

VICTORIAN MATERNITY SERVICES PERFORMANCE INDICATORS

Public hospitals indicators MAT1, MAT4 & MAT5
using combined data from 2001 and 2002.

November 2003



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Joint project between

Programs Branch,
Metropolitan Health and Aged Care Services Division and
Public Health Branch,
Rural & Regional Health and Aged Care Services Division,
Victorian Department of Human Services



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1 Summary

Programs Branch, Metropolitan Health and Aged Care Services Division (MHACS) of the Victorian Department of Human Services (DHS) commissioned this project through the Public Health Branch, Rural & Regional Health and Aged Care Services Division, Department of Human Services, to provide advice on the analysis and reporting of the Victorian Department of Human Services Maternity Services Performance Indicators.^{1 2} This project has led to the development of this 'stand alone' report on Maternity Services Performance Indicators.

This report describes the three indicators, which are derived using data from the Perinatal Data Collection Unit (PDCU). It combines two years worth of data for the indicators, MAT-1 and MAT-4 (2001 and 2002) and five years for the standardised perinatal mortality ratios (SPMR) MAT-5 (1998-2002).

The intervention rates for standard primiparae appear high, however there is no agreed clinically appropriate rate. The wide variation between hospitals suggests that these indicators have the potential for identifying ways in which consistency in clinical care can be improved. It is hoped that the information in this report will support quality measures within individual health services to analyse the data, implement practice change and review further outcomes in a multi-disciplinary environment. The broader goal is to support improved outcomes for women and babies.

Readers of this report are directed to Appendix 1 for an explanation of the reporting system. While all public hospitals doing maternity services will receive a report, results are graphed for hospitals with at least one event out of a possible ten or more occasions eg at least one induced birth and 10 or more standard primiparae giving birth over the time period of the report. **Hospitals are ordered from the largest number of confinements down to the smallest.**

2 Introduction

In 2001, the Victorian Government Report, *Measuring Maternity Care*, commissioned by the Department of Human Services (DHS), recommended that a set of performance indicators be implemented throughout the State's maternity services.¹ The nine recommended indicators form one part of the Department's Quality Framework for Victoria. There is one existing indicator, "The proportion of women referred to postnatal domiciliary care" which 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.

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.¹

The final indicators developed were:²

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

Some of these indicators can be obtained from an existing data source. Three indicators (MAT-1, MAT-4 and MAT-5) are derived directly from the Perinatal Data Collection (PDCU). The results of these three indicators and the statewide average have already been reported by the PDCU back to hospitals in the last two Hospital Profiles ie the 2001 and 2002 data. However, the Profiles only include data for the individual hospital and the state average. This is the first report that enables individual public hospitals to be compared with other public hospitals and the statewide average for public and private hospitals.

In early 2003, the Programs Branch, Metropolitan Health and Aged Care Services Division commissioned a project to provide expert advice on the analysis and reporting of Maternity Services Performance Indicators. The aim of the project was to develop a reporting framework for the Victorian Maternity Services Performance Indicators by providing advice about appropriate presentation of the Maternity Services Performance Indicator (MSPI) data for public hospitals in Victoria.

A project team of Christine Stone, Consultant Epidemiologist and James King, Chair of the Consultative Council on Obstetric and Paediatric Mortality and Morbidity (CCOPMM) in consultation with the Performance Indicator sub-committee of the Maternity Services Advisory Committee (MSAC) conducted the project. It is envisaged the MSAC sub-committee will also provide expert advice to assist DHS to formulate appropriate policy and action consequent to the analysis of the MSPI.

The project team and MSAC sub-committee explored a variety of systems for reporting performance indicators including some of the current local and overseas systems. While it is recognised that many issues are considered when developing reporting frameworks for indicators, this work concentrates on

producing a model for a statistically valid report. Other issues that are relevant include the viewpoint of analysis, data validity, numerator & denominator, comparator, confidence intervals, statistical target, clinical target, risk adjustment, potential for subgroup analysis, and expert opinion/clinical commentary. The preference was for a statistically appropriate method that used a clear and simple visual system such that it could be publicly displayed for instance in maternity wards, or other such venues. This system enables comparisons between the index hospital and the state average for public and private hospitals and with other public hospitals, particularly hospitals of a similar size.

3 MAT-1 Outcomes for standard primiparae in Victorian public hospitals in 2001 & 2002

This indicator is defined in the report on the Final Set of Performance Indicators.²

The key question is '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 maternity care controls for substantial difference in casemix (pre-risk adjustment), and increases the validity of those comparisons.³

A 'cascade' effect of intervention has been described, which starts with induction of labour and progresses through augmentation, epidural anaesthesia to increased risk of operative vaginal delivery or emergency caesarean section. This effect is greater for nulliparous women.⁴ 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.

There are three outcomes associated with this indicator:

MAT1a - Inductions in standard primiparae,

MAT1b - Caesareans in standard primiparae and

MAT1c - 3rd and 4th degree perineal tears in standard primiparae who give birth vaginally.

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 ¹and pregnant with a singleton pregnancy at term (37 to 41 weeks gestation), with a non small for gestational age (greater than the 10th percentile) infant and a cephalic presentation.

¹ She has no major medical conditions (pre-existing diabetes, mental illness, cardiac disease or hypertension) and no obstetric complications.

3.1 Standard primiparae as a proportion of all births

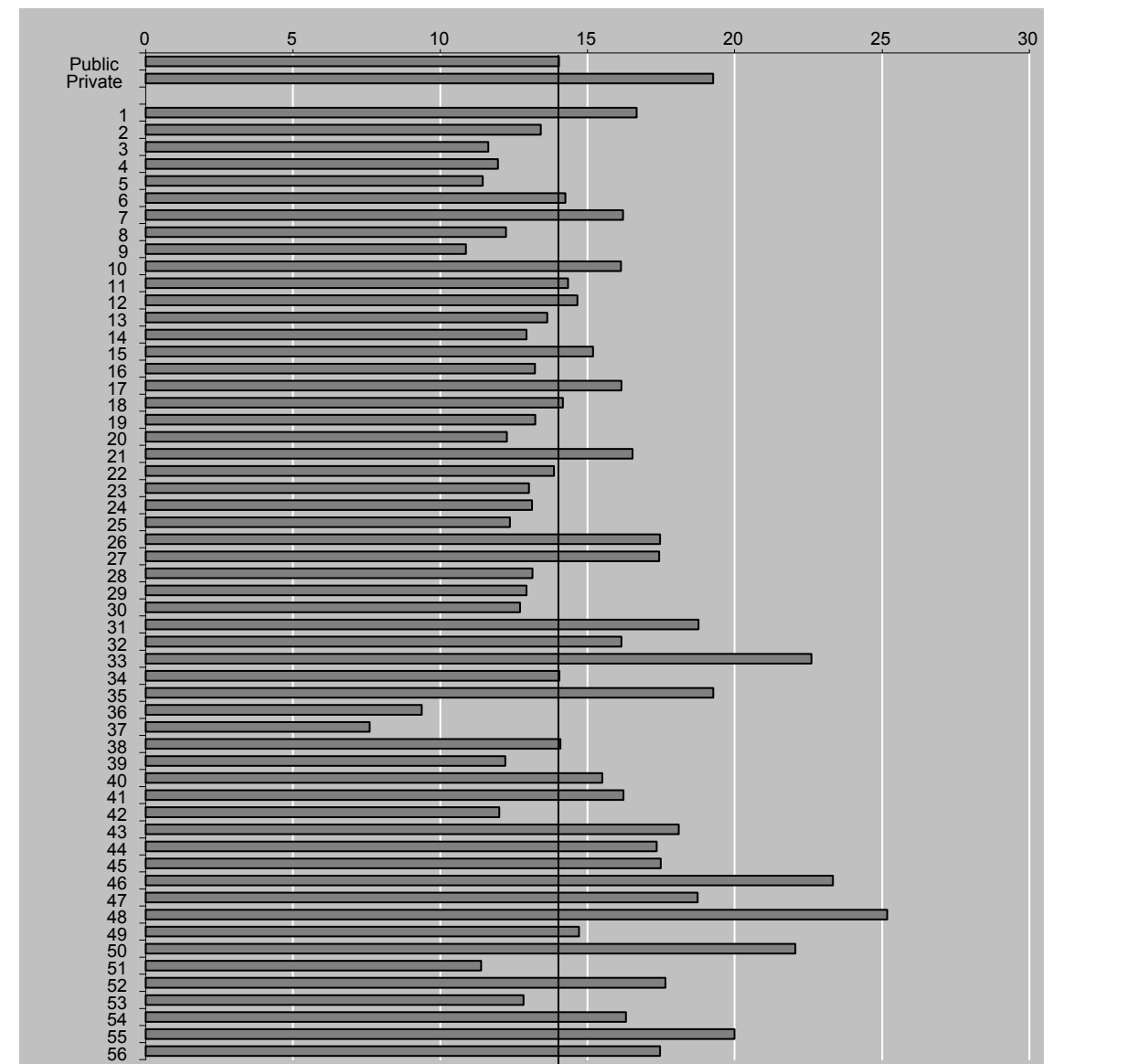
This is not an indicator as such but provides some idea of the proportion of births in public hospitals and in private hospitals that are included in the first indicator: MAT-1.

$$\% \text{ Standard primiparae} = \frac{\text{The number of standard primiparae}}{\text{The number of women who give birth}} \times 100$$

Public hospital average	11,882/84,655	14.0%
Private hospital average	7,153/37,151	19.3%

Comments: The proportion of women who give birth who are standard primiparae is lower in Victorian public hospitals than in Victorian private hospitals. The difference requires further analysis. The rate in public hospitals varies from 7.6% to 25.2%.

Figure 1 Standard primiparae per 100 confinements 2001 and 2002

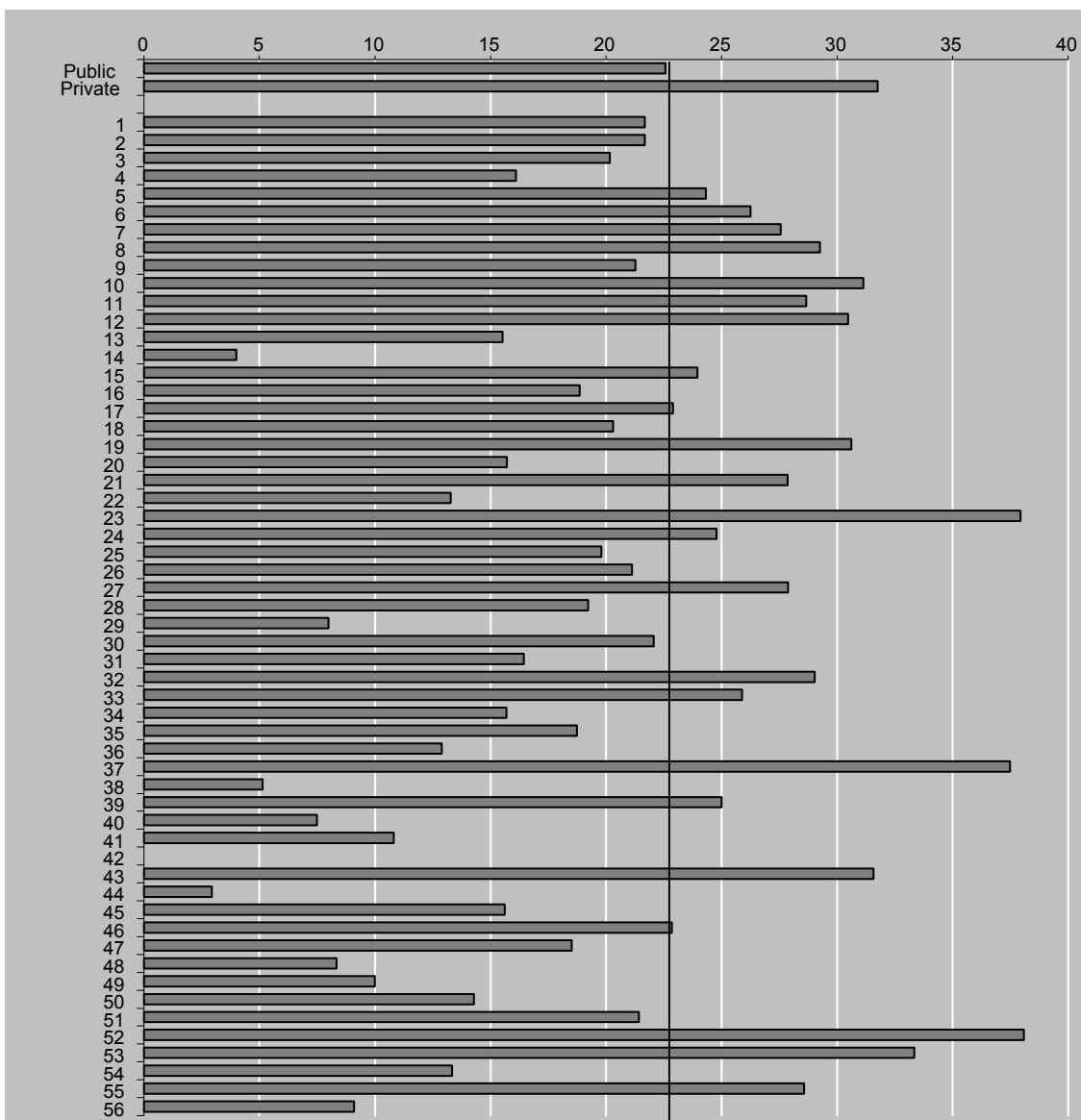


3.2 MAT-1a Induction of labour in standard primiparae

$$\% \text{ Induced} = \frac{\text{The number of standard primiparae undergoing induction of labour}}{\text{The number of standard primiparae who give birth}} \times 100$$

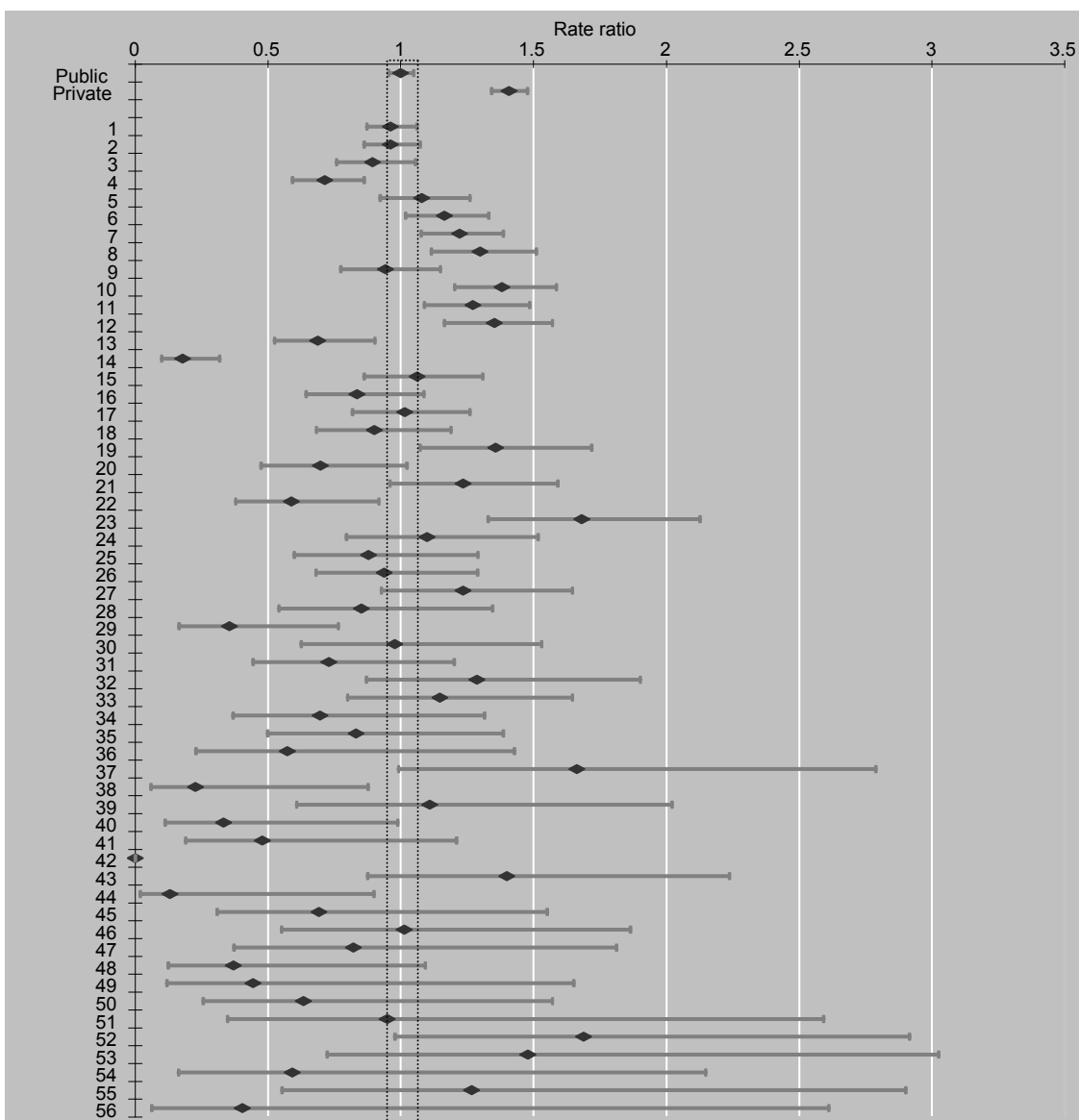
Public hospital average = 2,681/11,882 22.6% (95% CI 21.8, 23.3)
 Private hospital average = 2,272/7,153 31.8% (95% CI 30.7, 32.9)

Figure 2 Inductions per 100 standard primiparae 2001 and 2002



Rate ratio
 Public hospital average RR = 1.00 (95% CI 0.95,1.05)
 Private hospital average RR = 1.41 (95% CI 1.34,1.48)

Figure 3 Rate ratio of inductions compared to the State Public hospital average 2001 and 2002



Comments on inductions in standard primiparae in public hospitals

1. The state public hospital average proportion of 22.6% (95% CI 21.8%, 23.3%) is significantly lower than the state private hospital average of 31.8% (95% CI 30.7%, 32.9%) for 2001 and 2002 combined.
2. The histogram in Figure 2 provides a visual demonstration of the variation in proportions across Victorian hospitals and a comparison with the state public and private hospital average. Combined results from 2001 and 2002, show that three out of 56 hospitals have a particularly high proportion of inductions 'ie greater than 35 in 100 births', whereas two out of 56 hospitals show a comparatively low proportion of inductions 'ie less than 5 in 100'. This histogram does not show which hospitals are significantly different from the state average.
3. Figure 3 provides a visual demonstration of the variation in rate of inductions across Victorian hospitals when compared to the state public hospital average and also the confidence interval around that rate ratio. A hospital's rate is significantly different from the state average if the confidence interval of the rate ratio does not include 1. Combined data from 2001 and 2002 show that for standard primiparae, 8 out of 56 hospitals have a significantly higher rate of induction and 7 have a significantly lower rate than the statewide average. However, no hospital has double the average rate whereas 6 have less than half the average rate.
4. The overall state average of 22.6% inductions in standard primiparae delivering in public hospitals appears high. However, there is no agreed optimal or clinically appropriate proportion. The wide variations between hospitals indicate that this indicator has the potential for identifying ways in which consistency in clinical care can be improved.
5. Comparisons with other reports
The UK maternity information system, SMMIS, in 1992, induction rate in standard primiparae was 17.0% as compared with 19.3% in non-standard primiparae.³
Washington State induction rate in standard primiparae increased from 10.2% in 1989 to 19.7% in 1993.⁴
WA induction rate in standard primiparae was 21.7% in 1995/96. (Report to Inquiry into O and G Services at King Edward Memorial Hospital).
Comparisons with all births
Australian Institute of Health and Welfare, in 1999 25.9% of all births in Australia were induced. ⁵ In 2000, 25.7% of all births were induced, ranging from 20.1% in NT to 32.5% in Tasmania.⁶
Canadian Perinatal Health report 2000, induction rate in 1997 was 18.5% of all births and ranged from 10.4% to 22.1% across the provinces. ⁷
The US National Vital Statistics Reports, induction rate as reported on birth certificates was 20.5% of all births in 2001. ⁸

3.3 MAT-1b Caesarean section in standard primiparae

$$\% \text{ Caesarean} = \frac{\text{The number of standard primiparae undergoing caesarean section}}{\text{The number of standard primiparae who give birth}} \times 100$$

Public hospital average	= 2,035/11,882	17.1% (95% CI 16.5, 17.8)
Private hospital average	= 1,676/7,153	23.4% (95% CI 22.5, 24.4)

Rate ratio		
Public hospital average RR	= 1.00 (95% CI 0.95,1.06)	
Private hospital average RR	= 1.37 (95% CI 1.29,1.45)	

Figure 4 Caesareans per 100 standard primiparae 2001 and 2002

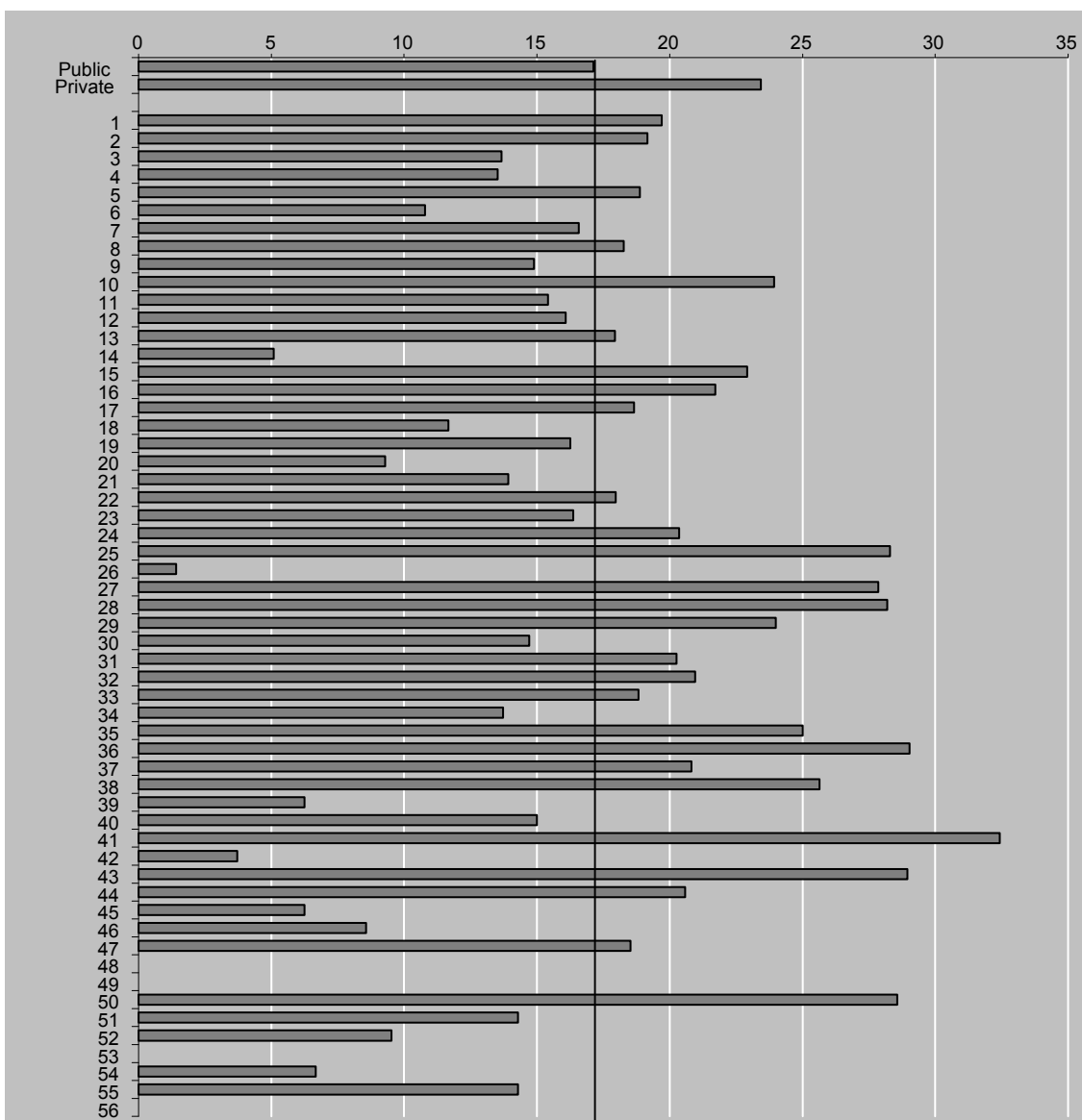
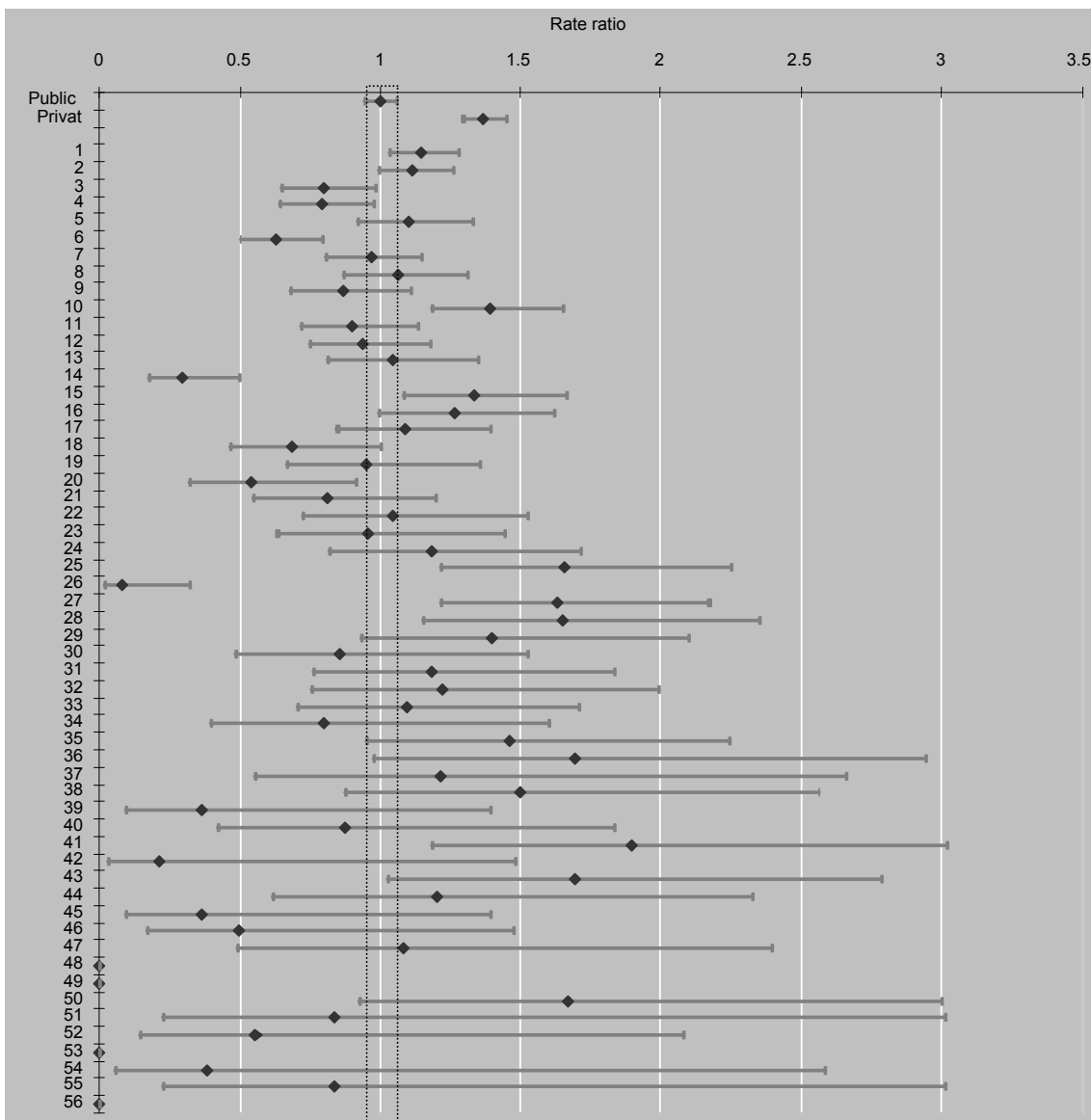


Figure 5 Rate ratio of caesareans compared to state Public hospital average 2001 and 2002



Comments on caesareans in standard primiparae in public hospitals

1. The state public hospital average proportion of 17.1% (95% CI 16.5%, 17.8%) is significantly lower than the state private hospital average of 23.4% (95% CI 22.5%, 24.4%) for 2001 and 2002 combined.
2. The histogram in Figure 4 provides a visual demonstration of the variation in proportions across Victorian hospitals and a comparison with the state public and private hospital average. Combined results from 2001 and 2002, show that one out of 53 hospitals has a particularly high proportion of caesareans 'ie greater than 30 in 100 births', whereas two out of 53 hospitals show a comparatively low proportion of caesareans 'ie less than 5 in 100'. This histogram does not show which hospitals are significantly different from the state average.
3. Figure 5 provides a visual demonstration of the variation in rate of caesareans for standard primiparae occurring across Victorian hospitals and also the confidence interval around that rate ratio. A hospital's rate is significantly different from the state average if the confidence interval of the rate ratio does not include 1. Combined data from 2001 and 2002 show that for standard primiparae, 9 out of 53 hospitals have a significantly higher caesarean rate and 6 have a significantly lower rate than the statewide average. However, no hospital has double the average rate whereas 4 have less than half the average rate.
4. The overall state average caesarean section rate of 17.1% in standard primiparae delivering in public hospitals appears high. However, there is no agreed optimal or clinically appropriate proportion. The wide variations between hospitals indicate that this indicator has the potential for identifying ways in which consistency in clinical care can be improved.
5. Comparisons with other reports
In the UK maternity information system, SMMIS, in 1992, the caesarean rate in standard primiparae was 7.9% as compared with 20.5% in non-standard primiparae.³
US National Vital Statistics shows that 18% and 19% of low-risk women had a caesarean in 1998 and 1999 respectively. A low-risk woman was defined as one with a full-term (at least 37 weeks since last menstrual period, singleton, vertex fetus).⁹ The report also shows that 23.1% of primiparae had a caesarean in 1999.
Comparisons with all births
Australian Institute of Health and Welfare, in 1999 21.9% of all births in Australia were by caesarean section.⁵ In 2000, 23.3% of all births were by caesarean, ranging from 20.8% in NT to 25.6% in Queensland. The rate for primiparae are slightly higher at 25.8%⁶
Canadian Perinatal Health report 2000, caesarean rate in 1997 was 19.1% of all births.⁷
The US National Vital Statistics Reports, caesarean rate as reported on birth certificates was 24.4% of all births in 2001.⁸

3.4 MAT-1c 3rd and 4th degree perineal tears in standard primiparae

$$\% \text{ 3}^{\text{rd}} \text{ or 4}^{\text{th}} \text{ Tear} = \frac{\text{The number of standard primiparae who sustain a 3rd or 4th degree tear}}{\text{The number of standard primiparae who give birth vaginally}} \times 100$$

Public hospital average	= 329/9,847	3.3% (95% CI 3.0, 3.7)
Private hospital average	= 123/5,477	2.2% (95% CI 1.9, 2.7)

Rate ratio		
Public hospital average RR	= 1.00 (95% CI 0.86,1.16)	
Private hospital average RR	= 0.67 (95% CI 0.55,0.82)	

Figure 6 Rate of 3rd and 4th degree perineal tears per 100 standard primiparae 2001 and 2002

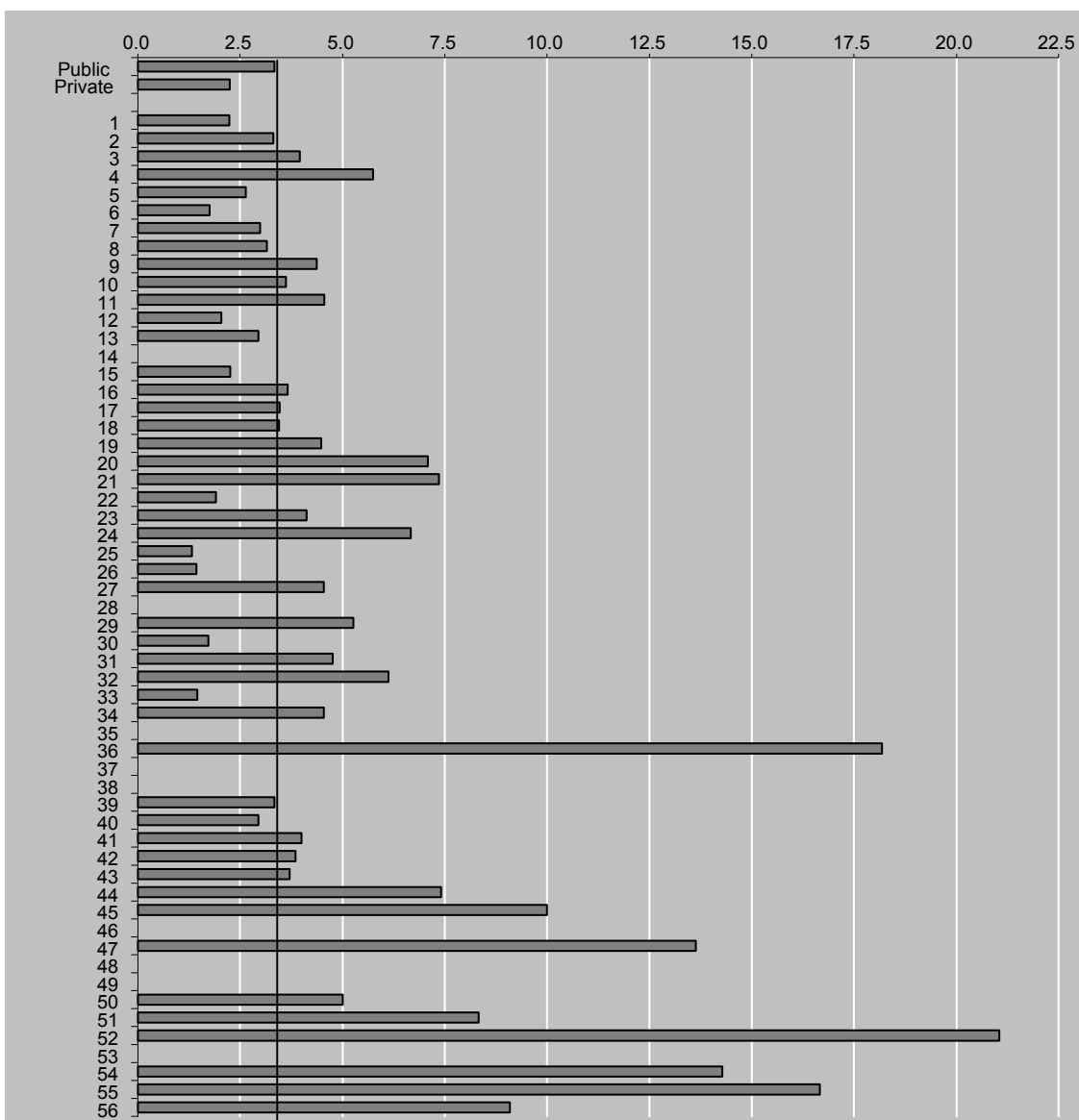
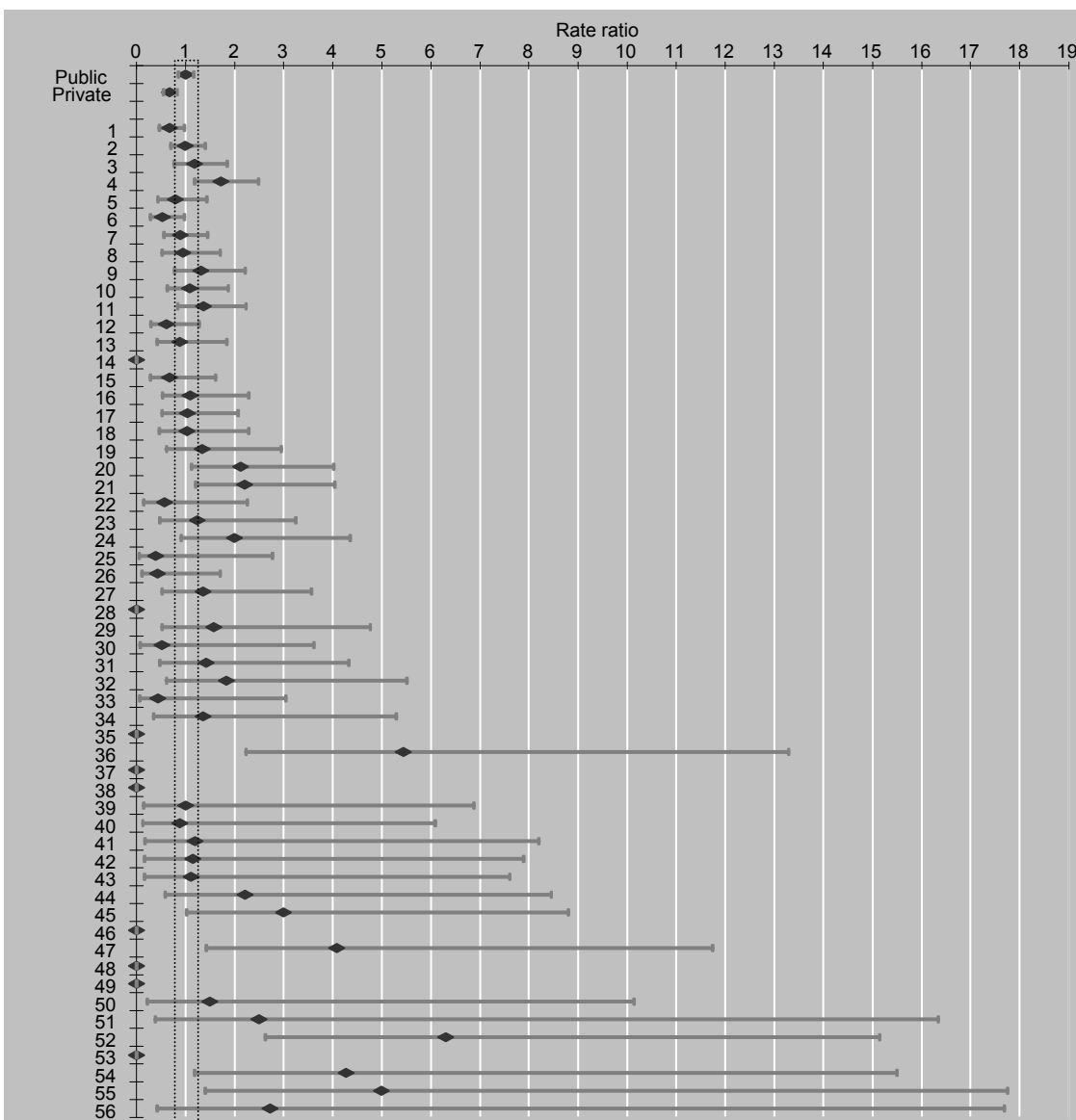


Figure 7 Rate ratio of 3rd and 4th degree perineal tears compared to state Public hospital average 2001 and 2002



Comments on 3rd and 4th degree perineal tears in standard primiparae who give birth vaginally in public hospitals

1. The state public hospital average proportion of 3.3% (95% CI 3.0%, 3.7%) is significantly higher than the state private hospital average of 2.2% (95% CI 1.9%, 2.7%) for 2001 and 2002 combined. The reasons for this difference require comprehensive evaluation.
2. The histogram in Figure 6 provides a visual demonstration of the variation in proportions across Victorian hospitals and a comparison with the state public and private hospital average. Combined results from 2001 and 2002 show that three out of 48 hospitals have a higher proportion of 3rd and 4th degree perineal tears 'ie greater than 15 in 100 births', whereas six out of 48 hospitals show a comparatively low proportion of 3rd and 4th degree perineal tears 'ie less than 2 in 100'. This proportion appears to relate to size of hospital, with the smaller hospitals reporting a higher rate of 3rd and 4th degree perineal tears. This histogram does not show which hospitals are significantly different from the state average.
3. Figure 7 provides a visual demonstration of the variation in rates of 3rd and 4th degree perineal tears occurring across Victorian hospitals when compared to the state average and also the confidence intervals. A hospital's rate is significantly different from the state average if the confidence interval of the rate ratio does not include 1. Combined data from 2001 and 2002 show that for standard primiparae giving birth vaginally, 9 out of 48 hospitals have a significantly higher rate of 3rd and 4th degree perineal tears and 2 have a significantly lower rate than the statewide average. Five hospitals have over four times the average rate of 3rd and 4th degree perineal tear; an additional seven hospitals have double the average rate whereas none have less than half the average rate.
4. The overall state average rate of 3rd and 4th degree perineal tears equals 3.3% of all standard primipara having a vaginal birth in public hospitals. However, there is no agreed optimal or clinically appropriate proportion. Differences in rates may be associated with coding or difference in ascertainment, or it may reflect a true difference in skill level.
5. Comparisons with other reports
Direct comparisons are not readily available however comparisons with all births are.
Australian Institute of Health and Welfare report, 2.6% of all Australian births, in 2000, resulted in 3rd and 4th degree perineal tears.⁶
Canadian Perinatal Health report 2000, the rate of 3rd and 4th degree perineal tears in 1997 was 3.8% of all vaginal births.⁷

4 MAT-4 Vaginal births after a primary caesarean section 2001 & 2002

This indicator is defined in the report on the Final Set of Performance Indicators.²

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

Definitions

Planned VBAC

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

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

Achieved VBAC

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

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

It is important to recognise that

1. The PDCU does not record whether a women has a plan for a vaginal birth so the fact that she has laboured is being used as a surrogate to indicate a plan for vaginal birth
2. The way this indicator is defined may differ from other 'Vaginal birth after a Primary Caesarean' indicators. Primary caesarean is defined as the first ever caesarean regardless of parity whereas this indicator selects only caesareans in the first birth.

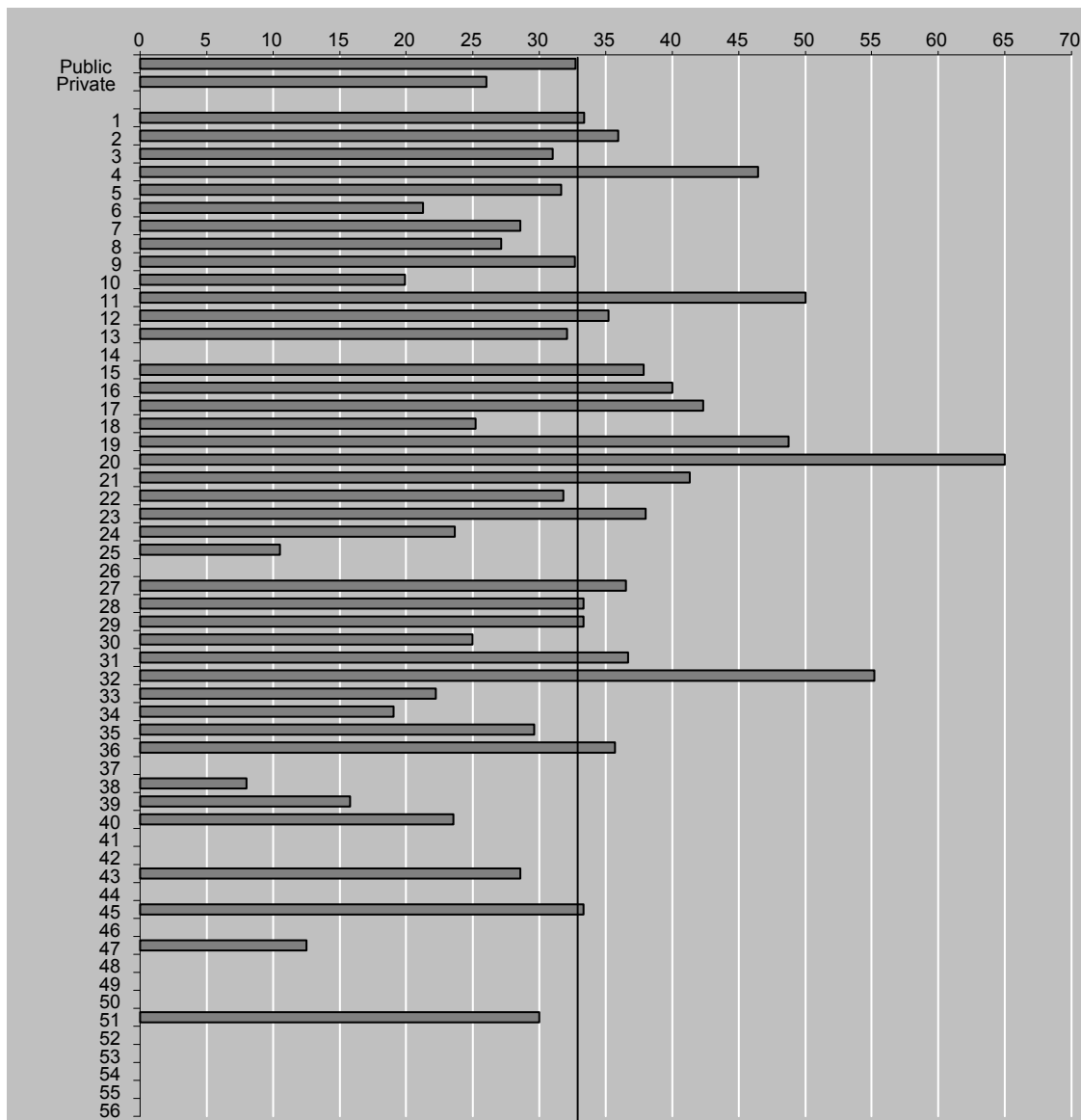
4.1 MAT-4a 'Planned' VBAC

Numerator = The number of women (para 1 and at term) whose previous birth was a caesarean section who enter labour at term with a plan for a vaginal birth

Denominator = The total number of women (para 1 and at term) whose previous birth was a caesarean section

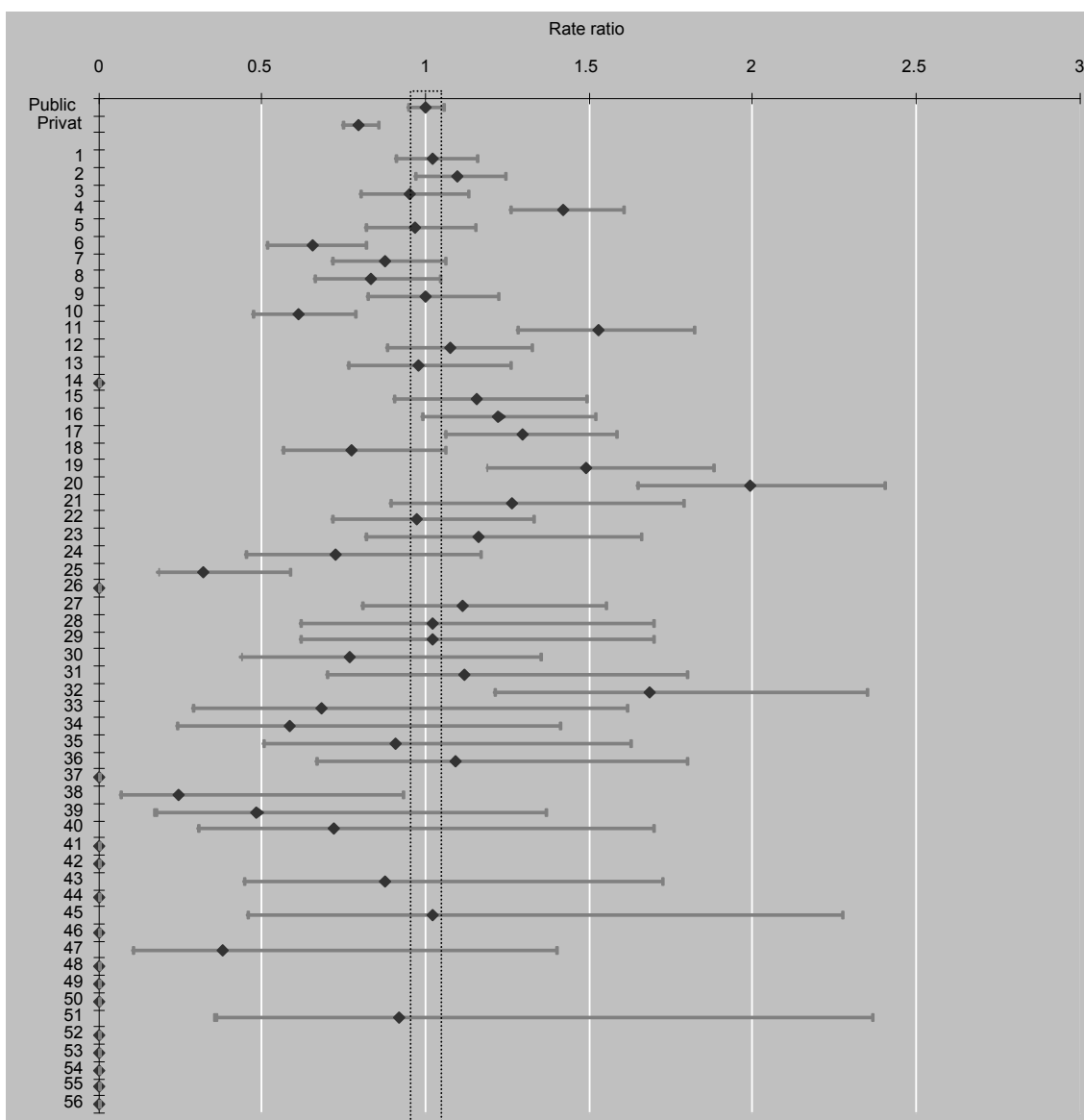
Public hospital average	= 1,689/5,165	32.7 (95% CI 31.4, 34.0)
Private hospital average	= 915/3,517	26.0 (95% CI 24.6, 27.5)

Figure 8 'Planned' VBAC in 2001 and 2002.



Rate ratio
 Public hospital average RR = 1.00 (95% CI 0.95,1.06)
 Private hospital average RR = 0.80 (95% CI 0.74,0.85)

Figure 9 Rate ratio of 'planned' VBAC compared with state Public hospital average 2001 and 2002.



Comments on 'planned' VBAC

1. The state public hospital average proportion of 32.7% (95% CI 31.4%, 34.0%) is significantly higher than the state private hospital average of 26.0% (95% CI 24.6%, 27.5%) for 2001 and 2002 combined.
2. The histogram in Figure 8 provides a visual demonstration of the variation in proportions across Victorian hospitals and a comparison with the state public and private hospital average. Combined results from 2001 and 2002 show that three out of 38 hospitals have a high proportion of 'planned' VBAC 'ie greater than 50 in 100 births', whereas four out of 38 hospitals show a low proportion of planned VBAC 'ie less than 20 in 100'. This histogram does not show which hospitals are significantly different from the state average.
3. Figure 9 provides a visual demonstration of the variation in rate of planned VBAC occurring across Victorian hospitals when compared to the state average and also the confidence interval around that rate ratio. A hospital's rate is significantly different from the state average if the confidence interval of the rate ratio does not include 1. Combined data from 2001 and 2002 show that eligible women in 6 out of 42 hospitals have a significantly higher rate of having a 'planned' VBAC and 4 have a significantly lower rate than the statewide average. No hospital has twice the average rate of a 'planned' VBAC whereas 3 have less than half the average rate.
4. The wide variations between hospitals indicate that this indicator has the potential for identifying ways in which consistency in clinical care can be improved.
5. Comparisons with other reports
This indicator is often called 'trial of scar' or 'trial of labour'.
Information from other sources on planned VBAC is not readily available.

4.2 MAT-4b Achieved VBAC

Numerator = The number of women (para 1 and at term) whose previous birth was a caesarean section who enter labour at term with a plan for a vaginal birth and achieve this

Denominator = The number of women (para 1 and at term) whose previous birth was a caesarean section who enter labour at term with a plan for a vaginal birth

Public hospital average	= 846/1,688	50.1 (95% CI 47.7,52.5)
Private hospital average	= 446/915	48.7 (95% CI 45.5 52.0)

Rate ratio

Public hospital average RR = 1.00 (95% CI 0.93,1.07)

Private hospital average RR = 0.97 (95% CI 0.90,1.06)

Figure 10 'Achieved' VBAC

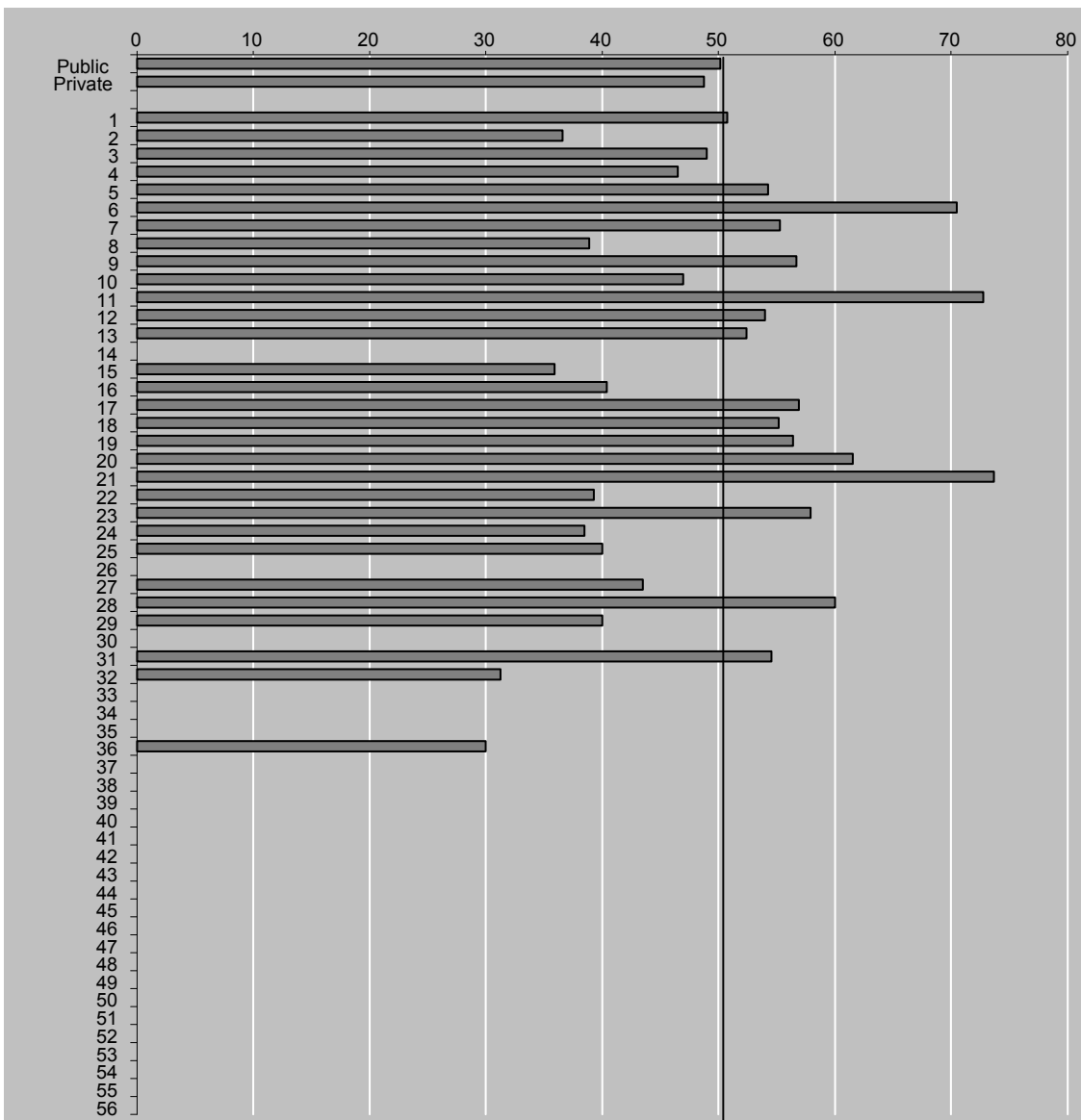
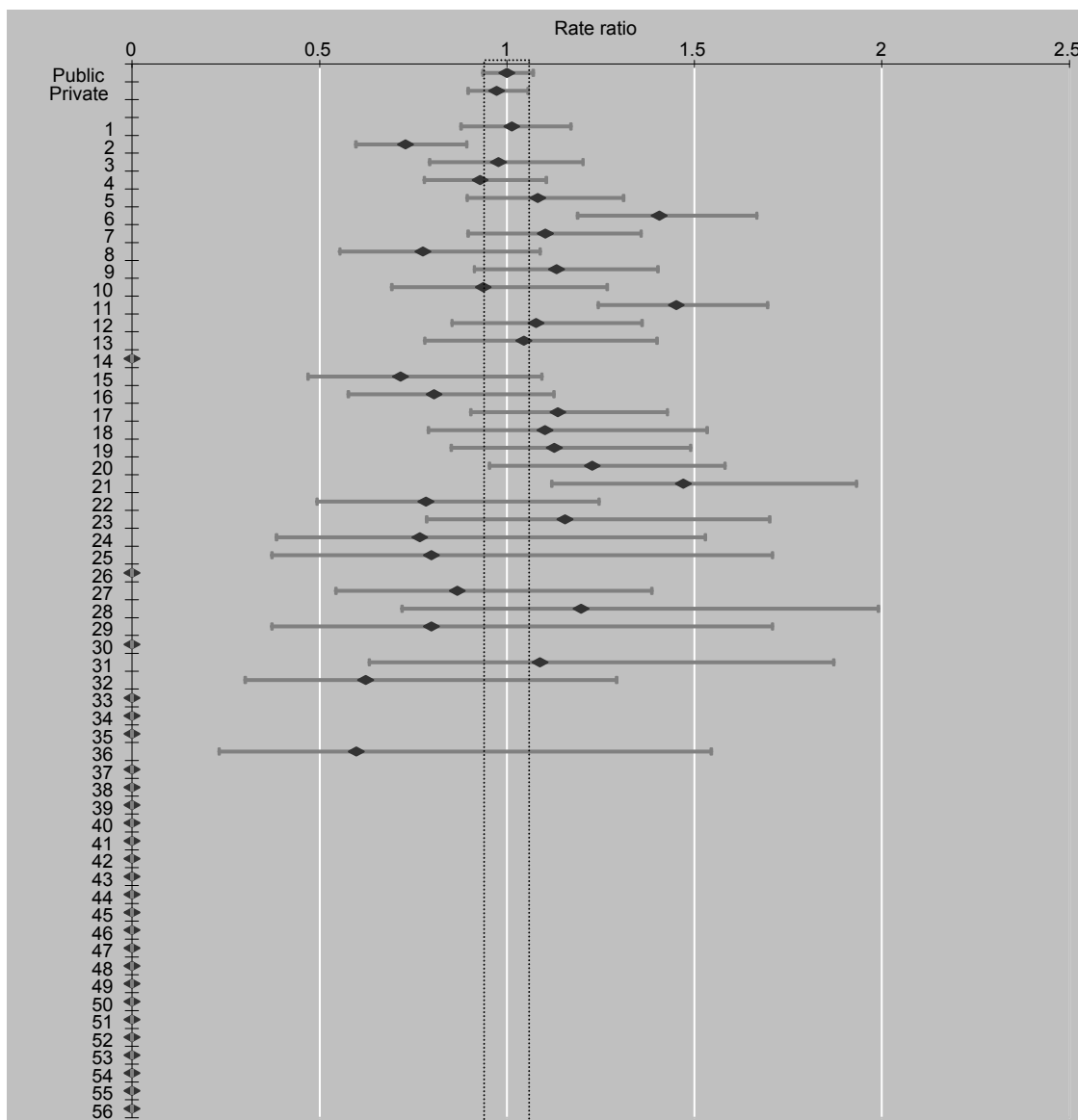


Figure 11 Rate ratio of 'Achieved' VBAC compared to the state Public hospital average 2001 and 2002



Comments on achieved VBAC

1. The state public hospital average proportion of 50.1% (95% CI 47.7%, 52.5%) is not significantly different to the state private hospital average of 48.7% (95% CI 45.5%, 52.0%) for 2001 and 2002 combined.
2. The histogram in Figure 10 provides a visual demonstration of the variation in proportions across Victorian hospitals and a comparison with the state public and private hospital average. Combined results from 2001 and 2002 show that three out of 31 hospitals have a high proportion of achieved VBAC 'ie greater than 70 in 100 births', whereas two out of 31 hospitals show a low proportion of achieved VBAC 'ie less than 35 in 100'. This histogram does not show which hospitals are significantly different from the state average.
3. Figure 11 provides a visual demonstration of the variation in rate of achieved VBAC occurring across Victorian hospitals when compared to the state average and also the confidence interval around that rate ratio. A hospital's rate is significantly different from the state average if the confidence interval of the rate ratio does not include 1. Combined data from 2001 and 2002 show that eligible women in three out of 31 hospitals have a significantly higher rate of having achieved a VBAC and one has a significantly lower rate than the statewide average. No hospital has twice the average rate of achieved VBAC nor is there a hospital with half the average rate.
4. The wide variations between hospitals indicate that this indicator has the potential for identifying ways in which consistency in clinical care can be improved.
5. Comparisons with other reports
Information from other sources on achieved VBAC is not readily available.

5 MAT-5 Five-year (1998-2002) Birthweight Standardised Perinatal Mortality Ratio

Care promoting the avoidance of stillbirth and neonatal death 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 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, or
- A more detailed evaluation is indicated because of a consistently raised SPMR.

This indicator has been applied to public hospitals that have had five or more perinatal deaths over a five year period. The SPMR is standardised according to the birthweight specific perinatal mortality rate of the total population. The standardisation does not adjust for congenital malformations or all interhospital transfers.

The data in this report is calculated from

- Five years of pooled data
 - Standardised to the birthweight specific perinatal mortality rate in Victorian public hospitals.
 - Excluding unknown birthweight and births less than 500 gms
- The exclusion of births less than 500g 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 excluded from the calculation.

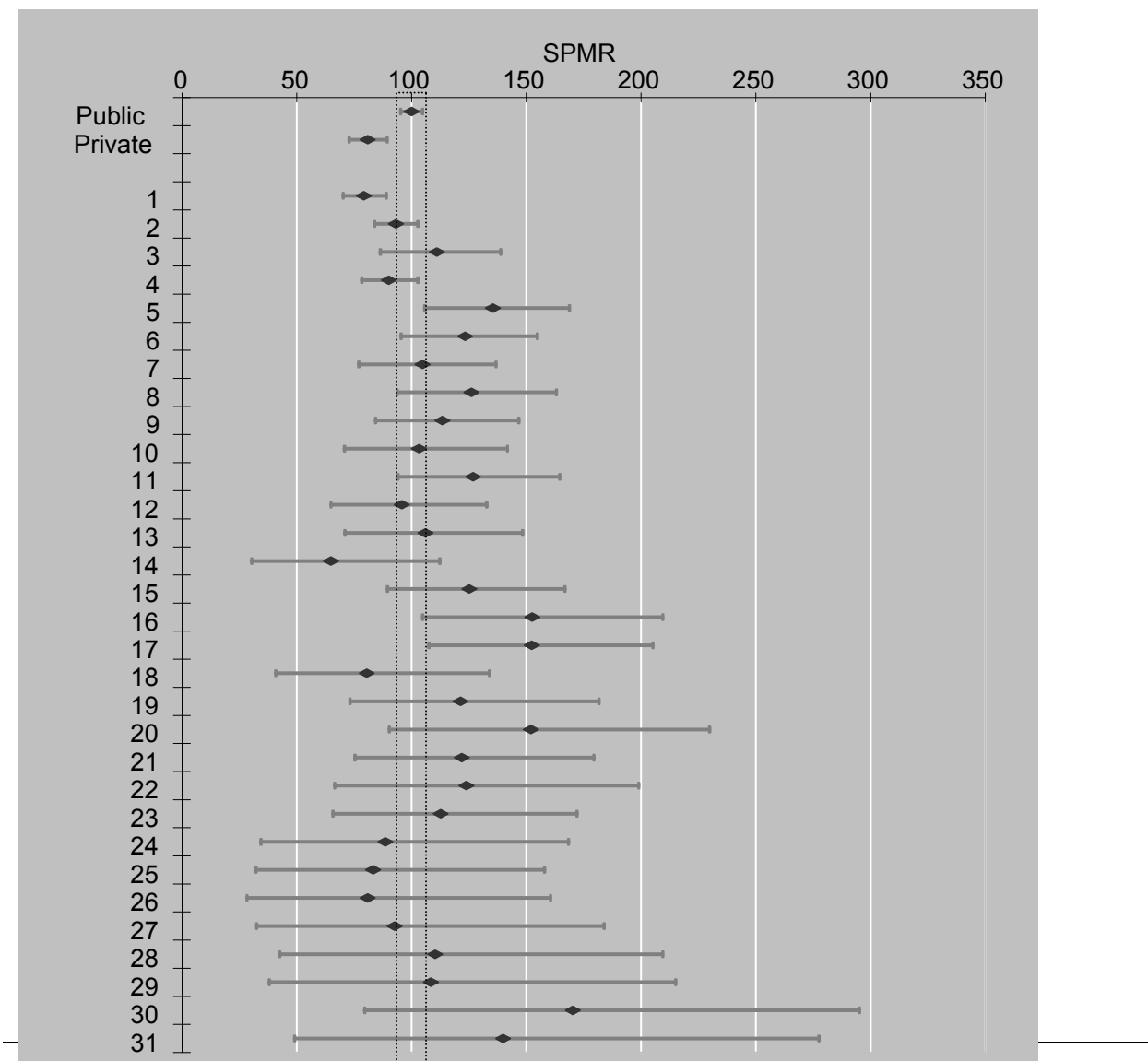
Birthweight standardised perinatal mortality ratio (SPMR)

Public hospital (the standard population) = 100.0 (95% CI 95.3, 104.8)
 Private hospital SPMR = 80.9 (95% CI 72.8, 89.4)

Comments on SPMR

1. The five-year state (1998-2002) public hospital SPMR of 100.0 (95% CI 95.3, 104.8) is significantly higher than the state private hospital average of 80.9 (95% CI 72.8, 89.4). This difference requires further auditing including assessment of the differential contribution from congenital malformations and referral patterns.
2. Figure 12 provides 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 1. Combined data from 1998 to 2002 show that four out of 31 hospitals have a significantly higher SPMR and one has a significantly lower SPMR.

Figure 12 Birthweight standardised perinatal mortality ratio (SPMR)



6 Appendix 1 Explanation of the reporting system for Maternity Services Indicators

The agreed system of reporting the maternity services indicators is as follows:

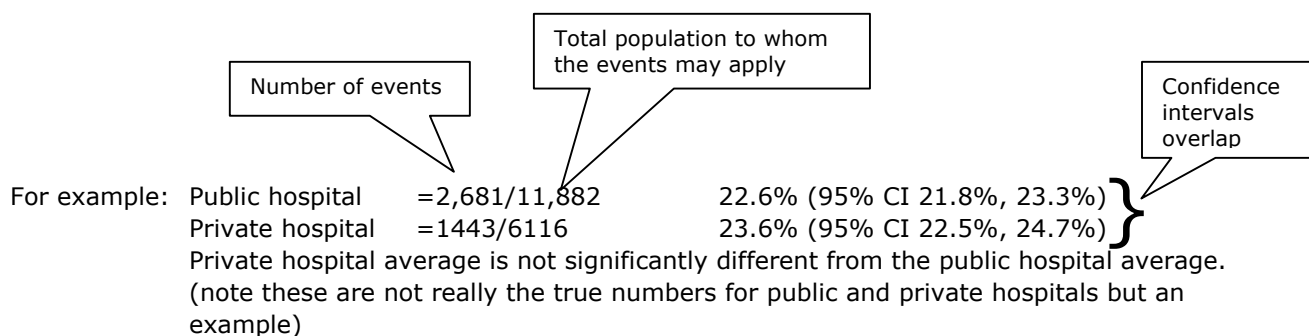
1. A **numerical comparison** of the public hospital data with private hospital data for the numerator (event of interest) and denominator (the population of women at risk of the event), the proportion expressed as a percentage with **95% confidence intervals** (CI) calculated using a method that accounts 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. These results show how an individual hospital differs from the average.

Report format:

Public hospital	= numerator/denominator	proportion% (lower 95% CI, upper 95%CI)
Private hospital	= numerator/denominator	proportion% (lower 95% CI, upper 95%CI)

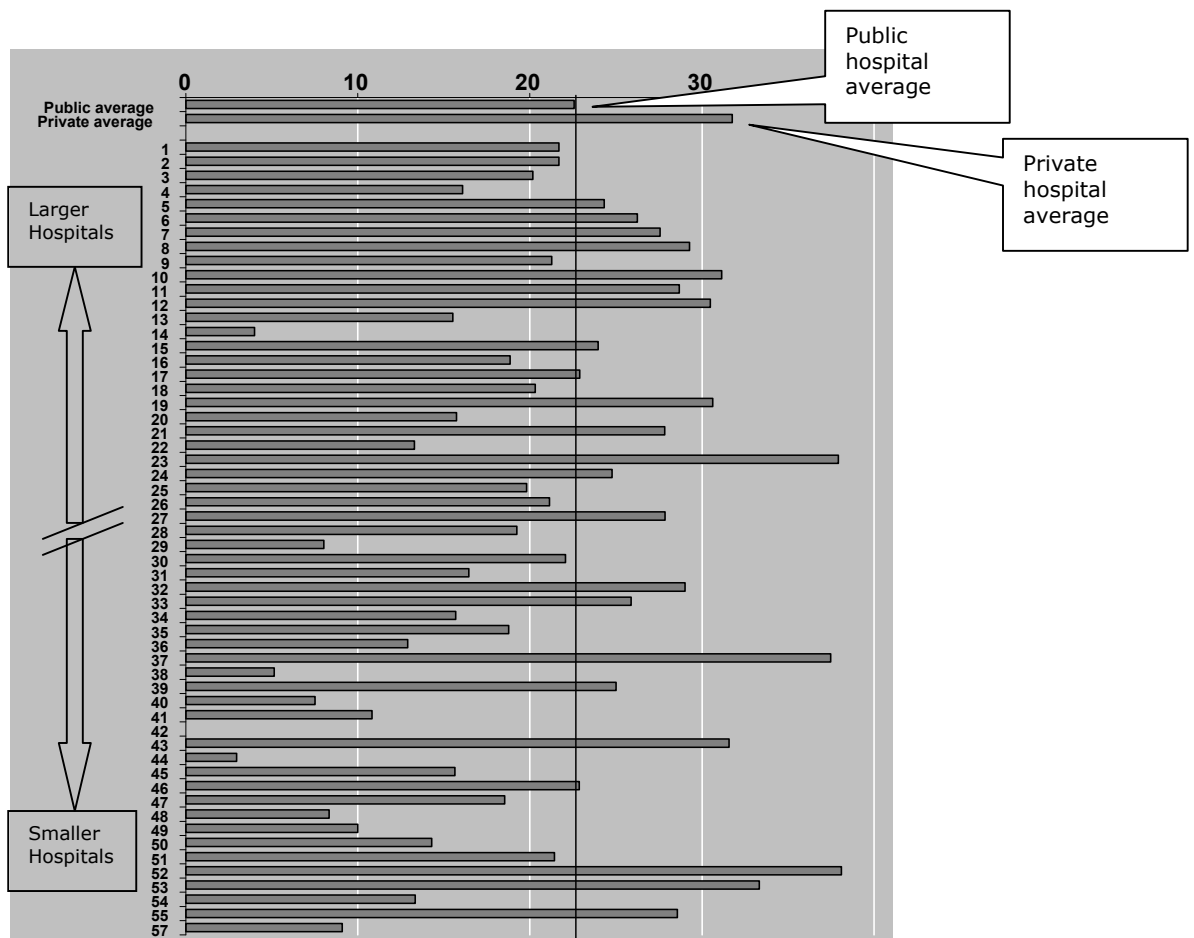
Interpretation – if confidence intervals of one group overlap with the confidence intervals of the other then there is no significant difference. If there is no overlap then there is a significant difference.



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 Y-axis by the size of the denominator from largest to smallest.**

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 (2 out of 56) show a low proportion, less than 5 in 100. Some have a high proportion (3 out of 56), greater than 35 in 100 births.

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



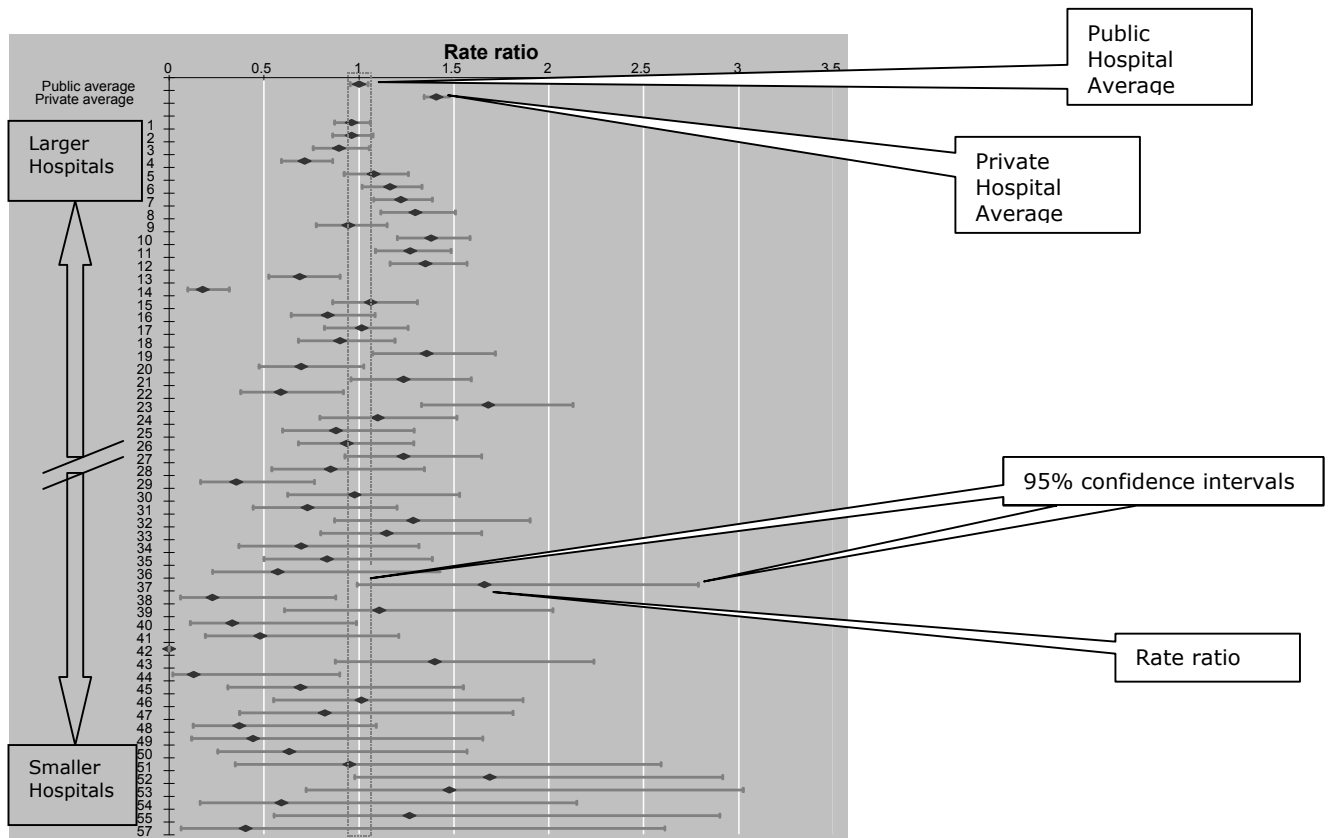
3. A **graphical comparison** of the **rate ratio** with **95% confidence interval** for the intervention compared with the state average. **To enable comparison between public hospitals of a similar size, the public hospitals are ordered along the y-axis by the size of the denominator from largest to smallest.**

Rate ratio (RR) = proportion in hospital X/ average statewide proportion and the Wald¹¹ 95% confidence interval can be calculated from

$$RR \times e^{\pm 1.96 \times \sqrt{\frac{1}{n_i} - \frac{1}{d_i} + \frac{1}{n_0} - \frac{1}{d_0}}}$$

where n= number of events and d=number of standard primipara and the subscripts i = hospital X and o = statewide figures.

Interpretation – The second graph provides a visual demonstration of the variation in rate of an event occurring across Victorian public hospitals when compared to the state public and Private hospital average and also the confidence interval around that rate. A public hospital’s rate is significantly different from the state average if its confidence interval does not include 1. In this example, 8 out of 56 hospitals have a significantly higher rate of intervention and 7 have a significantly lower rate than the statewide average for public hospitals. No hospital has double the rate whereas 6 have less than half the rate.



7 Appendix 2 References

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8 Appendix 3 Key to public hospitals in report

Hospital	Births 2001 & 2002	Confinements 2001 & 2002	ID No
PUBLIC TOTAL		84,655	Public
PRIVATE TOTAL		37,151	Private
Mercy Hospital for Women	9945	9681	1
Royal Women's Hospital	9719	9448	2
Sunshine Hospital	5092	5032	3
Monash Medical Centre - Clayton	5048	4883	4
Dandenong Hospital	4534	4491	5
Angliss Health Service	4554	4489	6
Box Hill Hospital - Birralee	4254	4209	7
The Northern	3525	3490	8
Barwon Health - Geelong	3518	3460	9
Werribee Mercy Hospital	2955	2926	10
PHCN - Frankston	2942	2894	11
Wodonga District Hospital	2843	2797	12
Bendigo Health Care	2156	2127	13
Monash Medical Centre -	2127	2127	14
Ballarat Health Services	1934	1897	15
Latrobe Regional Hospital	1870	1847	16
Goulburn Valley Base Hospital	1791	1759	17
Sandringham District Hospital	1402	1391	18
Mildura Base Hospital	1229	1209	19
West Gippsland Hlth Care Grp	1159	1141	20
South West Health Care - Wbool	973	956	21
Northeast Health - Wangaratta	942	923	22
CGHS - Sale	913	891	23
Djerriwarrh Health Services	862	862	24
Williamstown Hospital	862	857	25
PHCN - Rosebud	813	813	26
Wimmera Health Care - Horsham	706	700	27
Echuca Regional Health Services	602	594	28
Bairnsdale Regional Health	581	580	29
Swan Hill District Hospital	539	535	30
GSHS - Leongatha	424	421	31
WDHS - Hamilton	384	384	32
Colac Area Health	377	376	33
Seymour District Memorial Hospital	363	363	34
Kyabram & District Health Services	332	332	35
Portland & District Hospital	333	331	36
Kilmore & District Hospital	316	316	37
Wonthaggi & District Hospital	277	277	38
Kyneton District Health Services	262	262	39
Benalla & District Memorial	258	258	40
Maryborough District Health	230	228	41
Healesville & District Hospital	225	225	42
Stawell District Hospital	210	210	43
EGHS-Ararat	197	196	44
Kerang & District Hospital	183	183	45
Timboon & District Hospital	150	150	46
South Gippsland Hospital-Foster	144	144	47
Yarrawonga District Hospital	143	143	48
Mt Alexander Hospital	136	136	49
Mansfield District Hospital	127	127	50
South West Hlth Sve-Camperdown	125	123	51
Cohuna District Hospital	120	119	52
Numurkah District Hlth Sve	117	117	53
Orbost Regional Health	92	92	54
WWHS-Nhill	70	70	55
Hepburn Health Service	63	63	56