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DISCUSSION PAPER

**Further policy implications of rising  
Aboriginal fertility in the 1990s**

**H. Tesfaghiorghis**

**No. 103/1996**

**ISSN 1036-1774  
ISBN 0 7315 1777 6**

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Director, CAEPR  
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## ABSTRACT

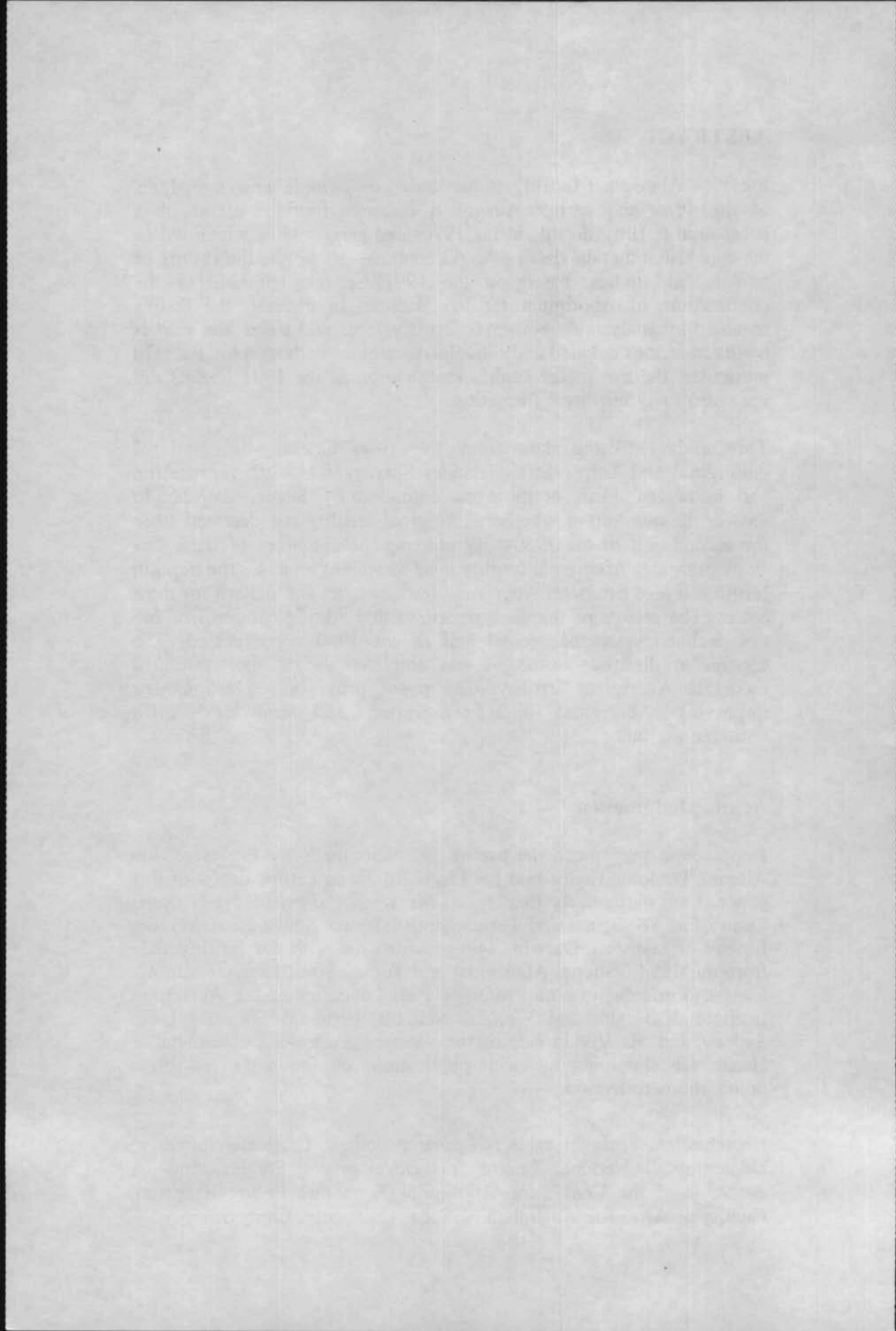
Previous Aboriginal fertility studies based on comprehensive analyses of the 1986 and earlier Australian censuses found a trend of a substantial fertility decline in the 1970s and early 1980s, which led to the conclusion that the decline would continue. However, the results of two recent studies, based on the 1991 Census, contradicted the continuation of Aboriginal fertility decline. In general, the results obtained by analysing Aboriginal fertility level and trend are suspect owing to lack of detailed and reliable Aboriginal demographic data. In particular, the two recent studies are suspect, as the 1991 Census did not collect any fertility information.

This study, utilising data from the 1986 Census, the National Aboriginal and Torres Strait Islander Survey 1994 birth registration and midwives' birth notifications compiled by States, attempts to answer the question of whether Aboriginal fertility has declined since the second half of the 1980s. By utilising these sources of data, this study estimates Aboriginal fertility level as well as analyses the trend in fertility. It also estimates Aboriginal fertility level and pattern for most States. The results of the analysis shows that Aboriginal fertility has not declined since the second half of the 1980s as expected. The conclusion discusses some of the implications of the continued moderate Aboriginal fertility. The paper provides suggestions for improving Aboriginal birth registration and midwives' birth notifications data.

## Acknowledgments

I appreciate very much the useful comments made by Professor Jon Altman, Dr John Taylor and Ms Linda Roach on earlier drafts of this paper. I am particularly thankful to Mr Dean Carson of the National Centre for Aboriginal and Torres Strait Islander Statistics, Australian Bureau of Statistics, Darwin, who provided me with the fertility data from the 1994 National Aboriginal and Torres Strait Islander Survey. I am also grateful to both Professor Paul Lancaster of the Australian Institute of Health and Welfare National Perinatal Statistics Unit, Sydney, and Ms Vivien Gee of the Western Australia Department of Health for supplying me with publications on the midwives' birth notifications collection.

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## Introduction

Though fertility is the major component of population change in the context of Aboriginal<sup>1</sup> demography, reliable and detailed fertility data are lacking. It is thus important to study fertility in order to analyse Aboriginal demographic trends and to carry out population projections. This paper has three purposes. The first is to attempt an estimation of the current level and pattern of Aboriginal fertility. The second is to examine if there has been any Aboriginal fertility decline since the mid-1980s. The third is to examine if there are any Aboriginal fertility differentials by State and part-of-State.<sup>2</sup> The task of accomplishing the set purposes is difficult as Aboriginal demographic data are limited and deficient. The estimation of current Aboriginal fertility is complex because the 1991 Census of Population and Housing, unlike previous censuses, did not collect any fertility information. The 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS) (Australian Bureau of Statistics (ABS) 1995: 96) asked only one question on fertility: 'Have you had any babies? If yes, how many babies have you had (excluding still births)?'. Given the lack of Aboriginal fertility data and the need to know their level and trend for policy purposes, it is expedient to utilise information from NATSIS despite its limitations. By comparing this with 1986 Census data, an attempt is made to estimate and analyse Aboriginal fertility level and change.

In order to supplement the census- and survey-based analysis, Aboriginal birth registration data for selected States and midwives' birth notification collections for the majority of States are also utilised. An important aspect of this study is to estimate fertility for South Australia, Western Australia and the Northern Territory from their 1991 Aboriginal birth registration data, which are evaluated as reasonably complete (Luther et al. 1995). This provides an opportunity for the first time to synthesise a picture of Aboriginal fertility levels and patterns based on birth registration. The opportunity is also taken to estimate and describe Aboriginal fertility levels and patterns by States based on the 1991 midwives' birth notifications, which are compiled by respective States and Territories and supplied to the Australian Institute of Health and Welfare National Perinatal Statistics Unit at the University of Sydney (Lancaster et al. 1994). These data refer to New South Wales, Northern Territory, Queensland, South Australia, Western Australia and Victoria.

## Review of Aboriginal fertility studies

The first comprehensive research on Aboriginal fertility was undertaken by Gray (1983, 1990). Based on an analysis of intercensal comparisons of Aboriginal parity data, Gray found that Aboriginal fertility reached its peak total fertility rate (TFR) of 5.9 children per woman in the 1956-1961 period, which then remained at this level up to 1966-71, before it declined steeply in the 1970s to reach 4.4 in 1971-76, 3.3 in 1976-81 and 3.1 in 1981-86. TFR is defined as the average number of children a woman would bear after completing her reproduction and surviving to the end of her reproductive years. Another national set of Aboriginal TFR estimates referring to the 1972-86 period come from Jain's (1989) work, which were based on application of the Own-Children Method to 1986 Census information on relationships within the household. Jain's estimated fertility levels were similar to those of Gray and supported Gray's finding of a trend of Aboriginal fertility decline that began in the 1970s and continued to the early 1980s.

These results for the 1970s were also supported by this study's analysis of parity progression ratios for women aged 40-44 and 45-49 years from the 1994 NATSIS parity data, which produced estimates of TFR of 4.2 children per woman for 1972 and 3.6 children for 1977, respectively. It can be concluded that both Gray (Gray 1983; Gray and Tesfaghiorghis 1991: 10-11) and Jain's (1989: 9) estimates suggest a slowing of Aboriginal fertility decline between 1976 and 1986, and in fact Jain's estimates show almost constant fertility between 1977 and 1983.

As these two studies cover the period up to 1986, there were no other national Aboriginal fertility estimates referring to the post-1986 period until the results of the 1991 Census were known and analysed. But there were estimates for some States that could shed some light on what was happening to Aboriginal fertility in the late 1980s. On the basis of birth statistics for some States, Thomson and Briscoe (1991a, 1991b, 1991c, 1991d; also cited in Gray and Tesfaghiorghis 1991: 10) produced estimates of TFR for 1987-88 of three or more children per woman for the Northern Territory, Queensland and Western Australia, 2.5 for South Australia and 2.1 for New South Wales. With respect to New South Wales, low fertility was a reflection of incomplete identification of Aboriginal mothers in the maternal/perinatal collection (Thomson and Briscoe 1991a: 10). Thomson and Hogg (1992: 8) also showed that, based on birth statistics, the TFR in Queensland Aboriginal communities declined from 3.8 in 1972-77, to 3.3 in 1978-83 and to 3.0 in 1984-90, compared to 3.2 for all Queensland Aboriginal women in 1987.

Gray and Tesfaghiorghis (1991: 10-11), mindful of the conflicting fertility trends suggested by national estimates up to 1986 and the estimates for some States for the late 1980s, assumed a gradual fertility decline in their projection of the Aboriginal population from 1981 to 2001. However, two studies which estimated Aboriginal fertility at the national and state levels based on the 1991 Census appeared since that projection, and these can be used to judge whether Gray and Tesfaghiorghis' assumption of moderate fertility decline was correct or not. Gray and Tesfaghiorghis (1993: 88-91) estimated Aboriginal TFR for the 1986-91 intercensal period at 3.22 children per woman. This result indicates a fertility rise when compared to the estimated TFR of 3.06 for the 1981-86 intercensal period (Gray 1990: 60; Gray and Tesfaghiorghis 1993: 89).

Dugbaza's (1994) application of the Own-Children Method to the 1991 Census data produced a TFR of 3.1 children per woman for the 1986-91 intercensal period and concluded that fertility remained constant between 1981 and 1991. While the estimates of both Gray and Tesfaghiorghis (1993) and Dugbaza (1994) agree on the absence of Aboriginal fertility decline since the mid-1980s, these two studies, however, conflict as to what happened to Aboriginal fertility since the mid-1980s. Gray and Tesfaghiorghis' analysis indicates a small fertility rise and contrasts with the stable fertility trend depicted by Dugbaza's analysis.

Having thus ruled out sustained Aboriginal fertility decline, the question then is, did fertility remain constant or rise during the 1980s? The estimation methods used both by Gray and Tesfaghiorghis (1993) and Dugbaza (1994) are prone to data errors. The reliability of the 1986-91 intercensal fertility estimates by both methods depends on correct age reporting as well as enumeration of children aged 0-4 years and women aged 15-49 years in the 1991 Census, which were both found to be defective (Gray and Tesfaghiorghis 1991: 92-4; Luther et al. 1995: 157). Furthermore, the Own-Children Method fertility estimates are biased by the large proportion of unmatched children (33 per cent) found in the 1991 Census (Dugbaza 1994: 19-20). As these errors tend to underestimate fertility, Dugbaza's and Gray and Tesfaghiorghis' 1986-91 intercensal estimates of Aboriginal fertility may thus be taken as lower bound estimates.

#### *Analysis of the 1994 parity distributions*

The 1994 survey showed that the fertility differences by part-of-State are narrowing down, particularly at older ages. Table 1 shows that the mean parity for women who completed their reproduction, that is those aged 45-49 years, was about four children per woman irrespective of urban or rural residence. The higher mean parities of



young rural and other urban women compared to their counterparts in capital cities was due to the substantially high proportion of childless women in capital cities.

Furthermore, Table 1 shows greater fertility differences between States than between parts-of-State. With respect to States, the overall standardised mean parity of women aged 15-49 years shows that both Western Australia and Northern Territory had higher fertility than New South Wales and Queensland, while Queensland's fertility appeared to be moderately higher than that of New South Wales. At this juncture, it is worth pointing out that the distribution of mean parities presented in Table 1 will be used later to assess the reliability of midwives' notification-based fertility estimates by States, which are provided in Table 3.

**Table 1. Distribution of mean parities by age group, part-of-State and selected States and Territory, 1994.**

Age group	Total	Capital cities	Part-of-State Other urban	Rural
15-19	0.21	0.08	0.18	0.37
20-24	1.18	0.97	1.38	1.23
25-29	2.26	2.31	2.32	2.14
30-34	2.89	2.89	2.82	3.01
35-39	3.33	3.11	3.29	3.65
40-44	3.50	3.69	3.33	3.64
45-49	3.97	3.76	4.24	3.96
Mean				
Reported	2.12	2.02	2.12	2.23
Standardised <sup>a</sup>	2.12	2.04	2.15	2.21

Age group	NSW	State/Territory Qld	WA	NT
15-19	0.15	0.14	0.31	0.35
20-24	1.18	1.23	1.28	1.42
25-29	2.07	2.30	2.56	2.26
30-34	2.77	2.92	3.43	2.96
35-39	3.04	3.14	3.51	3.69
40-44	3.09	3.55	4.37	4.23
45-49	3.67	4.37	4.49	4.40
Mean				
Reported	1.98	2.11	2.41	2.35
Standardised <sup>a</sup>	1.96	2.14	2.44	2.35

a. Directly standardised using the age distribution of all women.

## Indirect estimation of Aboriginal fertility

As identification of Aboriginal births in the States' birth registration system started following a Commonwealth Task Force representation to the States in 1984 and 1986, it will be some time before complete and reliable Aboriginal birth registration data are achieved. Thus, there is a need to base estimation of national Aboriginal fertility on indirect methods. As already stated, the task of indirect estimation is made difficult as the 1991 Census did not collect any fertility information and the Aboriginal parity data collected in previous censuses were severely affected by errors, especially where parity was not stated (Gray 1983, 1990). By contrast, the proportions of women with parity not stated in the 1994 NATSIS were negligible.

**Table 2. Distribution of average parity and estimated age-specific fertility rates: application of Arriaga method.**

Age group	Average parity per woman		Ratio <sup>a</sup> (3)
	1986 Census (1)	1994 NATSIS (2)	
15-19	0.229	0.208	90.8
20-24	1.078	1.176	109.1
25-29	1.997	2.045	102.4
30-34	2.719	2.892	106.4
35-39	3.189	3.325	104.3
40-44	3.716	3.500	94.2
45-49	4.202	3.972	94.5

Age group	Estimated age-specific fertility rates per woman		
	1986-87 <sup>b</sup>	1993-94 <sup>b</sup>	1994 <sup>c</sup>
15-19	0.1191	0.1233	0.1261
20-24	0.1996	0.2099	0.2005
25-29	0.1764	0.1762	0.1685
30-34	0.1380	0.1623	0.1434
35-39	0.1019	0.0538	0.0358
40-44	0.0673	0.0162	0.0138
45-49	0.0247	0.0061	0.0051
TFR	4.13	3.74	3.47
Crude birth rate	0.0358	0.0342	0.0313
GFR <sup>d</sup> , 15-44 years	0.1431	0.1383	0.1291
Mean age of fertility schedule	26.7	25.4	25.0

a. Column 2/column 1 x 100.

b. Fertility rates consistent with the 1986 and 1994 parity data.

c. Fertility rates consistent with the 1994 parity data.

d. Gross fertility rate (GFR).

While it is common practice for censuses around the world to collect both parity and current fertility data, the 1986 and previous Australian censuses only collected parity data. This study therefore attempts to estimate the level of current fertility from comparison of parity data collected in the 1986 Census and the 1994 NATSIS. However, as the interval between the census and the survey exceeded the five-year interval required to apply the hypothetical cohort method of fertility estimation (United Nations 1983: 41-5), the Arriaga (1983) method is used instead. The Arriaga method estimates age-specific fertility rates from distributions of parity data at two points or one point in time, irrespective of the interval length. The estimation of current fertility is limited only to the national level, as the 1994 NATSIS parity data by States are not considered reliable. The results of applying Arriaga's method to the Aboriginal population at the national level given parity data at two points in time as well as at one point in time for the 1994 NATSIS are presented in Table 2.

The results in Table 2 show that the current fertility levels estimated using comparison of the 1986 and 1994 parity data were a TFR of 4.1 children per woman and a crude birth rate of 36 births per 1,000 population for 1986-1987, and 3.7 children per woman and a crude birth rate of 34 births per 1,000 population for 1993-94. The estimated fertility level for 1994, based on the 1994 parity data only, was a TFR of 3.5 children per woman and a crude birth rate of 31 births per 1,000 population. These estimates depict a moderate Aboriginal fertility level, which is much higher than the previous estimates reviewed in this paper.

The higher Aboriginal fertility found here from the analysis of the 1986 and 1994 parity data could be accurate, unless Aboriginal women grossly over-reported the number of children ever born to them. As already shown, the 1986 parity data were substantially affected by errors owing to parity not stated and corrections were made to retrieve those women of zero parity who were wrongly classified as parity not stated. If corrections for parity not stated were not made and women with parity not stated were excluded from the denominator for the calculation of average parity, then Aboriginal fertility could be much higher than otherwise indicated by these estimates.

It is difficult to ascertain how reliable the 1994 parity data are, as NATSIS did not collect any other fertility information which can be used to evaluate internal data consistency. However, there are no grounds to suspect that such parity data are erroneous, especially given their consistency with estimated 1986 parity data. What the comparison of the two parity data sets shows is that there was little period change in average parities of different cohorts of women who reached the same age groups during 1986-94, though modest fertility rise among

women aged 20-39 years, counteracted by a fertility decline of the 15-19 age group as well as of older women, were apparent. The low fertility rate of the 15-19 age group in the 1994 NATSIS could be due to sampling error.

### **Birth statistics based fertility estimation by States**

Whether the estimated fertility levels based on parity data are correct or not can be further assessed using 1991 birth registration data for Western Australia, South Australia and the Northern Territory as well as using midwives' birth notifications for most States. Aboriginal birth registration in South Australia and Northern Territory and the midwives' birth notifications for Western Australia are considered complete (Luther et al. 1995). The midwives' birth notifications in Western Australia were evaluated to be 100 per cent complete, while birth registration in South Australia and Northern Territory were estimated at 93 per cent and 95 per cent complete respectively (Luther et al. 1995). In the case of Western Australia, the 1,462 notified births to Aboriginal mothers in 1991 are accepted as correct in this analysis. On the basis of the findings by Luther et al. (1995) of the completeness of birth registration, the number of registered births for South Australia and the Northern Territory were corrected to 510 and 1,280 births, respectively. With respect to the remaining States, the 1991 midwives' notifications were used in the calculations without corrections. The fertility rates in Table 3 were calculated by accepting the age distribution of registered or notified births by maternal age as correct. The 1991 Census female age distributions by State, except for the Northern Territory, South Australia and Western Australia, were used as denominators for the calculation of age-specific fertility rates. In the cases of the Northern Territory, South Australia and Western Australia, corrected 1991 female age distributions were used (Luther et al. 1995).

Before discussing the fertility estimates by States, some caveats on the methodological problems of using Aboriginal birth statistics for the purpose of fertility estimation are considered.

#### *Methodological problems of identifying Aboriginal births*

There are serious problems in utilising Aboriginal birth registration and midwives' notifications for estimating Aboriginal fertility that are noteworthy. One such problem is the incomplete identification or registration of Aboriginal births which results in underestimation of Aboriginal fertility. A second problem is that, even if Aboriginal births were to be completely identified, the question of how such births are to be treated in fertility estimation when one of the parents is a non-Aboriginal person arises. Mixed families are increasingly

becoming characteristic of the Aboriginal population. This issue raises a serious methodological problem as there are a substantial number of mixed marriages and the treatment of births from these marriages in statistical calculations affects the estimation of overall Aboriginal fertility and consequently estimates of Aboriginal population growth. To estimate fertility rates by age group of women, the total number of births to women in a particular age group are divided by the total number of women in the particular age group. The methodological problem is whether to include all Aboriginal births or whether to take only births to Aboriginal mothers. How Aboriginal births of mixed parentage would be treated in demographic analysis and its socioeconomic implications are emerging demographic and policy concerns (Dugbaza 1994; Gray and Gaminiratne 1993; O'Reilly 1994).

The ABS (1990: 20-21) evaluation of the 1988 South Australian Aboriginal birth registration found that of total births, 38 per cent had Aboriginal parents, 26 per cent had Aboriginal mothers but non-Aboriginal fathers, 16 per cent had Aboriginal mothers but paternity was not acknowledged, and another 20 per cent had Aboriginal fathers but non-Aboriginal mothers. Thus, of the total Aboriginal births in South Australia, only 80 per cent were to Aboriginal mothers. The figure was the same in 1993 (ABS 1994: 21).

The extent of mixed marriage births by States is not well known, but for those States with available data it is significant, except for the Northern Territory. The proportion of Aboriginal children under age 15 years in the 1991 Census that had a non-Aboriginal mother ranged from a low of 6 per cent in the Northern Territory to a high of 42 per cent in Tasmania, compared to a national average of 24 per cent (Dugbaza 1994: 6). Dugbaza's (1994: 6) analysis of the composition of Australian Aboriginal families in the 1991 Census showed that only 43 per cent of couples were both Aboriginal, 25 per cent comprised an Aboriginal man and non-Aboriginal woman, and 32 per cent consisted of an Aboriginal woman and non-Aboriginal man. The proportion of mixed couples rose from 51 per cent in the 1986 Census to 57 per cent in the 1991 Census.

In order to overcome this methodological problem of estimating Aboriginal fertility using birth registration data, this study considers only births to Aboriginal mothers, as considering all Aboriginal births in the numerator will overestimate fertility. This problem of identifying births to Aboriginal mothers does not arise with the midwives' collections, as only births to Aboriginal mothers are identified and published. The shortcoming of the midwives' notification collection is that Aboriginal births in which the father is Aboriginal but the wife is non-Aboriginal are not identified.

**Table 3. Age-specific fertility rates and age pattern of fertility by State/Territory: midwives' birth notifications, 1991.**

Age group	Fertility rates per 1,000 women by age group and State						Weighted mean <sup>a</sup>	
	NSW	Vic	Qld	WA	SA	NT	Observed	Corrected
15-19	101.7	86.8	131.8	195.9		185.6	139.8	150.4
20-24	138.9	158.7	213.9	222.7	213.5	194.6	189.8	205.3
25-29	101.7	144.2	159.6	142.0	137.2	133.9	134.3	146.5
30-34	52.1	93.7	103.0	75.7	80.0	66.6	76.3	82.7
35-39	14.6	31.4		29.7	40.6	31.0	30.7	32.5
40-44	5.6		7.2	6.0	0.0	7.6	5.6	6.3
TFR	2.07	2.57	3.30	3.36	3.02	3.10	2.88	3.12
m <sup>b</sup>	24.6	25.8	25.5	24.1	24.8	24.2	24.8	24.8
Births	1,397	408	2,168	1,462	510	1,280	7,225	7,813

Age pattern of fertility (per cent)								
15-19	24.5	16.9	20.0	28.9	22.0	30.0	24.2	24.1
20-24	33.5	30.8	32.4	32.9	35.4	31.4	32.9	32.9
25-29	24.5	28.0	24.2	21.0	22.7	21.6	23.3	23.5
30-34	12.6	18.2	15.6	11.2	13.3	10.8	13.2	13.3
35-39	3.5	6.1	6.8	4.4	6.7	5.0	5.3	5.2
40-44	1.4	-	1.1	0.9	-	1.2	1.0	1.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

- a. The observed weighted mean age-specific fertility rates were obtained by weighting the age-specific fertility rates for each State by the age distribution of women in each State. The corrected weighted mean was obtained in a similar way after correcting for under-reported fertility level in New South Wales from a TFR of 2.1 to 3.0, assuming the identification of Aboriginal births was about 70 per cent complete (2,021 births instead of the 1,397 reported births).
- b. m is defined as the mean age of the fertility schedule or fertility distribution. It is the mean age at which a woman would give birth if she gives birth at each age group at the prevailing age-specific fertility rates and survives to the end of her reproductive life.

Table 3 displays the distribution of Aboriginal age-specific fertility rates and fertility patterns for each State in 1991 using midwives' birth notifications. The summation of these age-specific fertility rates produced a TFR of 2.1 children per woman for New South Wales, 2.6 for Victoria, 3.0 for South Australia, 3.1 for the Northern Territory, 3.3 for Queensland and 3.4 for Western Australia. The next to last column, labelled 'observed', gives weighted mean age-specific fertility rates for the States and Territory combined, which is arrived at by weighting the age-specific fertility rates for each State by the distribution of women in each State. The weighted mean TFR was 2.9 children per woman. This estimate is lower than the weighted TFR of

3.2 for the Northern Territory, South Australia and Western Australia combined, which is considered as the most reliable.

As the estimates for the Northern Territory, South Australia and Western Australia are considered reliable, some comments about the completeness of Aboriginal birth identification for Queensland, New South Wales and Victoria are in order. The degree of completeness of the Queensland midwives' notifications is not known, but the calculated TFR of 3.3 appears acceptable. It is also consistent with estimates obtained by indirect methods. The indirect TFR estimates for Queensland for the 1981-86 and 1986-91 intercensal periods were 3.3 and 3.2, respectively, according to Dugbaza (1994: 13) and 3.4 and 3.5, respectively, according to Gray (1990) and Gray and Tesfaghiorghis (1993).

The New South Wales Aboriginal fertility level clearly suggests substantial incomplete identification of births in the midwives' notifications, supporting a similar observation made by Thomson and Briscoe (1991a: 10). This observation, perhaps to a smaller extent, is also true of Victoria. The substantial underestimation of New South Wales Aboriginal fertility affects the national Aboriginal fertility level because of the greater relative size of the New South Wales Aboriginal population. The 1991 Census showed that, of the total Aboriginal population, 26.4 per cent lived in New South Wales, compared to only 6.3 per cent in Victoria. Thus New South Wales fertility needs to be corrected in order to arrive at a reasonable approximation of Aboriginal fertility at the national level.

The correction for New South Wales is based on Queensland's Aboriginal fertility level on the grounds that both had similar fertility levels according to 1994 NATSIS parity data (see Table 1) and that each was home to one-quarter of the Aboriginal population. The current fertility level of New South Wales based on birth notifications was corrected upwards to about 90 per cent of the level of Queensland, which resulted in a corrected TFR for New South Wales of 3.0 children per woman. This implies that Aboriginal birth identification in New South Wales in 1991 was about 70 per cent complete.<sup>3</sup>

By utilising this corrected fertility level for New South Wales and accepting the fertility rates for the other States as given in Table 3, corrected weighted mean age-specific fertility rates and TFR were calculated (last column of Table 3). The corrected weighted mean TFR for 1991 was 3.1 children per woman. This can be considered as the best estimate of national Aboriginal fertility level that could be derived from the present state of the midwives' birth notification system and also is a representative estimate, as the population of these five States and Territory make up 96 per cent of the total Aboriginal population.

Compared to the reliability of the estimated fertility level displayed in the top panel of Table 3, the age patterns of fertility – that is, the distribution of fertility rates by age – given in the bottom panel are more reliable. The age patterns of fertility given in the bottom panel of Table 3 and also depicted in Figure 1 invariably demonstrate the high concentration of Aboriginal fertility among teenagers and young women, with a uniform peak in the 20-24 age group, as well as the low fertility of women aged 35 years and over. In all States, there was hardly any fertility to women aged 40-44 years and virtually none in the 45-49 age group. The age pattern of fertility by States was similar, though Victoria stands out as having the lowest fertility contribution of the 15-19 age group, a broader fertility peak and the highest fertility contribution in the 25-34 age range. Despite the similarity between States, except Victoria, there were marked differences in the fertility contribution of the 15-19 year olds. The contribution to total fertility of the 15-19 age group ranged from 20 per cent in Queensland, to 25 per cent in New South Wales and to about 30 per cent in Western Australia and the Northern Territory. The other notable difference is the similarly very high fertility of the 15-19 and 20-24 age groups in the Northern Territory and Western Australia, while in the other States the fertility rate of the 20-24 age group was considerably higher than that of the 15-19 age group. It is not clear whether Victoria's fertility pattern reflects an emerging trend towards later child bearing or is an artefact of the data.

Furthermore, a comparison of the reliable Aboriginal fertility patterns for the Northern Territory, South Australia and Western Australia with that of their non-Aboriginal counterparts is displayed in Figure 2 in order to provide a comparative perspective between the two populations. Figure 2 depicts enormous differences in levels and patterns at younger ages and broad similarities at ages 30 and over. The Aboriginal fertility of the 15-19 age group was higher than that of the non-Aboriginal fertility by a factor of ten in Western Australia, eight in the Northern Territory and about seven in South Australia. The Aboriginal fertility rate of the 20-24 age group was higher than their non-Aboriginal counterparts by a factor of three in both South Australia and Western Australia and by 2.4 in the Northern Territory. The levels of Aboriginal and non-Aboriginal fertility in the 25-29 age group are comparable and thereafter Aboriginal fertility was even lower, particularly in the 30-34 age group. There is complete convergence at very low fertility in the 35-44 age range. The fertility differences between the two populations are reflected in the wide gap in the mean age at maternity, which for Aborigines in 1991 was 23.3 years in the Northern Territory and Western Australia, and 24.2 years in South Australia, compared to 28.5 years for non-Aboriginal mothers.



Figure 1. Comparisons of age patterns of Aboriginal fertility by States: based on birth notifications data.

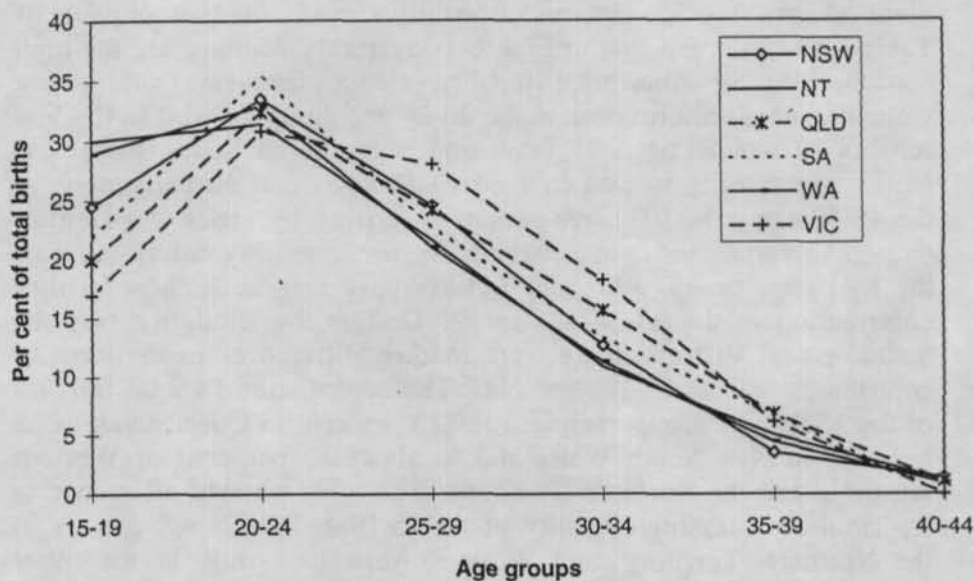


Figure 2. Comparisons of Aboriginal and non-Aboriginal fertility rates in selected States, 1991.

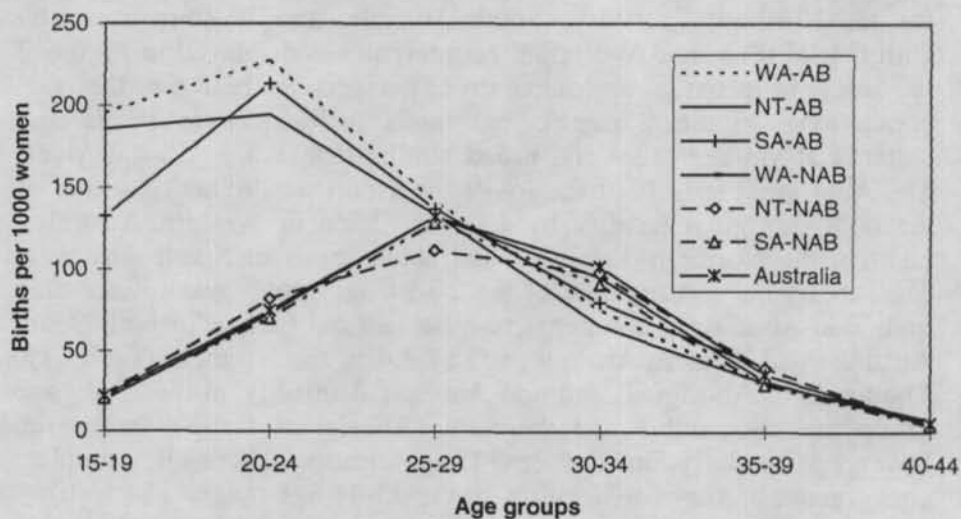


Figure 3. Comparison of distribution of Aboriginal and non-Aboriginal confinements by previous parity: mothers aged 15-29 years, 1992.

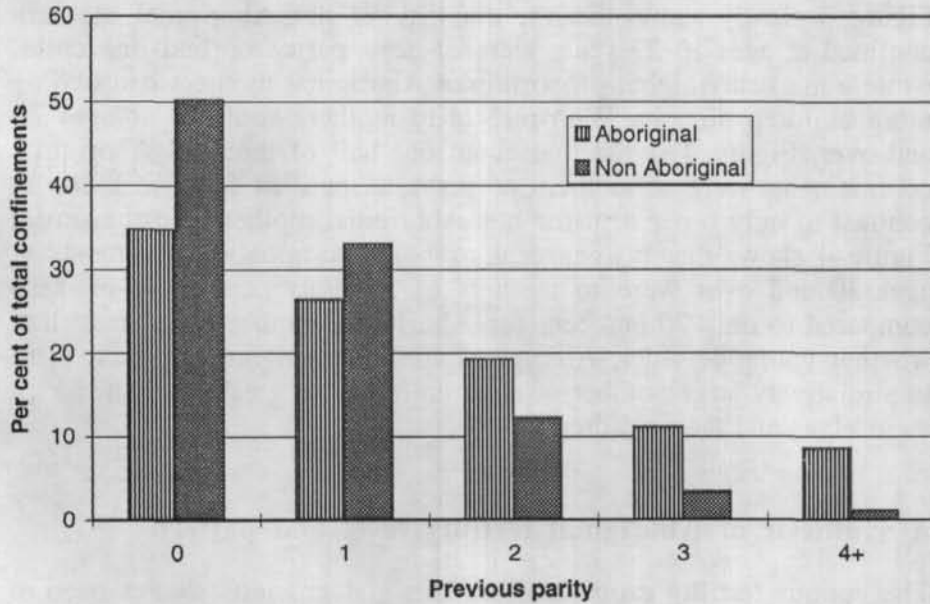
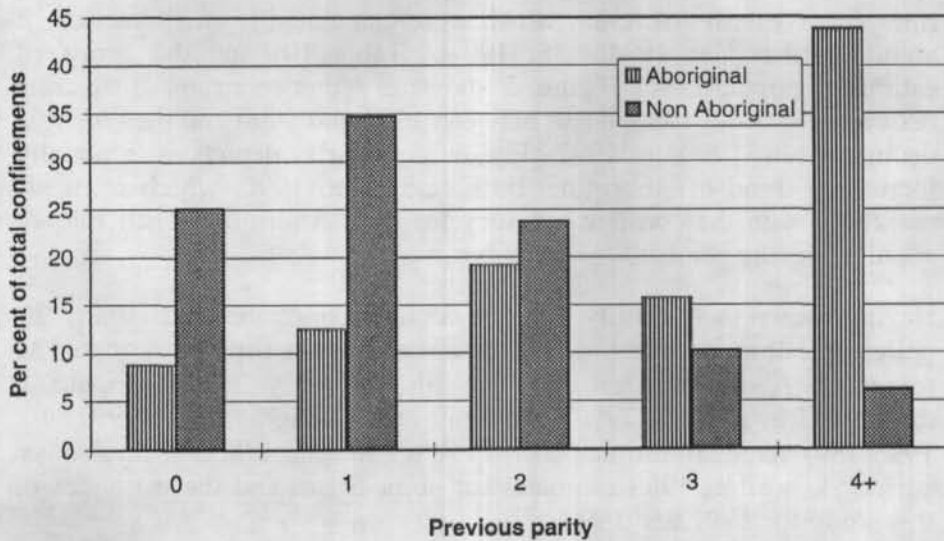


Figure 4. Comparison of Aboriginal and non-Aboriginal confinements by previous parity: mothers aged 30+, 1992.



### *Parity and age at confinement*

The analysis of 1992 confinements data shows that there are striking differences in age at confinement as well as in previous parity at confinement between Aboriginal and non-Aboriginal mothers. Figure 3 clearly shows that the majority of non-Aboriginal mothers confined at ages 15-29 years were of zero parity or had one child, while a markedly higher proportion of Aboriginal mothers had two or more children already. With respect to mothers confined at ages 30 and over, Figure 4 shows that about one-half of the total Aboriginal confinements were to mothers of previous parities four or more in contrast to only 6 per cent for non-Aboriginal mothers. Furthermore, Figure 4 shows that 60 per cent of non-Aboriginal confinements at ages 30 and over were to mothers of previous parity one or zero compared to only 20 per cent for Aboriginal mothers. The fact that, whether young or older, Aborigines confined had already given birth to a relatively large number of children reflects a greater health risk to themselves and their children.

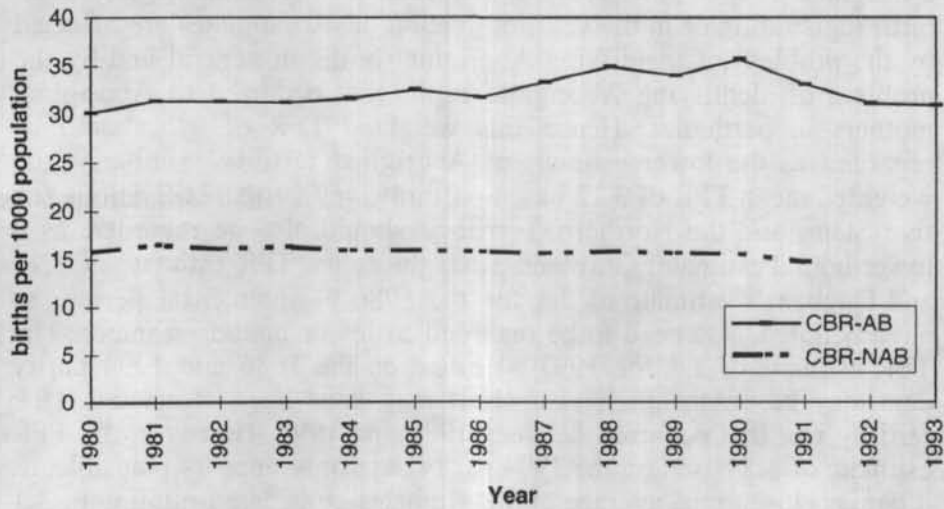
### **A synthesis of Aboriginal fertility level and pattern**

The various fertility estimates from this and previous studies need to be pieced together in order to get an insight into Aboriginal fertility levels, patterns and change.

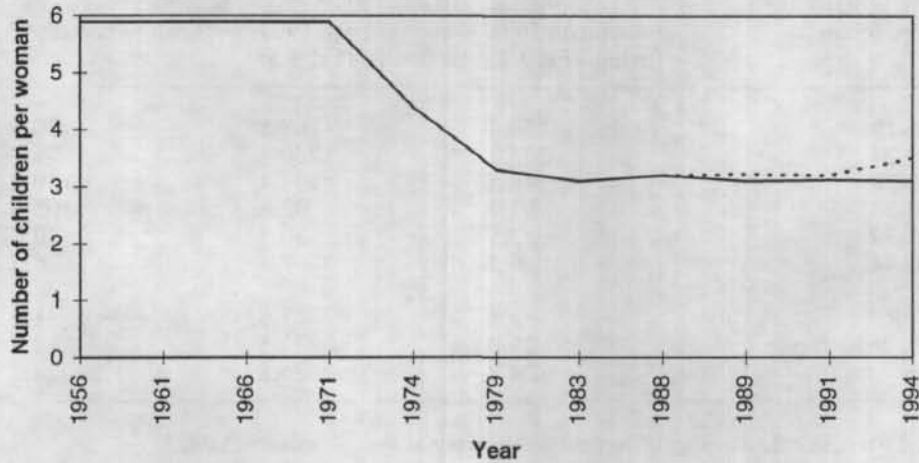
The estimates in this paper consistently point to the fact that Aboriginal fertility did not decline since the mid-1980s, as was expected, but rose instead. This is further supported by the series of Aboriginal birth rates for Western Australia, which were calculated from the series of annual births (Gee 1994a: 35, 1994b: Table 10) and the series of estimated populations.<sup>4</sup> Figure 5 shows a rather constant birth rate between 1980 and 1986, a rise between 1986 and 1990 and then a slight decline from 1990 to 1992. Figure 5 clearly depicts a gradually increasing trend of Aboriginal birth rate up to 1990, which contrasts markedly with the constant but very low non-Aboriginal birth rate of about 15 births per 1,000 population.

Having shown that fertility has not declined since the mid-1980s, the policy question is, which of the estimates should then be accepted to represent Aboriginal fertility level in the early 1990s? Figure 6 displays Gray's (1983, 1990) and Gray and Tesfaghiorghis' (1991: 10; 1993: 89) national estimates of TFR up to the 1986-91 intercensal period, as well as 1988 estimates for some States and the estimates of this study for 1991 and 1994.

**Figure 5. Comparisons of trends in Western Australian birth rates between the Aboriginal and non-Aboriginal population.**



**Figure 6. Trend in estimated Aboriginal total fertility rate.**



Of all the fertility estimates, those based on birth registration for South Australia, Northern Territory and Western Australia, which produced a weighted TFR of 3.2, should be regarded as most reliable. However, birth registration or midwives' notification based estimates are affected by the problem of identifying Aboriginal births in general and by the problem of identifying Aboriginal births that occurred to Aboriginal mothers in particular. Hence, this weighted TFR of 3.2 should be regarded as the lower estimate of Aboriginal fertility. Similarly, the weighted mean TFR of 3.12 based on midwives' birth notifications for five States and the Northern Territory should also be regarded as a lower bound estimate. Gray and Tesfaghiorghis' TFR estimate of 3.22 and Dugbaza's estimate of 3.1 for the 1986-91 intercensal period, as already noted, also need to be regarded as lower bound estimates. The TFR estimate of 3.7 for 1993-94 based on the 1986 and 1994 parity data may be on the high side, as it may have been affected by the fertility rise that occurred between 1986 and 1990. However, the TFR estimate of 3.5 based on the 1994 parity data only appears plausible, as it comes close to the average of the estimates considered minimum, 3.1 to 3.2, and the maximum, 3.7.

**Table 4. Comparison of final estimates of Aboriginal fertility rates with that of total population.**

Age group	Fertility rates per 1,000 women in each age group		
	Aboriginal women 1994 (using TFR 3.1)	Aboriginal women 1994 (using TFR 3.5)	Total women 1993
15-19	150.4	168.8	20.9
20-24	205.3	230.4	71.1
25-29	146.5	164.4	130.0
30-34	82.7	92.8	105.5
35-39	32.5	36.5	39.0
40-44	6.3	7.1	6.3
TFR	3.1	3.5	1.9
Crude birth rate	29.0	32.5	14.7
m <sup>a</sup>	24.8	24.8	28.7

a. Where m is the mean age of the fertility distribution as already defined in Table 3.

Given the uncertainty in the level of Aboriginal fertility, the best that can be done in this situation is to provide an interval estimate of the true level of Aboriginal fertility in 1994, as lying between a TFR of 3.1 and 3.5 children per woman. The weighted age pattern of fertility derived from the 1991 midwives' birth notifications was accepted as the correct pattern and only the fertility rates were adjusted. The final

Aboriginal age-specific fertility rates, TFRs and crude birth rates for 1994 are set out in Table 4. The fertility rates of total population women for 1993 are also shown in Table 4 so as to provide a comparative perspective of the large fertility differences at young ages as well as the similarities at older ages that exist between the two populations.

As is seen from Table 4, Aboriginal fertility in 1994 was estimated between 3.1 and 3.5 children per woman, compared to 1.9 children for total Australian women. The Aboriginal birth rate, 29 to 33 births per 1,000 population per year, was twice the level of the total population, primarily due to the high fertility of young Aboriginal women. The Aboriginal fertility estimates arrived at in Table 4 are acceptable.<sup>5</sup>

### Conclusion

Aboriginal fertility declined dramatically in the 1970s and first half of the 1980s from its peak fertility, measured by a TFR, of about six children per woman in the 1950-1970 period to about three children per woman in the first half of the 1980s. This analysis attempted to assess if Aboriginal fertility has continued to decline since the mid-1980s, as was anticipated in previous research. This study found that Aboriginal fertility did not decline during 1986-94. Instead, the evidence points to a fertility rise between 1986 and 1990 and constant fertility, or slight decline, thereafter. Aboriginal fertility in the first half of the 1990s is estimated at a moderate level, as measured by a TFR of between 3.1 and 3.5 children per woman and a corresponding birth rate of between 29 and 33 births per 1,000 population. This contrasts markedly with a TFR of 1.9 children per woman and a birth rate of 15 births per 1,000 population for the total Australian population.

Although teenage and young Aboriginal fertility has remained very high by any standards, there has been considerable fertility reduction among Aboriginal women over 25 years to a level that is comparable and even lower than that of total Australian women. Furthermore, the analysis of 1992 confinements data showed that young as well as older Aboriginal mothers had higher previous parities at confinement compared to non-Aboriginal mothers.

Several demographic, economic, social and health implications stem from the moderately high Aboriginal fertility reported here. One of the important implications is for the understanding of new population projection and the revision of previous projections.

Tesfaghiorghis and Gray's (1991) population projection, which was based on the assumption of gradual fertility decline, showed that because of rapid Aboriginal population growth, especially of persons

of working age, the Government would face enormous difficulties in meeting its Aboriginal employment equality target by the year 2000. The 1991 Census showed that Tesfaghiorghis and Gray's projection underestimated the Aboriginal population, partly because of the wrong fertility assumption used. The implication of fertility rise rather than fertility decline assumed in the projection will make the employment consequences of rapid population growth even worse than estimates by Tesfaghiorghis and Gray (1991) suggest.

The implication of the findings of this study with respect to projections of the Aboriginal population suggests two scenarios on the future course of fertility. One set of projections would give a minimum population, where fertility is assumed to remain constant at a TFR of 3.1 children per woman. Another set of projections would incorporate a maximum population, in which fertility remained constant at a moderately high level of TFR of 3.5 children per woman.

The fact that the final Aboriginal fertility level is given as an interval estimate indicates the uncertainty that still prevails in the state of Aboriginal demographic knowledge. There is a need for continued Aboriginal fertility research. From the analysis of the fertility levels derived from birth registration and midwives' birth notifications, it can be expected that levels and trends in Aboriginal fertility could be reasonably known from these sources in the near future. Already the birth registration data for Western Australia, Northern Territory and South Australia and the midwives' birth notifications for Western Australia, Northern Territory, South Australia and Queensland are reasonably reliable. What is needed is greater effort and coordination to improve coverage in all States, particularly in New South Wales, Tasmania and the Australian Capital Territory.

In order to correctly measure Aboriginal women's fertility derived from these statistical systems, the parentage of Aboriginal births needs to be collected and analysed. The identification of Aboriginal births which occur to Aboriginal mothers is important because mixed families are increasingly a feature of the Aboriginal population, and this can affect the estimation of Aboriginal population growth and size depending on how births from mixed parentage are treated in fertility estimation. Given the uncertainty in the prospect of Aboriginal fertility, the reinstatement of the question on the number of children born and surviving to Aboriginal women in future Australian censuses is essential.

#### Notes

1. Throughout the paper 'Aboriginal' is used to refer to both Aboriginal and Torres Strait Islander people.

2. The ABS part-of-State classification includes three settlement categories: Capital cities, Other urban (non-capital city urban areas of 1,000 persons or more) and Rural (localities with less than 1,000 persons).
3. A comparison of the distribution of mean parity by States given in Table 1 shows that the mean parities in the 15-19 and 20-24 age groups for New South Wales and Queensland were comparable. In the 25-29 age group, the mean parity in New South Wales was 90 per cent of the level of Queensland. The overall mean parity of women aged 15-49 years in New South Wales was 92 per cent of the level of Queensland. The overall level of fertility in New South Wales was moderately lower than that of Queensland, but similar in the young age groups of highest Aboriginal fertility concentration.
4. The estimated population for the single years 1986 to 1991 were based on a linear interpolation of the corrected 1986 and 1991 Western Australia Aboriginal population by Luther et al. (1995); the estimated population for the years 1980 to 1985 was obtained by applying a growth rate of 2.2 per cent per annum to the 1986 corrected population, and the 1992 and 1993 estimates were obtained by applying the corrected 1986-91 intercensal growth rate of 2.5 per cent to the 1991 corrected population.
5. Some commentary about the acceptability of the estimated fertility rates given in Table 4 is in order. The notable corrections to the age-specific fertility rates implied by the 1994 NATSIS parity data were for the 30-34 and the 15-19 age groups (see Tables 2 and 4). It has been observed in previous studies that Aboriginal fertility is considerably higher than that of total population among young women under 30 years but similar at older ages (Gray 1990; ABS 1995: 94). As is seen in Table 4, the finally estimated fertility rates for Aboriginal women over age 30 years are similar to that of the total population, though on the lower side, consistent with the results suggested by Aboriginal birth registration and midwives' notification data. The estimated fertility rates of the 15-19 age group given in Table 4 are higher than that implied by the 1994 NATSIS parity data but are lower than the weighted fertility rate for South Australia, Western Australia and the Northern Territory. Furthermore, birth data for Aboriginal communities in Queensland for 1984-90 gave a similar fertility rate of 154 for the 15-19 age group, which had dramatically declined from a rate of 201 in 1972-77 (Hogg and Thomson 1992: Table 3). With respect to the 30-34 age group, the estimated fertility rates are much lower than that implied by the 1994 NATSIS parity data but lie well within the bounds of the States' rates suggested by midwives' notifications data. Judging from comparisons with Aboriginal birth registration and midwives' notifications data as well as comparison with the fertility rates of the total population over age 30, it can be concluded that the final estimates of Aboriginal fertility rates arrived at in this study (Table 4) are acceptable.

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