

## Rates for obstetric intervention among private and public patients in Australia: population based descriptive study

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### Abstract

**Objective** To compare the risk profile of women receiving public and private obstetric care and to compare the rates of obstetric intervention among women at low risk in these groups.

**Design** Population based descriptive study.

**Setting** New South Wales, Australia.

**Subjects** All 171 157 women having a live baby during 1996 and 1997.

**Interventions** Epidural, augmentation or induction of labour, episiotomy, and births by forceps, vacuum, or caesarean section.

**Main outcome measures** Risk profile of public and private patients, intervention rates, and the accumulation of interventions by both patient and hospital classification (public or private).

**Results** Overall, the frequency of women classified as low risk was similar (48%) among those choosing private obstetric care and those receiving standard care in a public hospital. Among low risk women, rates of obstetric intervention were highest in private patients in private hospitals, lowest in public patients, and generally intermediate for private patients in public hospitals. Among primiparas at low risk, 34% of private patients in private hospitals had a forceps or vacuum delivery compared with 17% of public patients. For multiparas the rates were 8% and 3% respectively. Private patients were significantly more likely to have interventions before birth (epidural, induction or augmentation) but this alone did not account for the increased interventions at birth, particularly the high rates of instrumental births.

**Conclusions** Public patients have a lower chance of an instrumental delivery. Women should have equal access to quality maternity services, but information on the outcomes associated with the various models of care may influence their choices.

### Introduction

Caesarean sections have been widely scrutinised, without consideration of other obstetric interventions.<sup>1-4</sup> A recent Australian parliamentary inquiry, with a mandate to explore the differences between public and private care, heard repeated submissions that high caesarean rates in the private sector are probably because large numbers of women at high risk take out private health insurance for pregnancy care.<sup>4</sup> However, there

are no data to support this assertion and neither is there information about other obstetric interventions associated with medical insurance status. International comparisons show Australia to have among the highest rates for obstetric intervention; in 1996, 20% of women had caesarean sections and 11% had instrumental births.<sup>5-6</sup>

Australian maternity care has features of British and American systems; all women are covered by national health insurance, which provides free maternity care for patients in public hospitals (public patients), but about one third take out private medical insurance or pay for private obstetric care (private patients). For private patients, antenatal care is provided in private rooms by an obstetrician chosen by the woman, and delivery may be at either a private or a public hospital. Public patients receive antenatal care and birth care at public hospitals, and care is provided by rostered midwives, residents, registrars, and staff obstetricians. Women choose their care depending on their knowledge of what is available, whether or not they can meet the costs of private insurance or private care, and their proximity to services.<sup>7</sup>

We aimed to compare the risk profiles of women receiving public and private obstetric care and to compare the rates of obstetric intervention among women at low risk in these groups giving birth in New South Wales, Australia.

### Subjects and methods

The study population comprised women delivering a live infant in New South Wales from 1 January 1996 to 31 December 1997. Data were obtained from the NSW Midwives Data Collection, a population based surveillance system covering all births in New South Wales, which relies on midwives to record information on each birth.<sup>8-9</sup> We compared maternal demographic and clinical factors among public and private patients. Maternal factors available for analysis were age, parity, medical conditions (any or none reported, including pre-existing diabetes mellitus and essential hypertension), and obstetric complications (any or none reported, including antepartum haemorrhage, pregnancy induced hypertension, gestational diabetes, and rupture of membranes before labour). Type of labour was classified as spontaneous, augmented, induced, or none (caesarean section before labour). Augmented and induced labours were those where drugs were

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used to augment or induce labour. Other factors for management of labour were type of delivery (vaginal, vacuum, forceps, or caesarean section), epidural, episiotomy, and third degree tear. Infant factors available for analysis were presentation, multiple birth, gestational age, birth weight, birthweight percentile,<sup>10</sup> and Apgar score at five minutes.

We considered women to be at low risk of poor pregnancy outcome if they were aged 20-34 years with no medical or obstetric complications and a singleton of normal size (10th-90th birthweight percentile) presenting in the cephalic position and born at term (37-41 weeks' gestation). Primiparas (first birth at 20 weeks or more of gestation) were examined separately from multiparas (previous births) because of the significant impact of the care and outcome of previous pregnancies on care in multiparous pregnancies.

We examined the rates of obstetric interventions among women at low risk for three patient and hospital groups: private patients giving birth in private hospitals, private patients giving birth in public hospitals, and public patients giving birth in public hospitals. We examined a prespecified cascade effect of obstetric interventions by grouping them in chronological sequence—those interventions that occur during labour but before birth (epidural and induction or augmentation of labour) followed by those that occur at the time of birth (episiotomy and type of delivery). Induction and augmentation are grouped together for simplicity of presentation as the outcomes were similar after these interventions and because the intervention is similar for women and only differs in whether it occurs before or after labour has begun.

### Analysis

Associations between patient and hospital group and maternal, infant, and clinical factors were examined by contingency table analyses. Because of the large number of births and statistical comparisons made, the significance level for all statistical testing was set at  $P < 0.01$ . As the age distribution differed among private and public women at low risk, we calculated age adjusted intervention rates by direct standardisation, with the pooled low risk population as the standard. The probabilities of interventions are presented as age adjusted rates per 100 women for each of four subgroups of labour management before birth. The absolute probability of each end point can be obtained by multiplying the end point probability for the subgroup by the probability for the entire subgroup. Analyses were conducted with SAS through the New South Wales health department's Health Outcomes Information and Statistical Toolkit (HOIST) data warehouse system.

### Results

Of 171 157 livebirths, we excluded 95 without a public or private classification recorded and 356 home births. Of the remaining 170 706 women, 31.6% (53 947 women) were private patients and 68.4% (116 759) were public patients. Private patients were more likely to be older, have lower parity, be without medical or obstetric complications, and have non-cephalic presenting infants and twin pregnancies, and their infants were likely to be heavier (table 1). Although these

**Table 1** Frequency (%) of maternal and infant characteristics

Pregnancy and infant characteristics†	Patient classification	
	Private (n=53 947)*	Public (n=116 759)*
<b>Maternal age (years)</b>		
<20	0.5	7.1
20-34	77.6	80.9
≥35	21.9	12.1
<b>Parity</b>		
0	41.3	39.8
1-3	57.0	55.8
≥4	1.8	4.4
<b>Pre-existing medical condition</b>		
Yes	1.5	2.1
None reported	98.5	97.9
<b>Obstetric complication</b>		
Yes	12.8	16.0
None reported	87.2	84.0
<b>Hospital type</b>		
Private	53.0	2.0
Public	47.0	98.0
<b>Presentation</b>		
Cephalic	94.3	95.2
Breech	4.4	3.8
Other	0.6	0.7
<b>Plurality</b>		
Singleton	98.3	98.9
Twins	1.7	1.1
<b>Birthweight or gestational age percentile</b>		
0.0-9.9	7.8	11.6
10.0-24.9	13.2	15.9
25.0-75.0	51.1	49.4
75.1-90.0	16.3	13.8
90.1-100	11.7	9.2
<b>Birth weight (g)</b>		
<2500	4.1	5.4
2500-4499	94.1	92.8
≥4500	1.8	1.7
<b>Gestational age (weeks)</b>		
<37	5.5	5.9
37-41	92.8	91.2
≥42	1.7	2.9
<b>Low risk women</b>		
Primiparas	21.0	17.4
Multiparas	28.2	30.7

\*Percentages may not add up to 100 because of missing data.

†Distribution of these factors significantly ( $P < 0.001$ ) different between private and public patients using  $\chi^2$  tests.

differences were highly significant ( $P < 0.001$ ), the absolute magnitudes of many were small (table 1). Just under half of the women had pregnancies that were classified as low risk. Over half of private patients gave birth in private hospitals and this was true for both primiparas (58%) and multiparas (55%) at low risk. Among low risk primiparas, private patients in private hospitals were significantly more likely to have obstetric interventions compared with public patients and were less likely to have spontaneous onset of labour or a non-instrumental vaginal birth (table 2). For all interventions, the rates for private patients in public hospitals fell between those of private patients in private hospitals and public patients.

Table 3 shows the cascade effect of obstetric interventions among low risk primiparas. There was increasing intervention in the management of birth as interventions in labour accumulated (epidural, induction or augmentation). This is shown by an increasing gradient of intervention down the columns of the table

for all patient and hospital groups. Within each category for management of labour, however, there is also a gradient across the rows of the table, with lower instrumental delivery rates among public patients. Thus private patients were more likely to have interventions initiated during labour and were also more likely to have operative intervention at the time of birth. Notably, of all private primiparas at low risk in private hospitals only 18 per 100 women achieved a vaginal birth without any intervention compared with 28 per 100 private patients in public hospitals and 39 per 100 public patients. Among private patients with an epidural, the most likely birth outcome was an instrumental delivery with an episiotomy. Among similar public patients, the most likely outcome was a non-instrumental vaginal birth without episiotomy.

Intervention rates were generally lower among low risk multiparas, with the exception of caesarean sections before labour, which are likely to be due to repeat caesareans (table 4). As with primiparas, intervention rates for multiparas are highest among private patients in private hospitals and lowest in public patients, with intermediate rates for private patients in public hospitals (table 4). Among low risk multiparas, 39 per 100 private patients in private hospitals had a vaginal birth without any intervention compared with 51 per 100 private patients in public hospitals and 67 per 100 public patients (table 5). The patterns of increased intervention at birth associated with intervention during labour that were apparent for primiparas in private hospitals were also seen for multiparas (table 5). There were two exceptions. Firstly, among the relatively few multiparas with epidurals there were noticeably higher rates of caesarean section after labour in public patients in association with lower rates of instrumental deliveries, whereas the reverse was observed among private patients. Secondly, the use of augmentation or induction without epidural did not noticeably increase the probability of an instrumental birth.

## Discussion

### Study limitations

Overall, the proportions of women in public and private care who were classified as low risk were similar. Among low risk women, regardless of parity, private patients had higher age adjusted rates of instrumental delivery, especially after epidural. Our observation that epidurals begin a cascade of obstetric interventions leading to a low probability of a non-operative birth is consistent with trial evidence of this association.<sup>11</sup> Although much attention has been drawn to increases in rates of caesarean sections,<sup>1-5</sup> we found that in low risk primiparas high rates of operative vaginal births (including episiotomies, forceps, and vacuum deliveries) drive the overall intervention rates, not caesarean sections.

Our study does not have details on birth outcomes, such as duration of labour and neonatal death, nor the reasons for intervention, but its strength lies in the size and validity of the population database used.<sup>9</sup> The results, however, may not pertain to other populations with differing rates of private care, models of care, or maternal preference and knowledge of different types of care. Furthermore, a cross sectional study cannot establish cause and effect, although most components

**Table 2** Birth characteristics and outcomes among primiparas at low risk. Values are percentages

Birth characteristics and outcomes	Private patients		Public patients (all hospitals) (n=20 354)
	Private hospitals (n=6548)	Public hospitals (n=4798)	
Maternal age (years)*:			
20-24	10.6	16.3	40.6
25-29	48.9	47.0	40.0
30-34	40.6	36.7	19.3
Type of labour*:			
Spontaneous	47.0	54.1	63.8
Augmented	23.1	21.8	19.7
Induced	25.7	21.1	15.7
No labour	4.1	2.9	1.4
Delivery*:			
Vaginal	49.7	60.0	72.6
Forceps	22.5	15.0	10.5
Vacuum	11.4	11.1	6.8
Caesarean section before labour	4.1	2.9	1.5
Caesarean section after labour	12.3	10.9	8.5
Epidural*	50.8	35.2	25.1
Episiotomy*†	46.6	39.8	28.6
Third degree tear*†	1.4	1.8	2.3
Apgar score <7 at 5 minutes*	1.3	1.0	1.8

\*Distribution of these factors significantly different ( $P<0.001$ ) among three groups with  $\chi^2$  tests.

†Among vaginal births.

**Table 3** Age adjusted rates per 100 women for obstetric intervention among primiparas at low risk

Labour management before birth		Private patients		Public patients (all hospitals) (n=20 354)
		Private hospitals (n=6548)	Public hospitals (n=4798)	
No epidural, no induction*	No episiotomy			
	Vaginal birth	55.5	63.5	71.4
	Forceps or vacuum	3.9	4.4	3.1
	Episiotomy			
	Vaginal birth	21.3	18.8	14.6
	Forceps or vacuum	15.9	10.1	7.9
	Caesarean section after labour	3.4	3.3	3.1
Subgroup rate		32.5	44.0	54.0
No epidural, induction*	No episiotomy			
	Vaginal birth	45.7	45.1	56.4
	Forceps or vacuum	6.0	5.1	4.3
	Episiotomy			
	Vaginal birth	22.3	22.7	16.8
	Forceps or vacuum	16.7	16.8	14.3
	Caesarean section after labour	9.3	10.4	8.2
Subgroup rate		17.8	20.6	9.1
Epidural, no induction*	No episiotomy			
	Vaginal birth	27.8	31.7	37.8
	Forceps or vacuum	15.7	15.3	8.3
	Episiotomy			
	Vaginal birth	7.2	7.5	9.5
	Forceps or vacuum	33.8	29.6	27.4
	Caesarean section after labour	15.6	16.5	17.0
Subgroup rate		15.2	11.0	19.0
Epidural, induction*	No episiotomy			
	Vaginal birth	24.5	26.2	34.1
	Forceps or vacuum	14.7	12.4	9.5
	Episiotomy			
	Vaginal birth	9.0	9.4	6.7
	Forceps or vacuum	32.3	29.7	24.4
	Caesarean section after labour	19.5	22.3	25.3
Subgroup rate		31.0	21.7	16.3
Rate for caesarean section before labour		3.4	2.7	1.6

\*Induction includes both induction and augmentation of labour with oxytocics or other measures (for example, Foley's catheter) with or without artificial rupture of membranes, but does not include augmentation or induction with artificial rupture of membranes alone.

**Table 4** Birth characteristics and outcomes among multiparas at low risk. Values are percentages

Birth characteristics and outcome	Private patients		Public patients (all hospitals) (n=35 825)
	Private hospitals (n=8439)	Public hospitals (n=6775)	
Maternal age (years)*:			
20-24	3.5	5.3	22.7
25-29	34.5	36.2	41.7
30-34	61.9	58.5	35.6
Type of labour*:			
Spontaneous	55.3	64.3	76.8
Augmented	7.2	6.6	4.8
Induced	22.9	18.9	12.9
No labour	14.5	10.2	6.5
Delivery*:			
Vaginal	74.3	80.8	88.0
Forceps	4.2	2.4	1.3
Vacuum	3.4	3.1	1.3
Caesarean section before labour	14.5	10.2	6.5
Caesarean section after labour	3.5	3.3	2.9
Epidural*	31.3	16.8	9.2
Episiotomy†	19.2	14.6	7.0
Third degree tear†	0.2	0.3	0.9
Apgar score <7 at 5 minutes*	0.8	0.6	0.9

\*Distribution of these factors significantly ( $P<0.001$ ) different among three groups with  $\chi^2$  tests.

†Among vaginal births.

**Table 5** Age adjusted rates per 100 women for obstetric intervention among multiparas at low risk

Labour management before birth	Management at birth	Private patients		Public patients (all hospitals) (n=35 825)
		Private hospitals (n=8439)	Public hospitals (n=6775)	
No epidural, no induction*	No episiotomy			
	Vaginal birth	82.5	85.8	92.0
	Forceps or vacuum	1.6	1.9	0.8
	Episiotomy			
	Vaginal birth	11.9	9.5	4.9
	Forceps or vacuum	1.3	1.3	0.7
No epidural, induction*	Caesarean section after labour	2.7	1.5	1.6
	<b>Subgroup rate</b>	<b>47.6</b>	<b>59.8</b>	<b>72.4</b>
No epidural, induction*	No episiotomy			
	Vaginal birth	79.3	80.0	87.9
	Forceps or vacuum	1.5	2.1	1.3
	Episiotomy			
	Vaginal birth	15.5	14.2	6.3
	Forceps or vacuum	1.9	1.6	1.5
Epidural, no induction*	Caesarean section after labour	1.8	2.1	3.0
	<b>Subgroup rate</b>	<b>19.9</b>	<b>20.1</b>	<b>14.9</b>
Epidural, no induction*	No episiotomy			
	Vaginal birth	51.4	52.9	61.0
	Forceps or vacuum	10.4	15.8	5.2
	Episiotomy			
	Vaginal birth	11.5	7.9	3.8
	Forceps or vacuum	11.2	9.7	8.2
Epidural, induction*	Caesarean section after labour	15.4	13.7	21.8
	<b>Subgroup rate</b>	<b>8.1</b>	<b>5.9</b>	<b>3.4</b>
Epidural, induction*	No episiotomy			
	Vaginal birth	55.2	64.4	62.3
	Forceps or vacuum	13.7	7.1	9.2
	Episiotomy			
	Vaginal birth	14.0	11.6	5.3
	Forceps or vacuum	8.9	8.9	8.0
Rate for caesarean section before labour	Caesarean section after labour	8.2	8.0	15.2
	<b>Subgroup rate</b>	<b>11.2</b>	<b>5.1</b>	<b>3.0</b>
Rate for caesarean section before labour		13.0	9.1	6.3

\*Induction includes both induction and augmentation of labour with oxytocics or other measures (for example, Foley's catheter) with or without artificial rupture of membranes, but does not include augmentation or induction with artificial rupture of membranes alone.

of the intervention cascade have been examined in randomised trials and systematic reviews.<sup>11-16</sup>

### Instrumental births

High rates of instrumental deliveries are not associated with improved perinatal outcomes but are associated with increased risks for mothers.<sup>5 17</sup> Although forceps and vacuum deliveries are associated with some adverse neonatal outcomes, long term follow up of infants suggests no adverse physical, cognitive, or visual impairment.<sup>12 18</sup> For women, however, instrumental deliveries are associated with an increased risk of vaginal or perineal trauma and damage to the anal sphincter resulting in urinary incontinence and bowel and sexual problems.<sup>12 19 20</sup> Population estimates for these outcomes at 6-7 months postpartum for women who have had instrumental births are 54% for perineal pain, 18% for urinary incontinence, 19% for bowel problems, 36% for haemorrhoids, and 39% for sexual problems.<sup>19</sup> Studies with sufficiently long follow up, including the need for surgical repair later in life, are required to properly evaluate the association between instrumental deliveries and such outcomes.

### Private and public obstetric care

Whereas a rate of intervention that is appropriate or reasonable is unknown, there are no obvious clinical reasons for intervention rates to be higher in private than in public patients. The women with low risk pregnancies in our study may include a few women with additional risk factors, but their numbers are likely to be small, with little influence on the overall results. Again, most research pertains to caesarean sections, but high rates in the private sector have been linked to fear of litigation, financial reward, time pressures, and widespread use of electronic fetal monitoring and epidurals.<sup>2 21 22</sup> Fisher et al found that, in addition to private insurance, women who are well educated, assured, and have mature personalities are at increased risk of obstetric intervention.<sup>21</sup> Whereas this may be due to fear of malpractice if these women are perceived as potential litigants,<sup>21</sup> it is not clear how or why the personality of a patient influences the use of interventions. If women pay more they may expect more.<sup>22</sup> Certainly they will expect their private obstetrician to attend the birth and may expect greater access to some interventions—for example, epidural anaesthesia, caesarean section. Although there was no direct financial incentive for instrumental birth in Australia, there might be gains in efficiencies if intervention is less disruptive to the schedule of an obstetrician.<sup>22</sup> Practical factors such as ensuring women deliver at times when labour wards and operating theatres are well staffed may be more important in private hospitals. The intermediate intervention rates for private patients in public hospitals, where care is augmented by salaried doctors, supports the hypotheses that time and practical factors contribute to variation in intervention rates.

Satisfaction with maternity care is associated with involvement in decision making and provision of adequate information about the relative harms and benefits of procedures before they are carried out.<sup>1 2 23 24</sup> Women want involvement in decision making about their obstetric care, and obstetric emergencies do not necessarily deny women this involvement.<sup>1 2 23</sup> Women who choose their obstetric care based



## What is already known on this topic

Rates of caesarean section vary internationally, prompting debate on what rate is appropriate for quality maternity care

Little attention has been paid to other obstetric interventions such as epidurals, episiotomies, and instrumental births

Instrumental births can have long term adverse consequences

## What this study adds

In Australia, where 31% of women choose private obstetric care, women with high risk pregnancies did not disproportionately seek private care

Among women at low risk of poor pregnancy outcome, rates of obstetric intervention were highest for private patients in private hospitals, lowest in public patients, and intermediate in private patients in public hospitals

Higher rates of obstetric intervention in the private sector were due to instrumental deliveries rather than to caesarean sections

on perceived access to pain relief may not be aware of the possible consequences of such a choice. There is evidence that support from caregivers reduces the need for analgesia in women in labour, as may movement of the woman and choice of position.<sup>13-25</sup> More emphasis on efficacious interventions may reduce the need for epidurals thereby reducing the potential for a cascade of obstetric interventions. The impact of labour interventions that reduce a woman's freedom to walk around should not be underestimated; women value this freedom, and it may be beneficial in reducing labour pains.<sup>24-25</sup> Further, early augmentation of nulliparous women with mild delays in the progress of labour does not seem to provide a benefit over a more conservative form of management.<sup>14</sup> Whereas information alone will not alter the rates of operative births,<sup>1</sup> intervention rates associated with various care options could be used in a dialogue between women with their chosen carer about their likely birthing experience. The impact of such a strategy should be properly evaluated before implementation.

In conclusion, private patients had higher rates of intervention at birth than did public patients. In women with low risk pregnancies most of this difference was due to higher rates of instrumental deliveries rather than caesarean sections. Women should have equal access to quality maternity services, but information on the outcomes associated with the various models of care may influence their choices.

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## Endpiece Still a chance

If people could be persuaded to read and write, not just to eat and make love, there was still a chance that they might come to reason.

T H White, *The Once and Future King*.  
London: Voyager, 1996.