# The impact of the Baby Bonus payment in New South Wales: who is having "one for the country"?

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n 1 July 2004, the Australian Government introduced a Baby Bonus payment of \$3000 for the birth of a child. This payment increased incrementally to \$5000 per child on 1 July 2008. The aim of the Baby Bonus was to increase family size and, at the time of its introduction, the then Australian Treasurer, Peter Costello, urged parents to have three children: "one for your husband, one for your wife and one for the country". <sup>1</sup>

The introduction of financial incentives produced an increase in birth rates in the Union of Soviet Socialist Republics (USSR) in the 1980s,<sup>2</sup> and more recently in Quebec, Canada,<sup>3</sup> and France.<sup>4</sup> The Australian Bureau of Statistics (ABS) has reported that the annual number of births has increased since 2004,<sup>5</sup> and media reports have claimed that the Baby Bonus has led to an increase in births to teenagers<sup>6</sup> and women in marginalised groups.<sup>7</sup> These claims have not been investigated at a population level.

Our aim was to evaluate the impact of the Baby Bonus policy on birth rates in New South Wales, both overall and in age, parity, socioeconomic and geographical subgroups of the population, using a statewide population dataset.

# **METHODS**

Women aged 15-44 years who gave birth in NSW from 1 January 1997 to 31 December 2006 were included in the study population. To examine the effect of the Baby Bonus payment on different population subgroups, birth rates were stratified by age group, socioeconomic status, geographical area and birth order. We defined birth rate as the annual number of women of reproductive age (15-44 years) with a pregnancy that resulted in a birth, divided by the population of women of reproductive age at 30 June each year. We examined which populations of women became pregnant after the introduction of the Baby Bonus; thus, stillbirths were included in the analysis and multiple births (eg, twins) were counted as one birth.

# Data sources

Birth data (the numerator) were obtained from the NSW Midwives Data Collection, a

# **ABSTRACT**

**Objective:** To assess the change in birth rates, both overall and in age, parity, socioeconomic and geographical subgroups of the population, after the introduction of the Baby Bonus payment in Australia on 1 July 2004.

**Design and setting:** Population-based study using New South Wales birth records and Australian Bureau of Statistics population estimates for the period 1 January 1997 – 31 December 2006.

**Participants:** All 853606 women aged 15–44 years with a pregnancy resulting in a birth at  $\geq$  20 weeks' gestation or a baby  $\geq$  400 g birthweight.

**Main outcome measure:** Change in birth rate in 2005 and 2006 compared with the trend in birth rates before the introduction of the Baby Bonus.

**Results:** The crude annual birth rate showed a downward trend from 1997 to 2004; after 2004 this trend reversed with a sharp increase in 2005 and a further increase in 2006. All age-specific birth rates increased after 2004, with the greatest increase in birth rate, relative to the trend before the Baby Bonus, being seen in teenagers. Rates of first births were not significantly affected by the bonus; however, rates of third or subsequent births increased across all age, socioeconomic and geographical subgroups.

**Conclusions:** In the first 2 years after the introduction of the Baby Bonus, birth rates increased, especially among women having a third or subsequent birth. This could represent an increase in family size and/or a change in the timing of births.

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legislated, population-based surveillance system of all babies born in NSW of  $\geq$  20 weeks' gestation or  $\geq$  400 g birthweight. The Midwives Data Collection includes information on total number of previous pregnancies for each mother, and is reported reliably.<sup>8,9</sup>

Population data, used as the denominator for birth-rate calculations, were obtained from ABS Estimated Residential Populations. Data were stratified into age groups and statistical local areas; the latter can be used to identify different socioeconomic and geographical regions. Parity-specific birth rates were calculated by stratifying the female population by the number of children they had given birth to. Thus, for first births, the denominator for birth rate was women who have no children, and that for second births was women who have had one child. The ABS collects information about the number of children ever born to each woman every 10 years, most recently in the 2006 Census. From unpublished ABS data<sup>10</sup> and annual birth data, we back-projected the female population in NSW stratified by age, parity and local area for the years before 2006, using a method described by Kippen. 11 Parity of the women was grouped

into those having their first child, second child, and third or subsequent child.

Women were classified as residing in "metropolitan" or "rural" areas according to the Accessibility/Remoteness Index of Australia. <sup>12</sup> Metropolitan areas comprised the capital city and large regional districts, while rural areas included small regional districts and remote regions. Women residing in metropolitan areas were then classified into three socioeconomic groups: "disadvantaged" (0–20th percentile), "average" (21st – 80th percentile) and "advantaged" (81st – 100th percentile). Women in rural areas were not differentiated by socioeconomic status because of similar trends in birth rates among socioeconomic groups.

Socioeconomic status was obtained from the Index of Relative Socio-economic Disadvantage from the Socio-Economic Indexes for Areas, <sup>13</sup> derived from the 2006 Census and incorporating attributes such as low income, low educational attainment and high unemployment.

# Data analysis

Poisson regression analysis was used to examine changes in birth rates after the intro-

duction of the Baby Bonus. Year was treated as a continuous variable to assess the underlying time trend from 1997 to 2004. The mean annual percentage change in the birth rate was estimated for these years. We used dummy variables for the years 2005 and 2006 to assess deviations from the previous vears' trend (see trend line in Box 2). Rate ratios obtained for these dummy variables were interpreted as the change in the birth rate in that year compared with the birth rate had the trend continued. For example, a rate ratio of 1.20 in 2006 would be interpreted as a 20% increase in birth rate relative to the expected birth rate in 2006 projected from the trend before the Baby Bonus.

Poisson regression analyses were stratified by age group, parity and geographical area/socioeconomic status, and interaction terms were entered into the models to test whether the underlying trend before 2004 and the change in birth rates in 2005 and 2006 differed between subpopulations. Poisson goodness-of-fit tests were used to evaluate model fit.

# Ethics approval

Ethics approval for our study was obtained from the NSW Population and Health Services Research Ethics Committee.

## **RESULTS**

From 1997 to 2006, there were 861 372 women aged 15–44 years who gave birth in NSW. Of these, 853 606 women were included in our study. The women who were excluded resided outside NSW (0.01%) or had missing data for age group, birth order or statistical local area (0.9%).

The number of women giving birth decreased from 85 860 in 1997 to 83 467 in 2004 (about 0.8% per annum) then increased to 89 921 in 2006. During the study period there was an increase in the proportion of women giving birth who were aged 30 years or older or of higher socioeconomic status (Box 1). From 1997 to 2004, the proportion of births that were first births increased, and then decreased from 2004 to 2006.

# Age-specific birth rates

Annual birth rates and the underlying trend before the introduction of the Baby Bonus for the whole dataset are shown in Box 2.

1 Characteristics of women giving birth in New South Wales at the start of the study period (1997), and before (2004) and after (2006) the Baby Bonus policy was introduced

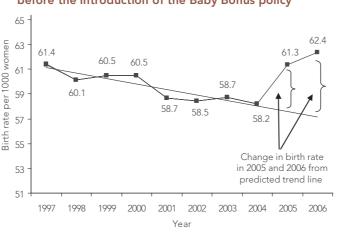
	1997 (n = 85 860)	2004 (n = 83 467)	2006 (n = 89 921)					
Age group (years)			_					
15–19	4219 (4.9%)	3 336 (4.0%)	3 4 2 0 (3.8%)					
20–24	14744(17.2%)	11 988 (14.4%)	12536 (13.9%)					
25–29	28 037 (32.7%)	22 916 (27.5%)	24 221 (26.9%)					
30–34	25 588 (29.8%)	28 710 (34.4%)	30410 (33.8%)					
35–44*	13 272(15.5%)	16 517 (19.8%)	19334 (21.5%)					
Parity								
First births	34 665 (40.4%)	35 490 (42.5%)	37 426 (41.6%)					
Second births	29 214(34.0%)	28 079 (33.6%)	30 062 (33.4%)					
Third or subsequent births	21 981 (25.6%)	19 898 (23.8%)	22 433 (24.9%)					
Geographical area / socioeconomic status (SES)								
Metropolitan area								
Disadvantaged SES (lower 20%)	16 924 (19.7%)	14 917 (17.9%)	16059 (17.9%)					
Average SES (21%–80%)	45 351 (52.8%)	44 251 (53.0%)	47 665 (53.0%)					
Advantaged SES (upper 20%)	14 281 (16.6%)	16 267 (19.5%)	17.737 (19.7%)					
Rural area <sup>†</sup>	9 304 (10.8%)	8 033 (9.6%)	8 460 (9.4%)					

\*Women aged 35–39 and 40–44 years were combined into one group due to similar patterns in births over the study period. †Women in rural areas were not differentiated by socioeconomic status because of similar trends in birth rates among socioeconomic groups.

Birth rates for every age group increased significantly in 2005 and continued to rise in 2006. The largest change in birth rates, relative to the trend of the previous years, was seen in teenage women. Before 2004, birth rates for women aged 15–19 years were declining steeply, at an average of 4.5% (95% CI, 4.1%–5.0%) per year. Compared with this sharp decline, the birth rate for this age

group increased 7.7% (95% CI, 3.2%–12.4%) in 2005 and 13.5% (95% CI, 8.5%–18.7%) in 2006. Births to women aged 35 years and older had been increasing at an average of 2.6% per year from 1997 to 2004; however, compared with this upward trend, births increased by an additional 7.2% (95% CI, 4.8%–9.6%) in 2005 and 10.9% (95% CI, 8.4%–13.6%) in 2006, the second largest increase of all age groups.

# 2 Birth rate per 1000 women aged 15–44 years in 1997–2006 in New South Wales, and birth-rate trend line before the introduction of the Baby Bonus policy 65 1



# Age- and parity-specific birth rates

For women having their first child in 2005 or 2006, the birth rates for most age groups appear to follow the trend of the previous years. The only groups that had a significant increase in first births after the introduction of the Baby Bonus payment were teenagers of average socioeconomic status, women in rural areas in their teens or early 20s, and women aged 30-44 years living in metropolitan areas and of average or advantaged socioeconomic status (Box 3).

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3 Percentage increases (95% CI) in birth rates in women in New South Wales (in age, parity, socioeconomic and geographical subgroups) in 2005 and 2006 relative to the birth-rate trend before the introduction of the Baby Bonus policy

	First birth		Second birth*		Third or subsequent birth <sup>†</sup>	
•	2005	2006	2005	2006	2005	2006
15-19 years						
Metropolitan area						
Disadvantaged SES	3.2 (-6.4 to 13.7)	-0.7 (-10.6 to 10.4)	5.7 (-15.7 to 30.9)	13.2 (-9.5 to 41.8)	_	_
Average SES	7.2 (0.7 to 14.2)	8.9 (1.8 to 16.5)	18.6 (3.1 to 36.8)	39.1 (20.3 to 60.9)	_	_
Advantaged SES	‡	‡	‡	‡	_	_
Rural area	-0.2 (-10.6 to 11.4)	12.8 (0.6 to 26.5)	6.2 (-14.9 to 32.5)	31.4 (4.8 to 64.6)	_	_
20-24 years						
Metropolitan area						
Disadvantaged SES	0.6 (-5.3 to 6.8)	-0.5 (-6.7 to 6.2)	13.5 (5.1 to 22.4)	16.1 (7.0 to 26.0)	24.2 (10.6 to 39.5)	26.6 (11.7 to 43.4)
Average SES	-1.8 (-5.6 to 2.2)	0.7 (-3.5 to 5.1)	14.7 (8.8 to 21.0)	13.7 (7.3 to 20.5)	10.9 (1.8 to 20.8)	5.4 (-4.0 to 15.7)
Advantaged SES	-1.3 (-11.5 to 10.0)	5.0 (-6.7 to 17.8)	13.2 (-6.4 to 36.9)	19.3 (-2.6 to 46.0)	‡	‡
Rural area	10.7 (1.5 to 20.9)	13.2 (3.1 to 24.5)	-0.3 (-9.9 to 10.4)	5.4 (-6.3 to 17.5)	14.5 (1.9 to 30.1)	22.3 (6.2 to 40.8)
25-29 years						
Metropolitan area						
Disadvantaged SES	-4.0 (-9.4 to 1.6)	-1.2 (-7.3 to 4.6)	12.9 (6.2 to 20.0)	13.4 (6.2 to 21.1)	12.8 (5.2 to 20.8)	14.4 (6.3 to 23.3)
Average SES	1.3 (-1.2 to 4.6)	1.6 (-1.8 to 5.0)	4.1 (0.3 to 8.0)	10.0 (5.7 to 14.4)	14.3 (8.9 to 19.9)	20.7 (14.7 to 27.0)
Advantaged SES	3.7 (-1.8 to 9.5)	3.8 (-2.1 to 10.1)	0.9 (-7.2 to 9.7)	10.7 (1.4 to 20.8)	14.0 (-2.0 to 32.7)	31.2 (12.3 to 53.4)
Rural area	1.0 (-7.5 to 10.2)	-3.9 (-12.6 to 5.7)	13.3 (3.9 to 23.6)	8.6 (-1.1 to 19.4)	18.1 (8.1 to 28.9)	21.2 (10.2 to 33.2)
30-34 years						
Metropolitan area						
Disadvantaged SES	-0.1 (-7.9 to 7.3)	7.8 (-0.2 to 16.4)	2.5 (-4.2 to 9.2)	3.7 (-3.1 to 10.9)	13.6 (6.8 to 20.9)	13.1 (5.8 to 20.8)
Average SES	8.1 (4.5 to 11.8)	7.6 (3.7 to 11.8)	1.5 (-2.8 to 4.9)	1.5 (-2.3 to 5.1)	11.2 (7.1 to 15.6)	18.6 (13.9 to 23.6)
Advantaged SES	4.8 (0.5 to 9.4)	7.3 (2.5 to 12.3)	-3.2 (-7.7 to 1.2)	-2.7 (-8.5 to 2.4)	9.7 (1.8 to 18.2)	16.8 (7.8 to 26.5)
Rural area	0.7 (-9.6 to 12.2)	3.5 (-7.8 to 16.3)	8.7 (-0.5 to 18.7)	5.3 (-4.4 to 16.0)	5.1 (-2.9 to 13.8)	17.9 (8.5 to 28.1)
35–44 years§						
Metropolitan area						
Disadvantaged SES	11.0 (-2.0 to 25.8)	15.3 (1.0 to 31.5)	7.7 (–2.7 to 19.1)	20.7 (8.8 to 34.0)	15.8 (7.1 to 25.4)	12.9 (3.7 to 22.9)
Average SES	0.8 (-4.8 to 6.6)	4.8 (-2.3 to 11.2)	1.3 (-3.7 to 6.5)	1.9 (-3.4 to 7.4)	12.6 (7.3 to 18.2)	13.1 (7.4 to 19.1)
Advantaged SES	4.1 (-2.3 to 11.2)	10.8 (3.4 to 18.8)	3.3 (-2.8 to 9.7)	1.1 (-2.8 to 9.7)	10.3 (2.6 to 18.6)	9.6 (1.4 to 18.5)
Rural area	1.4 (-16.7 to 22.6)	2.5 (-16.1 to 25.1)	20.5 (3.8 to 39.7)	18.5 (1.1 to 39.0)	18.4 (6.4 to 31.7)	14.8 (2.3 to 28.8)

Statistically significant results (P < 0.05) are in **bold type**. SES = socioeconomic status. Disadvantaged SES = lower 20%; average SES = 21%-80%; and advantaged SES = upper 20%. \* Second or subsequent births for women aged 15–19 years. † No data analysed for third or subsequent births for women aged 15–19 years due to small numbers. ‡Very small numbers of births resulting in unstable estimates. §Women aged 35–39 and 40–44 years were combined into one group due to similar patterns in births over the study period.

Birth rates for women having their second child in 2005 or 2006 deviated significantly from the previous years' trend for young women living in metropolitan areas. For women aged 20-24 years of disadvantaged or average socioeconomic status, birth rates for second births increased in 2005 and remained about stable in 2006. Second births to teenagers of disadvantaged or average socioeconomic status increased in 2005 and continued to increase in 2006, although results for "disadvantaged" teenagers were not statistically significant as a result of small numbers. There was also a large relative increase in teenagers in rural areas having a second child in 2006 (Box 3).

Birth rates for women having a third or subsequent child were constant from 1997 to 2004, but rose significantly after 2004 for all women aged 20 years and older across all socioeconomic and geographical groups (Box 3).

# **DISCUSSION**

These findings suggest that the Baby Bonus affected the birth rate in NSW for second, third or subsequent births, but had limited impact on first births. The increase in second births occurred predominantly among younger women of low and average socioeconomic status. The increase in third or subsequent births appears to have occurred

across all age, socioeconomic and geographical groups. These findings indicate that, in the short term, a financial incentive has had an impact on the birth rate among certain subgroups of the population. Studies in other countries have shown that birth rate increases occurring immediately after the introduction of financial incentives were not sustained.<sup>3,4</sup> Financial incentives may have a temporary effect on birth rates: couples may change the timing of births, but the resulting family size does not change.2

As pregnancy and childbirth in teenagers are associated with adverse perinatal outcomes, 14,15 the increase in births to teenagers

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after the introduction of the Baby Bonus is of concern, and follows a steep decline in teenage birth rates in the years before 2004. Although the absolute increase in births to teenagers after 2004 was only about 40 births per year, from 1997 to 2004 teenage births were declining on average by 125 births per year. Contrary to anecdotal reports, we did not find that the increase in births only occurred in low socioeconomic or disadvantaged groups.

A large proportion of the increase in births after 2004 was among women over the age of 30 years. This group of women may have had a baby even without the bonus payment. The current Australian Government has announced that, from 1 January 2009, only families earning less than \$150000 per year will be eligible to receive the payment, 16 and it remains to be seen how this restriction in policy will affect the birth rate. In 2004, the government also introduced a number of tax rebates to assist with the costs of raising children and with child care, although these tax rebates did not gain as much publicity or stimulate as much public discussion as the Baby Bonus payment. Considered together, these policies may have increased the birth rate by highlighting the importance to society of motherhood and increasing the value that is placed on children.<sup>17</sup>

The introduction of a policy such as the Baby Bonus also affects maternity services. One startling implication of the announcement of a financial incentive to be paid from 1 July 2004 was the delay of over 1000 births from June to July by rescheduling inductions and caesarean sections. <sup>18</sup> Both this short-term disruption to maternity services and the longer-term impact of an increase in births have placed huge pressure on the health system at a time when there are decreasing numbers of practising obstetricians and a shortage of midwives. <sup>19</sup>

The main strengths of our study lie in the use of a large representative population health dataset, which provides 10 years of longitudinal data, and the ability to analyse the dataset by birth order. To our knowledge, this is the first study to examine the impact of a financial incentive on parity-specific birth rates using individual data. The main limitation of our study is that the follow-up time only allowed short-term effects of the policy to be evaluated. Further research on longer-term impacts is warranted as birth and population data become available.

We could not account for other social and economic changes occurring in Australia over this period that may have affected the birth rate. For example, there may have been an increase in births due to economic prosperity, but it is unlikely that the short-term change of the magnitude seen from 2004 to 2005 is not related to the introduction of the Baby Bonus in mid 2004. We do not have data regarding the impact of the bonus on women's intentions, so we cannot say whether this policy has altered their childbearing decisions, only that there is an association between the introduction of the policy and the increase in birth rates.

In conclusion, the Baby Bonus appears to have had a differential impact on the birth rate according to age and birth order. In the short term, the policy has had the greatest impact on women having a third or subsequent birth. Whether it has encouraged couples to increase their family size or just change the timing of a birth is yet to be seen, but the results of this social experiment suggest that financial incentives do affect birth rates.

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# **COMPETING INTERESTS**

None identified.

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