Prevalence of Induced Abortion in a Reproductive Lifetime

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The period total first abortion rate (TFAR) has been used to estimate the proportion of women who will experience an induced abortion in their reproductive lifetime. It is a hypothetical measure as age-specific rates currently existing will change with time. Instead, a cohort TFAR has been calculated for women born around 1955 using legal-abortion reports in South Australia to calculate first abortion rates for each year of age from 15 years to 44 years for 1971–2000, respectively, and summing these. Yearly fertility rates were also calculated for this cohort to further describe their reproductive experience. Yearly first abortion rates were also calculated for later cohorts born in 1960–1980. The 1955 cohort TFAR was 288.1 per 1,000 women aged 15–44 years. Cumulative first abortion rates at specific ages were higher for subsequent cohorts (e.g., 309.6 per 1,000 at age 40 years for the 1960 cohort). Thus, about 29% of South Australian women born around 1955 and exposed to legal abortion throughout their reproductive lifetime experienced an induced abortion. This proportion would be higher for later cohorts of women born in 1960–1980 (e.g., at least 31% for those born in 1960).

The question has often been asked, “What proportion of all women have experienced or will experience an induced abortion in their lifetime?” (1). This has been estimated using the period total first abortion rate (TFAR) (1) in which rates for first abortions for 5-year age groups in the reproductive age group 15–44 years are summed and multiplied by five. Forrest (2) estimated that at first abortion rates existing in 1982 in the United States for the 5-year age groups, 46 percent of women in the United States would have an induced abortion in their reproductive lifetime, and Henshaw (3) estimated this to be 43 percent based on 1992 US first abortion rates.

The first abortion rates for 5-year age groups used to calculate the US period TFARs were derived from the national surveys of abortion providers by the Alan Guttmacher Institute, with adjustment for underreporting of abortions (2) and from abortion statistics reported by abortion providers to state health departments (3). This period TFAR is a hypothetical value, and it may be misleading as it estimates the prevalence of abortion among women if they experience the first abortion rates for the age groups existing at a specific time. These, however, will continue to change with time (1).

If we wish to estimate the prevalence of abortion among a cohort of women born in a certain year, we would have to calculate the TFAR based on the first abortion rates experienced by this cohort throughout their years of reproductive life. It is unlikely that any country has data permitting the computation of a cohort TFAR (1), although this may be possible in England and Wales where statistics on abortions and previous abortions have been collected under the Abortion Act of 1967 (1). Abortion statistics for Australia are incomplete, as notifications of abortions are required by legislation in only two of the seven Australian states, Western Australia (from 1998) and South Australia (from 1970), and in both territories, Northern Territory (from 1974) and the Australian Capital Territory (from 1999). In states without specific legislation, abortion statistics may be obtained by complementing Medicare statistics (available nationally for complete calendar years only from 1985) with hospital morbidity statistics for public patients in public hospitals (available nationally for complete calendar years only from 1993) (4). However, Medicare statistics from

Abbreviations: TAR, total abortion rate; TFAR, total first abortion rate.
private clinics in at least one state have been reported to be underestimated by about 15 percent, as 5 percent of women who had terminations did not have Medicare cards and at least 10 percent of those who did have cards did not intend to file claims (5). Australia also does not have national statistics on which of these women have had previous abortions, information needed for the calculation of the TFAR.

South Australia, with a population of 1.5 million out of Australia’s 19.4 million, has had abortion notifications mandated by specific abortion legislation since 1970, and these notifications require information on previous abortions. Hence, we have population data for a cohort of women who were at the beginning of their reproductive life when legal abortion became available and who are now at the end of their reproductive life. This paper estimates the prevalence of abortion in this cohort of women who were about 15 years of age in 1971 (i.e., born around 1955), using first abortion rates for each year of age throughout their reproductive lifetime from population-based abortion notifications provided under legislation. We thus calculate, for the first time, a cohort TFAR for South Australian women born around 1955. It has not been possible to calculate this until now as statistics are needed for the 30-year reproductive life span of 15–44 years. Fertility rates and the proportions of pregnancies terminated are also calculated for each year of age to demonstrate the reproductive life experience of this cohort.

MATERIALS AND METHODS

Specific South Australian abortion legislation was enacted on January 8, 1970, permitting medical termination of pregnancy under specified conditions. It has to be performed by a medical practitioner, who, together with another medical practitioner who has also examined the woman, certifies that there is a greater risk to the life or the physical or mental health of the woman if the pregnancy continued than if it were terminated, or that there is substantial risk of a serious handicap in the child from physical or mental abnormalities. The abortion has to be performed in a prescribed hospital before 28 weeks’ gestation (although rarely performed after 22 weeks), and the woman has to have been resident in the state for at least 2 months before the abortion. In cases of emergency, where a termination is immediately necessary to prevent grave injury to the health of the pregnant woman or to save her life, a single medical practitioner may perform and report the abortion. Reporting on a prescribed schedule is required. The schedule requires details, such as age and previous obstetric history, including previous abortions. In the years 1970–1981, previous obstetric history of abortion did not specify whether the abortion was spontaneous or induced, so that for those years we used “date of last termination under the Act” (which has always been in the schedule) as indicating a history of previous induced abortion. In subsequent years, we were able to use a history of previous induced abortion, as this was specified in the schedule.

The numbers of women who had abortions and previous abortions (as described above) for each consecutive year of age for the cohort of women aged 15 years in 1971 were extracted from the abortion statistics database (i.e., for age 15 years in 1971, 16 years in 1972, 17 years in 1973, etc.) (table 1). The estimated resident population of women in South Australia for each specific age in a specific year was obtained from the Australian Bureau of Statistics (6). First abortion rates were then calculated for each year of age from 15 years to 44 years, by the exclusion of women who had had previous abortions at each age, and these were then summed to provide cumulative first abortion rates for each year of age and to obtain a cohort TFAR for women born around 1955. A 1955 cohort total abortion rate (TAR) was also calculated using the rates for all abortions for each year of age (i.e., without exclusion of women with previous abortions) (table 1). The first abortion rates for each year of age from 15 years for subsequent cohorts of women born around 1960, 1965, 1970, 1975, and 1980 and cumulative first abortion rates were also calculated. These cumulative first abortion rates were then graphed for all six cohorts of women (figure 1).

The numbers of livebirths at each year of age from 15 years to 44 years for the 1955 cohort (i.e., age 15 years in 1971, 16 years in 1972, etc.) were obtained from the Australian Bureau of Statistics’ registered births for 1971–1980. The state’s perinatal data collection of births reported directly by midwives from the place of birth commenced in 1981 and was used for the years 1981–2000. This collection is held in the Pregnancy Outcome Unit and has been shown to be more complete than birth registrations (7). Fertility (livebirth) rates per 1,000 women were calculated for each year of age. The proportion of pregnancies that ended in induced abortion for each year of age was calculated using induced abortions as a proportion of induced abortions and livebirths, as statistics on spontaneous abortions are incomplete. These abortion proportions were then graphed with the abortion rates and fertility rates for each year of age for the 1955 cohort (figure 2).

The definitions of abortion and fertility rates are provided in the Appendix.

RESULTS

The cohort of women born around 1955 had increasing age-specific abortion and first abortion rates in their teenage years, reaching a peak at age 19 years of over 21 abortions per 1,000, after which the rates gradually declined (table 1). The cohort TAR was 288.1 per 1,000 women aged 15–44 years and indicates that, for this cohort of women born around 1955, about 29 percent experienced at least one induced abortion in their reproductive lifetime. The cumulative first abortion rate was 69.0 per 1,000 before age 20 years, 160.8 per 1,000 before age 25 years, and 215.4 per 1,000 before age 30 years, indicating that about 7 percent had an abortion before age 20 years, 16 percent before age 25 years, and 22 percent before age 30 years. The cohort TAR of 345.1 per 1,000 women aged 15–44 years indicates the quantity of induced abortion (averaging 0.3 abortions per woman) among this cohort, some of whom had more than one abortion.

The cumulative first abortion rates for subsequent cohorts (figure 1) show an increasing prevalence of induced abortion; for example, for the 1980 cohort, 10 percent had an abortion
before age 20 years, and for the 1960, 1965, 1970, and 1975 cohorts, 17–19 percent had an abortion before age 25 years. For the 1960 cohort, 31 percent had an abortion before age 41 years compared with 28 percent for the 1955 cohort, and for the 1965 cohort, 29 percent had an abortion before age 36 years compared with 26 percent for the 1955 cohort.


FIGURE 2. Fertility and abortion rates, and abortions as a proportion of abortions and livebirths, by age, 1955 cohort, South Australia, Australia.

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Figure 2 shows that the 1955 cohort had increasing fertility rates from age 15 years to a peak of 146 per 1,000 at age 26 years, followed by a decline which was more gradual from the late thirties. The total fertility rate was 2,061.6 per 1,000 women or 2.1 livebirths per woman. The proportion of pregnancies ending in induced abortion was highest at the extremes of reproductive life, with 51–52 percent of pregnancies terminated at ages 16 years and 43 years. The abortion proportion was lowest—less than 10 percent—at ages 26–30 years, after which it increased, particularly from age 40 years. The average abortion proportion for the reproductive lifetime of this cohort was 14.2 percent. Thus, the 1955 cohort averaged 2.1 livebirths and 0.3 induced abortions per woman, and about 14 percent of their pregnancies were terminated. The latter would be an overestimate, as spontaneous abortions, ectopic pregnancies, and stillbirths were not included in the denominator of pregnancies.

**DISCUSSION**

Abortion statistics collated by the Alan Guttmacher Institute (8) show that, for 1995, the Australian abortion rate of

![Table 1](https://academic.oup.com/aje/article-abstract/159/5/475/92161)
22.2 was similar to that of the United States of 22.9 per 1,000 women aged 15–44 years. Worldwide abortion rates range from the low rate of 11 per 1,000 in Western Europe through the world average of 33–37 per 1,000 in Africa, Asia, and Latin America, to the high rates of 78–83 in Cuba and Vietnam and 90 per 1,000 in Eastern Europe. South Australia has a lower rate than that of Australia and some of the more cosmopolitan and populous Australian states, being 17 per 1,000 in 1995 (9), close to the rate of 16 per 1,000 of other developed English-speaking countries such as Canada, England and Wales, and New Zealand (8).

These crude abortion rates may be supplemented by comparison of abortion proportions, which reflect both the choice by women and the availability of abortion, as well as the level of unintended pregnancy. These proportions are highest in Eastern Europe, around 65, while Australia and the United States have similar lower proportions of around 26 per 100 known pregnancies, equivalent to the world average (8).

Comparisons have also been undertaken using age-specific rates (e.g., for the teenage years) (10). The Australian teenage abortion rate of 23.8 was lower than the US rate of 29.2 per 1,000 in the mid-1990s. However, the much higher abortion proportion among Australian teenagers (54 compared with 35 per 100 known pregnancies for the United States) obscures the vast difference in teenage pregnancy rates (43.7 for Australia vs. 83.6 per 1,000 women aged 15–19 years for the United States), demonstrating the importance of considering abortion together with fertility rates.

The period TAR sums the abortion experience of the 5-year age-specific rates for a specific period using a synthetic cohort. For 1995–1996, the Australian TAR was 670 per 1,000 compared with 690 for the United States and 440–490 for Canada, England and Wales, and New Zealand (8, 11). The South Australian period TAR for 1995 was 515 per 1,000 (9). A cohort TAR can be calculated only if we have statistics for the whole 30-year reproductive life span of the birth cohort. It estimates the amount of abortion experienced by that birth cohort, some of whom may have had more than one abortion, and allows comparison with other birth cohorts or periods. Thus, the South Australian 1955 cohort TAR of 345 per 1,000 is substantially lower than the period TAR for the year 1995 of 515 per 1,000, reflecting the increase in abortion experience.

The cohort TFAR may be calculated only if we have statistics on abortions and previous abortions for the whole 30-year reproductive life span of the cohort. While the period TFAR estimates the prevalence of induced abortion for a particular period using data for that period, which are more readily available, the cohort TFAR defines the experience of a real-life cohort and enables comparison with other real-life birth cohorts or periods. Use with fertility rates also enables clearer definition of the total reproductive life experience of the cohort. Australian demographers have used total fertility rates to compare periods, regions, states, countries, ethnic groups, countries of birth, and birth cohorts, and they have mapped the fall in the average number of livebirths borne by an Australian woman in her reproductive lifetime from nearly four in 1901 to 1.73 in 2001, also showing the dramatic change brought on by the Great Depression of the 1930s (7, 12). The TAR is the abortion equivalent of the total fertility rate, while the TFAR is the abortion equivalent of the proportion of women who have a livebirth in their reproductive lifetime, which in Australia has declined from 92 percent in 1981 to 87 percent in 2001 (7).

The cohort TFAR may be subject to some sources of error or adjustment:

1. Underreporting of abortions by women. It has been a constant finding that women tend to underreport their induced abortions (13, 14). Our data will also underestimate previous abortions before 1971–1981 that were not performed under the Act (i.e., illegal abortions and those performed outside South Australia), but these will apply mainly to migrant women, as the South Australian cohorts would have been exposed to legal abortion throughout their reproductive lifetimes. Because underreporting will reduce the number of previous abortions reported, it will result in higher numbers of women identified as having a first abortion at each age. Underreporting will therefore tend to increase the cohort TFAR. Underreporting would appear to be less frequent from these hospital reports, as it is more likely to occur in telephone surveys than in the clinic face-to-face situation (14).

2. Abortions at the extremes of reproductive life (e.g., before age 15 years and after age 44 years). These numbers are small; for example, for the 1955 cohort, there were five for age 14 years in 1970 and eight for age 45 years in 2001.

3. Demographic changes in this cohort, through migration, so that the cohort does not remain the same as that of the women aged 15 years in 1971. In particular, there is emigration of young women to the more populous eastern states of Australia, mainly for greater employment opportunities. There is also immigration of women from other countries, some of which have high rates of abortion (e.g., some Eastern European and Asian countries) (1, 8, 12, 15). However, the South Australian population has not been greatly affected by this, currently receiving only about 4 percent of the immigrant population to Australia in any one year (12, 15).

4. Strictly speaking, women who have had a previous abortion should be excluded from the estimated population at each age, as they are no longer in the “at risk” denominator. This will result in only a small increase in the cohort TFAR, from 288.1 to 288.6 per 1,000 for the 1955 cohort.

The calculation of a 1955 cohort TFAR over the 30-year reproductive life span has provided, we believe for the first time, an estimate of the prevalence of induced abortion (29 percent) among a real-life cohort of women in the English-speaking Western world who were exposed to the availability of legal abortion throughout their reproductive lifetime. This estimate was based on population data collected over 30 years under legislation. The cumulative first abortion rates for later cohorts of women show an increasing prevalence of abortion; for example, at least 31 percent of the 1960 cohort had an abortion in their reproductive lifetime.

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REFERENCES


APPENDIX

Abortion rate: (number of induced abortions/number of women aged 15–44 years) × 1,000.

Age-specific abortion rate: (number of induced abortions in a specific 5-year age group/number of women in that specific age group) × 1,000.

Cumulative abortion rate per 1,000 women: sum of 5-year age-specific abortion rates, multiplied by 5, up to a specified age.

Total abortion rate per 1,000 women aged 15–44 years: sum of 5-year age-specific abortion rates for women aged 15–44 years, multiplied by 5. This can be calculated for a period, using the age-specific rates for the period, or for a birth cohort, using the rates for each 5-year age group of the cohort. In this paper, we used individual years of age for the cohort, as these were available.

First abortion rate: (number of first induced abortions in a specific 5-year age group/number of women in that specific age group) × 1,000.

Cumulative first abortion rate per 1,000 women: sum of 5-year age-specific first abortion rates, multiplied by 5, up to a specified age.

Total first abortion rate per 1,000 women aged 15–44 years: sum of 5-year age-specific first abortion rates for women aged 15–44 years, multiplied by 5. This can be calculated for a period, using the age-specific rates for the period, or for a birth cohort, using the rates for each 5-year age group of the cohort. In this paper, we have used individual years of age for the cohort, as these were available.

Abortion proportion: number of induced abortions/number of induced abortions + livebirths. This measures the proportion of known pregnancies that end in induced abortion. It may be expressed per 100 known pregnancies; it is sometimes called the abortion ratio.

(General) fertility rate: (number of livebirths/number of women aged 15–44 years) × 1,000.

Age-specific fertility rate: (number of livebirths to women in a specific 5-year age group/number of women in that specific age group) × 1,000.

Total fertility rate: sum of 5-year age-specific fertility rates, multiplied by 5. For a period, this represents the number of livebirths a woman would bear during her lifetime if she experienced the age-specific fertility rates of the period at each age of her reproductive life. In this paper, we have used the age-specific fertility rates for each year of the 1955 birth cohort to calculate a cohort total fertility rate.

Births and abortions for women under 15 years of age are included in the rate for women aged 15–19 years and, for women over 44 years of age, in the rate for women aged 40–44 years, as is traditional in demography (1). The denominators “number of women” refer to the average population for a specific period, usually the mid-year population.