Impact of time of delivery on perinatal outcomes in Queensland

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Several international studies have found higher rates of adverse neonatal outcomes such as neonatal death (within 28 days of birth) and intrapartum death (death during delivery) for babies born on the weekend or during the night[1-4]. Several methodological limitations in these studies make it difficult to determine whether the difference is attributable to decreased quality of care or more complicated births taking place at night or during the weekend.

Table 1. Distribution of singleton vaginal and caesarean deliveries by day and time, Queensland, 2000-2007

		Vaginal	Caesarean
Weekday	Number	216,454	105,471
	Average/day	103.8	50.6
Weekend	Number	67,130	15,055
	Average/day	80.4	18.0
Day	Number	172,507	99,103
	Average/hour	4.2	2.4
Night	Number	111,077	21,423
	Average/hour	3.8	0.7

The impact of time of delivery on neonatal and intrapartum deaths was investigated in Queensland perinatal data. To avoid limitations identified in previous studies, we included only singleton babies delivered vaginally. Caesarean births were excluded because the risk level of the procedure is likely to be highly related to when the procedure is done. That is, it is more likely that lower risk elective caesareans would take place during the day and during the week since these procedures are booked to fit in with specialist and hospital schedules. Since it is difficult to distinguish between elective and emergency caesarean sections in the Queensland data, we were not able to control for this important confounder so we excluded all caesarean births. We also excluded births that did not occur in hospital or that involved a 'termination of pregnancy' procedure. All analyses were adjusted for risk level of the mother and of the birth. Night was defined as the period from 9:00pm through until 6:59am (inclusive).

Differences in rates of vaginal and caesarean births by time of delivery for all singleton births in Queensland are described in Table 1.

In the singleton, vaginal cohort, babies born on weekends or during the night had significantly lower odds of delivery by an obstetrician than at other times of the week (adj OR (95% CI); weekend: 0.93 (0.90-0.97); night: 0.76 (0.73-0.78)).

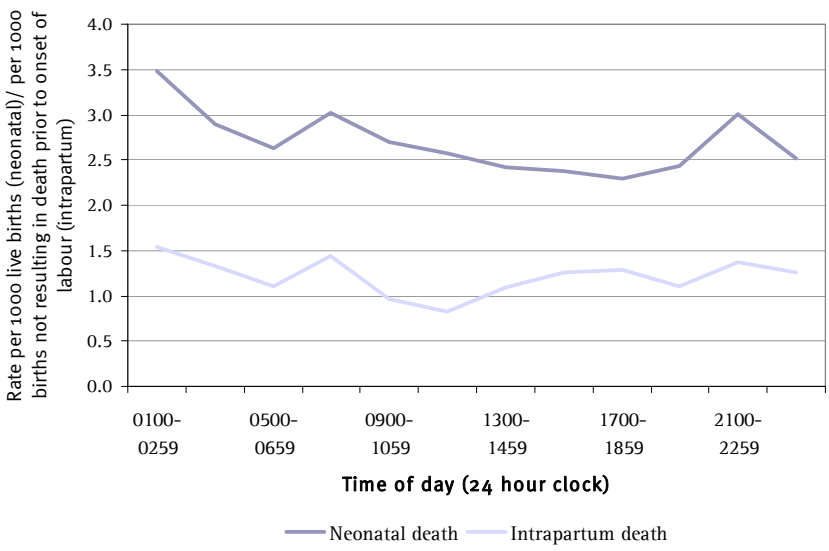
Babies who were delivered on the weekend had similar rates of intrapartum death and only slightly higher rates of neonatal death than babies born on weekdays (Table 2). These differences remained non-significant after adjusting for differences in the demographic profiles of mother and baby, medical conditions and pregnancy complications (Table 3).

Table 2. Rates of neonatal death, intrapartum death and induction of labour by time of delivery, Selected births, Queensland, 2000-2007

		Weekday	Weekend	Day	Night
Neonatal death	Number (Rate per 1000 live births)	554 (2.59)	196 (2.95)	431 (2.52)	319 (2.91)
Intrapartum death	Number (Rate per 1000 births alive at labour onset)	247 (1.15)	92 (1.38)	194 (1.13)	145 (1.32)
Induction of labour	Number (Percentage)	69,123 (32.1)	11,201 (16.8)	56,905 (33.1)	23,419 (21.2)

Unadjusted rates of neonatal death bordered on being significantly higher for babies delivered during the night than during the day (Table 2, odds ratios not shown). Figure 1 shows the change in death rates during the course of the day. Death rates were highest at 1:00-2:59am and lowest at 11:00am-12:59pm for intrapartum and 5:00-6:59pm for neonatal deaths. After adjusting for differences in case mix, the differences in odds of neonatal death at night were not statistically significant (Table 3). Odds of intrapartum death rates during both nights and weekends were estimated to be 14% higher than during weekdays and day-times but these increases were not significant at the 95% level. Almost ten percent of all fetal deaths were unrecorded as to whether they were antepartum or intrapartum. If this ascertainment was improved, a clearer estimate of intrapartum death rates could be obtained.

Figure 1. Unadjusted neonatal and intrapartum death rates by time of day of delivery, Selected births, Queensland, 2000-2007



Differences in rates of early neonatal death (within 7 days of birth) for babies born at weekends and night times were similar to those for all neonatal deaths.

Induction of labour was significantly less likely to occur during weekends and the night than at other times (Table 2, 3). This probably reflects the practice of booking mothers into hospital to have inductions at a pre-specified time if the baby is not born by a specific date.

After adjusting for case-mix, neonatal death rates and intrapartum death rates in Queensland did not indicate significant decreases in quality of care during weekends or at night, despite significant differences in principal accoucheur. However, improved estimates of intrapartum death rates could be obtained if the quality of data reported was improved.

Table 3. Adjusted odds ratios for neonatal death, intrapartum death and induction of labour for weekend and night-time births, Selected births, Queensland, 2000-2007

		Weekend (vs. weekday)	Night (vs. day)
Neonatal death	Adjusted OR (95% CI)	0.94 (0.79, 1.12)	1.04 (0.89, 1.20)
Intrapartum death	Adjusted OR (95% CI)	1.14 (0.88, 1.47)	1.14 (0.90, 1.43)
Induction of labour	Adjusted OR (95% CI)	0.43 (0.42, 0.44)	0.56 (0.55, 0.57)

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