

# Victorian Maternity Services Performance Indicators

Complete set for 2003–2004

March 2005



### Acknowledgements

This report was prepared by Vickie Kyriakopoulos with expert assistance from Mary-Ann Davey and Associate Professor James King. It has been developed in consultation with the Maternity Services Advisory Committee Performance Indicator Sub-Committee of the Department of Human Services, Victoria.

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## 1. Background

In 2001, the Victorian Government report, *Measuring maternity care*, commissioned by the Department of Human Services, recommended that a set of nine performance indicators be implemented throughout the state's maternity services.<sup>1</sup> An existing indicator: 'The proportion of women referred to postnatal domiciliary care', was added to complete the set. The ten indicators span a range of domains of care and address both process and outcome measures for the three phases of maternity care.

In previous years, these indicators were reported as part of the department's Quality Framework for Victoria. In November 2003, a report of the first two years of three of the indicators (MAT-1, MAT-4 and MAT-5), derived from the Perinatal Data Collection Unit (PDCU), was published on the web.<sup>2</sup> This report included rate ratios, histograms and statewide figures with confidence intervals, in relation to combined data for 2001 and 2002.

## 2. Introduction and summary

This report of the 2003–04 Maternity Services Performance Indicators for Victorian hospitals with birthing services collates the results of reporting requirements outlined in *Maternity Services Performance Indicators Business Rules* for 2003–04. It forms part of the Metropolitan Health and Aged Care Services/Rural and Regional Health and Aged Care Services Divisions' Integrated Performance Report.

The report was compiled through joint work between Programs Branch, Metropolitan Health and Aged Care Services Division and the PDCU, Public Health Branch, Rural and Regional Health and Aged Care Services Division, in consultation with expert advice provided by the Maternity Services Advisory Committee Performance Indicator Sub-Committee.

The Maternity Services Indicator Program aims to improve public hospitals' ability to compare their performance over a range of maternal and perinatal outcomes. Implementing the indicators is expected to:

- enable comparisons about performance
- promote discussion within and between hospitals about performance against the indicators
- promote discussion about what level of performance should be achieved in a given area
- promote discussion and shared learning about how to improve the quality of maternity care generally.<sup>3</sup>

The complete set of maternity services performance indicators, which are included in this report, are:<sup>4</sup>

MAT-1. Outcomes for standard primiparae.

MAT-2. The rate of term infants transferred or admitted to special care nursery (SCN) or neonatal intensive care unit (NICU) for reasons other than birth defect.

MAT-3. The rate of administration of antenatal corticosteroids to women delivered or transferred before 34 weeks gestation.

MAT-4. The rate of vaginal birth for women in the birth immediately following a primary caesarean section.

MAT-5. Standardised perinatal mortality ratio.

MAT-6. The proportion of women referred to postnatal domiciliary care.

MAT-7. The proportion of women offered appropriate interventions in relation to smoking.

MAT-8. The provision of appropriate breastfeeding support and advice.

MAT-9. The proportion of women who receive timely hospital antenatal clinical services.

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<sup>1</sup> Department of Human Services Victoria. *Measuring maternity services: a set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2001.

<sup>2</sup> Christine Stone and James King. *Victorian Maternity Services Performance Indicators: Public hospitals indicators MAT1, MAT4 & MAT5 using combined data from 2001 and 2002*. November 2003. Public Health Group, Department of Human Services, Melbourne 2003.

<sup>3</sup> Department of Human Services Victoria. *Measuring maternity services: a set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2001.

<sup>4</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

MAT-10. The proportion of women from a non-English speaking background (NESB) without proficiency in English who receive appropriate interpreter services.

Each indicator is introduced with Key question, Purpose and rationale, Definition, Data source and Indicator type (process, outcome or rate-based), adapted from the final set of performance indicators report, 2002.<sup>5</sup>

MAT-1, MAT-4 and MAT-5 are derived using data from the PDCU. MAT-2 and MAT-6 are derived using data from the Victorian Admitted Episodes Dataset (VAED). MAT-3, MAT-7, MAT-8, MAT-9 and MAT-10 are derived from data that is reported by Victorian public hospitals to the Department of Human Services. Data is collected over the calendar year for MAT-1, MAT-4 and MAT-5, and over the financial year, July 2003–June 2004, for MAT-2, MAT-3, MAT-6, MAT-7, MAT-8, MAT-9 and MAT-10. Given this report represents one year's data, it was agreed that MAT-1 and MAT-4 would be best displayed as proportions with 95 per cent confidence intervals. Histograms are provided for all other indicators, except MAT-5, the birth-weight standardised perinatal mortality ratio.

Unless indicated, results are graphed for hospitals with at least 10 possible occasions for a given event, for example, 10 or more standard primiparae giving birth over the time period of the report. Hospitals are ordered from largest to smallest, with respect to the number of confinements. A table giving the number of confinements per hospital can be found in the appendix. Where available, the statewide public rates are given. Where a statewide public rate is unavailable, the average for the reporting hospitals will be shown. **It is important to note that several public hospitals have a significant proportion of private patients among their confinements.**

The wide variation between hospitals suggests that these indicators have the potential for identifying ways in which consistency in clinical care can be improved. MAT-3 is the exception to this trend, where the majority of hospitals report a high performance.

It is hoped that the information in this report will support quality measures within individual health services to review and analyse the results, implement practice change and further review outcomes in a multidisciplinary environment. The broader goal is to support improved outcomes for women and babies.

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<sup>5</sup> Department of Human Services V. *Measuring Maternity Services: The Final Set of Performance Indicators*. Melbourne: Victorian Government Publishing Services, 2002.

### 3. MAT-1 Outcomes for standard primiparae in Victorian public hospitals in 2003

This indicator is clearly defined in the report on the final set of performance indicators.<sup>6</sup>

MAT-1a	Induction of labour in standard primiparae
MAT-1b	Caesarean section in standard primiparae
MAT-1c	3rd and 4th degree perineal tears in standard primiparae

#### Key question

How does this public hospital achieve outcomes for standard primiparae compared to the overall rates for standard primiparae in Victorian public hospitals?

#### Purpose and rationale

Use of the standard primipara (rather than all women giving birth) as the basis for inter-hospital comparison of mortality care controls for substantial difference in casemix (pre-risk adjustment), and increases the validity of those comparisons.

The standard primipara represents an uncomplicated pregnancy, therefore, a presumption of this indicator is that intervention and complication rates should be low and consistent across all hospitals.

A 'cascade' effect of intervention has been described, particularly with nulliparous women, which starts with induction of labour and electronic fetal monitoring, and progresses through augmentation, epidural anaesthesia and increased risk of operative vaginal delivery or caesarean section. By reducing the number of standard primiparae who have induced labour, the number of women undergoing unnecessary operative birth and other interventions may be reduced.

This is an outcome indicator.

#### Definition

The standard primipara is defined as a woman who is 20 to 34 years of age, giving birth for the first time, who is free of medical complications and pregnant with a singleton pregnancy at term (37 to 41 completed weeks gestation), with a non small for gestational age (greater than the 10<sup>th</sup> percentile) infant and a cephalic presentation.

#### **MAT-1a Induction of labour**

*Numerator:* The number of standard primiparae undergoing induction of labour.

*Denominator:* The number of standard primiparae who give birth.

#### **MAT-1b Caesarean section**

*Numerator:* The number of standard primiparae undergoing caesarean section.

*Denominator:* The number of standard primiparae who give birth.

#### **MAT-1c Perineal tear**

*Numerator:* The number of standard primiparae who sustain a third-degree or fourth-degree tear.

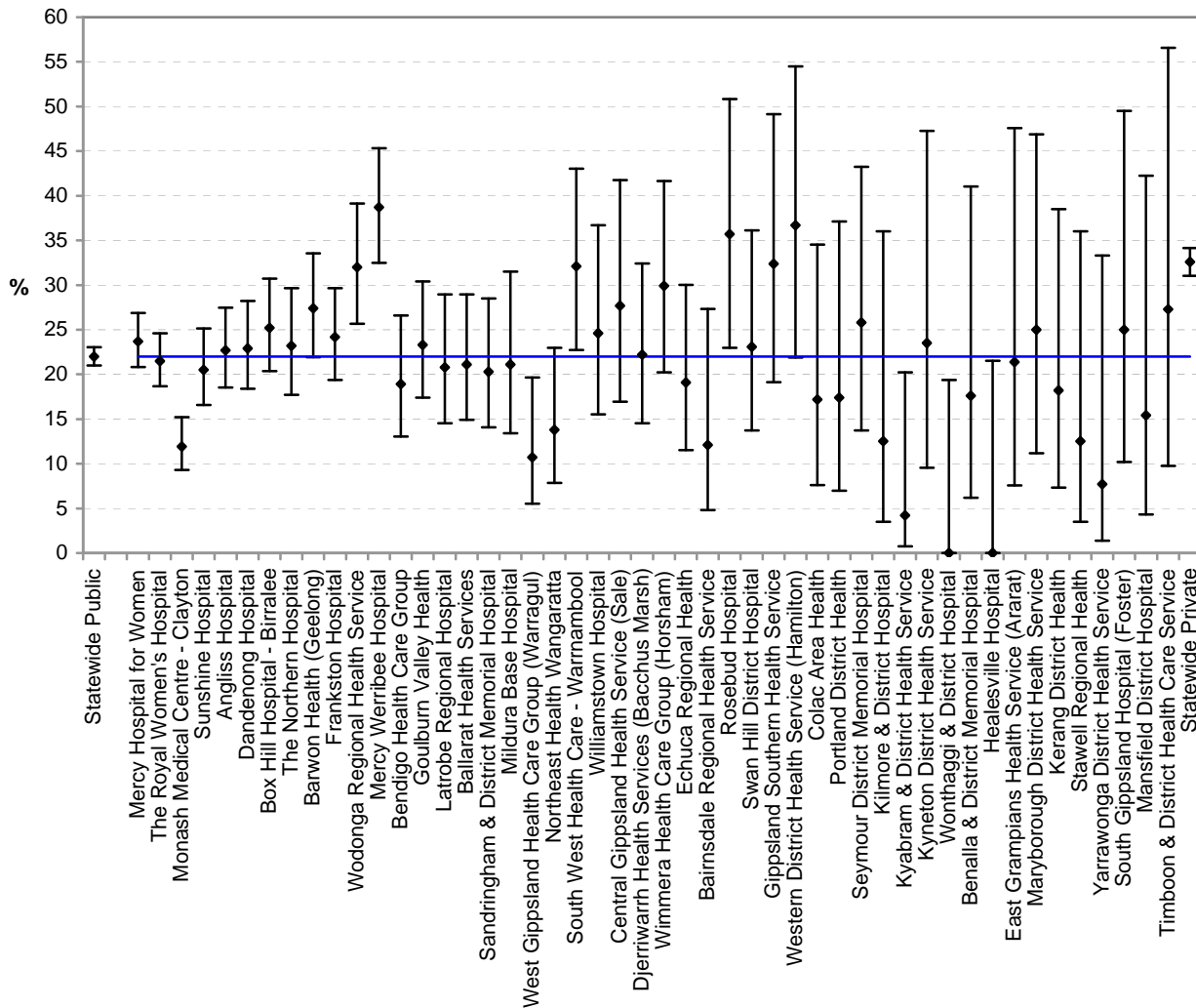
*Denominator:* The number of standard primiparae who give birth vaginally.

#### Data source

The PDCU collects data for this indicator and reports back to hospitals.

<sup>6</sup> Department of Human Services V. *Measuring Maternity Services: The Final Set of Performance Indicators*. Melbourne: Victorian Government Publishing Services, 2002.

**Figure 1 MAT-1a Rate of inductions in standard primiparae in Victorian public hospitals providing maternity services 2003**



Statewide public rate = 22.0% (95% CI 21.0, 23.1)

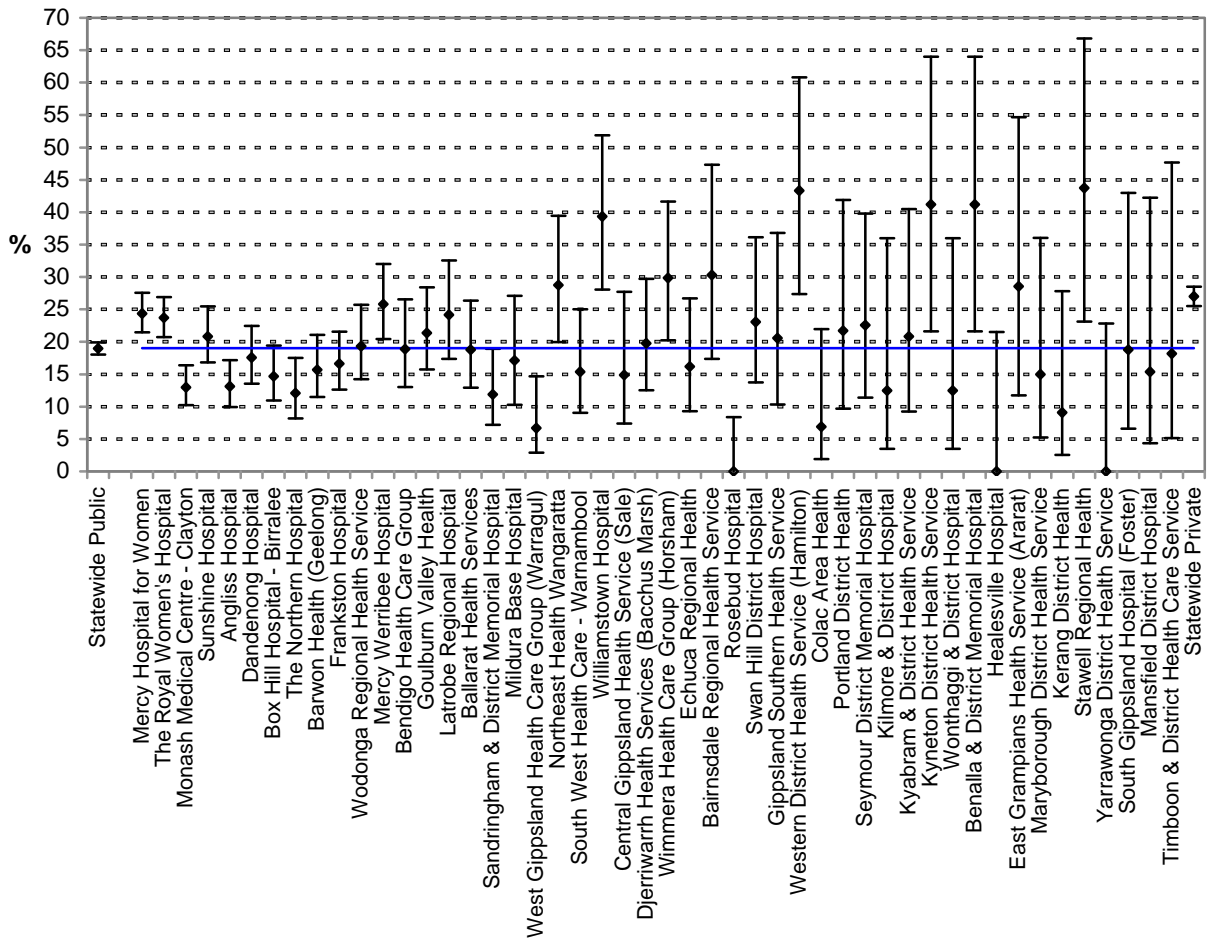
**2001 and 2002 combined:**

Statewide public rate = 22.6% (95% CI 21.0, 23.1)

### **Comments on inductions in standard primiparae in Victorian public hospitals 2003**

1. Figure 1 provides a visual demonstration of the variation in inductions of labour for the standard primiparae occurring across Victorian public hospitals when compared to the statewide public hospital rate, and the 95% confidence interval around that rate. A hospital's rate is significantly different from the statewide rate if its confidence interval does not overlap the statewide interval.
2. Two out of the 48 public hospitals show a significantly higher rate of induction among standard primiparae than the statewide public rate, whereas four of the 48 hospitals show a significantly lower induction rate among standard primiparae. The wide variation between hospitals shows that this indicator has the potential for identifying improved consistency in clinical practice.
3. The statewide public rate for inductions in standard primiparae for 2003 is 22.0% (95% CI 21.0, 23.1). For the previous two-year period (2001 and 2002), the statewide public rate for inductions for standard primiparae was 22.6% (95% CI 21.8, 23.3).
4. Although there is no agreed optimal or clinically appropriate proportion, these rates appear high for these low risk pregnancies.

**Figure 2 MAT-1b Rate of caesarean section in standard primiparae in Victorian public hospitals providing maternity services 2003**



Statewide public rate = 19.0% (95% CI 18.0, 19.9)

**2001 and 2002 combined:**

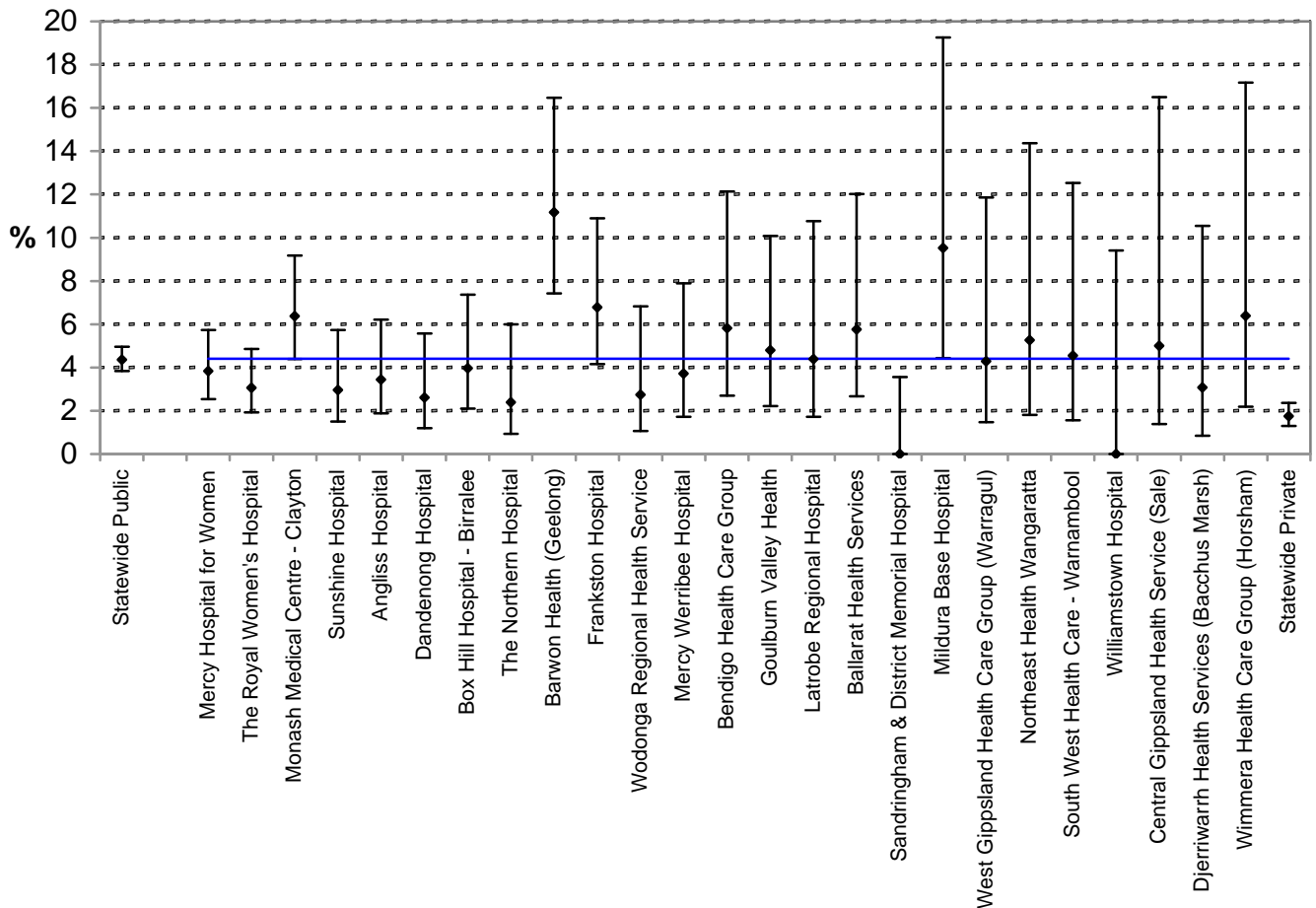
Statewide public rate = 17.1% (95% CI 16.5, 17.8)

### **Comments on caesareans in standard primiparae in Victorian public hospitals 2003**

1. Figure 2 provides a visual demonstration of the variation in caesareans for the standard primiparae occurring across Victorian public hospitals when compared to the statewide public hospital rate, and the 95% confidence interval around that rate. A hospital's rate is significantly different from the state average if its confidence interval does not overlap the statewide interval.
2. Ten out of the 48 public hospitals show a significantly higher caesarean rate for the standard primiparae than the statewide public rate, whereas five of the 48 hospitals show a significantly lower caesarean rate for the standard primiparae. The wide variation between hospitals shows that this indicator has the potential for identifying improved consistency in clinical practice.
3. The statewide public rate for caesareans among standard primiparae in 2003 is 19.0% (95% CI 18.0, 19.9). For the previous two-year period (2001 and 2002), the statewide rate for caesareans among standard primiparae was 17.1% (95% CI 16.5, 17.8).
4. Although there is no agreed optimal or clinically appropriate proportion, these rates appear high for these low risk pregnancies.

**Figure 3 MAT-1c Rate of 3<sup>rd</sup> and 4<sup>th</sup> degree perineal tears in standard primiparae in Victorian public hospitals providing maternity services 2003**

**Hospitals with  $\geq 350$  confinements**



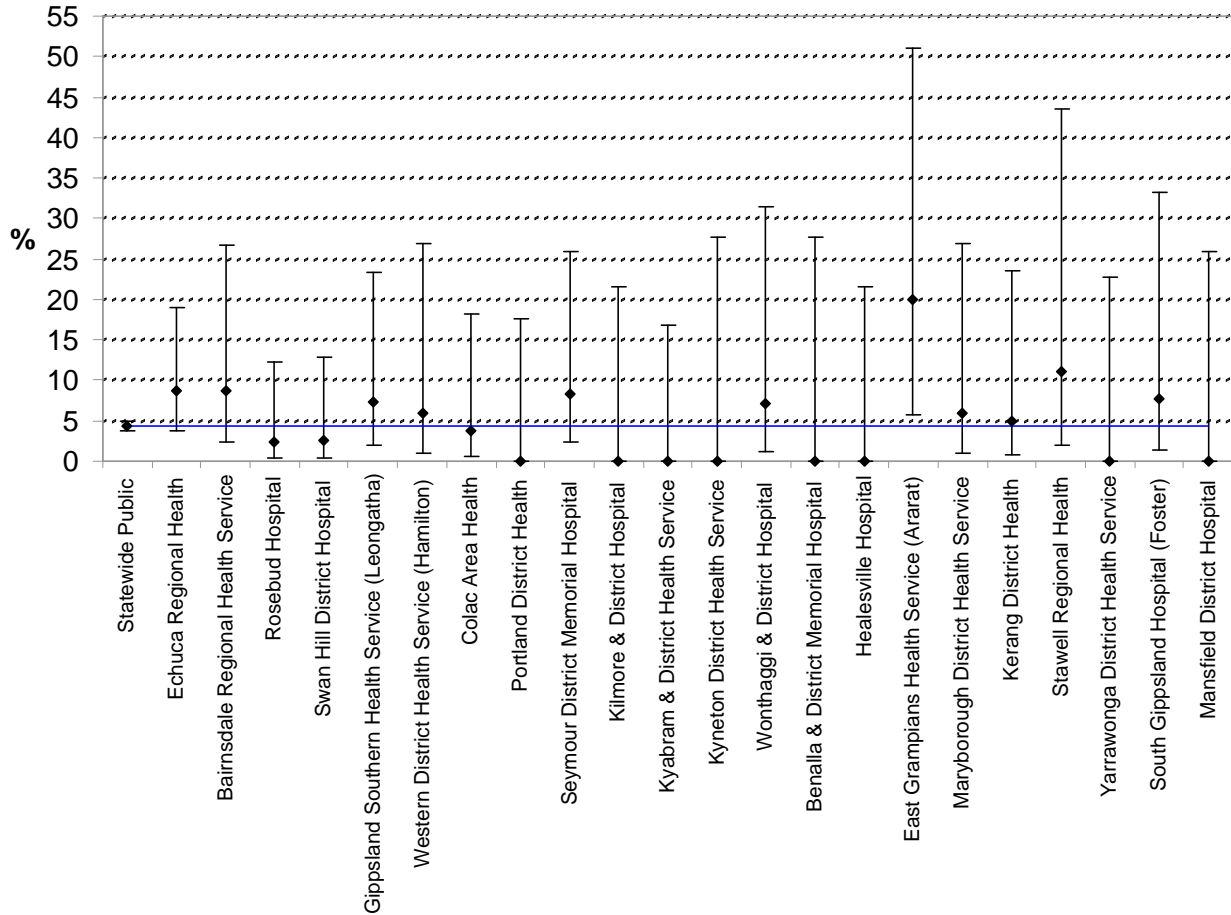
Statewide public rate = 4.4% (95% CI 3.8, 5.0)

**2001 and 2002 combined:**

Statewide public rate = 3.3% (95% CI 3.0, 3.7)

**Figure 4 MAT-1c Rate of 3rd and 4th degree perineal tears in standard primiparae in Victorian public hospitals providing maternity services 2003**

**Hospitals with < 350 confinements**



Statewide public rate = 4.4% (95% CI 3.8, 5.0)

**2001 and 2002 combined:**

Statewide public rate = 3.3% (95% CI 3.0, 3.7)

### **Comments on 3<sup>rd</sup> and 4<sup>th</sup> degree perineal tears in standard primiparae in Victorian public hospitals 2003**

1. Figures 3 and 4 provide a visual demonstration of the variation in 3<sup>rd</sup> and 4<sup>th</sup> degree perineal tears among standard primiparae occurring across Victorian public hospitals when compared to the statewide public hospital rate, and the 95% confidence interval around that rate. A hospital's rate is significantly different from the state average if its confidence interval does not overlap the statewide interval.
2. Two out of the 47 public hospitals show a significantly higher rate for 3<sup>rd</sup> and 4<sup>th</sup> degree perineal tears among standard primiparae than the statewide public rate, whereas one public hospital shows a significantly lower rate for 3<sup>rd</sup> and 4<sup>th</sup> degree perineal tears among the standard primiparae. Differences in rates may be associated with differences in ascertainment and reporting, or may reflect a true difference in occurrence.
3. The statewide public rate for 3<sup>rd</sup> and 4<sup>th</sup> degree perineal tears in standard primiparae giving birth vaginally for 2003 is 4.4% (95% CI 3.8, 5.0). For the previous two-year period (2001 and 2002), the statewide public rate of 3<sup>rd</sup> and 4<sup>th</sup> degree tears in standard primiparae was 3.3 % (95% CI 3.0, 3.7).

## 4. MAT-2 Term infants transferred or admitted for reasons other than birth defect

This indicator is clearly defined in the report on the final set of performance indicators.<sup>7</sup>

### Key question

Is the rate of admission of inborn term infants to special care nursery (SCN) or neonatal intensive care unit (NICU) for reasons other than birth defects principally due to non-avoidable factors?

### Purpose and rationale

Inborn term infants without birth defects are not normally expected to be admitted to a SCN or NICU. The indicator focuses on unplanned admission of term infants (without a birth defect), resulting from adverse events occurring in labour or immediate neonatal period, which require the facilities of SCN or NICU. This will include term infants with low five-minute Apgar scores, as well as those with birth trauma, early seizures/hypoxic ischaemic encephalopathy (HIE), intrauterine growth retardation (IUGR) and sepsis.

This is a process indicator acting as a proxy for the quality of antenatal and perinatal care.

#### Definition

An inborn term infant is defined as an infant born at the reporting hospital, at gestational age of 37 weeks or more.

#### Level 3 hospital

*Numerator:* The number of inborn term infants admitted to its SCN or NICU, for reasons other than the management of birth defects.

*Denominator:* The number of inborn term infants without major birth defect.

#### Level 2 hospital

*Numerator:* The number of inborn term infants admitted to its SCN or transferred to a NICU for reasons other than the management of birth defects.

*Denominator:* The number of inborn term infants without major birth defect.

#### Level 1 hospital

*Numerator:* The number of inborn term infants transferred to a SCN or NICU for reasons other than the management of birth defects.

*Denominator:* The number of inborn term infants without major birth defect.

### Data source

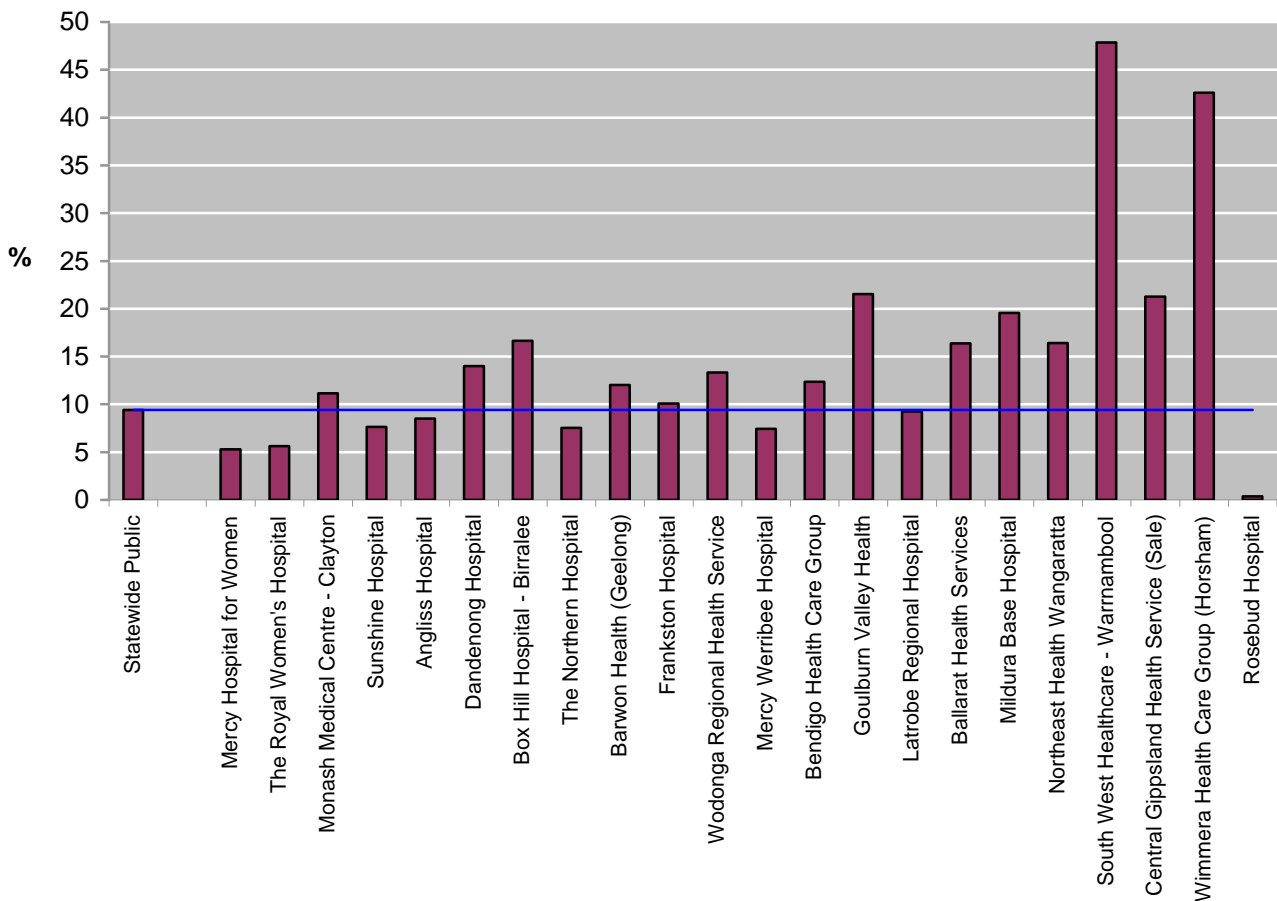
Hospitals identify infants born at term (minimum 37 weeks gestation) without birth defect and admitted or transferred to a SCN or NICU through in-house data or the Victorian Admitted Episodes Dataset (VAED).

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<sup>7</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

**Figure 5 MAT-2 Rate of term infants transferred or admitted to SCN or NICU for reasons other than birth defect in Victorian public hospitals providing maternity services for the year July 2003–June 2004**

***Hospitals with >100 confinements included only  
Hospitals with no transfers or admissions are excluded***



Statewide public rate = 9.4%

**July 2002–June 2003**

Statewide public rate = 11.2%

**Comments on term infants transferred or admitted for reasons other than birth defect in Victorian public hospitals July 2003–June 2004**

1. Figure 5 provides a visual demonstration of the variation in proportions across Victorian hospitals and a comparison with the statewide public rate, but does **not** demonstrate which hospitals are significantly different from the statewide public rate.
2. The overall statewide public rate for term infants transferred or admitted for reasons other than birth defect in Victorian public hospitals is 9.4% for the year 2003–04. This is a decrease from the previous year's statewide public rate of 11.2%.
3. Two of the 22 hospitals show considerably high rates of transfer or admission, that is, greater than 25%, and one hospital shows a comparatively low rate, that is, less than 5%.
4. The histogram demonstrates large variation among bigger hospitals as well as higher rates of admission/transfer to SCN or NICU among rural hospitals. These variations have also been noted in the previous year. The reason for these differences requires further analysis; although they are more likely a reflection of neonatal bed management and usage practices rather than clinical practice, for example, the use of SCN beds for the treatment of physiological jaundice.

## 5. MAT-3 The rate of administration of antenatal corticosteroids to women delivered or transferred before 34 weeks gestation 2003–04

This indicator is clearly defined in the report on the final set of performance indicators.<sup>8</sup>

### Key question

Are women who give birth before 34 weeks gestation receiving an antenatal course of corticosteroids?

### Purpose and rationale

In Victoria, a Level 1 or 2 maternity service should give a first dose of corticosteroids to women at risk of preterm birth before they are transferred to a Level 3 hospital. A Level 3 hospital would ensure women at risk of preterm birth received a completed course of corticosteroids. However, it is recognised that some women will give birth before completing the course, and the numerator takes such cases into account.

The administration of a single course (two doses, 24 hours apart) of corticosteroids to such women has been shown to improve neonatal outcome significantly. There is Level I evidence that such treatment helps to mature the baby's lungs and prevent death. There are also demonstrated protective effects on other systems, such as reducing intraventricular haemorrhage.

This is a process indicator measuring compliance with internationally accepted best practice.

### Definition

#### Level 3 hospital

*Numerator:* The number of women who give birth between 25 and 34 weeks gestation who have received an initial dose of corticosteroid (excluding transfers).

*Denominator:* The total number of women who give birth between 25 and 34 weeks gestation (excluding transfers).

#### Level 2 hospitals

*Numerator:* The number of women who give birth between 25 and 34 weeks gestation or are transferred to a Level 3 hospital prior to 34 weeks gestation and have received an initial dose of corticosteroid.

*Denominator:* The total number of women who give birth between 25 and 34 weeks gestation or are transferred to a Level 3 hospital prior to 34 weeks gestation.

#### Level 1 hospitals

*Numerator:* The number of women who are transferred to a Level 2 or 3 hospital prior to 34 weeks gestation who have received an initial dose of corticosteroid.

*Denominator:* The total number of women who are transferred to a Level 3 hospital prior to 34 weeks gestation.

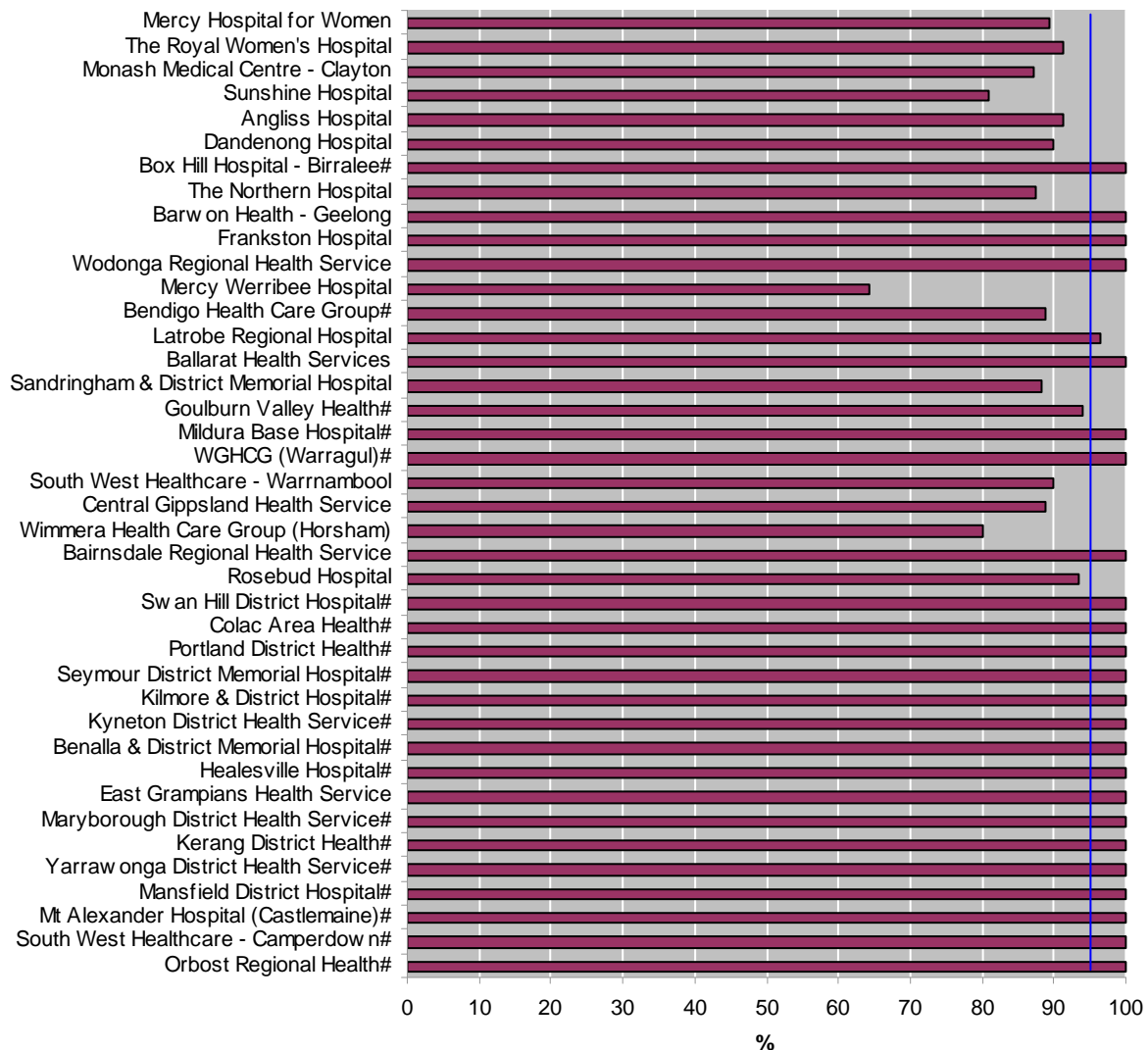
### Data source

Hospitals identify infants born between 25 and 34 weeks gestation and audit relevant medication charts for corticosteroid administration.

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<sup>8</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

**Figure 6 MAT-3 Rate of administration of antenatal corticosteroids to women delivered or transferred before 34 weeks gestation in Victorian public hospitals providing maternity services for the year July 2003–June 2004**



The average for the hospitals charted = 95.1% (Statewide public rate not available)

**July 2002–June 2003**

The average for reporting hospitals = 89.8% (statewide public rate not available)

**July 2001–June 2002**

The average for reporting hospitals = 83.0% (statewide public rate not available)

**Note:**

Hospitals marked # had <10 women who gave birth or were transferred between 25 and 34 weeks gestation (denominator)

**Comments on administration of corticosteroids to women delivered or transferred before 34 weeks gestation in Victorian public hospitals July 2003–June 2004**

1. Figure 6 provides a visual demonstration of the variation in proportions across Victorian hospitals that reported this data to the department and a comparison with the average derived from this data. It does **not** demonstrate which hospitals are significantly different from the average.
2. The overall rate of administration of antenatal corticosteroids for reporting hospitals in the reporting period is 95.1%. The overall rate for the previous year July 2002–June 2003 was 89.8%. However, there are a small number of reporting hospitals that did not report in the previous year and vice-versa.
3. It is important to note that those hospitals marked with # had less than 10 women transferred or giving birth prior to 34 weeks gestation.
4. This indicator does not define and exclude women who give birth upon, or within a very short time, of arrival to hospital (and for this reason did not receive antenatal corticosteroids). Excluding these women would give higher rates for this indicator.

## 6. MAT-4 Vaginal births after a primary caesarean section in Victorian public hospitals providing maternity services in 2003

This indicator is clearly defined in the report on the final set of performance indicators.<sup>9</sup>

### Key question

Do maternity hospitals provide appropriate care for women with a previous primary caesarean section?

### Purpose and rationale

The purpose of this indicator is to identify the proportion of women with a history of a primary caesarean section who are offered vaginal birth after a primary caesarean section (VBAC) and who achieve a term vaginal birth. This reflects appropriate management of these women.

This is a process indicator.

### Definitions

#### **MAT-4a Planned VBAC**

*Numerator:* the number of women (para 1 and at term with a singleton pregnancy) whose previous birth was a caesarean section who enter labour with a plan for a vaginal birth.

*Denominator:* the number of women (para 1 and at term with a singleton pregnancy) whose previous birth was a caesarean section.

#### **MAT-4b Achieved VBAC**

*Numerator:* the number of women (para 1 and at term with a singleton pregnancy) whose previous birth was a caesarean section who enter labour with a plan for a vaginal birth and who achieve a vaginal birth.

*Denominator:* the number of women (para 1 and at term with a singleton pregnancy) whose previous birth was a caesarean section who enter labour with a plan for a vaginal birth.

### Data source

The PDCU will identify and track outcomes for women (para 1) at term whose previous birth was a caesarean section and who experience labour. This data will be collected by the PDCU and reported back to hospitals.

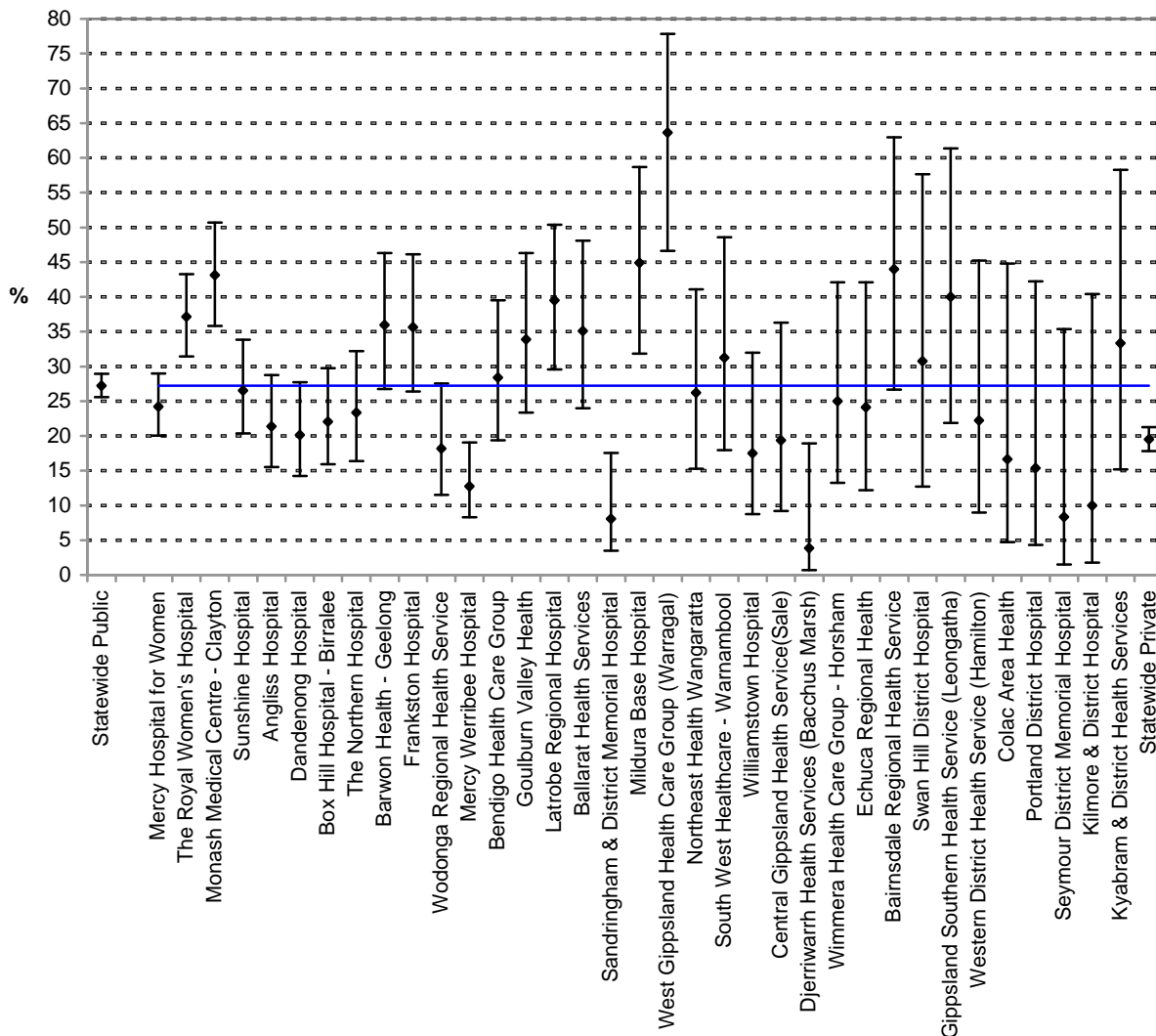
It is important to recognise that:

1. The PDCU does not record whether a woman has a plan for a vaginal birth but does record if a woman has laboured. So all women who were recorded as having laboured, **excluding** those who were recorded as going on to have an elective caesarean section, were selected as having a plan for vaginal birth. **This differs from the November 2003 report, which used combined data from 2001 and 2002, in which all women who were recorded as having laboured were selected as having a plan for VBAC, including those who were recorded as going on to have an elective caesarean section.**
2. The way this indicator is defined may differ from other VBAC indicators. Primary caesarean is often defined as the first ever caesarean regardless of parity, whereas this indicator selects only caesareans in primiparae.

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<sup>9</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

**Figure 7 MAT-4a Rate of women who plan for vaginal birth (VBAC), for the birth immediately following a primary caesarean section in Victorian public hospitals providing maternity services for the year 2003**



Statewide public rate = 27.3% (95% CI 25.6, 28.9)

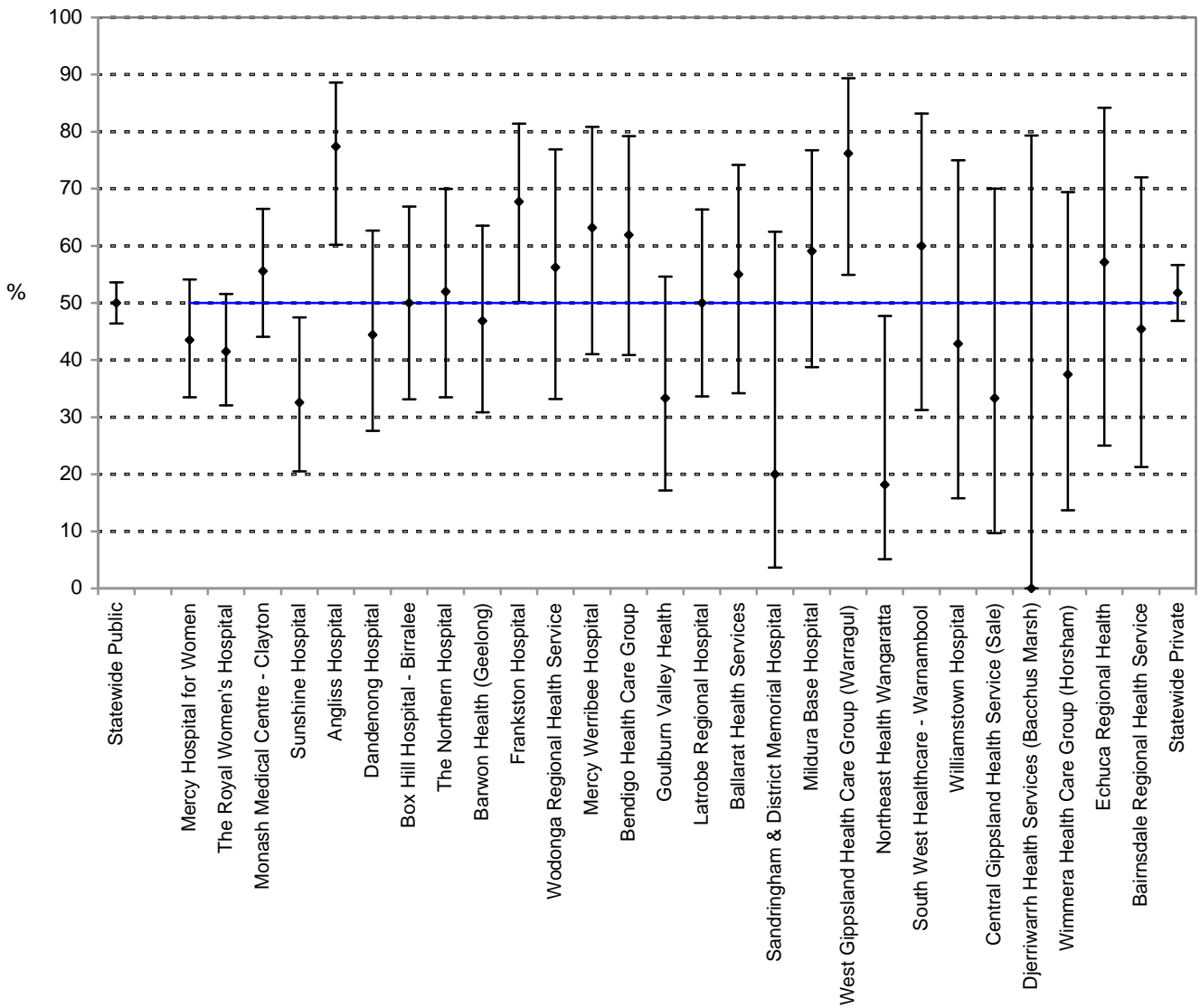
**2001 and 2002 combined:**

Statewide public rate = 32.7% (95% CI 31.4, 34.0)

### **Comments on 'planned' VBAC in Victorian public hospitals 2003**

1. Figure 7 provides a visual demonstration of the variation in planned VBAC occurring across Victorian public hospitals when compared to the statewide public hospital rate, and the 95% confidence interval around that rate. A hospital's rate is significantly different from the statewide rate if its confidence interval does not overlap the statewide interval.
2. Five of the 35 public hospitals show a significantly higher 'plan' for VBAC rate than the statewide public rate, whereas three of the 35 hospitals show a significantly lower 'plan' for VBAC rate. The wide variation between hospitals shows that this indicator has the potential for identifying improved consistency in clinical practice.
3. The statewide public rate for planned VBAC for 2003 is 27.2% (95% CI 25.6, 28.9). For the previous two-year period (2001 and 2002), the statewide public rate for planned VBAC was 32.7% (95% CI 31.4, 34.0).
4. It should be noted that there is no agreed optimal or clinically appropriate proportion for this indicator.

**Figure 8 MAT-4b Rate of vaginal birth (VBAC) amongst women who plan for VBAC, in the birth immediately following a primary caesarean section in Victorian public hospitals providing maternity services for the year 2003**



Statewide public rate = 50.0% (95% CI 46.4, 53.6)

**2001 and 2002 combined:**

Statewide public rate = 50.1% (95% CI 47.7, 52.5)

### **Comments on 'achieved' VBAC in Victorian public hospitals 2003**

1. Figure 8 provides a visual demonstration of the variation in achieved VBAC occurring across Victorian public hospitals when compared to the statewide public hospital rate, and the 95% confidence interval around that rate. A hospital's rate is significantly different from the statewide rate if its confidence interval does not overlap the statewide interval.
2. Two of the 27 public hospitals show a significantly higher VBAC rate than the statewide public rate, whereas none of the hospitals show a significantly lower VBAC rate. The wide variation between hospitals shows that this indicator has the potential for identifying improved consistency in clinical practice.
3. The statewide public rate for achieved VBAC for 2003 is 50.0% (95% CI 46.4, 53.6). For the previous two-year period (2001 and 2002), the statewide public rate for achieved VBAC was 50.1% (95% CI 47.7, 52.5).
4. It should be noted that there is no agreed optimal or clinically appropriate proportion for this indicator.

## 7. MAT-5 Five-year (1999–2003) birth-weight standardised perinatal mortality ratio in Victorian public hospitals providing maternity services

This indicator is clearly defined in the report on the final set of performance indicators.<sup>10</sup>

### Key question

Does the perinatal care provided in this hospital result in optimal survival of infants?

How does this hospital compare with the state average with respect to perinatal mortality, adjusted for birth-weight (Birth-Weight Standardised Perinatal Mortality Ratio = BWSPMR)?

### Purpose and rationale

Care promoting the birth and survival of live born babies is one of the primary objectives of a maternity service. The standardisation is a risk-adjusted calculation, enabling hospitals with higher proportions of low birth-weight infants (and therefore higher likelihood of perinatal mortality) to be validly compared with hospitals with a different casemix.

The purpose of collecting this indicator is to provide assurance that mortality rates are within a safe range, and to identify variations and outliers. Pooling the data over five years (1999–2003) adds stability to the data and reduces the risk of over-interpretation of chance fluctuations.

This indicator will enable identification of those public hospitals where:

- care meets the statewide reference standard
- a more detailed evaluation is indicated because of a consistently raised BWSPMR.

This is an outcome indicator.

### Definitions

Perinatal death: A stillbirth or a death occurring within 28 days of birth in a live born baby of at least 20 weeks gestation (or, if gestation is unknown, weighing at least 400 grams).

$$\text{SPMR} = \frac{\text{Observed perinatal deaths}}{\text{Expected perinatal deaths}} \times 100$$

### Data source

PDCU currently calculates and applies birth weight adjusted SPMR to all hospitals having five or more observed or expected perinatal deaths in the year of analysis (2003). The SPMR is standardised according to the BWSPMR of the total population. The standardisation does not adjust for inter-hospital transfers.

The Performance Indicator Sub-Committee of the Maternity Services Advisory Committee considered that the BWSPMR, as previously presented, is a crude indicator, and agreed to present the data as follows:

1. BWSPMR excluding infants of < 500 grams, with data for public hospitals being shown against the statewide public rate as the standard or reference population.
2. As above, but also excluding all terminations and deaths due to congenital malformations.

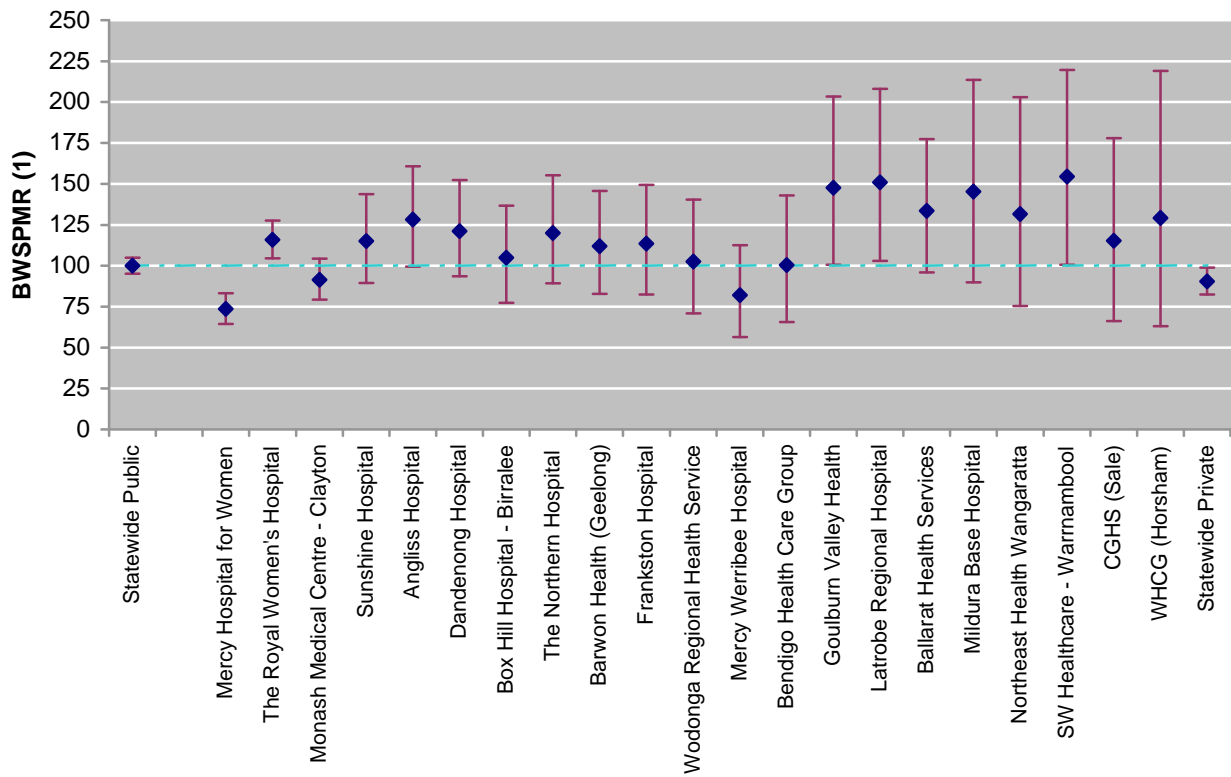
<sup>10</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

We believe that this adjustment provides a more sensitive indicator, and more closely reflects quality of care. The onus is on outliers to assess individual mortality cases, exploring the presence of contributing factors to address the potential for preventability. For completeness, we also present the BWSPMR, unadjusted for congenital malformations, for public hospitals.

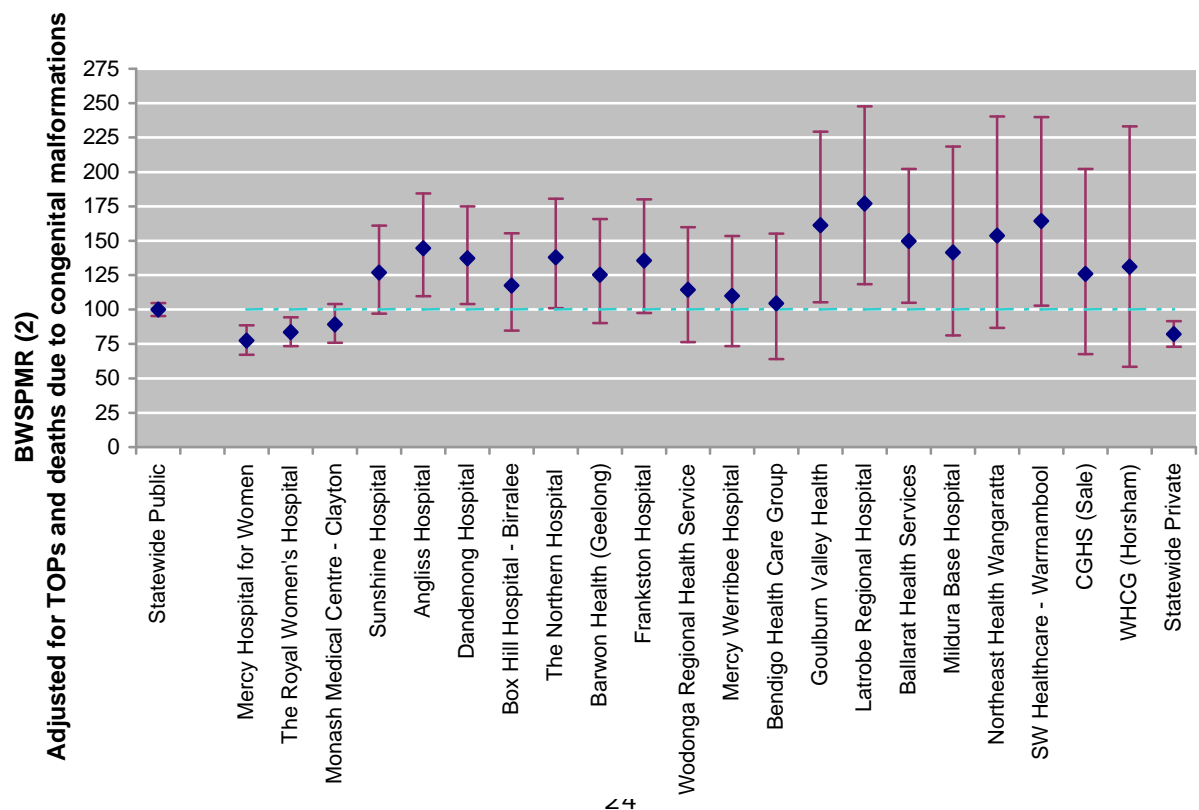
The data in this report is calculated from:

- five years of pooled data
- standardised to the BWSPMR in Victorian public hospitals
- excluding unknown birth-weight and births less than 500 grams.  
The exclusion of births less than 500 g accounts for most of the terminations of pregnancy that are undertaken for suspected or confirmed congenital malformations in pregnancies greater than or equal to 20 weeks gestation. Terminations of pregnancy greater than or equal to 20 weeks gestation undertaken for psychosocial indications are also excluded from the calculation in Figure 10.

**Figure 9 MAT-5 (1) Birth-weight standardised perinatal mortality ratio using five years pooled data in Victorian public hospitals providing maternity services for the year 2003**



**Figure 10 MAT-5 (2) Birth-weight standardised perinatal mortality ratio adjusted for terminations and deaths due to congenital malformations, using five years pooled data, in Victorian public hospitals providing maternity services for 2003**



### **Comments on the BWSPMR in Victorian public hospitals 2003**

1. Figures 9 and 10 provide a visual demonstration of the variation in SPMR occurring across Victorian public hospitals when compared to the state public hospital average and also the confidence interval around that ratio. A hospital's rate is significantly different from the state average if its confidence interval does not include 100.
2. The adjusted BWSPMR presented in Figure 10 has not been presented before and is thought to be a more precise reflection of care than the otherwise unadjusted rates presented in Figure 9.
3. Figure 10 shows three of the 21 public hospitals having a significantly higher BWSPMR relative to the statewide public rate (the reference population), whereas two of the 21 public hospitals show a significantly lower BWSPMR.

## 8. MAT-6 The proportion of women referred to postnatal domiciliary care in Victorian public hospitals providing maternity services in the year July 2003–June 2004

This indicator is clearly defined in the report on the final set of performance indicators.<sup>11</sup>

### Key question

Do Victorian public hospitals providing maternity services provide adequate postnatal domiciliary care and support to women following discharge from hospital?

### Purpose and rationale

The purpose of this indicator is to assess the proportion of women referred to postnatal domiciliary care.

It is requirement that all public hospitals with maternity services provide postnatal domiciliary support to women following birth. The offer of one or more postnatal domiciliary visits by a midwife, depending on need, has been a clearly established requirement of all Victorian public hospitals with maternity services for the past five years.

This is a process indicator.

### Definitions

*Numerator:* Number of women giving birth referred to postnatal domiciliary care or Hospital-in-the-Home

*Denominator:* Number of women giving birth excluding women transferred to another hospital

### Data source

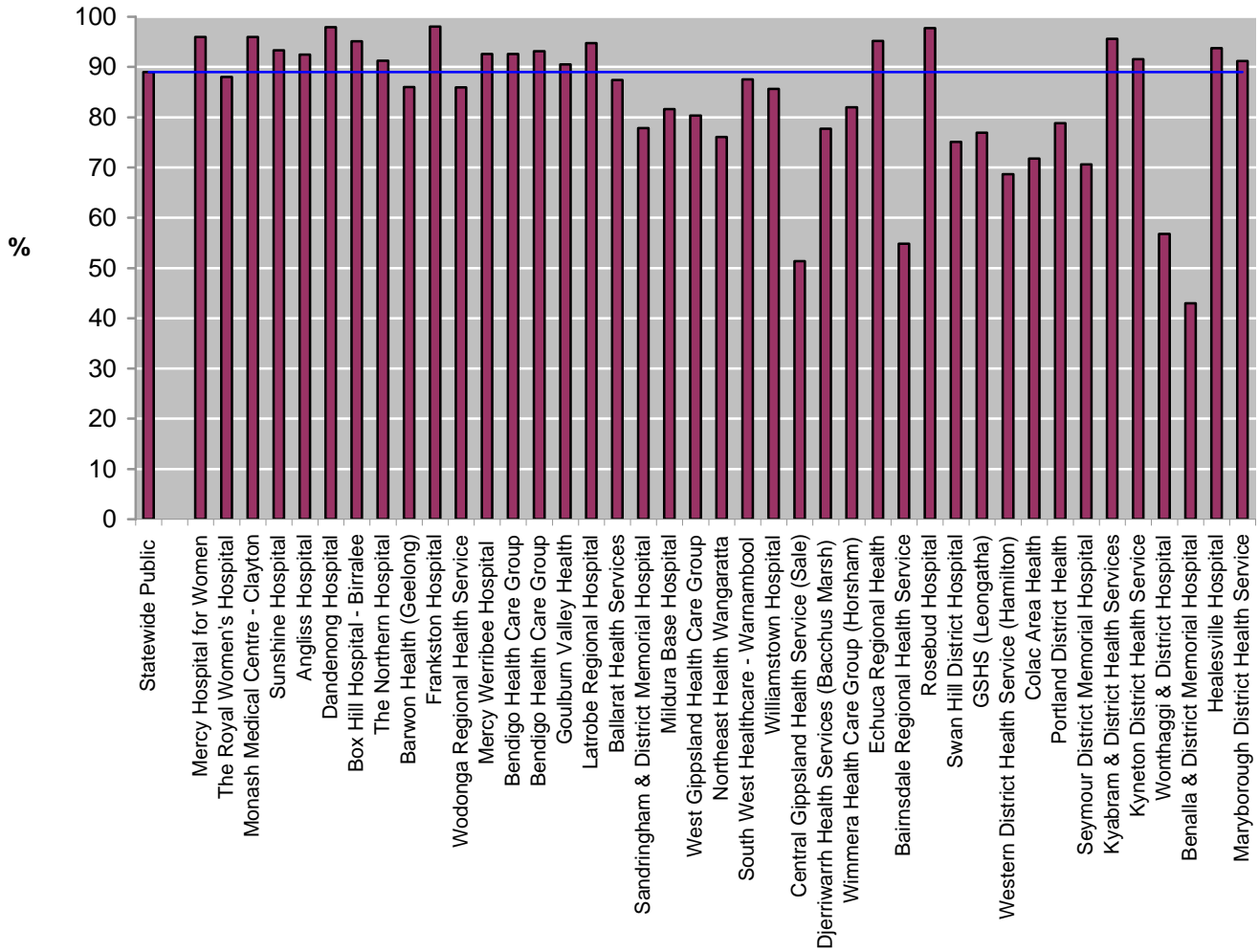
Data is provided to the Department of Human Services via the VAED.

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<sup>11</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

**Figure 11 MAT-6: Rate of referral to postnatal domiciliary care or Hospital-in-the-Home in Victorian public hospitals providing maternity services for the year July 2003–June 2004**

**Hospitals with 100 or more confinements**



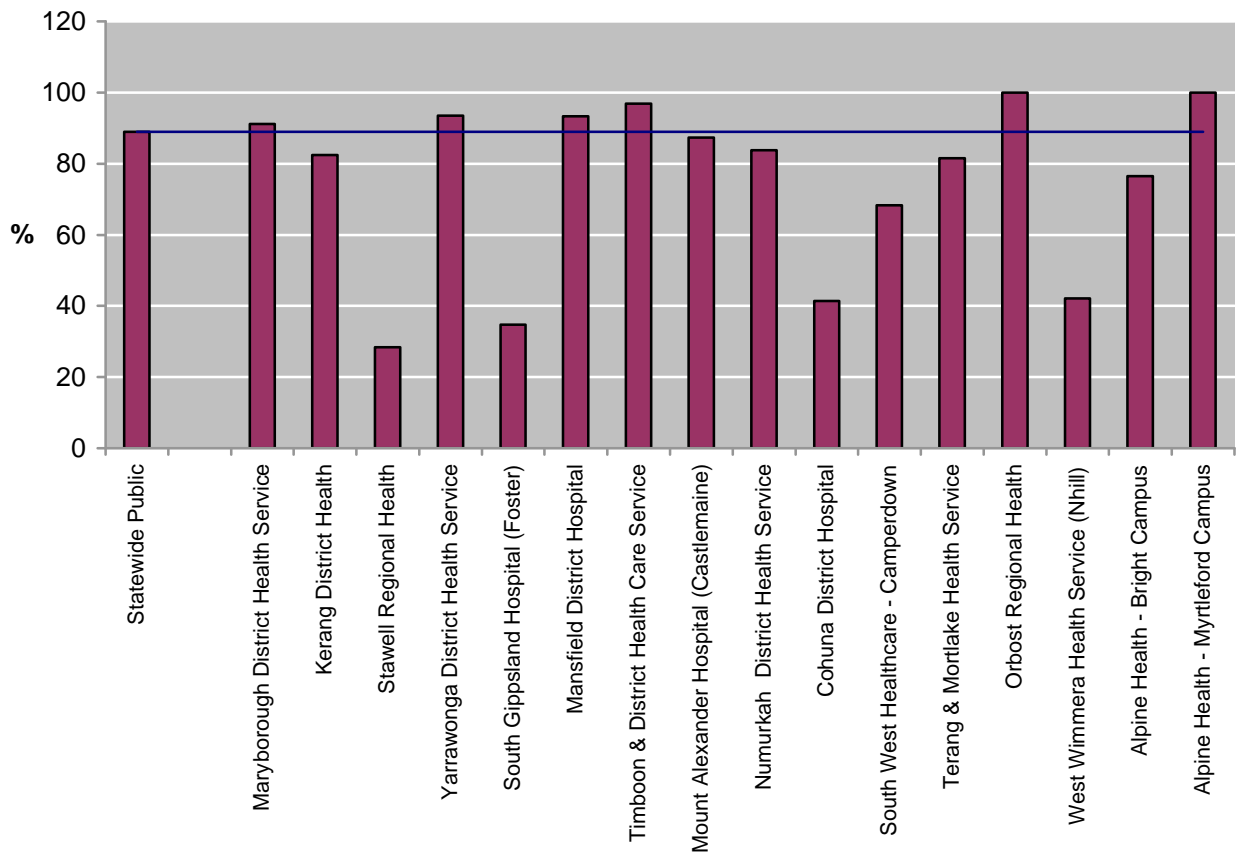
Statewide public rate = 89.0%

**July 2002–June 2003**

Statewide public rate = 88.0%

**Figure 12 MAT-6: Rate of referral to postnatal domiciliary care or Hospital-in-the-Home in Victorian public hospitals providing maternity services for the year July 2003–June 2004**

**Hospitals with 10–99 confinements**



Statewide public rate = 89.0%

**July 2002–June 2003**

Statewide public rate = 88.0%

## Comments on referral to postnatal domiciliary care in Victorian public hospitals July 2003–June 2004

1. Figures 10 and 11 provide a visual demonstration of the variation in proportions across Victorian hospitals and a comparison with the statewide public rate, but do **not** demonstrate which hospitals are significantly different from the statewide public rate.
2. The Victorian statewide public hospital rate of referral to postnatal domiciliary care in 2003–04 is 89.0%. The agreed targets for Victorian hospitals providing maternity care is 90% for metropolitan hospitals and 80% for rural/regional hospitals.
3. There is greater variation amongst smaller rural hospitals, with many rural hospitals demonstrating low rates of referral to postnatal domiciliary services. This may reflect a longer hospital stay, as is the case in many rural hospitals, or reduced availability of services to more remote locations.

## 9. MAT-7 The proportion of women offered appropriate interventions in relation to smoking in Victorian public hospitals providing maternity services for the year July 2003–June 2004

This indicator is clearly defined in the report on the final set of performance indicators.<sup>12</sup> This is the first year of reporting on this indicator. As this indicator came into effect on 1 October 2003, the reporting period for the first year is nine months. Only health services that provide antenatal services or a booking-in visit prior to 20 weeks are required to report on this indicator.

### Key question

Does the hospital help pregnant women to quit smoking and to reduce the risk of smoking-associated adverse health outcomes for the baby?

### Purpose and rationale

This indicator assesses the performance of providers of maternity care in providing smoking cessation advice, assistance and follow-up during routine antenatal care. It aims to reduce the rate of smoking among pregnant women and improve outcomes for their babies.

The antenatal phase is an ideal opportunity for smoking cessation or reduction education programs, which might involve both hospital and community-based carers.

This is a process indicator.

### Definitions

#### **Ask/assess/advise/assist**

*Numerator:* For the population sample, the number of women who are asked about smoking status, assessed as to motivation to quit and offered advice and assistance at the first hospital antenatal appointment.

*Denominator:* The population sample (every fourth woman who had their first antenatal visit at the hospital and subsequently gave birth at the hospital within the last six months).

#### **Ask again**

*Numerator:* For the population sample, the number of women identified as smokers (including spontaneous quitters) at the first hospital antenatal appointment who are asked again about smoking status by 20 weeks gestation.

*Denominator:* For the population sample, the number of women who attended an antenatal visit by 20 weeks gestation (either hospital or community) and who had been identified as smokers (including spontaneous quitters) at the first hospital antenatal appointment.

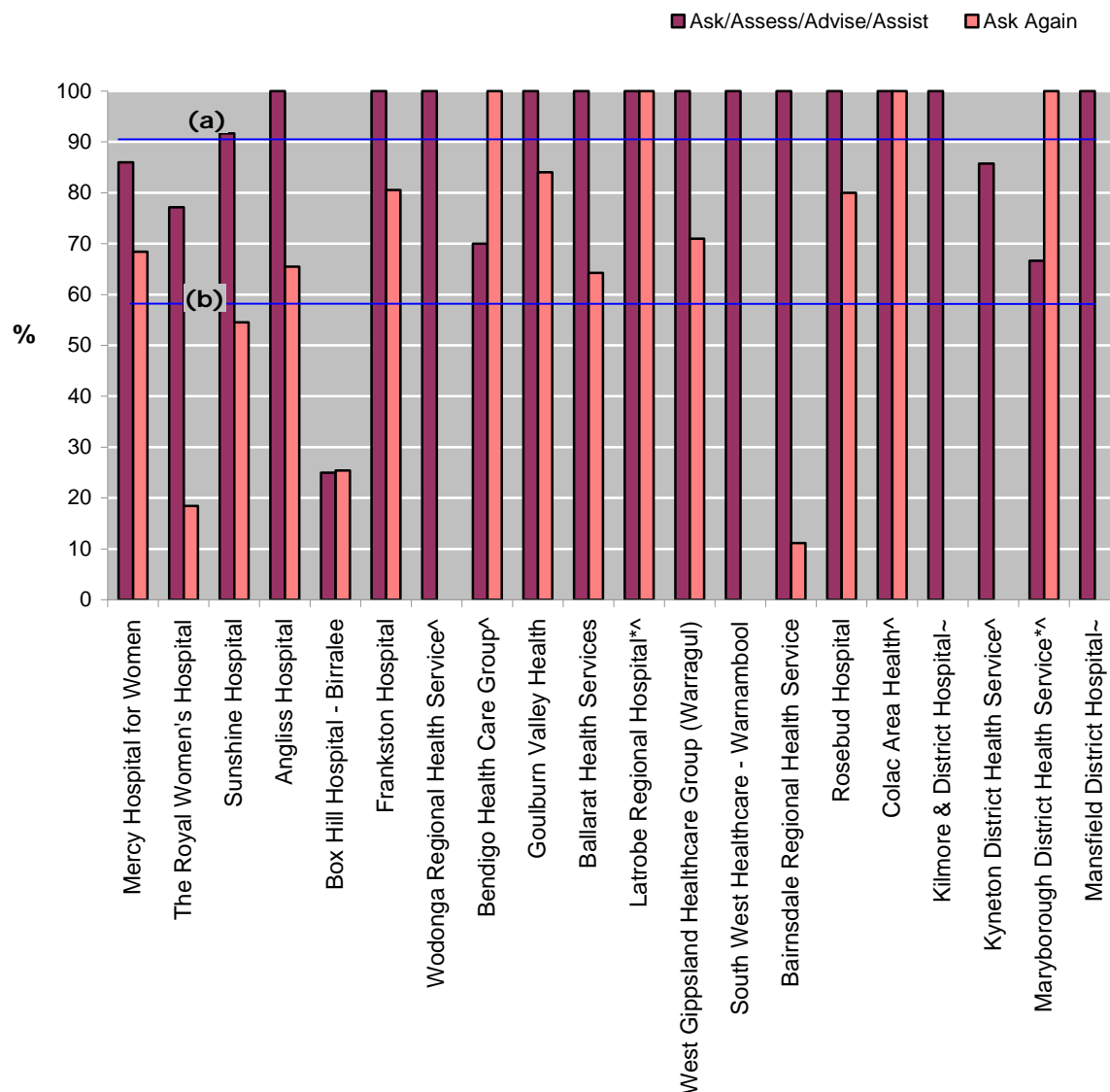
### Data source

Victorian public maternity hospitals, once they have a system capable of recording smoking assessments and advice at the first hospital appointment and at the subsequent antenatal appointments, report this data annually to the Department of Human Services. This may require collaboration with community-based providers, including shared documentation systems.

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<sup>12</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

**Figure 13 MAT-7 Proportion of women offered appropriate antenatal interventions in relation to smoking in Victorian public hospitals providing maternity services from October 2003–July 2004**



**(a) Ask/assess/advise/assist**

The average for the hospitals charted = 90.1% (statewide public rate not available)

**(b) Ask again**

The average for the hospitals charted = 56.8% (statewide public rate not available)

**Note**

1. \* denotes hospitals where denominator < 10 for 'Ask, Assess, Advise, Assist'.
2. ^ denotes hospitals where denominator < 10 for 'Ask Again'.
3. ~ denotes no smokers or recent quitters identified, therefore there is no value for 'Ask again'.

### **Comments on the proportion of women offered appropriate antenatal interventions in relation to smoking in Victorian public hospitals October 2003–July 2004**

1. The histogram provides a visual demonstration of the variation in proportions across Victorian hospitals that reported this data to the department and a comparison with the average across these hospitals. It does **not** demonstrate which hospitals are significantly different from the average.
2. This is the first year that hospitals have been required to report data for this indicator.
3. Fewer hospitals are represented in this indicator because many rural hospitals do not:
  - a. provide antenatal clinic services
  - b. book women in to their hospital prior to 20 weeks gestation, or
  - c. see women again in hospital based antenatal clinic prior to 20 weeks gestation.
4. On average, the proportion of women assessed for smoking behaviour and given assistance at the first antenatal appointment, for 2003–04 for the chartered Victorian hospitals is 90.1%. The proportion of further appropriate intervention in relation to smoking prior to 20 weeks gestation for those hospitals which identified smokers or recent quitters is 56.8%. This shows a potential for improvement in:
  - data collection methods demonstrating that further intervention in relation to smoking was given
  - the actual provision of appropriate intervention in relation to smoking prior to 20 weeks.
5. One theme that was consistently reported by rural hospitals was the issue/difficulty regarding being able to ascertain/demonstrate whether women having antenatal care with general practitioners were given further interventions in relation to smoking prior to 20 weeks. Some of these hospitals commented that they have begun asking women to book or attend the hospital prior to 20 weeks for supplementary antenatal care for the purpose of providing assessment and intervention in relation to smoking behaviour. This in itself is encouraging, given the recent introduction of this indicator.

## 10. MAT-8 The provision of appropriate breastfeeding support and advice in Victorian public hospitals providing maternity services for the year July 2003–June 2004

This indicator is clearly defined in the report on the final set of performance indicators.<sup>13</sup>

### Key question

Does the hospital provide information and support on breastfeeding in accordance with the Baby Friendly Hospital Initiative (BFHI), which is based on the World Health Organisation (WHO) *Ten Steps to Successful Breastfeeding*?

### Purpose and rationale

The indicator supports care practices for women who wish to breastfeed their baby to ensure:

- breastfeeding initiation is enhanced
- breastfeeding advice and support is in line with the WHO *Ten Steps to Successful Breastfeeding*.
- babies separated from their mothers (due to illness/prematurity) receive breast milk.

This indicator provides a means of monitoring ongoing compliance with WHO *Ten Steps* for Baby Friendly accredited hospitals. Alternatively, it can be used as an opportunity to assess readiness for accreditation.

The implementation of this indicator does not require hospitals to become accredited as Baby Friendly Hospitals, nor does it equate with accreditation.

This is a score-based indicator, which is an administrative/clinical measure for care and the process of care delivery on a range of parameters.

### Definitions

*Numerator:* Number of WHO *Ten Steps* approved at time of assessment.

*Denominator:* WHO *Ten Steps*.

This is an organisational assessment; a score of 10/10 is considered best practice.

#### **WHO: The Ten Steps to Successful Breastfeeding**

Every facility providing maternity services and care for newborn infants should:

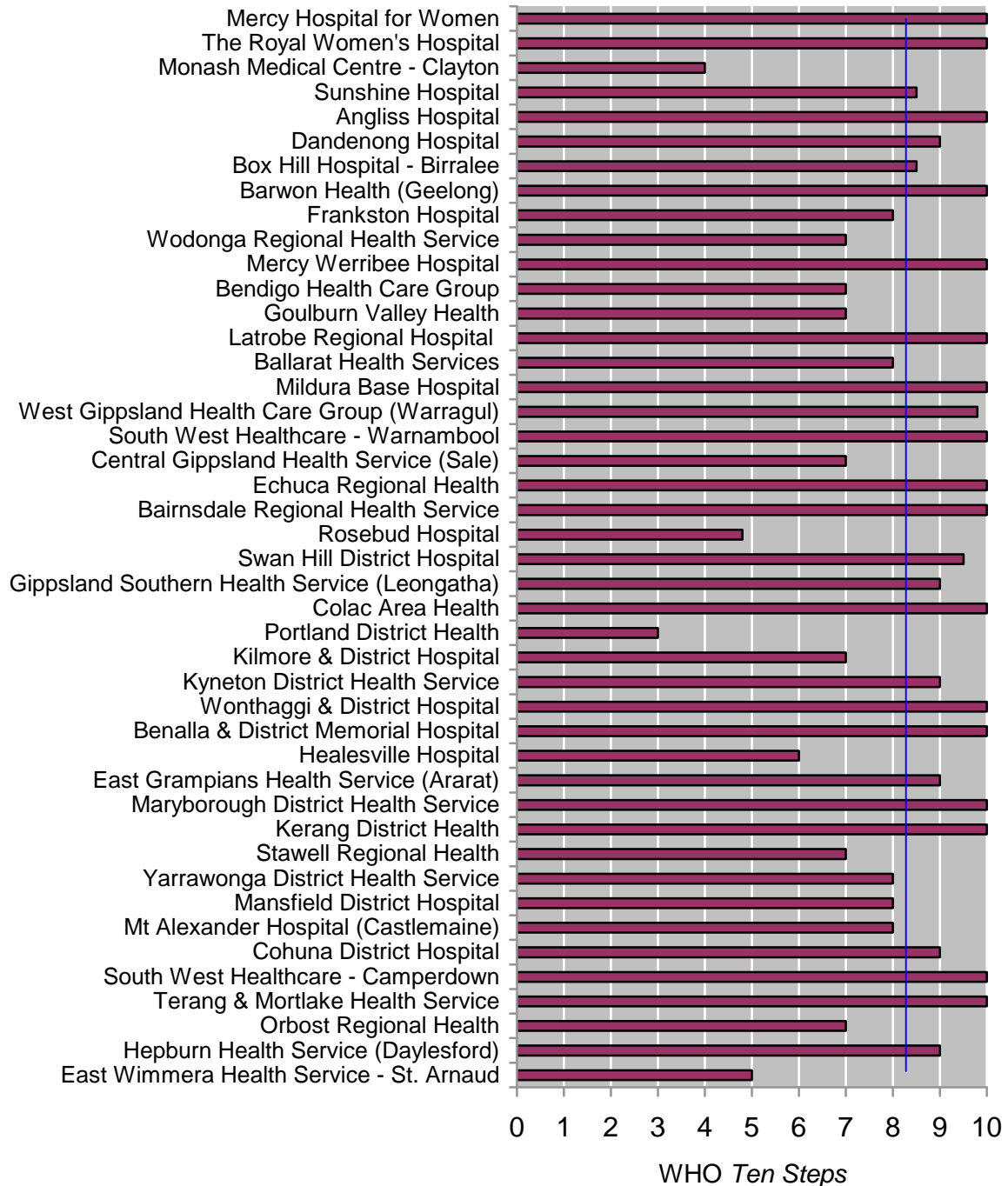
- Step 1 Have a written breastfeeding policy that is routinely communicated to all health care staff.
- Step 2 Train all health care staff in skills necessary to implement this policy.
- Step 3 Inform all pregnant women about the benefits and management of breastfeeding.
- Step 4 Help mother initiate breastfeeding within a half-hour of birth.
- Step 5 Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
- Step 6 Give newborn infants no food or drink other than breast-milk unless medically indicated.
- Step 7 Practice rooming-in, allow mothers and infants to remain together 24 hours a day.
- Step 8 Encourage breastfeeding on demand.
- Step 9 Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
- Step 10 Foster the establishment of breastfeeding groups and refer mothers to them on discharge from the hospital or clinic.

### Data source

Assessment and documentation in line with WHO accreditation governed and coordinated by the Australian College of Midwives Incorporated (ACMI). Hospitals conduct annual self-assessment using the BFHI self-assessment tool and report annually to the Department of Human Services.

<sup>13</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

**Figure 14 MAT-8 The proportion of WHO *Ten Steps* achieved in Victorian public hospitals providing maternity services for the sample periods in the year July 2003–June 2004**



The average score for the hospitals charted = 8.5/10 (statewide public rate not available)

**June 2002–July 2003 sample periods:**

The average score for the reporting hospitals = 8/10 (statewide public rate not available)

### **Comments on the provision of appropriate breastfeeding support and advice in Victorian public hospitals July 2003–June 2004**

1. The histogram provides a visual demonstration of the variation in proportions across Victorian hospitals that reported this data to the department and a comparison with the average across these hospitals. It does **not** demonstrate which hospitals are significantly different from the average.
2. The average proportion of WHO *Ten Steps* achieved by the Victorian reporting hospitals for 2003–04 is 8/10.
3. Steps 1, 2, 3, 6 and 9 of The WHO *Ten Steps* featured consistently as not being implemented in those hospitals with low scores (8/10 or less). Approval of Steps 4 and 10 were also lacking in low-scoring hospitals to a lesser extent. Steps 5, 7 and 8 showed consistently better ratings across hospitals.
4. There are 42 hospitals graphed, 17 of which are BFHI accredited, based on the WHO *Ten Steps to Successful Breastfeeding*.
5. Fifteen hospitals scored 8/10 or less. Of these, 14 were not BFHI accredited.
6. Of the 17 hospitals that are BFHI accredited, 14 had achieved a score of 10/10.

## 11. MAT-9 The proportion of women who receive timely hospital antenatal clinic services in Victorian public hospitals providing maternity services for the year July 2003–June 2004

This indicator is clearly defined in the report on the final set of performance indicators.<sup>14</sup>

### Key question

Does the hospital provide antenatal care in a timely and efficient way?

### Purpose and rationale

Several studies have identified waiting times as a factor in maternal satisfaction. It is anticipated that by using this indicator there should be a fall in the percentage of women who wait for more than 30 minutes from time of appointment to the time attended by the clinician.

This indicator measures organisational efficiency and a key component of patient satisfaction.

This is a process indicator.

### Definitions

*Numerator:* For the period of one month, the number of women waiting more than 30 minutes from hospital antenatal appointment time to the time clinician consultation begins.

*Denominator:* For the period of one month, the number of women presenting for hospital antenatal appointment.

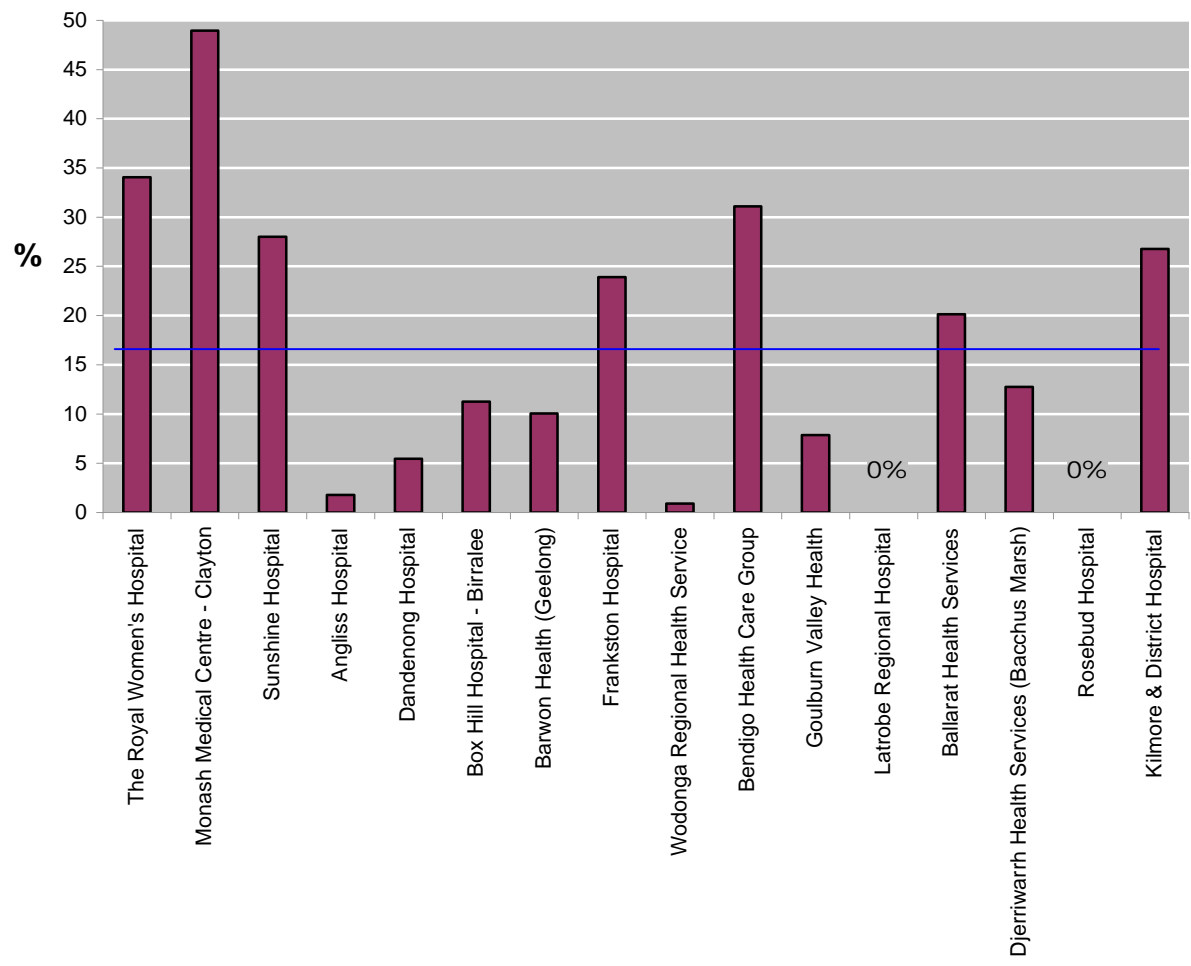
### Data source

Data is to be collected for all clinics providing antenatal care, via outpatient booking systems. Not all facilities have computerised booking systems. Some hospitals institute manual audits. Data is reported to the Department of Human Services by reporting hospitals.

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<sup>14</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

**Figure 15 MAT-9 Proportion of women who wait more than 30 minutes for hospital antenatal clinic services in Victorian public hospitals providing maternity services for the sample periods in the year July 2003–June 2004**



The average for the hospitals charted = 16.4% (statewide public rate not available)

**July 2002–June 2003 sample periods:**

The average for the reporting hospitals = 33.7% (statewide public rate not available)

### **Comments on the proportion of women who receive timely hospital antenatal clinic services in Victorian public hospitals July 2003–June 2004**

1. The histogram provides a visual demonstration of the variation in proportions across Victorian hospitals that reported this data to the department and a comparison with the average across these hospitals. It does **not** demonstrate which hospitals are significantly different from the average.
2. Fewer hospitals are represented in this indicator because many rural hospitals do not provide antenatal clinic services.
3. On average, 16.4% of women waited more than 30 minutes for their antenatal clinic appointments for the Victorian hospitals charted in 2003–04. This is a considerable improvement from the previous year's rate of 33.7% for the reporting hospitals 2002–2003.
4. Three of the 16 hospitals had high rates of women waiting more than 30 minutes, that is, more than 30% of women, and four of 16 hospitals had a low rate of women waiting more than 30 minutes, that is, less than 10%. Given that reduced waiting times for antenatal clinic are associated with greater satisfaction of care<sup>15</sup>, these results demonstrate a potential for improvement in antenatal clinic waiting times in Victorian public hospitals.
5. On average, 11.0% of women arrived late for their antenatal appointments for the hospitals charted. These women were excluded from the calculation.
6. There were two consistent themes among reporting hospitals:
  - poor compliance with regards to accurate entering of 'time seen' on electronic or manual systems by clinicians
  - difficulty in managing waiting times when doctors have been 'called away' for medically urgent reasons.Therefore, accuracy of data is dubious, and this will need to be addressed in future.

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<sup>15</sup> Bruinsma F, Brown S & Darcy MA, *Victorian survey of recent mothers 2000: women's views and experiences of different models of maternity care*. Centre for the Study of Mothers' and Children's Health/School of Public Health, La Trobe University, Melbourne: September 2001.

## 12. MAT-10 The proportion of women from a non-English speaking background (NESB), without proficiency in English, who receive appropriate interpreter services in Victorian public hospitals providing maternity services for the year July 2003–June 2004

This indicator is clearly defined in the report on the final set of performance indicators.<sup>16</sup>

### Key question

Do women from NESB have access to accredited interpreter services at hospital antenatal appointments?

### Purpose and rationale

The purpose of this indicator is to identify the percentage of women accessing maternity services who require interpreter services and who are able to access them.

The indicator supports an assessment of informed decision making and equity in access to services. NESB women require adequate information to ensure informed decision making from a medical, legal and ethical perspective. The literature recommends that women be offered the use of accredited interpreters rather than relying on family or other staff.

This is a process indicator.

### Definitions

#### **Assess interpreter requirements**

*Numerator:* For the period of one month, the number of women presenting for hospital antenatal appointment who have had interpreter requirements assessed.

*Denominator:* For the period of one month, the total number of women presenting for hospital antenatal appointment.

#### **Provision of accredited interpreter services**

*Numerator:* For the period of one month, the number of women presenting for hospital antenatal appointment identified as requiring an interpreter and who receive accredited interpreter services.

*Denominator:* For the period of one month, the number of women presenting for hospital antenatal appointment identified as requiring accredited interpreter services.

### Data source

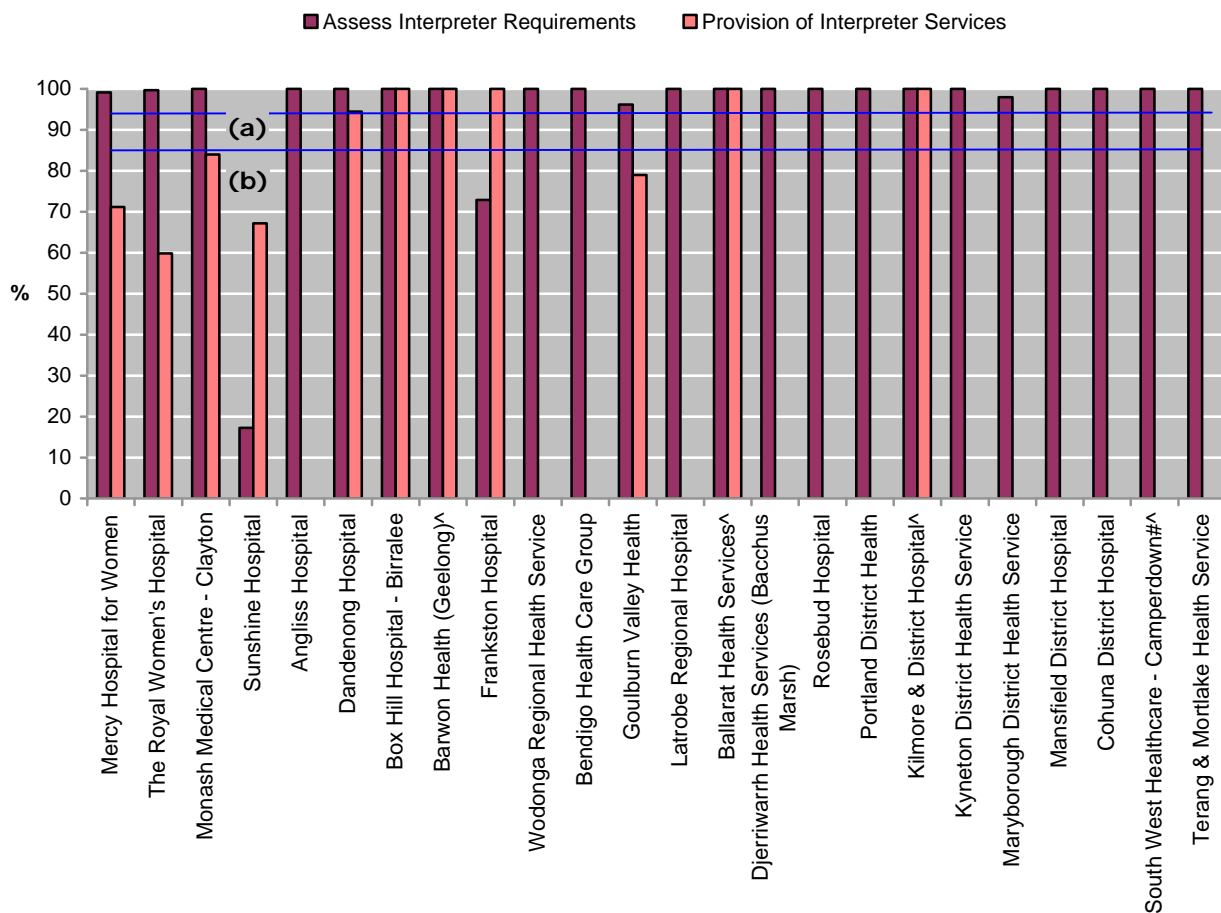
The collection and recording of information relevant to this indicator varies from hospital to hospital. Data may be accessed through linking data from sources including the patient registration database, outpatient booking systems, individual hospital interpreter service databases and interpreting service agency records.

Data is reported to the Department of Human Services by reporting hospitals.

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<sup>16</sup> Department of Human Services Victoria. *Measuring maternity services: the final set of performance indicators*. Melbourne: Victorian Government Publishing Services, 2002.

**Figure 16 MAT-10 The proportion of NESB women who are (a) assessed for interpreter requirements and (b) provided appropriate interpreter Services in Victorian public hospitals providing maternity services for the sample periods in the Year July 2003–June 2004**



**(a) Assess interpreter requirements**

The average for the hospitals charted = 95.1% (statewide public or private rates not available)

**(b) Provision of interpreter services**

The average for the hospitals charted = 86.9% (statewide public or private rates not available)

**Note**

All hospitals graphed without bars for 'provision of interpreter services' reported no NESB women requiring interpreter services were identified for that hospital. It does not represent 0% in any case.

^ denotes hospitals with denominator less than 10 for 'provision of interpreter services'.

#^ denotes denominator less than 10 for 'assess interpreter requirements' and 'provision of interpreter services'.

Hospital marked with ~ reported poor data collection methods in relation to 'provision of interpreter services', rather than a true poor result.

**July 2002–June 2003 sample periods:**

**(a) Assess interpreter requirements**

The average for the reporting hospitals = 91.9% (statewide public or private rates not available)

**(b) Provision of interpreter services**

The average for the reporting hospitals = 42.1% (statewide public or private rates not available)

## **Comments on the proportion of NESB women, without proficiency in English, who receive appropriate interpreter services in Victorian public hospitals July 2003–June 2004**

1. The histogram provides a visual demonstration of the variation in proportions across Victorian hospitals that reported this data to the department and a comparison with the average across these hospitals. It does **not** demonstrate which hospitals are significantly different from the average.
2. On average, the proportion of women assessed for interpreter requirements prior to antenatal booking in the Victorian public hospitals charted was 95.1%. Of those who were identified as NESB, without proficiency in English, 86.9% were given appropriate interpreter services at subsequent antenatal visits. This is a considerable increase from the previous year's rates of: 91.9% of women being assessed for interpreter requirements and 42.1% of women provided with appropriate interpreter services for 2002–2003.
3. The larger metropolitan hospitals demonstrated lower rates for 'provision of interpreter services'. However, these hospitals also had the greatest demand for interpreters and reported barriers in the collection and provision of complete or accurate data. The one metropolitan hospital demonstrating less than 20% for 'provision of interpreter services' reported poor data collection methods for this indicator.
4. The majority of rural hospitals reported little or no need for interpreters.
5. This indicator highlights the potential for improvement for metropolitan public hospitals to be able to demonstrate the appropriate use of interpreters for NESB women without proficiency in English.

## Appendix 1 Explanation of the data reporting system for 2003–2004 Maternity Services Performance Indicators

Adapted from Victorian Maternity Services Performance Indicators Reporting Framework<sup>17</sup>

- 1. The proportion expressed as a percentage with 95% confidence intervals (CI)** calculated using a method that accounts for small numbers. This provides a **numerical comparison** of the public hospital figures with the statewide public figures.

It is important to note that the statewide proportion does not represent the optimal or clinically appropriate proportion of women having the outcome of interest. These results show how an individual hospital differs from the average.

Report format:

Statewide public rate = numerator/denominator proportion% (lower 95% CI, upper 95%CI)

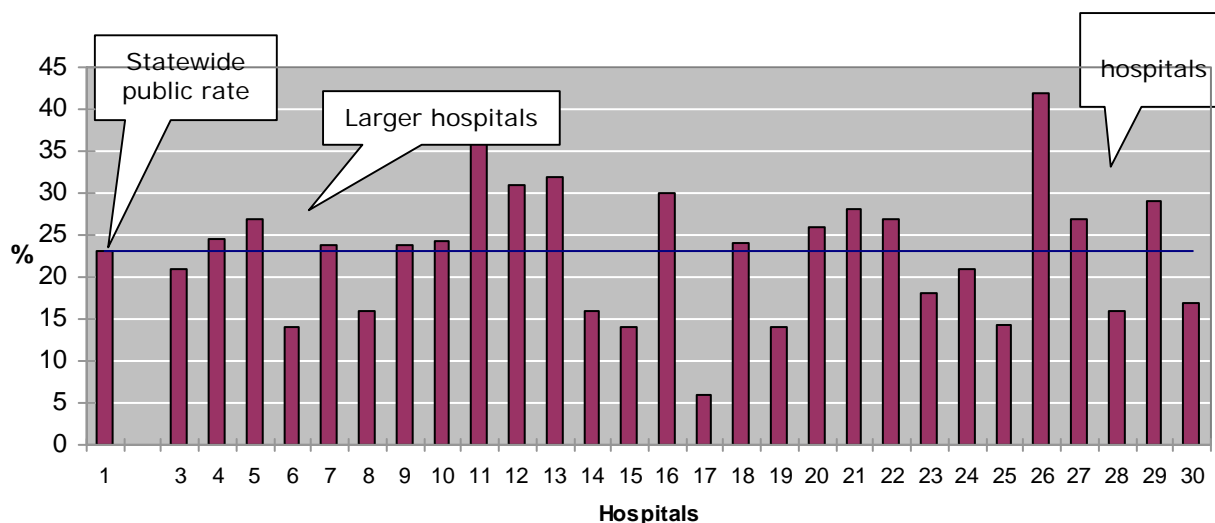
**Interpretation** – if confidence intervals for hospital X overlap with the confidence intervals for the statewide rate for public hospitals then there is no significant difference from the state average.

- 2. A graphical comparison of the hospital with other public hospitals and the state average for public hospitals, using a histogram** displaying the proportions calculated from the raw numbers for the numerator (event of interest) divided by the denominator (the population of women at risk of the event). To enable comparison between public hospitals of a similar size, the hospitals are ordered along the x-axis by the number of confinements from largest to smallest.

It is important to note that the statewide proportion does not represent the optimal or clinically appropriate proportion of women having the outcome of interest. Therefore, these results show how an individual hospital differs from the average.

**Interpretation** – this graph provides a model for a visual demonstration of the variation in proportions of an obstetric intervention across Victorian hospitals and a comparison with the state average. In this example, some hospitals (five out of 49) show a low proportion, less than one in 10. Some have a high proportion (seven out of 49), greater than three in 10 births. This proportion does not appear to relate to size of hospital.

**The wide variation between hospitals indicates that this indicator has the potential for identifying ways in which clinical care can be improved.**



<sup>17</sup> Christine Stone and James King, *Victorian maternity services performance indicators: development of a reporting framework*. Public Health Group, Department of Human Services, Melbourne 2003.

**3. Proportions expressed as a percentage with 95% confidence intervals using modified method of Wilson for small numbers.**

The traditional method is an approximation and should not be used for very low or very high observed proportions. The restriction is that neither  $n_i$  nor  $d_i - n_i$  is less than 5. Using the modified method of Wilson<sup>18</sup>, the proportion ( $p_i$ ) is still calculated from  $n_i/d_i$  however the confidence interval is calculated in two steps: First calculate three quantities:

$$A = 2n_i + z^2 \quad B = z\sqrt{[z^2 + 4n_i(1-p_i)]} \quad C = 2(d_i + z^2) \text{ where } z = 1.96 \text{ for } 95\% \text{ CI}$$

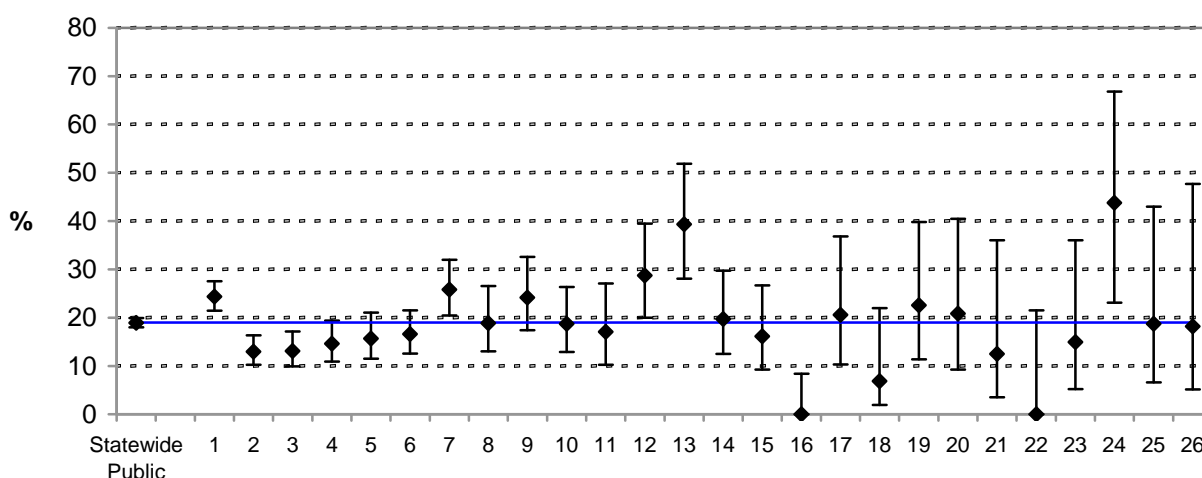
then the confidence interval is given by

$$(A - B)/C \text{ to } (A + B)/C$$

This is a graphical representation of the results. The y-axis shows the proportion of the population having the outcome of interest. On the x-axis, the first value represents the state average as a dot with a line depicting the 95% confidence interval. The other bars represent the individual hospital results, ordered along the axis by the number of confinements, from largest to smallest.

This diagram provides a visual comparison of differences between hospitals overall, public hospitals of a similar size and with the statewide public rate. If the confidence intervals overlap, then the difference in the proportions is not significantly different from the state average at the  $p=0.05$  level.

**Example: Figure 5 Proportion with 95% confidence intervals (modified for small numbers)**



It is important to note that the statewide proportion does not represent the optimal or clinically appropriate proportion of women having the outcome of interest. Therefore, these results show how an individual hospital differs from the average rather than the optimal or clinically appropriate value.

**Interpretation** – This graph provides a visual demonstration of the variation in rate of an event occurring across Victorian public hospitals when compared to the statewide public rate and also the confidence interval around that rate. A public hospital's rate is significantly different from the statewide rate if its confidence interval does not overlap the statewide confidence interval. In this example, four of the 26 hospitals have a significantly higher rate of intervention and three have a significantly lower rate than the statewide public hospital rate.

<sup>18</sup> Newcombe R & Altman D. 'Chapter 6 Proportions and their differences'. In: Altman D, Machin D, Bryant T, Gardner M, editors. *Statistics with confidence*. Second edition ed: BMJ Books, 2000.



