Impact of private health insurance incentives on obstetric outcomes in NSW hospitals

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Abstract

The purpose of this study is to analyse the impact of changes in Australian private health insurance coverage as seen in NSW public and private hospital birth profiles, and identify trends in obstetric outcomes from 1997-2001. NSW Midwives Data Collection unit record data is analysed for women who gave birth to a live singleton baby of term gestation (≥37weeks) and cephalic presentation in NSW hospitals during 1997 – 2001. Use of private hospitals for childbirth has increased in conjunction with increases in private health insurance coverage. Although some obstetric interventions have increased for both public and private hospitals over time, clinical factors do not explain the large differences in birth interventions and outcomes between NSW public and private hospitals. Incentives to increase private health insurance coverage appear to be having a negative impact on childbirth, in terms of higher birth intervention and operative birth rates in NSW private hospitals.

Recent Health Insurance Incentives in Australia

From 1 July 1997, the Federal government introduced the first of what became a series of three major incentives with the aim of increasing rates of subscription to private health insurance. Incentives included means tested subsidies and tax surcharges, a 30 percent rebate on premiums and Lifetime Health Cover (LHC) (Butler 2002, Shorten and Shorten 2002). A recent figure of 3,146,000 persons covered is almost one million persons higher than the December 1996 figure of 2,200,000 (Private Health Insurance Administration Council (PHIAC) 2003). This suggests that due to the policy changes many more Australians will be using private hospitals. It is implicit in these incentives that Australians can expect health outcomes in private hospitals to be at least equivalent to public hospitals in terms of safety and quality.

Women using private health insurance for pregnancy, however, may be unaware that in doing so, they are increasing their likelihood of experiencing interventions such as caesarean section, induction of labour, instrumental birth and episiotomy (Shorten & Shorten 1999, Roberts et al. 2000, Shorten & Shorten 2002). Given the potential negative health impact for women who experience intervention during childbirth (Brown & Lumley 1998, Johanson & Menon 1999, Enkin et al. 2000), analysis of the impact of changes in health insurance cover on public and private hospital obstetric outcomes is timely.

Concern has already been raised about obstetric funding whereby significant amounts are devoted to the majority of women at very low risk, and in particular those with private health insurance (Senate Community Affairs References Committee 1999). Referring to Hart's 'inverse care law', the report highlights the fact that many healthy women receive specialist obstetric care when there is no medical indication for it while more needy

individuals receive lower levels of care (Hart 1971, Senate Community Affairs References Committee 1999). Pregnancy care is also unique in the expectation that women, mostly in the private sector but also to some extent in the public sector, will be encouraged to consult medical specialists for what are essentially primary health care services. (Senate Community Affairs References Committee 1999).

This study aims to present an analysis of changes in private health insurance coverage in terms of public and private hospital birth profiles and how they have impacted on trends in NSW hospital obstetric outcomes from 1997-2001. This will produce a clearer picture for analysis of the costs and benefits of the move to increase utilisation of private obstetric services.

Research Questions

- What is the impact of the increase in private health insurance membership during the period 1999-2001 on the proportion of women utilising private obstetric services for pregnancy and birth in NSW?
- What is the impact of recent changes in Australian health insurance on obstetric outcomes such as caesarean section rates, instrumental birth rates and perineal outcomes?

Method

The eligible study population (n= 372,303) comprised women in New South Wales who gave birth to a live singleton infant at term (≥ 37 weeks gestation) in a NSW hospital between January 1 1997 and 31 December 2001. (One regional and one metropolitan public hospital had to be excluded due to unavailable insurance status data at the time of analysis). Eligible births represent 85.5 percent of the 435,507 births recorded in total during this period, with almost no variation from year to year (85.3-85.7 percent). De-identified unit record data were obtained from the NSW Midwives Data Collection, covering all NSW births as recorded by midwives in NSW hospitals. Maternal demographic and clinical factors available for analysis include age, parity, pre-existing medical and current obstetric conditions (eg. essential hypertension, diabetes, gestational diabetes, pregnancy induced hypertension and obstetric complications such as antepartum haemorrhage). Birth outcomes data includes labour (eg. spontaneous, induction, augmentation), pain relief (eg. nitrous oxide, pethidine, epidural), mode of birth (normal vaginal, instrumental vaginal, caesarean section, perineal outcomes) and neonatal outcomes (gestational age, birthweight, resuscitation measures, Apgar scores, admission to neonatal special/intensive care).

The SPSS for windows release 10.0 software was used for all analyses of this dataset. Descriptive statistics and cross tabulations were generated for relevant variables in the MDC files and logistic regression analysis was used to identify significant factors in explaining the variations found in management for birth and subsequent outcomes. Most analyses are subdivided into primiparous and multiparous births, due to the fundamental difference parity often makes to the management of labour and birthing outcomes.

Results

Hospital Type versus Insurance Status

At the time of analysis, data on insurance status (public or private) was available for analysis for 1997-2000 only. All women birthing in NSW private hospitals are categorized as privately insured, however some women birthing in public hospitals are also privately insured. Table 1 illustrates the public/private mix within NSW for available years and overall NSW private health insurance membership figures. The aforementioned exclusion of two public hospitals means that both public/public and private/public births would be slightly understated, but should have little impact on trends observed over time.

Table 1: Trends in Insurance Status/Hospital Type Among Eligible Births, 1997–2001 (percent)

	Year									
Insurance Status/ Hospital Type	1997 Jan-June	1997 July-Dec	1998 Jan-June	1998 July-Dec	1999 Jan-June	1999 July-Dec	2000 Jan-June	2000 July-Dec	2001 Jan-June	2001 July-Dec
Public/Public	69.8	69.5	70.8	70.8	72.2	71.5	72.1	69.9	N.A.	N.A.
Private/Public	13.5	13.4	11.8	10.1	9.0	9.0	8.5	8.8	N.A.	N.A.
Private/Private	16.7	17.1	17.4	19.1	18.8	19.6	19.4	21.3	21.3	25.7
Total Private Insurance	30.2	30.5	29.2	29.2	27.8	28.6	27.9	30.1	N.A.	N.A.
Total NSW Population Private Insurance Coverage*	32.4	32.0	31.1	30.3	30.7	31.5	38.6	46.6	45.7	45.5

N.A = Not Available

*Source: PHIAC 2003. Average of two quarterly hospital insurance coverage figures .

The percentage of privately insured births declined from 30.2 to 28.6 percent between 1997 and 1999, mirroring overall trends in private health insurance. In 2000, however, a sharp upturn in private hospital insurance occurred, reaching 46.6 percent in the second half of the year. After a short time lag, an upward trend in private hospital births is seen, and appears to have accelerated in the second half of 2001 (possibly reflecting the usual 12 month waiting period for eligibility for claims for obstetric services). Table 1 also demonstrates that, even when privately insured births were in decline, the percentage of births in NSW private hospitals was rising. This was due to a sharp decline in privately insured births in public hospitals (from 13.5 percent of eligible births in 1997 to 8.7 percent overall in 2000).

Table 2 provides the most recent available snapshot (the year 2000) of selected birth interventions and outcomes. Interventions such as elective caesarean section (CS), induction of labour and use of epidural anaesthetic are far more prevalent in private hospitals, as are operative birth outcomes such as instrumental birth and emergency CS. For example, 15.2 percent of privately insured women experienced elective CS compared with just 6.5 percent of publicly insured women, and rates of use of epidural anaesthetic were 48.3 and 20.9 percent respectively.

Table 2: Selected Interventions/Outcomes by Insurance Status/Hospital Type, Eligible Births in 2000 (percent)

		Insurance Status/Hospital Type			
Labour Status	Outcome/ Intervention	Private/ Private Hosp	Private/ Public Hosp	Public/ Public Hosp	Total Public Hospital Births
No Labour	Elective CS	15.2	10.1	6.5	6.9
Labour[a]	Spontaneous	63.1	69.7	75.8	75.2
	Induction	36.9	30.3	24.2	24.8
Pain Relief[a]	Epidural	48.3	31.7	20.9	22.0
Type of Birth[a]	Normal Vaginal	66.8	71.6	81.2	80.2
	Instrumental	20.7	17.2	10.0	10.7
	Emergency CS	12.5	11.2	8.8	9.1

[a] Excludes Elective CS Births

Outcomes and intervention rates for private patients in public hospitals consistently lie between those of fully public and fully private patients. For example, the elective CS rate for these women was 10.1 percent, and the epidural rate 31.7 percent. Consequently, combining fully publicly insured births with privately insured births in public hospitals gives a "less favourable" impression of public sector outcomes than is in fact the case. However, because the 'private/public' group is relatively small (and shrinking) the extent of this bias is quantitatively modest. For example, including this group in analysing public hospital elective CS rates raises the percentage only from 6.5 to 6.9 percent, despite the 10.1 percent rate for 'private/public' women. While hospital type can be used as a proxy for insurance type, it should be noted that the true differences in interventions/outcomes between public and privately insured women will be greater than those presented in Tables 3-5 below.

Trends in risk factors for women birthing in NSW public and private hospitals

Table 3 presents clinical characteristics of eligible women birthing in public and private hospitals between 1997 and 2001, separately according to parity (primiparous and multiparous). The variables of 'medical condition' and 'obstetric complication' indicate that the woman is at greater risk of complications during pregnancy and birth either due to a pre-existing medical condition (diabetes, hypertension and hepatitis B) or a pregnancy-related condition (placenta praevia, placenta abruptio, gestational diabetes, pregnancy-induced hypertension, prolonged rupture of membranes >24 hours, threatened premature labour and rhesus iso-immunization). The other listed factors such as maternal age, birthweight >4500g and gestation >41 weeks, refer to situations associated with greater risk but not necessarily indicating specific risks for all women in those categories.

Possibly the most important increase is in the number of women over 35 years of age, (especially primiparous or having their first birth at ≥20 weeks gestation) birthing in private hospitals. Advancing maternal age is associated with increased risk of medical conditions and obstetric complications. However, in Table 3 there appear to be no clear differences between hospital type and actual presence of maternal conditions/complications. In fact women birthing in public hospitals have the highest rates of recorded obstetric complications and appear to have a higher objective risk profile. Although there is some evidence that incidence of maternal conditions has been increasing more rapidly in the private sector, these conditions are still relatively rare and are unlikely to explain much of the observed public/private differences in interventions and outcomes.

Table 3 demonstrates that the incidence of maternal smoking during pregnancy is substantially lower, and has declined more rapidly, among women birthing in private hospitals, which suggests a lower risk of complications and adverse outcomes due to smoking. There has also been a reduction in gestation >41 weeks in private hospitals, which may be linked to higher rates of induction of labour (IOL) and elective CS in the private sector. There has also been an increase in the number of multiparous women with previous caesarean section (PCS), especially in private hospitals, which in itself can lead to repeat CS or risks associated with trial of vaginal birth after caesarean.

Table 3: Trends in risk factors (% unless stated) (All eligible women)

Risk Factors	1997		1998		1999		2000		2001		%Change 1997-2001	
	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv
Primiparous												
Age (mean yrs)	26.2	29.7	26.3	30.0	26.4	30.5	26.6	30.6	26.5	30.6	+1	+3
Age (>35)	7.4	12.7	8.0	14.2	8.3	16.9	8.7	17.9	8.8	18.0	+19	+42
Maternal Conditions	NC	NC	1.1	0.9	1.1	1.3	1.1	1.2	1.2	1.5	+9[a]	+67[a]
Obstetric Complication	NC	NC	12.0	9.5	13.2	11.3	13.0	11.4	12.1	9.7	+1[a]	+2[a]
Smoking	20.7	5.8	20.1	5.0	18.9	4.1	17.2	3.5	17.7	3.9	-14	-33
Gest >41 weeks	3.6	1.7	3.5	1.6	3.6	1.3	4.0	1.3	4.4	1.1	+22	-35
Birthweight>4500g	1.3	1.5	1.3	1.2	1.3	1.2	1.5	1.9	1.5	1.4	+15	-7
Multiparous												
Age (mean yrs)	29.6	32.1	29.6	32.3	29.7	32.5	29.9	32.7	29.8	32.8	+1	+2
Age (>35yrs)	18.0	26.7	18.4	28.8	19.1	30.1	19.6	31.7	19.5	32.4	+8	+21
Maternal Conditions	NC	NC	1.2	1.0	1.2	1.2	1.4	1.0	1.3	1.2	+8[a]	+20[a]
Obstetric Complications	NC	NC	8.3	5.2	8.7	6.1	8.8	6.3	8.6	5.4	+4[a]	+4[a]
Smoking	24.4	5.5	23.9	5.1	23.7	4.2	22.1	4.0	22.3	3.8	-9	-31
Gest>41 weeks	2.4	1.0	2.1	0.8	2.3	0.5	2.6	0.7	2.7	0.5	+13	-50
Birthweight>4500g	2.2	2.3	2.4	2.3	2.4	2.3	2.6	2.2	2.4	2.1	+9	-9
Previous CS	NA	NA	15.6	22.8	15.8	24.5	16.0	25.0	16.4	26.1	+5[a]	+14[a]

NC Data not comparable with later years

NA Not available

[a] Percent change 1998-2001

Trends in obstetric interventions and birth outcomes 1997–2001

An analysis of birthing interventions and outcomes in public and private hospitals provides a clearer picture of the results of higher rates of both private heath insurance and women birthing in private hospitals. Tables 4 and 5 compare rates of obstetric interventions and birth outcomes between public and private hospitals during the study period, separately for primiparous and multiparous women.

Table 4: Trends in obstetric interventions and birth outcomes in NSW public and private hospitals by parity, 1997–2001 (percent) Primiparous women

	No Labour		Labour Status		Pain Relief		Mode of Birth						Perineal Outcomes					
	Elective CS[a]		Induction labour[b]		Epidural[b]		Normal Vaginal[b]		Forceps/ Vacuum[b]		Emerg. CS[b]		Intact[c] Perineum		Epis[c]		Tear Sutured[c]	
Year	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv
2001	3.3	10.6	29.6	39.1	34.4	60.4	65.1	45.4	18.7	33.7	16.2	20.9	24.3	12.2	23.5	42.6	52.2	45.1
2000	2.8	8.7	27.7	36.9	35.3	62.2	65.9	46.4	19.7	33.5	14.4	20.1	24.6	10.7	25.4	45.2	50.1	44.1
1999	2.7	8.4	28.3	36.9	34.0	60.5	66.5	46.5	20.3	34.9	13.2	18.6	24.6	9.7	27.6	49.3	47.9	41.1
1998	2.5	6.7	28.0	35.2	33.3	57.6	68.0	48.1	19.4	36.0	12.6	15.8	25.5	11.4	30.1	49.5	44.3	39.1
1997	2.6	6.6	25.1	33.7	30.2	53.0	69.0	48.9	19.3	34.3	11.7	16.9	NA	NA	30.2	48.3	NA	NA
% Change 1997–2001																		
	27	61	18	16	14	14	-6	-7	-3	-2	38	24	-5[d]	7[d]	-22	-12	18[d]	15[d]
Percentage point change 1997–2001																		
	0.7	4.0	4.5	5.4	4.2	7.4	-3.9	-3.5	-0.6	-0.6	4.5	4.0	-1.2[d]	0.8[d]	-6.7	-5.7	7.9[d]	6.0[d]

a Includes all eligible births

b Excludes elective CS

c Excludes elective and emergency caesarean section

d Percentage change 1998-2001

NA Not available

Table 5: Trends in obstetric interventions and birth outcomes in NSW public and private hospitals by parity, 1997–2001 (percent) Multiparous women

	No Labour		Labour Status		Pain Relief		Mode of Birth						Perineal Outcomes					
	Elective CS[a]		Induction labour[b]		Epidural[b]		Normal Vaginal[b]		Forceps/ Vacuum[b]		Emerg. CS[b]		Intact[c] Perineum		Epis[c]		Tear Sutured[c]	
Year	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv
2001	10.8	21.4	24.0	39.1	11.1	36.3	90.9	83.0	3.9	10.2	5.2	6.8	58.2	32.9	6.2	19.4	35.6	47.8
2000	9.7	20.1	22.6	36.8	12.2	36.5	90.8	84.0	4.1	9.9	5.2	6.1	57.8	31.0	7.0	19.8	35.1	49.2
1999	8.9	18.9	23.1	36.7	11.4	34.0	91.5	84.4	4.0	10.0	4.5	5.7	56.9	31.7	7.9	21.3	35.2	47.0
1998	8.7	18.0	24.2	36.0	10.6	30.5	91.5	84.6	3.9	9.5	4.5	5.9	56.7	32.9	9.4	21.0	33.9	46.1
1997	8.2	16.8	21.5	33.6	9.8	28.8	91.9	84.5	3.9	9.7	4.2	5.8	NA	NA	9.1	20.5	NA	NA
% Change 1997-2001																		
	32	27	12	16	13	26	-1	-2	0	5	24	17	3[d]	0[d]	-32	-5	5[d]	4[d]
Percentage point change 1997-2001																		
	2.6	4.6	2.5	5.5	1.3	7.5	-1.0	-1.5	0.0	0.5	1.0	1.0	1.5[d]	0.0[d]	-2.9	-1.1	1.7[d]	1.7[d]

a Includes all eligible births

b Excludes elective CS

c Excludes elective and emergency caesarean section

d Percentage change 1998-2001

NA Not available

Table 4 suggests that, for eligible primiparous women in NSW private hospitals, there was a 61 percent increase in the rate of birth by elective CS and a 24 percent increase in emergency CS rates. For women who experienced labour, there was an increase in incidence of IOL of 16 percent and a 14 percent increase in epidural use. There was also a 7.7 percent reduction in the likelihood of normal vaginal birth, from 48.9 percent in 1997 to 45.4 percent in 2001. Primiparous women in public hospitals experienced a 27 percent increase in likelihood of elective CS, and a 38 percent increase in the incidence of emergency CS. IOL rates increased by 18 percent and use of epidural by 14 percent, with a 6 percent reduction in rate of normal vaginal birth. In cases where vaginal birth occurred, although there was a 28 percent reduction in the rate of episiotomy, there was an 18 percent increase in tear requiring suturing (TRS) rates. The intact perineum rate actually fell by almost 5 percent (or by 1.2 percentage points).

Although there is no clear pattern of relative public/private trends in Table 4, rates of intervention and less favourable outcomes remain substantially higher in private hospitals in most cases. Primiparous women in private hospitals have consistently experienced higher rates of obstetric procedures/intervention than their public counterparts, with only 12.2 percent experiencing normal vaginal birth with intact perineum compared to 24.3 percent of public patients in 2001. Indeed for women having their first baby who attempt labour, only 45.4 percent birthing in private hospitals in 2001 compared to 65.1 percent in public hospitals actually experienced a normal vaginal birth.

The picture for multiparous women is also concerning, with almost 40 percent of those who attempted labour in private hospitals in 2001 being induced, compared with only 24 percent in public hospitals (a 16 percent increase in IOL rates for multiparous women in private hospitals). Epidural was used in 36.3 percent of cases in private hospitals (an increase of 26 percent between 1997-2001) compared with only 11.1 percent in public hospitals in 2001. The rate of use of emergency CS for multiparous women increased by 17 percent in private hospitals and 24 percent in public hospitals, although the percentage point change was the same (1.0) and the difference for hospital type was still 31 percent (6.8 versus 5.2 percent) in 2001.

Operative delivery versus normal vaginal birth

To what extent can the substantial public/private differences in obstetric interventions and outcomes be explained by differences in maternal risk factors and complications? Table 6 presents, for 2001, the results of two logistic regression models aimed at identifying factors affecting the odds of eligible primiparous women who labour experiencing an operative birth (instrumental or emergency CS) rather than a normal vaginal birth. Note that, for this group of women, operative delivery rates were 34.9 percent in public hospitals (7541 women had operative deliveries, 14084 did not) and 54.6 percent in private hospitals (3772 and 3132 respectively), giving rise to an unadjusted odds ratio of 2.25 (ie. primiparous women labouring in private hospitals were 2.25 times as likely to experience an operative delivery).

Table 6 presents two regressions, the first suggesting that much of the private/public hospital difference in operative deliveries is 'explained' by differences in the factors and interventions included (the private/public odds ratio falls to 1.44). This regression is similar to that in Roberts et al (2002:118) for 1990 and 1997, except for the inclusion of a number of additional explanatory factors. However, this model is seriously flawed, as it includes factors that are influenced by hospitals/doctors (IOL and use of epidural) as well as those beyond their control (maternal age, ethnicity and smoking status). Choices made about the former interventions cannot legitimately be regarded as 'explaining' the differences in outcomes observed. To put this in a statistical sense, the inclusion of both these interventions and type of hospital as explanatory variables in the same regression represents a clear case of simultaneity or endogeneity bias. In the absence of instruments that may be used to 'correct' this bias (variables correlated with the interventions but not with hospital type or any other variable appearing in the model), it is preferable to omit inductions and epidural anaesthetic when analysing the effect of hospital type on birth outcomes, as is done in the second regression in Table 6. This gives an odds ratio for private/public hospitals of 2.08 (with a 95% C.I. of 1.96-2.20), only slightly different from the unadjusted ratio of 2.25, and suggests that exogenous factors have very little power in explaining why operative delivery rates are so much higher in private hospitals; and that the differences are due to the way private hospitals choose to

manage labour, such as by using induction of labour and epidural anaesthetic much more freely. In fact, comparing the two models implies that one half to two thirds of the gap in operative delivery rates could be eliminated if private hospitals used these two interventions in the same way that public hospitals do. Nevertheless, a substantial unexplained gap would still exist.

Table 6: Logistic Regressions for Risk of Operative Delivery, Eligible Primiparous Women Experiencing Labour, 2001[a]

	With Simultaneity Bias			Without Simultaneity Bias	
Risk/Intervention	Category	Odds Ratio (OR)	95% CI for OR	Odds Ratio (OR)	95% CI for OR
Maternal age	<20 years	0.54	0.48-0.60	0.48	0.44-0.54
	20-34 years	1.00 (reference)		1.00 (reference)	
	35+ years	1.70	1.56-1.85	1.80	1.66-1.95
Birthplace	Overseas	1.16	1.09-1.24	1.12	1.06-1.19
	Australia	1.00 (reference)		1.00 (reference)	
Aboriginal	Yes	1.13	0.91-1.42	1.09	0.89-1.34
	No	1.00 (reference)		1.00 (reference)	
Smoker	Yes	0.92	0.85-1.00	0.95	0.88-1.03
	No	1.00 (reference)		1.00 (reference)	
Medical Condition	Yes	1.51	1.18-1.93	1.77	1.41-2.22
	No	1.00 (reference)		1.00 (reference)	
Obstetric Complication	Yes	1.40	1.28-1.52	1.72	1.59-1.86
	No	1.00 (reference)		1.00 (reference)	
Gestation	37-41 weeks	1.00 (reference)		1.00 (reference)	
	42+ weeks	1.26	1.10-1.46	1.55	1.36-1.51
Birthweight	<2500g	1.18	0.96-1.45	1.02	0.84-1.23
	2500-2999g	0.83	0.76-0.90	0.76	0.70-0.82
	3000-3499g	1.00 (reference)		1.00 (reference)	
	3500-3999g	1.29	1.22-1.38	1.43	1.35-1.51
	4000-4499g	0.61	1.67-2.02	2.10	1.92-2.29
	4500g+	3.30	2.61-4.19	3.76	3.01-4.68
Type of Hospital	Public	1.00 (reference)		1.00 (reference)	
	Private	1.44	1.35-1.53	2.08	1.96-2.20
Induction	Yes	1.37	1.29-1.46		
	No	1.00 (reference)			
Epidural	Yes	5.52	5.23-5.83		
	No	1.00 (reference)			

[a] All variables significant at 0.01 or better except aboriginal and smoker.

Table 7 repeats this logistic regression model for eligible, labouring multiparous women, 9.1 percent of whom had operative deliveries if a public hospital was the place of birth, or 17.0 percent if a private hospital was used, producing a private/public odds ratio of 2.05.

Table 7: Logistic Regressions for Risk of Operative Delivery, Eligible Multiparous Women Experiencing Labour, 2001[a]

		With Simultaneity Bias		Without Simultaneity Bias	
Risk Factor / Intervention	Category	Odds Ratio (OR)	95% CI for OR	Odds Ratio (OR)	95% CI for OR
Maternal age	<20 years	0.62	0.41-0.93	0.55	0.37-0.82
	20-34 years	1.00 (reference)		1.00 (reference)	
	35+ years	1.53	1.40-1.67	1.56	1.44-1.70
Birthplace	Overseas	1.14	1.04-1.24	1.09	1.01-1.19
	Australia	1.00 (reference)		1.00 (reference)	
Aboriginal	Yes	1.35	1.06-1.72	1.21	0.95-1.53
	No	1.00 (reference)		1.00 (reference)	
Smoker	Yes	1.14	1.03-1.28	1.14	1.02-1.26
	No	1.00 (reference)		1.00 (reference)	
Medical Condition	Yes	1.38	1.02-1.87	1.66	1.25-2.20
	No	1.00 (reference)		1.00 (reference)	
Obstetric Complication	Yes	1.42	1.25-1.62	1.54	1.36-1.75
	No	1.00 (reference)		1.00 (reference)	
Gestation	37-41 weeks	1.00 (reference)		1.00 (reference)	
	42+ weeks	1.47	1.17-1.83	1.59	1.29-1.96
Birthweight	<2500g	1.81	1.35-2.42	1.58	1.19-2.10
		1.10	0.96-1.25	1.00	0.88-1.14
	3000-3499g	1.00 (reference)		1.00 (reference)	
	3500-3999g	1.12	1.02-1.23	1.16	1.06-1.26
	4000-4499g	1.56	1.39-1.76	1.64	1.47-1.83
	4500g+	2.69	2.19-3.30	2.98	2.45-3.61
Total Parity		0.75	0.71-0.78	0.68	0.65-0.71
Previous CS	Yes	10.53	9.61-11.53	12.15	11.17-13.22
	No	1.00 (reference)			
Type of Hospital	Public	1.00 (reference)		1.00 (reference)	
	Private	1.17	1.06-1.28	1.98	1.82-2.16
Induction	Yes	1.15	1.06-1.25		
	No	1.00 (reference)			
Epidural	Yes	6.21	5.72-6.74		
	No	1.00 (reference)			

[a] All variables significant at 0.05 or better except aboriginal.

Again, the first regression incorrectly allows the endogenous interventions of induction and epidural to help 'explain' this gap, and it appears that most of the difference is in fact explained by the model. However, the second regression shows that if these two interventions are excluded, it seems that none of the other included factors help explain the gap. Since the unadjusted odds ratio of 2.05 lies within the 95% C.I. of 1.82-2.16, we cannot reject the null hypothesis (that the gap is unaffected by the maternal factors etc. included in the model). We therefore conclude that exogenous risk factors and complications have little if any power to explain the substantial variations in birth outcomes between private and public hospitals. Rather, different choices made by private and public hospitals in labour management, as well as other, unexplained factors (some of which are discussed below) account for the vast majority of differences observed.

Discussion

This paper has analysed the most recent available data on birthing in NSW, which suggests that the proportion of babies born to privately insured women (largely in private hospitals) has been increasing and may continue to increase in years to come. However, the paper has also documented that rates of obstetric interventions such as elective CS, IOL and use of epidural anaesthetic are, and continue to be, much higher in private hospitals. Similarly, less favourable birth outcomes such as emergency CS, instrumental birth, episiotomy and TRS are substantially more likely to occur in private hospitals. Furthermore, evidence is presented which suggests that little if any of the observed private/public hospital differences are explainable in terms of differences in either risk profiles or birthing complications attributable to the women.

Hence, one may question the wisdom (in relation to maternity services) of current Australian government private health insurance policy, which provides substantial subsidies and other incentives to take out such insurance. The substantive effect of these policies appears to be that they will expose many more women to substantially elevated, seemingly unnecessary, risks of labour interventions and less favourable birth outcomes, to the detriment of maternal health outcomes.

If one accepts the propositions that the large majority of births constitute natural, uncomplicated events which do not require wholesale medical intervention; that private hospitals in particular appear to be relatively poor at achieving favourable outcomes in these situations; and that government policy should be to encourage only practices which have been judged to be soundly based on best available evidence, there are many implications from the evidence presented here.

Implications for Future Research and Policy

- There appears to be a case for questioning why private hospital birth outcomes seem to be so different to public hospitals, and for investigating whether and how private hospitals could be encouraged to adopt strategies that align underlying philosophies and management of labour and birth more closely to public hospital maternity services. Apart from clinical factors, the role of differential economic incentives should be given attention in this respect. Private hospitals may regard high levels of interventions as methods of better managing bed occupancy rates and therefore running more 'efficient' hospitals. Similarly, private obstetricians may derive economic benefits from high levels of intervention in the management of labour, either through increased remuneration or in terms of management of their practices.
- This paper has documented consistent trends over time towards increased rates of both intervention and sub-optimal maternal outcomes, for both private and public hospitals. Moreover, there is no unambiguously clear pattern in the relative magnitudes of public/private increases, which implies that factors other than hospital/insurance type must also be important in explaining these trends. Future research should address the question of why these trends are occurring, with possible explanatory factors including changes in the prevailing medical insurance/litigation environment, increases over time in maternal age, increased consumer demand for birth intervention, and increasing use of medical models of labour care, rather than midwifery-driven modes of care, in both private and public hospitals.
- It may be more effective and potentially less costly to address future shortages of specialist obstetricians through provision of midwifery-led models of care for the majority of women, with specialist services directed towards more complex pregnancies.

- Women purchasing private health insurance for childbirth episodes presumably believe that they are purchasing access to a superior obstetric product (private hospital care and/or a private obstetrician). There is also at least anecdotal evidence that privately insured women are, at times, strongly encouraged to use private hospital facilities for birth, even when public alternatives exist. It seems unlikely that women choosing to purchase private insurance in order to finance private obstetric care are aware that, in most cases, this choice will expose them to increased risks of interventions and outcomes that they may prefer to avoid. Consideration should be given to improving the flow of objective information from the health care system to the wider community regarding the relative risks and benefits of different models of care in pregnancy and childbirth.
- The evidence presented here and in earlier research suggests that consideration should be given to removing taxpayer-funded and other incentives to the use of private maternity care. For example, in Hong Kong "[p]rivate insurance … ordinarily does not include maternity coverage, which must be purchased separately by paying an additional premium" (Leung et al. 2001). Consideration could be given to targeting insurance subsidies so that only those that, at a minimum, provide an equivalent and evidence-based clinical outcome, would be eligible for the applicable rebate.

There are limitations to our analysis. For reasons of space, we have only provided detailed evidence regarding relative private/public hospital outcomes for a small subset of the large number of interventions, outcomes and issues worthy of study in this area. For example, this study provides no analysis of neonatal outcomes although work in this area is currently underway. This is important due to potential risks for neonates associated with operative modes of birth (Hook et al. 1997, Johanson & Menon 1999) and potential for differences in neonatal outcomes associated with patterns of practice.

Women and their families, in purchasing private health insurance as a direct result of government incentives, are increasing the likelihood that during pregnancy and birth they will experience higher levels of intervention and associated morbidity than they may have otherwise experienced in the public sector. Intervention during labour and birth is necessary in instances where clinical risk is evident and the given procedure is known to improve outcomes for mothers and babies. Research-based clinical recommendations for IOL, epidural, instrumental birth, episiotomy and caesarean section exist and evidence is available to justify their use in specific instances. Grey areas in clinical decision-making exist and the medico-legal environment must also be acknowledged. Consistent with NSW health initiatives (NSW Health, 2000), however, all women deserve the opportunity to experience optimal and desirable health outcomes for themselves and their babies through models of care that best meet their individual risk factors and needs. Therefore ongoing quality review of both process and outcomes for public and private services is required in conjunction with education of consumers about the relative merits of various options for care during pregnancy and childbirth.

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