

Reproductive experiences and outcomes among a representative sample of women: the Second Australian Study of Health and Relationships

Juliet Richters,¹ Allison Carter,^{1,2} Theresa Caruana,³ Deborah Bateson,^{4,5} Richard de Visser,⁶ Chris Rissel,^{7,8} Anna Yeung,⁹ Rebecca Guy,¹ Kevin McGeechan⁷

Over the last few decades several shifts have occurred in the pattern of births in Australia.^{1–4} The total fertility rate since 1976 has been lower than the level of 2.1 needed for population replacement (without immigration).⁵

Since 2001 Australia has seen increases in the fertility of women aged over 30 and especially those aged 40–44.⁶ This delay of childbearing is a result of increasing participation by women in education and paid employment over the last 40 years, which has influenced the fluctuation in the fertility rate and could now be a permanent shift.^{7–9} The median age of Australian women giving birth (first or subsequent births) increased steadily from 25 years in 1971 to 31 in 2006 (the highest on record) and 2013.⁴ The teenage birth rate (number of births per 1,000 women aged 15–19 years) fell rapidly from 41 in 1975 to 16 in 2013.⁴ However, such aggregated figures do not describe reproductive outcomes at the level of individual women. This gap is filled by the results from the Australian Study of Health and Relationships.

The first Australian Study of Health and Relationships (ASHR1) reported that 71% of women aged 16–59 years surveyed in 2001–2002 had ever been pregnant, of whom 92% had had a live birth, 33% had had a

Abstract

Objective: To enumerate pregnancy outcomes for a representative sample of women in Australia surveyed in 2012–2013 (primary aim) and compare these with women surveyed in 2001–2002 (secondary aim).

Methods: Computer-assisted telephone interviews with over 10,000 women aged 16–69 years (participation rate 68.4%). Results are weighted for chance of selection and to reflect the population as a whole.

Results: Of women with experience of vaginal intercourse, 75.1% had ever been pregnant, 18.4% reported difficulties getting pregnant and 10.0% had had fertility treatment. Of those who had been pregnant, 91.3% had ever had a live birth, 34.3% a miscarriage, 22.8% an abortion and 2.3% a stillbirth; 0.9% had relinquished a child for adoption. The proportion first pregnant in their 30s was 11% among women aged 60–69 and 26% among those aged 40–49. Fewer older women reported difficulties getting pregnant. Of the 21,882 pregnancies reported, 70% led to live births and 10% were terminated. Compared with our 2001–2002 survey, fewer women reported ever having been pregnant. Giving up newborns for adoption has become very rare.

Conclusions: Falling fertility since the 1960s reflects greater access to contraception and abortion and higher opportunity costs of childbearing.

Implications for public health: These findings on women's lifetime reproductive experiences complement routine annual data collections.

Key words: national survey, fertility, pregnancy, live birth, abortion, spontaneous, induced, adoption, infertility, Australia

miscarriage and 23% an induced abortion.¹⁰ The proportion who reported becoming pregnant for the first time in their teens was highest among those in their 50s (23%) and lowest among those in their 20s.

The interactions between social, economic, geographic, legal and policy environments and the changes in these factors over time mean that we need to examine the reproductive experiences of Australian

1. Kirby Institute, University of New South Wales

2. Faculty of Health Sciences, Simon Fraser University, Burnaby, Canada

3. Centre for Social Research in Health, University of New South Wales

4. Family Planning New South Wales

5. Discipline of Obstetrics, Gynaecology and Neonatology, University of Sydney, New South Wales

6. Department of Primary Care and Public Health, Brighton and Sussex Medical School, Falmer, UK

7. Sydney School of Public Health, University of Sydney, New South Wales

8. College of Medicine and Public Health, Flinders University, Darwin, Northern Territory

9. MAP Centre for Urban Health Solutions, Unity Health Toronto, Canada

Correspondence to: Professor Juliet Richters, Kirby Institute, Wallace Wurth Building, University of New South Wales, Sydney NSW 2052; e-mail: j.richters@unsw.edu.au

Submitted: April 2021; Revision requested: May 2021; Accepted: August 2021

The authors have stated they have no conflicts of interest.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

Aust NZ J Public Health. 2021; Online; doi: 10.1111/1753-6405.13166

women at regular intervals. The aim of this paper is to enumerate experiences of pregnancy and its outcomes for a representative sample of Australian women surveyed in ASHR2 in 2012–2013 (primary aim) and also to compare these with women surveyed in ASHR1 a decade earlier (secondary aim).

Methods

The methodology used in the first and second Australian studies of health and relationships is described in detail elsewhere.^{11,12} Briefly, for ASHR2, computer-assisted telephone interviews were completed by 10,128 women aged 16–69 years from all states and territories between October 2012 and November 2013. Respondents were selected using dual-frame modified random-digit dialling (RDD), combining directory-assisted landline-based RDD with RDD of mobile telephones. The response (participation) rate among eligible women was 68.4%. For ASHR1, people eligible to take part in the study were aged 16–59 years and participants were selected from landline only. The interviewing methods and questions asked were the same as ASHR2 and the response rate was 77.6%.

In a representative national survey, a very large proportion of respondents are (in sexual health terms) low-risk people with a single other-sex partner. To avoid spending a large amount of our interviewing time talking to very similar people, but still achieving a large sample size that would cover sufficient people in minority categories, we adopted the procedure of the French national sex surveys, also conducted by telephone,^{13,14} of restricting the length of the interview by omitting certain modules of the questionnaire for a random sample of 80% of the low-risk heterosexuals, defined for this purpose as respondents who had had one partner in the past year and no lifetime same-sex experience. All respondents with no partners in the past year or two or more partners, and all respondents with any same-sex experience, were asked all applicable questions from the full (long-form) questionnaire, as were the remaining 20% of the people with one partner and no same-sex experience.

Female respondents were asked a series of questions about different aspects of their reproductive histories (see Box 1). Women were also asked whether they

had ever experienced difficulties trying to get pregnant and whether they had ever been treated to help them get pregnant. Proportions reported are those of all women asked each question; thus (for example) the percentage of women reported to have had a miscarriage is the number who said yes divided by the number of women who were asked the question, including those who refused to answer or said 'Don't know'. All proportions should therefore be seen as lower-bound estimates.

Demographic characteristics (age, language spoken at home, education level, household income, occupation) were recoded into groups to facilitate analysis. We used respondents' postcodes with the Accessibility/Remoteness Index of Australia (ARIA)¹⁵ to determine whether respondents lived in a major city, a regional area, or a remote area. We coded respondents' reported occupations into the nine major categories of the Australian Standard Classification of Occupations¹⁶ to allow comparison with ASHR1. Sexual identity (in answer to the question 'Do you think of yourself as ...') was coded as heterosexual, bisexual or homosexual/lesbian. For further detail see the full account of the study design.¹² Data were weighted to adjust for the probability of each respondent being selected for a landline or mobile phone interview, a long-form interview, and (for landline participants) the number of in-scope women in the household. Data were then weighted to match the Australian population on the basis of age, area of residence (i.e. state and ARIA category), and telephone ownership (i.e. mobile telephone only versus other), resulting in an adjusted total sample of 10,037 women.

Box 1: Ascertainment of women's reproductive history.

Have you ever been pregnant? [If yes] How old were you when you first became pregnant?
How many children have you had? (If she asks, live births, not the ones now with her.)
Have you ever had a miscarriage? [If yes] Can you please tell me how many?
Have you ever had a stillbirth? [If yes] Can you please tell me how many?
Have you ever had a termination of pregnancy? (That is, an abortion.) [If yes] Can you please tell me how many?
Have you ever had a child that was given up for adoption? [If yes] Can you please tell me how many children?
Have you ever experienced difficulties trying to get pregnant? [If yes] Have you been treated to help you get pregnant?

Both unweighted and weighted denominators are shown in the tables. Confidence intervals and P values are calculated to allow for the effect of the weighting.

Weighted data were analysed using the survey estimation commands in Stata Version 14.¹⁷ We calculated the proportion of participants who reported each outcome, overall and by sociodemographic covariates. We tested bivariable associations using Pearson's chi-squared test for categorical variables. We then used univariate logistic regression for dichotomous outcomes and multinomial logistic regression for polytomous outcomes to show unadjusted odds ratios (ORs) and 95% confidence intervals (CIs). The significance level was set at 0.05. P values reported include both unadjusted (P) and adjusted (P_A) P values, the latter produced through applying survey estimate commands to account for the complex sampling design and to reflect the location, age and sex distribution of the Census. Finally, we compared outcomes in ASHR1 and ASHR2 to delineate trends, using ASHR1 as the reference. As this was primarily a descriptive analysis, exploring key predictors in models fell outside the scope of the current report. Thus, covariates were not adjusted for in the analysis.

The study protocol was approved by the Human Ethics Committee of La Trobe University (HEC 11-040) and ratified by the committees at the University of New South Wales, the University of Sydney and the University of Sussex.

Results

Women's fertility experiences

The data in Table 1 describe the fertility experiences of women who told us they had ever had vaginal intercourse (93.7%, 9407/10,037). Three-quarters of women with experience of vaginal intercourse had been pregnant at least once. About one in five (18.4%) of women who had had intercourse reported that they had experienced difficulties getting pregnant; of these women, 54.6% (95%CI 49.7–59.4%) had been treated to help them get pregnant. Thus, about 10% of women with experience of vaginal intercourse (after weighting) had been treated for fertility problems.

Table 2 displays the bivariable associations between markers of fertility (having ever been

pregnant and having had difficulties getting pregnant) and a range of demographic variables. Older women were significantly more likely than young women to report having ever been pregnant, as were women who identified as heterosexual or lived in regional areas. Women appeared more likely to have ever been pregnant if they had not completed secondary education, or were manager/professionals, but these differences were not apparent after adjustment for the other correlates. Similarly, women on very low incomes appeared less likely to report having ever been pregnant than those on higher incomes, but this difference too diminished in the adjusted analysis. Higher household income was associated with ever having been pregnant, but this association was not apparent after adjustment for other variables.

There was a significant association between ever having experienced difficulties getting pregnant and age at interview: women aged in their 30s and 40s were more likely to report this than women over 50 years of age. No other associations were significant.

Women's pregnancy outcomes

Table 3 shows the outcomes for those who had ever been pregnant (including some extra respondents who had not had vaginal intercourse or had not answered the question). Among women who had ever been pregnant, 91.3% reported at least one live birth. The number of live births reported by women who had been pregnant ranged from 0 to 8, with a mean of 2.18 and a median of 2. There was a significant association between age group and number of live births ($P < 0.001$). The average number of live births rose from 0.05 among women aged 16–19 years to 0.40 among women aged 20–29, 1.65 among women aged 30–39, 2.07 among women aged 40–49, 2.20 among women aged 50–59, and 2.34 among women aged 60–69.

Among women who had ever been pregnant, just over one-third reported a miscarriage (Table 3). Of these women, 62.9% reported one miscarriage, 21.6% reported two miscarriages, and 15.5% reported three or more miscarriages. The maximum number of miscarriages reported was 15. Very few women (2.3%) reported a stillbirth. The number of stillbirths reported ranged from 1 to 6, with 96% of women who had ever had a stillbirth reporting one stillbirth, 3% reporting two, and 1% reporting three or more stillbirths.

Less than a quarter (22.8%) of women who had ever been pregnant reported an abortion. The number of abortions reported ranged from 1 to 12, with 73.5% of the women who had ever had an abortion reporting one abortion, 20.6% reporting two abortions, and 5.9% reporting three or more.

Very few women who had ever been pregnant (0.9%) reported that they had given birth to a child who was given up for adoption. Almost all had done this only once. Only a handful of women under 50 years of age had given up a child, and none aged under 30, but 1.5% of women in their 50s and

Table 1: Fertility and pregnancy among 9,407 (4,125)^a women aged 16–69 reporting experience of vaginal intercourse: Second Australian Study of Health and Relationships.

Fertility and pregnancy	Women ^b % (95% CI)
Ever been pregnant	75.1 (73.0–77.1)
Ever had difficulties getting pregnant	18.4 (16.8–20.1)
Ever had fertility treatment	10.0 (9.1–10.9)

Note:

a: Weighted (unweighted) denominator

b: Base for all percentages is women who had had vaginal intercourse

Table 2: Sociodemographic correlates of markers of fertility among 9,407 (4,125)^a women who had ever had vaginal intercourse: Second Australian Study of Health and Relationships.

	Ever been pregnant ^b		Had difficulties getting pregnant ^b	
	% (95% CI)	P	% (95% CI)	P
Total	75.1 (73.0–77.1)		18.4 (16.8–20.1)	
Age at interview		$P < 0.001$		$P < 0.001$
16–19	14.2 (7.4–25.3)	$P_A < 0.001$	– ^c	$P_A < 0.004$
20–29	39.9 (33.9–46.2)		8.0 (5.1–12.3)	
30–39	82.3 (78.3–85.8)		24.9 (20.9–29.6)	
40–49	89.9 (86.9–91.9)		24.0 (20.5–28.0)	
50–59	92.4 (90.2–94.2)		20.4 (17.4–23.9)	
60–69	93.1 (90.7–94.9)		18.2 (15.1–21.8)	
Language spoken at home		$P < 0.25$		$P < 0.31$
English	75.4 (73.2–77.5)	$P_A < 0.36$	18.6 (17.0–20.4)	$P_A < 0.49$
Other	69.4 (57.8–79.0)		13.9 (7.7–23.9)	
Education		$P < 0.004$		$P < 0.34$
Less than secondary	70.2 (65.6–74.4)	$P_A < 0.72$	18.5 (15.0–22.7)	$P_A < 0.18$
Secondary	70.2 (65.6–74.4)		16.2 (13.3–19.7)	
Post-secondary	75.3 (72.4–77.9)		19.2 (17.1–21.3)	
Household income		$P < 0.001$		$P < 0.12$
<\$28,000	57.1 (51.2–62.8)	$P_A < 0.49$	14.7 (11.7–18.3)	$P_A < 0.20$
\$28,000–\$52,000	74.0 (68.5–78.8)		16.2 (12.9–20.3)	
\$52,000–\$83,000	77.0 (72.0–81.3)		17.2 (13.9–21.0)	
\$83,000–\$125,000	81.1 (76.7–84.8)		19.5 (16.0–23.4)	
>\$125,000	81.6 (77.4–85.2)		22.9 (18.9–27.4)	
Region of residence		$P < 0.001$		$P < 0.25$
Urban	72.9 (70.2–75.4)	$P_A < 0.15$	17.8 (15.8–19.9)	$P_A < 0.80$
Regional	81.2 (77.7–84.2)		20.6 (17.9–23.7)	
Remote	65.5 (41.0–83.8)		15.5 (7.2–30.4)	
Occupational classification		$P < 0.23$		$P < 0.81$
Blue collar	77.4 (70.6–83.1)	$P_A < 0.89$	18.8 (14.2–24.5)	$P_A < 0.62$
White collar	73.7 (70.7–76.6)		17.9 (15.8–20.3)	
Manager/professional	77.4 (73.8–80.6)		19.2 (16.5–22.2)	
Sexual identity		$P < 0.001$		$P < 0.10$
Heterosexual	76.1 (73.9–78.2)	$P_A < 0.004$	18.6 (16.9–20.4)	$P_A < 0.43$
Bisexual	50.1 (39.4–60.7)		10.2 (5.8–17.3)	
Lesbian	36.0 (24.0–50.1)		13.2 (7.2–22.8)	

Note:

a: Weighted (unweighted) denominator

b: Denominator varies due to missing data for correlates

c: Estimate unreliable due to small numbers

2.6% of women in their 60s who had ever been pregnant had done so.

The ages at which women first fell pregnant ranged from 12 years to 45 years of age, with a mean of 24.5 years and a median of 24 years (interquartile range 20–28). About one in five women (among those who had ever been pregnant) reported becoming pregnant the first time as a teenager. Age at first pregnancy was associated with current age ($P < 0.001$). There were also age differences in the chance of having a first pregnancy aged in one's 30s: 26% of women in their 40s and 19% of women in their 50s reported this, but only 11% of women in their 60s.

Table 4 displays correlates of the various outcomes of pregnancy (stillbirth is not shown as the numbers were too small to identify independent correlates). Older women were more likely to have had a live birth, as were women who identified as heterosexual. Women with less than secondary education appeared more likely to have had a live birth than women with higher education, but this association weakened after adjustment for the other variables.

None of the sociodemographic correlates were significant for miscarriage.

There was a significant association between current age and having had an abortion ($P < 0.001$), with women aged 20–29 years (as a proportion of those who had been pregnant) more likely to have had an abortion than those in the older age categories. Both region of residence and occupational classification became significant after adjustment for the other variables, with women in regional areas less likely and those in blue-collar jobs more likely to have had an abortion than other women.

Table 3: Reproductive outcomes among 7,094 (3,294)^a women aged 16–69 who had ever been pregnant: Second Australian Study of Health and Relationships.

Outcomes of pregnancy	Women % (95% CI)
Ever had a live birth	91.3 (89.5–92.8)
Ever had a miscarriage	34.3 (32.1–36.7)
Ever had a stillbirth	2.3 (1.7–3.0)
Ever had a termination of pregnancy (abortion)	22.8 (20.8–24.8)
Ever had a child who was given up for adoption	0.9 (0.6–1.2)

Note:
a: Weighted (unweighted) denominator. Includes 36 (unweighted) women not in Table 1 who had not had intercourse or declined to answer the question

Outcomes of pregnancies

Women provided data relating to the outcomes of 21,882 (10,763 unweighted) pregnancies. Of these, 70.0% resulted in live births, 19.3% resulted in miscarriages, 0.8% resulted in stillbirths, and 10.0% were terminated.

Selected comparisons between the first and second Australian Study of Health and Relationships

Women aged 16–59 years in ASHR2 were significantly less likely to report having ever been pregnant than women in ASHR1 (Table 5). They were also more likely to report having had difficulties getting pregnant. There were no significant differences between the two samples in the proportion of women who

reported having had fertility treatment.

Among those who had been pregnant, there were no significant differences between the two samples in the proportion of women reporting one or more live births, miscarriages, stillbirths or abortions. However, there is evidence of an age-cohort effect in relation to abortion. In ASHR1, only 13.6% of women aged 50–59 years reported ever having had an abortion,¹⁰ whereas 23.4% did in ASHR2, which is similar to the women aged in their 40s (23.8%) in ASHR1.

The relinquishment rate (i.e. the proportion of women who had had a child who was given up for adoption) dropped significantly between the two surveys, from 1.3% of women who had ever been pregnant in ASHR1 to 0.5% of such women aged 16–59 years in ASHR2.

Table 4: Sociodemographic correlates of having experienced pregnancy outcomes among 7,094 (3,294)^a women who had ever been pregnant: Second Australian Study of Health and Relationships.

	Live birth			Miscarriage			Abortion		
	%	95% CI	P	%	95% CI	P	%	95% CI	P
Total	91.3	(89.5–92.8)		34.3	32.1–36.7		22.8	20.8–24.9	
Age at interview			$P < 0.001$			$P < 0.37$			$P < 0.001$
16–19	58.6	(26.9–84.5)	$P_A < 0.001$	46.5	18.7–76.7	$P_A < 0.51$	b		$P_A < 0.001$
20–29	65.8	(55.1–75.0)		32.4	23.4–42.8		33.4	25.0–43.0	
30–39	91.4	(88.0–94.0)		36.1	31.1–41.5		20.1	16.2–24.6	
40–49	95.3	(93.1–96.8)		37.2	32.7–41.8		24.8	21.0–29.2	
50–59	95.9	94.3–97.1		32.5	28.7–36.5		23.4	20.0–27.1	
60–69	97.8	96.1–98.8		31.1	27.2–35.2		15.3	12.5–18.6	
Language at home			$P < 0.64$			$P < 0.45$			$P < 0.96$
English	91.4	89.6–93.0	$P_A < 0.46$	34.6	32.3–37.0	$P_A < 0.43$	22.8	20.8–24.9	$P_A < 0.72$
Other	89.2	74.2–96.0		30.0	19.6–42.9		22.6	13.2–35.7	
Education			$P < 0.01$			$P < 0.75$			$P < 0.80$
Less than secondary	95.6	92.3–97.6	$P_A < 0.43$	32.6	28.1–37.5	$P_A < 0.95$	24.0	17.7–29.0	$P_A < 0.70$
Secondary school	87.2	81.4–91.4		35.1	29.9–40.7		21.9	17.7–26.8	
Post-secondary	91.6	89.5–93.3		34.4	31.7–37.6		22.7	20.3–25.4	
Household income			$P < 0.19$			$P < 0.27$			$P < 0.05$
<\$28,000	87.5	81.4–91.8	$P_A < 0.45$	39.9	34.5–45.6	$P_A < 0.63$	29.7	24.4–35.7	$P_A < 0.14$
\$28,000–\$52,000	92.1	88.5–94.6		34.2	29.0–39.7		25.7	21.0–31.2	
\$52,000–\$83,000	89.0	83.0–93.0		31.6	26.4–37.3		21.5	17.4–26.4	
\$83,000–125,000	93.7	90.1–96.1		34.5	29.7–39.6		19.7	15.7–24.3	
>\$125,000	91.7	87.3–94.6		32.8	28.0–38.1		23.1	19.1–27.7	
Region of residence			$P < 0.44$			$P < 0.25$			$P < 0.07$
Major city	91.4	89.2–93.1	$P_A < 0.81$	34.2	31.4–37.2	$P_A < 0.23$	24.5	22.0–27.2	$P_A < 0.005$
Regional	92.0	88.2–94.7		34.9	31.0–38.9		19.6	16.7–23.0	
Remote	84.3	64.1–94.1		46.5	28.5–65.6		24.2	12.1–42.7	
Occupational classification			$P < 0.27$			$P < 0.76$			$P < 0.08$
Blue collar	88.3	81.1–92.8	$P_A < 0.43$	36.7	30.2–43.9	$P_A < 0.03$	29.0	22.5–36.3	$P_A < 0.011$
White collar	92.5	89.9–94.4		34.6	31.4–37.9		21.1	18.5–24.0	
Manager/Professional	90.5	87.2–92.9		34.0	30.3–36.9		22.9	19.8–26.3	
Sexual identity			$P < 0.01$			$P < 0.92$			$P < 0.07$
Heterosexual	91.6	89.7–93.1	$P_A < 0.04$	34.3	32.0–36.7	$P_A < 0.54$	22.5	20.5–24.6	$P_A < 0.14$
Lesbian	86.5	68.1–95.1		35.7	18.5–57.5		20.9	9.4–40.3	
Bisexual	80.1	67.5–89.6		33.6	21.7–47.9		37.8	24.9–52.6	

Notes:

a: Weighted (unweighted) denominators. *N* varies slightly due to missing data for correlates

b: Estimate unreliable due to small numbers

Although fewer pregnancies reported to ASHR2 led to live births, and more resulted in miscarriages, there were no significant differences between the overall proportion of stillbirths and abortions reported in the two surveys (Table 6).

Discussion

The results presented here provide a snapshot of the reproductive experiences of Australian women. The majority of women aged 16–69 years with experience of intercourse (75%) had been pregnant at least once. Significantly fewer had ever been pregnant than in ASHR1. Over 18% had experienced some difficulty in becoming pregnant, a percentage significantly higher than that reported in ASHR1.

As reported previously and in a number of other studies in Australia and overseas, only slightly more than half of the women who reported difficulties getting pregnant sought fertility treatment,^{10,18–20} despite the steady increase in births that result from the use of assisted reproductive technologies.²¹ The peak in the proportion of women reporting having had difficulties in becoming pregnant among those aged in their 30s and 40s is due to women's fertility declining as they age, but also reflects that increasingly over time, women aged 30–39 years are the most likely to be seeking pregnancy as more women are delaying trying to have a first child until their 30s or even early 40s.⁴

This pattern of delayed childbearing has been documented across the developed world, and examined by journalists, demographers and sociologists.^{22–24} Influences include the attractions of the independent life made possible by effective contraception, especially for men, who are less aware of having a 'biological clock'.^{25,26} Compounding such changes are high housing costs (major Australian cities have some of the world's most unaffordable housing),²⁷ insecure jobs,²⁸ lack of affordable child care or other support for parents who are students or in the workforce, extreme expectations of 'perfect' parenting,^{22,29} and social disapproval of early childbearing except in some religious, ethnic and Indigenous communities. The result is a child-unfriendly society that further discourages people from undertaking what is in economic terms an extremely expensive life decision.

Table 5: Comparison of experiences of fertility and pregnancy among women aged 16–59 in the first (2001–02) and second (2012–13) Australian Study of Health and Relationships.

	ASHR1 %	ASHR2 %	OR (95% CI)
Of all women with experience of vaginal intercourse	N=8,747 (3,040) ^a	N=8,083 (3,139)	
Ever been pregnant	76.3	72.3	0.81 (0.68–0.97)
Ever had difficulties getting pregnant	15.5	18.5	1.24 (1.03–1.50)
Ever had fertility treatment	8.3	10.3	1.26 (0.98–1.62)
Of all women who had ever been pregnant	N=6838 (2305)	N=5890 (2392)	
Ever had a live birth	91.6	90.0	0.82 (0.61–1.10)
Ever had a miscarriage	33.4	35.0	1.07 (0.91–1.27)
Ever had a stillbirth	2.6	2.0	0.74 (0.44–1.23)
Ever had an abortion	22.6	24.3	1.08 (0.91–1.33)
Ever had a child who was given up for adoption	1.3	0.5	0.39 (0.20–0.81)

Notes:

a: Weighted (unweighted) denominator

Bold figures indicate a significant difference between ASHR1 and ASHR2 (P < 0.05). ASHR1 was used as the reference

Our data illustrate the higher fertility in older age groups. As women aged in their 50s and 60s are not amassing further births, these figures represent higher completed fertility in those cohorts.

The rise since ASHR1 in the proportion of women aged in their 50s who have had an abortion reflects the change in access to abortion created by the legal changes in the 1970s, which may also have made it easier for women to admit to having had an abortion. Although mifepristone (formerly known as RU486) was registered by the Therapeutic Goods Administration in 2012 and subsidised by the Pharmaceutical Benefits Scheme in 2013, these changes did not occur in time to have an effect on the figures for abortion we report here (data collected in 2012–2013).

Until the 1970s, relinquishing a baby for adoption was a common outcome for a pregnant woman who could not raise the child herself. Since then the number of babies available for adoption has become very small.³⁰ Reasons include the introduction of the Supporting Mother's Benefit in 1972, greater accessibility to abortion and an increase in use of effective contraception.^{31,32} Nowadays, babies relinquished soon after

birth for adoption are a small proportion of the low numbers of children who are adopted each year.³³

This study provides a much-needed picture of the lifetime reproductive experiences of women of different ages between 16 and 69 years, as distinct from the annual population incidence of events such as births and stillbirths provided by routine data collections. However, there are drawbacks because the data are based on self-report. Most importantly, pregnancy itself may be underreported. It is possible that some women, when asked 'Have you ever been pregnant?'; did not count pregnancies that ended in early miscarriage or were terminated, so we may have underestimated the number of pregnancies and also the proportion of pregnancies that did not proceed to a birth. A recent analysis of abortion reporting in surveys in France and Britain (which have accurate national data on abortion) found more evidence of underreporting in a pregnancy history module than in response to a direct question about abortion.³⁴ Our 'ever pregnant' question had a non-answer rate of nearly 5%, reflecting the difficulty with this question for

Table 6: Comparison between selected outcomes of pregnancy in the first and second Australian Study of Health and Relationships: data from women aged 16–59.

Outcomes of pregnancies	ASHR1 % N=21,065 pregnancies	ASHR2 % N=17,903 pregnancies	OR (95% CI)
Live birth	72.2	68.5	0.84 (0.74–0.94)
Miscarriage	17.1	19.9	1.21 (1.04–1.40)
Stillbirth	0.9	0.7	0.75 (0.46–1.22)
Abortion	9.8	10.9	1.13 (0.95–1.33)

Note:

Bold figures indicate a significant difference between ASHR1 and ASHR2 (P < 0.05). ASHR1 was used as the reference.

women who may (for example) have had a late menstrual period but not known whether they were pregnant, or did not want to discuss the outcome of a pregnancy. Another source of inaccuracy in counting abortions may be underrepresentation of women from marginalised and disadvantaged groups, as in most health surveys. Among Australian female prisoners surveyed in 2007–2008, ever having had an abortion was twice as common (47%) as in ASHR2.³⁵ It is also possible that some women may have reported an abortion as a miscarriage, particularly if it was illegal. On the other hand, self-report includes information on miscarriages that were not reported to doctors or treated in hospital and would otherwise have remained unrecorded. Among women who reported ever having been pregnant, non-response rates for the outcomes were very low (0.1–0.3%).

Our reported percentage of women who reported difficulties getting pregnant does not necessarily represent a measure of infertility, as women may have had unrealistic expectations of how rapidly pregnancy would occur after cessation of contraceptive use and may have interpreted normal variation as a problem. Problems with answering the question are implied by the high (nearly 10%) non-response rate (don't know, can't remember, refused). Our survey found a higher proportion of women reporting 'difficulties getting pregnant' than reported infertility in the British survey Natsal-3 (12.5%),²⁰ which reflects Natsal's tighter definition of '12 months or longer, when you and a partner were trying for a pregnancy but it didn't happen'.

Conclusion

The fertility of Australian women over the past 50 years has changed substantially, reflecting greater access to contraception and abortion and higher opportunity costs of childbearing in recent decades. Most striking changes are the fall in fertility since the 1960s, and the virtual disappearance of relinquishment of newborns for adoption. Compared with ASHR1 a decade earlier, fewer women under 60 years of age reported ever having been pregnant (72% vs 76%). Our findings raise wider questions about the falling birth rate and women commencing childbearing at later ages – a phenomenon that is not ideal for obstetric outcomes. The high opportunity costs of childbearing,

especially for women, must be addressed by social and economic policy changes.

Acknowledgments

This study was funded by the National Health and Medical Research Council (grant number: 1002174). We are indebted to the late David Shellard and the staff of the then Hunter Valley Research Foundation for managing data collection and undertaking the interviews for this study, and to the Social Research Centre for producing weights for the data. We also thank the women who took part in the study and so freely shared the sometimes intimate aspects of their lives. We are grateful to Dr Huachun Zou, Dr Suzanne Fitzadam and Dr Praveena Gunaratnam for early analyses, to the late Associate Professor Julia Shelley for assistance with an early draft and many interesting discussions, and to Professor Andrew Grulich and Emerita Professor Judy Simpson for their contributions to ASHR2 as a whole. Professor Anthony Smith, who led ASHR1, died during the course of ASHR2 and we intend this work to be a tribute to the extraordinary contribution his work made to the sexual health and wellbeing of Australians.

References

1. Australian Bureau of Statistics. *3301.0 - Births, Australia, 2002*. Canberra (AUST): ABS; 2003.
2. Australian Bureau of Statistics. *3301.0 - Births, Australia, 2009*. Canberra (AUST): ABS; 2010.
3. Australian Bureau of Statistics. One for the Country: Recent Trends in Fertility. In: *4102.0 - Australian Social Trends, Dec 2010*. Canberra (AUST): ABS; 2010.
4. Australian Bureau of Statistics. *3301.0 - Births, Australia, 2013*. Canberra (AUST): ABS; 2014.
5. Australian Bureau of Statistics. *3301.0 - Births, Australia, 2012*. Canberra (AUST): ABS; 2014.
6. Australian Bureau of Statistics. Australia's Birth Rate Falls, But Older Mothers Buck the Trend. Media release. *3301.0 - Births, Australia, 2013*. Canberra (AUST): ABS; 2014.
7. Yu P. *Higher Education, the Bane of Fertility? An Investigation with the HILDA Survey*. Discussion Paper No. 512. Canberra (AUST): Australian National University Centre for Economic Policy Research; 2006.
8. Bongaarts J, Feeney G. When is a tempo effect a tempo distortion? *Genus*. 2002;66(2):1–15.
9. Australian Department of the Treasury. *2015 Intergenerational Report: Australia in 2055*. Canberra (AUST): Commonwealth of Australia; 2015. p. vii–xii.
10. Smith AMA, Rissel CE, Richters J, Grulich AE, de Visser RO. Sex in Australia: Reproductive experiences and reproductive health among a representative sample of women. *Aust N Z J Public Health*. 2003;27:204–9.
11. Smith AMA, Rissel CE, Richters J, et al. Sex in Australia: The rationale and methods of the Australian Study of Health and Relationships. *Aust N Z J Public Health*. 2003;27:106–17.
12. Richters J, Badcock PB, Simpson JM, Shellard D, Rissel CE, de Visser RO, et al. Design and methods of the Second Australian Study of Health and Relationships. *Sex Health*. 2014;11:383–96.
13. ACSF Investigators. AIDS and sexual behaviour in France. *Nature*. 1992;360:407–9.

14. Bajos N, Bozon M. *Sexuality in France: Practices, Gender and Health*. London (UK): Bardwell Press; 2012.
15. Australian Department of Health and Aged Care. *Measuring Remoteness: Accessibility/remoteness Index of Australia (ARIA)*. Canberra (AUST): Government of Australia; 2001.
16. Australian Bureau of Statistics. *1220.0. - ASCO - Australian Standard Classification of Occupations, Second Edition, 1997*. Canberra (AUST): ABS; 1997.
17. *Statacorp*. Stata statistical software. Release 14. College Station (TX): Stata Corporation; 2015.
18. Webb SM, Holman CDJ. A survey of infertility, surgical sterility and associated reproductive disability in Perth, Western Australia. *Aust J Public Health*. 1992;16:376–81.
19. Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment-seeking: Potential need and demand for infertility medical care. *Hum Reprod*. 2007;22:1506–12.
20. Datta J, Palmer MJ, Tanton C, et al. Prevalence of infertility and help seeking among 15000 women and men. *Hum Reprod*. 2016;31(9):2108–18.
21. Harris K, Fitzgerald O, Paul RC, Macaldowie A, Lee E, Chambers GM. *Assisted Reproductive Technology in Australia and New Zealand 2014* [Internet]. Sydney (AUST): University of New South Wales National Perinatal Epidemiology and Statistics Unit; 2016 [cited 2019 Oct 28]. Available from: <https://nipesu.unsw.edu.au/surveillance/assisted-reproductive-technology-australia-and-new-zealand-2014>
22. Cannold L. *What, No Baby? Why Women are Losing the Freedom to Mother, and How They Can Get It Back*. Fremantle (AUST): Fremantle Arts Centre Press; 2005.
23. Macken D. *Oh No, We Forgot to Have Children! How Declining Birth Rates are Reshaping Our Society*. Sydney (AUST): Allen & Unwin; 2005.
24. Hilder L, Zhichao Z, Parker M, Jahan S, Chambers GM. *Australia's Mothers and Babies 2012*. Canberra (AUST): Australian Institute of Health and Welfare; 2014.
25. Lemoine M-E, Ravitsky V. Sleepwalking into infertility: The need for a public health approach toward advanced maternal age. *Am J Bioethics*. 2015;15(11):37–48.
26. Phillips N, Taylor L, Bachmann G. Maternal, infant and childhood risks associated with advanced paternal age: The need for comprehensive counseling for men. *Maturitas*. 2019;125:81–4.
27. Janda M. Housing Costs in Australia Second Only to Hong Kong. *ABC News* [Internet]. 2016 [cited 2019 Oct 28]. Available from: www.abc.net.au/news/2016-01-25/housing-costs-in-australia-second-only-to-hong-kong/7111490
28. Steele EJ, Giles LC, Davies MJ, et al. Is precarious employment associated with women remaining childless until age 35 years? Results from an Australian birth cohort study. *Hum Reprod*. 2014;29(1):155–60.
29. Douglas SJ, Michaels MW. *The Mommy Myth: The Idealization of Motherhood and How It Has Undermined All Women*. New York (NY): Free Press; 2004.
30. Higgins D. *Impact of Past Adoption Practices: Summary of Key Issues from Australian Research. Final Report*. Melbourne (AUST): Australian Institute of Family Studies; 2010.
31. Richters J, Fitzadam S, Yeung A, et al. Contraceptive practices among women: The second Australian study of health and relationships. *Contraception*. 2016;94:548–55.
32. Rissel CE, Heywood W, de Visser RO, Simpson JM, Grulich AE, Badcock PB, et al. First vaginal intercourse and oral sex among a representative sample of Australian adults: The Second Australian Study of Health and Relationships. *Sex Health*. 2014;11:406–15.
33. Australian Institute of Health and Welfare. *Adoptions Australia 2013–14*. Canberra (AUST): AIHW; 2014.
34. Scott RH, Bajos N, Wellings K, Slaymaker E. Comparing reporting of abortions in three nationally representative surveys: Methodological and contextual influences. *BMJ Sex Reprod Health*. 2019. doi 10.1136/bmj.srh-2019-200321
35. Butler T, Richters J, Yap L, Papanastasiou C, Richards A, Schneider K, et al. *Sexual Health and Behaviour of Queensland Prisoners: With Queensland and New South Wales Comparisons*. Perth (AUST): Curtin University National Drug Research Institute; 2010.