41	41
South West Healthcare Camperdown	2	39	39
Orbost Regional Health	2	21	21
Kyabram and District Health Service <sup>10</sup>	2	16	16
Alpine (Bright, Myrtleford and Mt Beauty)	2	10	10
Other public hospitals		8	8
<b>Private homebirth</b>		<b>252</b>	<b>252</b>
<b>Public hospital total</b>		<b>57,734</b>	<b>58,579</b>
<b>Private hospital total (n = 16)</b>		<b>19,705</b>	<b>20,078</b>
<b>Statewide total</b>		<b>77,691</b>	<b>78,909</b>

Note: Excludes babies born  $\leq$  20 weeks' gestation, all terminations of pregnancy and birthweight  $\leq$  150g. Capability levels at 2014. Babies born before arrival are counted at the hospital the mother and baby are subsequently transported to. Public hospitals with  $\leq$  5 births are included in 'Other public hospitals'. Non-maternity public hospitals with occasional births are also included in 'Other public hospitals'.

<sup>10</sup>Kyabram and District Health Service ceased birthing services in February 2015.



## Appendix 5: Overview of results

Table 4: Overview of indicator results, 2014-15

Level of service		Number of births	Indicators								
			1a	1b	1c	2	3	4a	4b	5	6
	Statewide public hospitals		2.9	16.1	6.2	8.5	34.6	27.4	54.2	1.00	98.9
	Statewide private hospitals		12.3	31.5	3.3	N/A	29.9	15.4	48.9	0.66	N/A
	Lower quartile range		0.0	9.2	0.0	2.2	25.3	19.9	45.0	0.94	96.1
	Upper quartile range		4.1	23.7	8.3	8.4	42.5	31.5	64.6	1.23	99.6
6	The Royal Women's Hospital	7,149	2.7	9.2	7.1	8.8	33.2	26.6	70.9	0.92	98.0
6	Mercy Hospital for Women	5,863	4.1	18.5	1.4	6.1	22.0	22.5	61.6	0.48	99.9
6	Monash Medical Centre Clayton	3,743	0.0	9.7	8.7	21.8	28.3	31.5	54.0	1.00	99.0
5	Sunshine Hospital	5,170	1.7	19.2	11.1	8.5	37.1	34.9	41.1	1.31	99.6
5	The Northern Hospital	3,378	2.0	16.3	3.6	8.3	34.9	21.3	42.6	1.23	99.4
5	Frankston Hospital	2,670	4.4	17.5	4.3	5.9	43.3	27.3	49.3	1.27	99.7
5	Box Hill Hospital	2,405	0.0	8.8	9.7	8.1	37.0	25.8	56.7	1.13	98.7
5	University Hospital Geelong	2,352	2.5	17.5	7.6	10.7	27.1	27.1	51.9	1.00	98.9
5	Bendigo Health Care Group	1,338	0.0	23.3	9.1	9.5	16.7	29.7	48.5	N/A	99.8
5	Ballarat Health Services	1,327	13.2	23.7	6.9	8.8	15.6	26.2	44.4	1.18	99.8
5	Goulburn Valley Health	1,201	5.6	9.0	2.5	9.7	26.1	31.5	47.8	1.19	99.6
5	Central Gippsland Health Service	427	13.6	18.2	5.6	8.1	N/A	20.5	N/A	N/A	100

Level of service		Indicators							Total number of indicators in least favourable quartile (shaded red)	Total number of indicators in most favourable quartile (shaded green)
		7a	7b*	8a	8b	8c	9	10		
	Statewide public hospitals	12.6	7.8	94.7	25.2	80.0	20.0	1.5		
	Statewide private hospitals	1.7	0.4	96.7	39.5	73.3	85.4	0.9		
	Lower quartile range	N/A	N/A	92.5	10.1	81.0	4.6	0.5		
	Upper quartile range	N/A	N/A	95.8	25.3	92.2	42.9	1.9		
6	The Royal Women's Hospital	9.7	4.7	97.8	30.0	77.9	26.4	1.5	3	5
6	Mercy Hospital for Women	3.8	2.6	96.3	26.9	78.7	14.1	1.8	3	4
6	Monash Medical Centre Clayton	11.8	6.2	95.0	37.3	59.0	23.4	1.8	4	3
5	Sunshine Hospital	12.6	8.4	93.7	22.8	80.8	16.6	1.1	5	2
5	The Northern Hospital	12.6	7.8	90.4	41.3	67.6	4.1	1.2	6	0
5	Frankston Hospital	26.1	10.4	91.9	21.8	89.9	1.2	1.4	5	2
5	Box Hill Hospital	8.5	4.9	96.8	18.5	86.3	4.2	1.6	2	3
5	University Hospital Geelong	9.3	6.9	94.8	18.4	85.9	6.1	1.9	2	0
5	Bendigo Health Care Group	19.6	14.4	92.5	31.7	71.8	4.5	2.4	7	4
5	Ballarat Health Services	21.1	13.6	93.2	16.7	87.1	6.3	1.8	4	2
5	Goulburn Valley Health	24.0	15.8	92.5	24.8	85.3	3.8	1.3	4	3
5	Central Gippsland Health Service	19.2	15.2	93.8	44.6	75.2	73.4	0.6	3	2

Level of service		Number of births	Indicators									
			1a	1b	1c	2	3	4a	4b	5	6	
4	Dandenong Hospital	2,507	1.4	14.3	6.3	10.3	48.7	32.1	56.5	0.95	98.8	
4	Angliss Hospital	2,207	0.0	14.8	9.8	5.3	44.1	19.9	61.8	0.90	99.6	
4	Albury Wodonga Health	1,645	7.7	26.9	6.3	11.3	29.0	24.3	69.7	1.06	99.7	
4	West Gippsland Healthcare Group	940	0.0	10.0	11.1	7.9	21.4	50.8	66.7	N/A	97.0	
4	Mildura Base Hospital	860	4.0	25.7	4.0	6.7	38.9	26.2	62.5	N/A	97.9	
4	Latrobe Regional Hospital (Traralgon)	811	2.0	18.4	10.0	8.4	43.5	23.7	28.6	N/A	99.2	
4	South West Healthcare Warrnambool	745	3.1	9.2	6.8	10.4	29.4	39.6	52.4	N/A	98.9	
4	Northeast Health Wangaratta	545	7.3	19.5	6.1	4.9	N/A	48.0	45.8	N/A	99.8	
4	Wimmera Health Care Group	353	N/A	N/A	N/A	3.9	N/A	27.8	50.0	N/A	97.8	
3	Mercy Werribee Hospital	2,990	2.4	22.0	4.5	6.4	35.1	28.5	52.6	0.87	99.8	
3	Casey Hospital	1,976	1.7	12.6	7.8	11.9	44.7	16.1	45.0	1.23	99.6	
3	Women's at Sandringham	1,471	1.8	16.1	4.3	3.7	52.8	25.6	62.5	N/A	98.5	
3	Djerriwarrh Health Services	887	2.8	15.3	3.3	2.8	61.9	29.4	45.0	2.03	100	
3	Bairnsdale Regional Health Service	360	0.0	33.3	0.0	3.0	40.0	32.1	N/A	N/A	92.7	
3	Echuca Regional Health	303	18.2	27.3	N/A	1.1	N/A	23.5	N/A	N/A	88.7	
3	Swan Hill District Health	222	0.0	8.3	0.0	2.3	N/A	20.0	N/A	N/A	99.5	

Level of service		Indicators							Total number of indicators in least favourable quartile (shaded red)	Total number of indicators in most favourable quartile (shaded green)
		7a	7b*	8a	8b	8c	9	10		
4	Dandenong Hospital	9.3	4.3	96.4	173	77.4	44.3	11	3	4
4	Angliss Hospital	15.7	8.4	95.9	21.4	81.6	22.1	1.7	3	5
4	Albury Wodonga Health	13.8	11.6	93.0	25.9	89.0	38.8	1.8	4	2
4	West Gippsland Healthcare Group	20.9	14.9	95.1	20.1	93.3	63.6	1.0	1	6
4	Mildura Base Hospital	24.1	17.6	91.5	28.7	79.5	60.1	2.5	5	2
4	Latrobe Regional Hospital (Traralgon)	27.4	21.6	89.7	36.2	70.0	18.0	1.9	8	0
4	South West Healthcare Warrnambool	13.6	8.5	95.6	16.4	89.0	92.1	2.1	2	3
4	Northeast Health Wangaratta	14.3	10.6	92.8	25.6	87.0	13.2	1.9	3	2
4	Wimmera Health Care Group	17.3	11.3	90.1	27.3	83.7	37.1	0.3	2	1
3	Mercy Werribee Hospital	5.9	4.9	95.2	24.3	80.3	6.8	1.2	1	2
3	Casey Hospital	14.3	6.3	95.2	25.4	74.1	26.5	1.2	7	2
3	Women's at Sandringham	2.9	1.6	97.0	15.6	94.1	1.3	1.6	2	3
3	Djerriwarrh Health Services	14.4	13.0	91.1	17.2	86.8	32.4	1.0	5	1
3	Bairnsdale Regional Health Service	20.8	18.9	93.2	6.2	94.5	6.9	0.9	3	5
3	Echuca Regional Health	19.8	13.9	92.6	9.9	90.2	29.9	3.1	4	2
3	Swan Hill District Health	20.7	16.2	95.3	14.9	90.2	79.7	2.2	2	4

Level of service		Number of births	Indicators								
			1a	1b	1c	2	3	4a	4b	5	6
3	Kilmore and District Hospital	221	8.6	31.4	8.3	2.2	N/A	5.9	N/A	N/A	97.2
3	Bass Coast Regional Health	209	N/A	N/A	N/A	4.2	N/A	23.8	N/A	N/A	96.2
3	Gippsland Southern Health Service (Leongatha)	207	0.0	25.0	5.6	2.2	N/A	17.4	N/A	N/A	96.4
3	Western District Health Service (Hamilton)	182	N/A	N/A	N/A	2.7	N/A	14.3	N/A	N/A	98.3
3	East Grampians Health Service (Ararat)	111	N/A	N/A	N/A	1.9	N/A	N/A	N/A	N/A	99.0
3	Benalla and District Memorial Hospital	97	9.1	27.3	N/A	1.2	N/A	25.0	N/A	N/A	94.5
3	South Gippsland Hospital	82	0.0	9.1	0.0	3.8	N/A	N/A	N/A	N/A	86.5
3	Mansfield District Hospital	80	0.0	23.1	10.0	1.4	N/A	N/A	N/A	N/A	96.0
3	Cohuna District Hospital	52	N/A	N/A	N/A	10.5	N/A	N/A	N/A	N/A	82.0
3	Kerang District Hospital	35	N/A	N/A	N/A	0.0	N/A	N/A	N/A	N/A	89.3
3	Seymour District Memorial Hospital	31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Terang and Mortlake Health Service	25	N/A	N/A	N/A	4.0	N/A	N/A	N/A	N/A	92.0
2	Colac Area Health	164	0.0	21.4	18.2	2.9	N/A	N/A	N/A	N/A	96.7
2	Maryborough District Health Service	80	N/A	N/A	N/A	3.2	N/A	N/A	N/A	N/A	100
2	Yarrawonga District Health Service	62	N/A	N/A	N/A	0.0	N/A	N/A	N/A	N/A	96.5
2	Kyneton District Health Service	61	N/A	N/A	N/A	0.0	N/A	N/A	N/A	N/A	74.4

Level of service		Indicators							Total number of indicators in least favourable quartile (shaded red)	Total number of indicators in most favourable quartile (shaded green)
		7a	7b*	8a	8b	8c	9	10		
3	Kilmore and District Hospital	19.0	10.4	94.0	11.8	87.1	6.3	0.5	4	3
3	Bass Coast Regional Health	20.1	17.2	94.6	5.3	93.8	25.8	0.5	1	3
3	Gippsland Southern Health Service (Leongatha)	13.0	11.6	97.6	12.1	88.5	3.4	0.5	4	3
3	Western District Health Service (Hamilton)	17.0	15.4	91.0	23.6	80.2	0.0	0.6	5	0
3	East Grampians Health Service (Ararat)	28.8	12.6	93.4	13.3	92.9	90.0	2.9	1	4
3	Benalla and District Memorial Hospital	20.6	14.4	95.7	8.0	92.1	50.5	1.1	3	3
3	South Gippsland Hospital	11.0	8.5	98.7	6.7	92.2	36.6	1.3	1	6
3	Mansfield District Hospital	8.8	3.8	97.5	12.0	92.2	2.5	1.4	3	5
3	Cohuna District Hospital	11.5	9.6	91.8	20.0	88.9	84.0	2.1	4	1
3	Kerang District Hospital	8.6	2.9	94.1	43.8	84.4	50.0	0.0	2	4
3	Seymour District Memorial Hospital	16.1	12.9	96.8	14.3	86.7	3.3	3.3	2	1
3	Terang and Mortlake Health Service	16.0	20.0	95.8	8.7	100	4.2	0.0	3	4
2	Colac Area Health	12.2	11.6	96.2	9.9	91.4	64.6	0.0	2	5
2	Maryborough District Health Service	37.5	33.8	93.6	22.6	90.2	1.4	0.0	2	2
2	Yarrawonga District Health Service	21.0	9.7	95.1	0.0	98.3	16.1	5.1	1	4
2	Kyneton District Health Service	13.1	13.1	95.0	5.3	94.7	16.4	0.0	2	4

Level of service		Number of births	Indicators								
			1a	1b	1c	2	3	4a	4b	5	6
2	Castlemaine Health	55	N/A	N/A	N/A	1.8	N/A	N/A	N/A	N/A	96.7
2	Portland District Health	41	N/A	N/A	N/A	1.6	N/A	N/A	N/A	N/A	95.1
2	South West Healthcare Camperdown	39	N/A	N/A	N/A	4.8	N/A	N/A	N/A	N/A	77.3
2	Orbost Regional Health	21	N/A	N/A	N/A	0.0	N/A	N/A	N/A	N/A	100
2	Kyabram and District Health Service	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Alpine (Bright, Myrtleford and Mt Beauty)	10	N/A	N/A	N/A	7.1	N/A	N/A	N/A	N/A	90.9

Level of service		Indicators							Total number of indicators in least favourable quartile (shaded red)	Total number of indicators in most favourable quartile (shaded green)
		7a	7b*	8a	8b	8c	9	10		
2	Castlemaine Health	7.3	1.8	98.1	5.4	84.2	81.5	0.0	0	6
2	Portland District Health	24.4	24.4	84.6	6.1	93.9	4.9	0.0	3	4
2	South West Healthcare Camperdown	15.4	15.4	89.5	5.9	94.1	2.6	0.0	4	3
2	Orbost Regional Health	23.8	9.5	95.0	10.5	89.5	38.1	0.0	0	4
2	Kyabram and District Health Service	6.2	6.2	87.5	14.3	92.9	6.3	6.3	3	1
2	Alpine (Bright, Myrtleford and Mt Beauty)	20.0	20.0	90.0	N/A	N/A	60.0	0.0	3	2

\* Quartiles for this indicator have been calculated based on the relative reduction of smoking after 20 weeks' gestation at the health service compared with their rate before 20 weeks' gestation.

**Table 5: Gestation standardised perinatal mortality ratio for babies born from 32 weeks – moving average trend, 2007–2011 to 2010–2014**

Level of service	Hospital name	2007-2011	2008-2012	2009-2013	2010-2014
4	Albury Wodonga Health	0.88	0.98	1.15	1.06
4	Angliss Hospital	0.84	0.87	0.86	0.90
5	Ballarat Health Services	1.33	1.32	1.14	1.18
5	Bendigo Health Care Group	0.81	0.82	0.89	N/A
5	Box Hill Hospital	0.87	1.03	1.12	1.13
3	Casey Hospital	1.11	1.38	1.40	1.23
4	Dandenong Hospital	1.13	1.04	1.05	0.95
3	Djerriwarrh Health Services	N/A	N/A	2.07	2.03
5	Frankston Hospital	1.14	1.29	1.33	1.27
5	Goulburn Valley Health	0.67	N/A	1.08	1.19
4	Latrobe Regional Hospital (Traralgon)	1.47	1.37	N/A	N/A
6	Mercy Hospital for Women	0.51	0.55	0.50	0.48
3	Mercy Werribee Public Hospital	0.60	0.79	0.78	0.87
4	Mildura Base Hospital	0.92	N/A	N/A	N/A
6	Monash Medical Centre Clayton	0.82	0.83	0.92	1.00
4	Northeast Health Wangaratta	1.13	N/A	N/A	N/A
3	Sandringham and District Memorial Hospital	0.37	N/A	N/A	N/A
4	South West Healthcare Warrnambool	1.06	N/A	N/A	N/A
5	Sunshine Hospital	1.13	1.24	1.21	1.31
5	The Northern Hospital	1.18	1.37	1.24	1.23
6	The Royal Women's Hospital	1.04	1.03	0.97	0.92
5	University Hospital Geelong	0.73	0.66	0.77	1.00

Notes:

Results for up to four pooled five-year periods are shown for each hospital.

N/A: not applicable – the hospital did not meet the threshold for public reporting in any of the five-year pooled periods.

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