



Determinants of caesarean section in Queensland, 1997-2006

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The Robson Ten Group Classification System (TGCS) was developed with the aim of identifying prospectively, clinically relevant groups of women who experience different caesarean section (CS) rates. Its main purpose is to identify contributors to the current CS rate and to facilitate comparisons of CS rates across settings and time.

The TGCS classifies CS births based on characteristics of the individual woman and her pregnancy rather than the indication for the CS. Ten mutually-exclusive groups are based on obstetric concepts - previous obstetric history, type of pregnancy (singleton versus multiple), the course of labour and delivery and gestational length of the pregnancy. The ten groups are as follows:

1. Nulliparous^a, single cephalic, 37+ weeks gestation at birth, spontaneous labour
2. Nulliparous, single cephalic, 37+ weeks gestation at birth, induced or CS before labour
3. Multiparous^b, single cephalic, 37+ weeks gestation at birth, spontaneous labour, no previous CS
4. Multiparous, single cephalic, 37+ weeks gestation at birth, induced or CS before labour, no previous CS
5. Previous CS, single cephalic, 37+ weeks
6. All nulliparous breeches
7. All multiparous breeches, including previous CS
8. All multiple pregnancies, including previous CS
9. All abnormal lies, including previous CS
10. All single cephalic births less than 37 weeks gestation, including previous CS

The TGCS was recently applied to data from the Queensland Perinatal Data collection (2006) to describe the characteristics of women delivering by caesarean section in this state. The findings were compared to those reported from an earlier study at the Royal Women's Hospital (RWH), a public hospital in Melbourne (1).

The overall CS rate was similar in public patients (public beds in public facilities) in Queensland to that in the RWH (26.9% vs 28.3%) but much higher in private patients (private facilities and private beds in public facilities) in Queensland (48.0%). Most births occurred in group 3 (Table 1: 26.0%)

Table 1. Ten Group Classification System (TGCS) group size for Queensland public and private patients, 2006 and the RWH in Melbourne, 2005

TGCS Group	Number of births in QH PDC 2006				Relative size of group (%)		
	Public		Private		QH PDC 2006		RWH Melb
	CS	Total	CS	Total	Public	Private	2005
1	1307	8289	717	3111	22.0	16.4	27.0
2	1609	4091	2207	3613	10.8	19.0	13.7
3	292	11788	93	2949	31.2	15.6	25.6
4	680	4075	507	2848	10.8	15.0	8.5
5	3430	4422	3325	3586	11.8	18.8	9.1
6	600	664	495	510	1.8	2.6	2.2
7	623	722	377	392	2.0	2.0	1.8
8	672	1018	798	936	2.8	5.0	2.0
9	173	216	87	102	0.6	0.6	0.3
10	762	2379	511	938	6.4	5.0	8.2
Total	10148	37664	9117	18985	100.0	100.0	100.0

and this group had the lowest CS rate (Table 2). The main groups contributing to the CS rate in Queensland and at the RWH were nulliparous women with term, single, cephalic births who were induced or had a CS before labour (group 2) and women who had previously delivered by CS (group 5). There was a higher proportion of births in group 5 in both public (11.8%) and private (18.8%) patients in Queensland than occurred at the RWH (9.1%). Within that group there was a much higher CS rate in private patients in Queensland than in public patients or at the RWH (Table 2).

Table 2. Caesarean section (CS) rates and contribution to the CS rate by Ten Group Classification System (TGCS) group for Queensland public and private patients, 2006 and the RWH in Melbourne, 2005

TGCS Group	CS rate within each group (%)			Proportion of all CS births (%)			Contribution to overall CS rate (%)		
	QHPDC Public	QHPDC Private	RWH Melb	QHPDC Public	QHPDC Private	RWH Melb	QHPDC Public	QHPDC Private	RWH Melb
	2006	2006	2005	2006	2006	2005	2006	2006	2005
1	15.8	23.0	15.4	12.8	7.8	14.8	3.4	3.8	4.2
2	39.4	61.0	42.6	15.8	24.2	20.6	4.2	11.6	5.8
3	2.4	3.2	3.7	2.8	1.0	3.2	0.8	0.4	0.9
4	16.6	17.8	23.1	6.8	5.6	7.1	1.8	2.6	2.0
5	77.6	92.8	77.0	33.8	36.4	24.8	9.2	17.6	7.0
6	90.4	97.0	86.8	6.0	5.4	6.7	1.6	2.6	1.9
7	86.2	96.2	78.3	6.2	4.2	5.0	1.6	2.0	1.4
8	66.0	85.2	62.6	6.6	8.8	6.7	1.8	4.2	1.9
9	80.0	85.2	100.0	1.8	1.0	1.1	0.4	0.4	0.3
10	32.0	54.4	34.7	7.6	5.6	10.0	2.0	2.6	2.8
Total	26.9	48.0	28.3	100.0	100.0	100.0	26.9	48.0	28.3

Trends^c in the CS rate in each group were examined, by sector (Figures 1 and 2). This analysis showed:

- The CS rate has increased by 4-5% per year in nulliparous women with uncomplicated pregnancies (term, single, cephalic, spontaneous labour) (group 1) in both public and private patients. This group makes up approximately 20% of all births (table 1) so the increase to 15.8% deliveries via CS in public and 23.0% in private patients reflects a substantial change in practice compared with 10 years ago.
- The CS rate has increased by 4-6% per year in both nulliparous and multiparous women with term, single, cephalic pregnancies who were induced or had a CS before labour (groups 2 and 4) in public and private patients. These groups are fairly heterogeneous containing both inductions of labour and CS prior to labour so it is not clear what these increases indicate. Of interest, however, is the much lower CS rate in the multiparous women who have previously delivered vaginally (approximately 17% in both public and private patients in 2006) compared with the nulliparous women (39.4% in public and 61.0% in private patients in 2006). This suggests that birth experience has a strong impact on delivery method. These groups make up approximately one quarter of all deliveries so practices in these groups have a major impact on the overall CS rate.
- There is a very low CS rate in multiparous women with uncomplicated pregnancies (term, single, cephalic, spontaneous labour) who had previously delivered vaginally (group 3) which increased only slightly since 1997 in both public and private patients.
- Women who had previously delivered via CS with term, single, cephalic pregnancies (group 5) are a major contributor to the CS rate and make up 14.1% of all births. There is a very high CS rate in this group (77.6% in public and 92.8% in private patients in 2006) and there has been an increase in the CS rate in this group since 1997 of approximately 2% per year in both public and private patients.
- There has been little change in CS rates for groups where there was evidence for the use of CS already widely accepted by 1997 (breeches and abnormal lies (groups 6, 7 and 9)) (2-4).
- Use of CS for multiple births (group 8) has increased in public and private patients by approximately 4% per year since 1997 from 52.4% to 66.0% in public and from 61.0% to 85.2% in private patients. This may be related to increased evidence for CS in this group during the past decade (5).

- Use of CS in preterm births (group 10) has increased by approximately 3% per year over the past decade in public and private patients from 27.0% to 32.0% in public and from 38.6% to 54.4% in private patients.

Figure 1: Trends in caesarean section rates by TGCS Group: Public patients in Queensland (1997-2006)

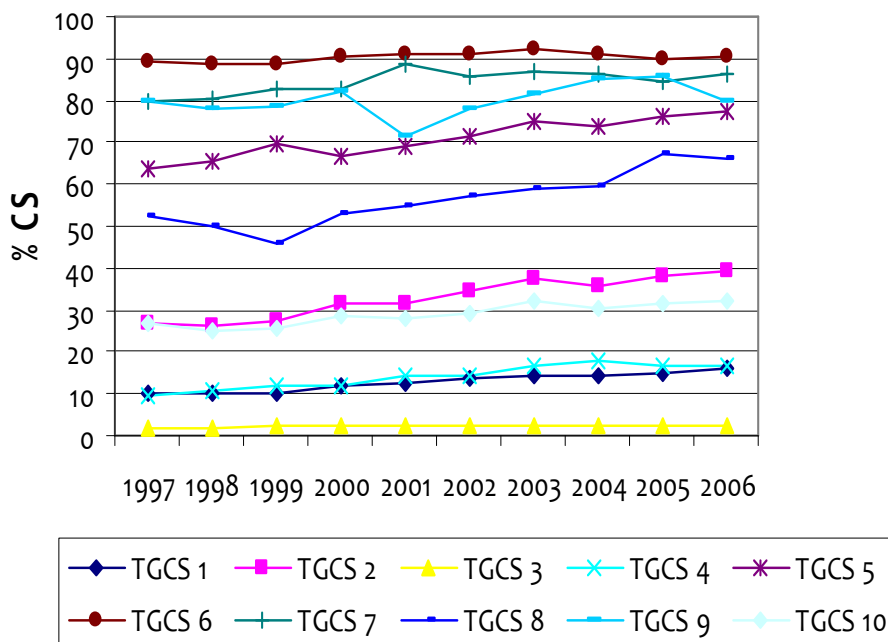
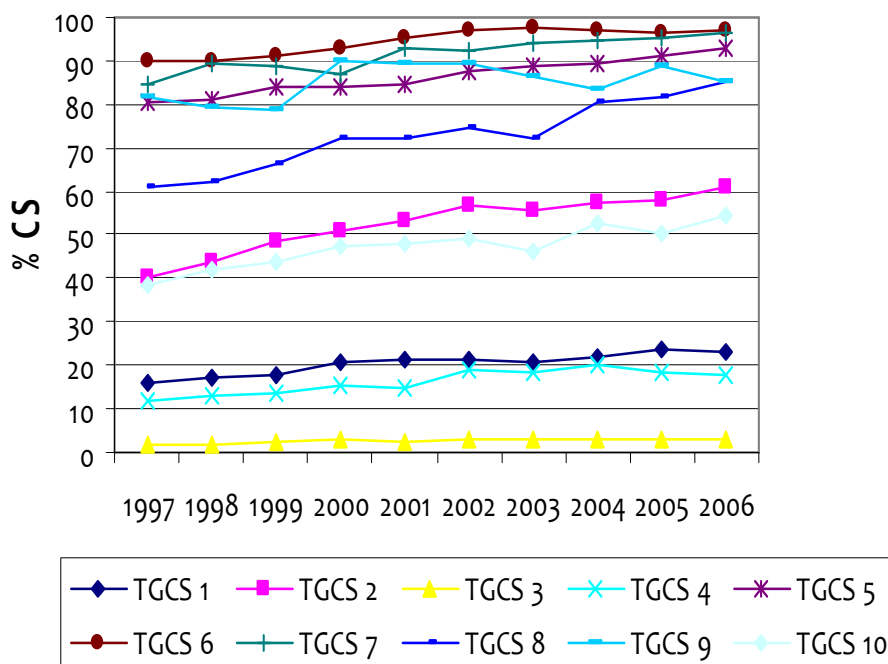


Figure 2: Trends in caesarean section rates by TGCS Group: Private patients in Queensland (1997-2006)



A potential limitation of this classification system is the loss of information resulting from combining women whose labour was induced and those who had a CS prior to the onset of labour in groups 2 and 4. Table 3 shows the size of groups and contribution to the CS rate in public and private facilities when these groups are split. This split shows that the CS rate is similar in public and private hospitals among both nulliparous and multiparous women whose labour is induced, and again shows a difference in CS rate among women who are induced due to birth experience: the CS rate among nulliparous women who are induced is around 30% compared with around 5% in multiparous women. This split also highlights the large number of CS births with no labour in nulliparous private patients with term, single, cephalic pregnancies: this group accounts for 8% of CS in private patients which is second only to those with previous CS (group 5 which accounts for 17.6% of all CS).

Table 3. Group size, caesarean section (CS) rates and contribution to the CS rate for groups 2 and 4 when split into induced and no labour subgroups for Queensland public and private patients, 2006

TGCS Group	Number of births				CS rate within each group (%)		Proportion of all CS births (%)		Contribution to overall CS rate (%)	
	Public		Private		Public	Private	Public	Private	Public	Private
	CS	Total	CS	Total						
2 Induced	1162	3644	695	2101	31.8	33.0	11.4	7.6	3.0	3.6
2 No labour	447	447	1512	1512	100.0	100.0	4.4	16.6	1.2	8.0
4 Induced	223	3618	101	2442	6.2	4.2	2.2	1.2	0.6	0.6
4 No labour	457	457	406	406	100.0	100.0	4.6	4.4	1.2	2.2

In summary, the groups with the most impact on the increasing CS rate are nulliparous women with uncomplicated pregnancies (term, single, cephalic) (groups 1 and 2) and those women who have had a previous CS (group 5). It is not possible to comment on the medical appropriateness of these CSs. However, the increasing practice of delivering via CS in uncomplicated first births combined with a low rate of vaginal births for subsequent deliveries (VBAC) can only result in further acceleration in the increase in the CS rate.

^a Nulliparous: of, relating to, or being a female that has not borne offspring

^b Multiparous: having experienced one or more previous births

^c Trend analysis was conducted using binomial regression. Change described is the relative change per year.

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