



**Queensland  
Government**

## Labour and delivery characteristics associated with primary postpartum haemorrhage, Queensland, 2008

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Postpartum haemorrhage (PPH) is a major cause of maternal morbidity and mortality. Nearly one quarter of all maternal deaths worldwide are attributable to PPH<sup>1</sup>.

Clinically, the most common cause of PPH is uterine atony (i.e. loss of uterine muscle tone)<sup>2</sup>. Several factors during labour and delivery can contribute to uterine atony, including uterine over-distension and length of labour. Uterine over-distension contributes to uterine atony due to the stretching of uterine fibres, particularly for macrosomic babies ( $\geq 4000\text{g}$ ) and multiple pregnancies. In addition, larger babies (and multiple pregnancies) are associated with larger placental masses (usually weighing one sixth of the baby's birth weight), and larger placental separation sites, which may also increase the likelihood of a PPH.

The uterine muscle may also become exhausted after a prolonged first stage of labour or from a dysfunctional labour pattern. This can adversely affect uterine muscle tone and ability to contract, resulting in ineffective clamping of blood vessels and PPH<sup>3</sup>. Induction of labour may also be associated with a prolonged first stage of labour, and thereby PPH<sup>4</sup>. Perineal, vaginal or cervical lacerations can increase the risk of PPH, and are more common with instrumental births.

This study investigates the incidence rates of primary PPH by estimated volume (500-999 ml or  $\geq 1000$  ml [severe]) and method of onset of labour, method of delivery, length of first stage of labour and birth weight for all singleton births in Queensland in 2008.

Of the 59,270 singleton births in Queensland in 2008, 16 were excluded due to an unknown PPH volume (8) or an unknown value for one of labour onset, delivery method or birth weight (8). Of the remaining 59,254 births, 47,531 (80.2%) involved labour. Analysis of the length of the first stage of labour excluded 196 mothers (0.4%) for whom the length of the first stage was unknown. The number of births in each category of the outcomes analysed is given in Table 1.

PPH rates varied by birth method (figure 1). Vaginal births had higher rates of PPH than caesarean births, with the highest rates occurring in instrumental, vaginal births (7.7%). Among caesarean births, PPH rates were lowest when no labour occurred prior to the caesarean (3.0%). However, despite the overall lower rates of PPH among caesarean births, those PPHs that did occur were 65% more likely to be severe than those occurring in vaginal births (RR 1.65; 95% CI 1.49-1.84).

Rates of PPH were significantly higher among mothers who had induced labour than those who entered labour spontaneously regardless of birth method (figure 2; RR [95% CI]: vaginal 1.16 [1.06-1.26]; caesarean 1.24 [1.01-1.55]). Caesarean births without labour were 44% less likely to result in PPH than spontaneous

**Table 1. Distribution of outcome variables, singletons, Queensland, 2008**

Outcome	No. Births	Percent
<b>Postpartum haemorrhage</b>		
No PPH	56,326	95.1
PPH 500-999 ml	2,010	3.4
PPH $\geq 1000$ ml	918	1.5
<b>Labour onset</b>		
Spontaneous labour	34,054	57.5
Induced	13,477	22.7
No labour (caesarean)	11,723	19.8
<b>Birth Method</b>		
Vaginal, non-instrumental	34,543	58.3
Vaginal, instrumental	5,399	9.1
Caesarean with labour	7,589	12.8
Caesarean without labour	11,723	19.8

Outcome	No. Births	Percent
<b>Length of labour -first stage (hrs)</b>		
<5	23,990	50.7
5-<9	14,224	30.0
9-<13	5,950	12.6
$\geq 13$	3,171	6.7
<b>Birth weight (g)</b>		
<2500g	3,027	5.1
2500-2999g	7,906	13.3
3000-3499g	21,185	35.8
3500-3999g	19,307	32.6
$\geq 4000\text{g}$	7,829	13.2

Source: Queensland Perinatal Data Collection

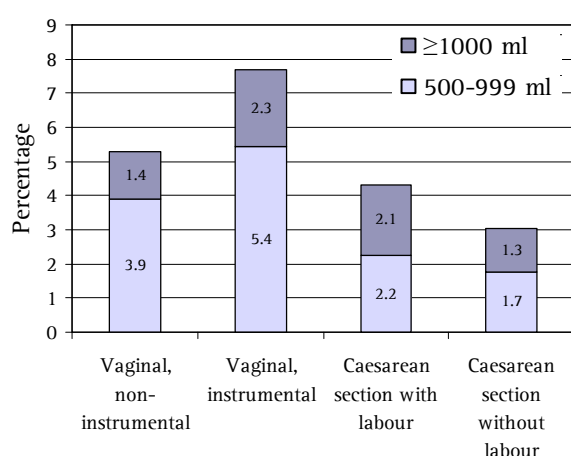
vaginal labours (RR 0.56; 95% CI 0.50-0.63).

Among vaginal births, an increasing length of the first stage of labour was associated with increasing rates of PPH (figure 3). The pattern was quite different for labours proceeding to caesarean sections with similar PPH rates across increasing labour lengths.

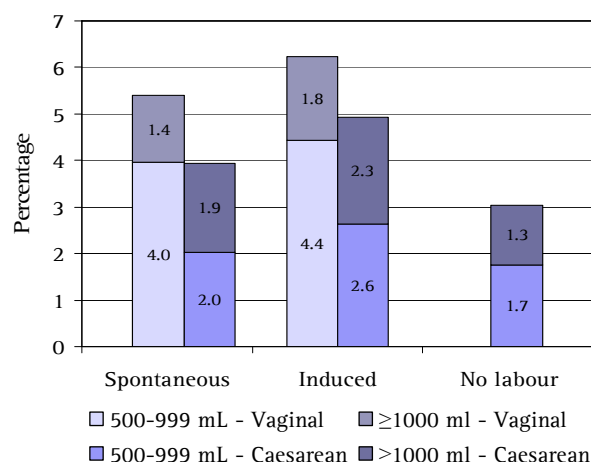
There were variations in PPH rates according to birth weight (figure 4). The highest rates of PPH among both vaginal and caesarean singleton births were observed for macrosomic babies (9.5% and 6.0% respectively).

There are many factors in labour and birth that contribute to a mother's risk of PPH. In Queensland, caesarean births were associated with more severe PPHs than vaginal births but lower rates of PPH overall. The reasons for these lower rates are unclear, but may be due to the different uterotonic regimens generally associated with caesarean section and the more direct observation of placental bed blood loss. Method of labour onset and birth weight showed similar trends in PPH for vaginal and caesarean births.

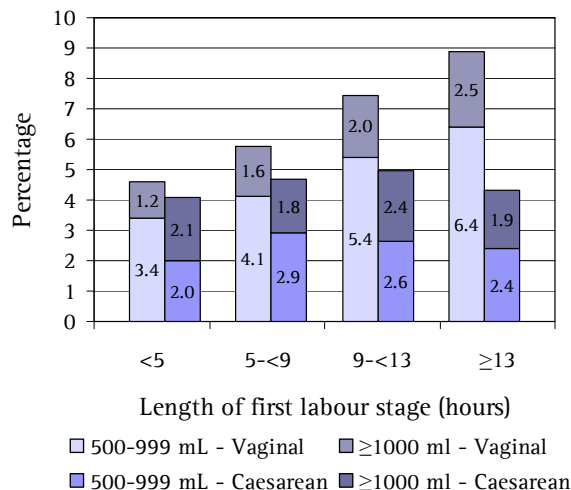
**Figure 1. Proportion of singleton births resulting in PPH by birth method, Queensland, 2008**



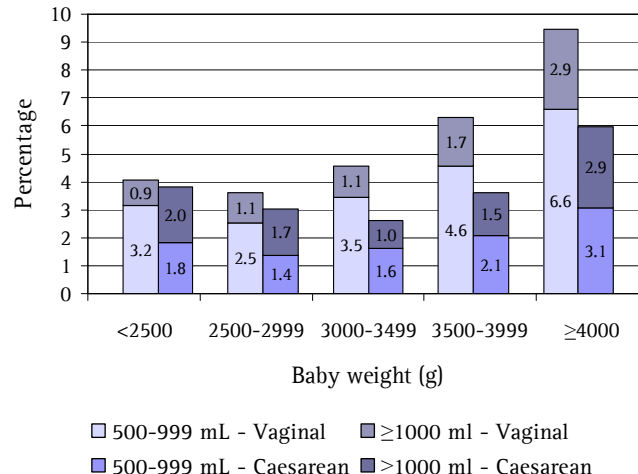
**Figure 2. Proportion of singleton births resulting in PPH by onset of labour and birth method, Queensland, 2008**



**Figure 3. Proportion of singleton births resulting in PPH by length of first stage of labour, Queensland, 2008**



**Figure 4. Proportion of singleton births resulting in PPH by birth weight and birth method, Queensland, 2008**



## Acknowledgements

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## References

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