Fertility trend and pattern in a rural area of South Africa in the context of HIV/AIDS

Carol S. Camlin*
Africa Centre for Health and Population Studies
P.O. Box 198
Mtubatuba 3935
South Africa

* Doctoral student, University of Michigan School of Public Health

Michel Garenne
Demographer
Unité d'Epidémiologie des Maladies Emergentes
Institut Pasteur
25-28, Rue du Docteur Roux
75724 Paris Cedex 15
France

Tom A. Moultrie
Andrew W. Mellon Foundation Postdoctoral Fellow in Demography
Centre for Actuarial Research, University of Cape Town
Private Bag
Rondebosch
South Africa

Correspondence to: Carol Camlin

1134 Kay Parkway

Ann Arbor, MI 48103 USA

Telephone: (734) 332-9660

E-mail address: ccamlin@umich.edu

Accepted for publication: African Journal of Reproductive Health.

Abstract

Little is known about the dynamics of the fertility transition in South Africa, though recent studies have begun to shed light on demographic changes in the country. This study presents trends and patterns of fertility observed in a rural South African population.

Various demographic and statistical techniques were used to examine fertility patterns in a population of 21,847 women in a rural KwaZulu-Natal (KZN) demographic surveillance area. These are compared with patterns seen in another South African rural population under demographic surveillance, and with data from the 1998 South Africa Demographic and Health Survey. Findings are interpreted in light of contraceptive use patterns and HIV prevalence in the population. In South Africa, the end of the fertility transition is now in sight. In rural KZN, where national fertility levels are highest, fertility has declined rapidly for about two decades and would have reached below replacement level in 2003. While fertility has declined rapidly among all women over age 18, fertility levels among adolescents have not changed in decades. Although most adolescents in rural KZN are sexually active (60%), few have ever used contraception (20%). High HIV seroprevalence appears to explain a small part of the fertility decline (12%); however, this effect is likely to grow in the near future as the HIV/AIDS epidemic continues in South Africa. Should current trends continue in the future, below replacement fertility, together with high mortality due to AIDS, could soon lead to negative natural population growth in rural South Africa.

Background

Apartheid, in all its manifestations, impinged on every aspect of the lives of African South Africans.[*] Racial segregation, job reservation, restrictions on mobility, inferior education and health care were just some of the more obvious aspects of that system. However, recent histories (see, for example, Posel)[1] have argued that apartheid was not a singular, hegemonic ideology, but an amalgam of policies forged out of conflict and compromise within the white ruling classes. Consequently, serious internal contradictions existed between different policy arenas.

Demographic concerns were central to many apartheid policies. It is not surprising that these contradictions impacted both on the formulation of population policy and on demographic outcomes more generally. While official population policies sought to reduce African fertility (driven by white South Africans' fear of being "swamped"), other policies ensured that Africans were systematically denied access to education, health care and urban residence-- factors that have been shown to be important in determining the pace of fertility decline in a variety of settings in both the developing and the developed world.

Little is known about the historical dynamics of the fertility transition in South Africa. Apartheid government concerns about security and secrecy meant that little of the demographic research conducted between 1960 and 1990 by the government was published, while the quality of census data collected on the African population was generally poor. Findings made available to the public tended to be published only in Afrikaans. Furthermore, policies implemented by successive apartheid governments led to the country's exclusion from several international data

[*] In South African Apartheid-era official (i.e. government) literature, the word "Black" usually referred specifically to Africans. In this paper, we use terms currently used in South Africa, including "African" to refer to people of African descent, "coloured" to refer to descendents of the Khoi and San peoples and those of mixed race, "white" to refer to those of European descent, and "Asian" for those of (subcontinental) Indian descent.

series. One consequence of this is that, in their analysis of the South African fertility decline, Caldwell and Caldwell[2] could not decide whether it should be viewed as being rapid or slow. The decline could be thought to have occurred rapidly given the institutional forces ranged against African South Africans. On the other hand, they expressed surprise at the slow pace of the decline given the intensity of family planning programs implemented by successive governments after 1974, and the level of socio-economic development in South Africa relative to other developing countries. Like the Caldwells, Carol Kaufman[3] tentatively favours the latter view. Both suggest that the political context in which African women made reproductive decisions may have inhibited a more rapid fertility decline. And the question always remained: to what extent are the processes of demographic change in the country comparable with those observed elsewhere in sub-Saharan Africa?

More recent data has allowed these phenomena to be investigated. Moultrie and Timæus' analysis of South African census and survey data,[4] indicates that fertility among African South Africans began declining in the early to mid-1960s, at about the same time as in other African urban areas, and several decades ahead of the onset of fertility decline in most rural areas of other African countries.[5] However, the decline in South African fertility has not been as rapid as claimed by some,[*] falling from around 6.5 children per woman in 1970 to 3.5 in 1996.

Moultrie[8] compared the age pattern of fertility among African South Africans with data for other African countries presented by Cohen[9] in his analysis of regional trends and differentials in fertility in sub-Saharan Africa. South Africa's age pattern of fertility is

---

[*] Oosthuizen,[6] for example, refers to "plummeting" African fertility in South Africa. However, the transcription of estimates of African from an earlier work[7] contained an error in reporting the level of African fertility as 3.6 in 1990-95, when the original suggested a level of 4.0 children per woman.

fundamentally similar to the region's, but the pattern of child spacing differs markedly from that observed in other African countries. Moultrie found that although South Africa's fertility decline has been relatively slow, the median length of women's birth intervals has almost doubled, to greater than 60 months. This increase is independent of birth cohort and parity, suggesting that the effect is almost entirely secular. Importantly for the present paper, the increase is associated, unsurprisingly, with the use of contraception. The observed trend in birth intervals strongly suggests that contraception in South Africa is practiced at the same time to limit the number of children born, and to space childbearing contingent on the age of the mother's youngest child. Often, women would appear to use contraception to delay childbearing until some distant and uncertain point in the future – a phenomenon first discussed by Lightbourne.[10]

Modern contraceptives had been made publicly available to African South Africans from the mid-1960s, but theological opposition, preoccupation with trying to increase white fertility, and fears of being accused of implementing a genocidal population program delayed the launch of an official programme until 1974.[11] Mostert's[12] claim that there was a "genuine demand" for family planning among African women is probably correct. Government surveys conducted in 1969-70 in the four major metropolitan areas of the country had shown low levels of current modern contraceptive use, ranging from 13 to 24 percent among women aged 25-34.[13-16] Five years later, shortly after the official announcement of the 1974 National Family Planning Programme, a national survey of Africans found much higher rates of current modern contraceptive use among urban women. Some 29 percent of fertile urban African women aged 15-24, 33 percent of women aged 25-34, and 27 percent of women aged 35-44 were then using modern contraception.[17] Thus, over the five years before the official launch of the national program, contraceptive use among urban African women had increased dramatically. Data on

rural women's use of contraception is harder to come by, as the balkanisation of South African "homelands" and service delivery problems meant that contraceptive availability was limited in rural areas in the early years of the family planning programs. By definition, the program operated only in the white areas of the country, leaving the majority of rural African women without as ready access to contraception. Nevertheless, the program expanded rapidly after its official endorsement in 1974.

Historical evidence suggests that African opposition to family planning from the 1960s onwards was sporadic and muted, and that white fears of a generalised resistance to family planning among Africans were overstated. Most frequently, African opposition to family planning was articulated in terms of the racialised discourse on population, rather than on the merits of contraception per se.[*] Significantly, opposition to family planning was found predominantly among men and was not representative of a more general African opposition. This suggests that, along lines similar to those argued by van der Vliet,[19] contraceptive use was perceived by men to constitute a threat against their traditional control over women and women's reproduction. Women favored the use of the injectable contraceptive (Depo-Provera) – not least because compliance was easy, protection against pregnancy was afforded for long periods of time and, since it was 'invisible', the method was less likely to arouse male opposition.[20]

A degree of path-dependence is observable in the mix of contraceptive use: the 1998 South Africa Demographic and Health Survey (SADHS) showed overwhelmingly that knowledge of injectable contraceptives was higher than any other method; that no fewer than 73 percent of all women aged 25-29 had used an injectable at some point; and that of the African

[*] One articulation of this was a polemic written for the "African Communist", which referred to family planning in South Africa as being "genocidal".[18]

women who had ever used contraception, 64.5 percent had used an injectable as their first method. Among sexually active rural South African women, the vast majority of whom are African, almost a third are using injectables. By comparison, 46.1 percent of these women are not using any method, 9.7 percent are using the pill and 7.4 percent have been sterilized.[21]

Using South African demographic surveillance data, Garenne and colleagues[22] demonstrated that the shape of the South African fertility schedule can be decomposed into two separate patterns: one of non-marital fertility among younger women, and a second of marital fertility among older women. 1998 SADHS data confirm that adolescent fertility is high. While the median age at first intercourse for African women older than 20 is 18, approximately one in every six births is to a woman under the age of 20. A significant proportion of sexually active adolescents do not use modern contraceptive methods. High adolescent fertility, coupled with low rates of contraceptive use, offers up significant policy challenges – in terms of both slowing the spread of HIV, as well as enabling young women to avert and avoid adolescent pregnancy.

This paper presents trends and patterns of fertility observed in a population of women of reproductive age in a rural area of northern KwaZulu-Natal (KZN), South Africa, with a focus on the trends in adolescent fertility. We compare patterns of fertility in this population in rural KZN with patterns seen in another rural population in South Africa under demographic surveillance (Agincourt), and with data from the 1998 SADHS, and highlight peculiar features of the fertility patterns for each population. We interpret these findings on fertility in light of contraceptive use patterns and HIV prevalence in the population.

Methods

Study sites and data sources

The **Africa Centre Demographic Information System (ACDIS)** is located in part of Umkhanyakude District, a predominantly rural area in northern KwaZulu-Natal that includes a peri-urban township. Since 2000, ACDIS has registered and then longitudinally tracked the population in a demographic surveillance area (DSA) of 435 square kilometres. ACDIS distinguishes between the "resident population" of persons living in the DSA and the "non-resident population", of persons who are acknowledged members of registered households, but live most of the time outside the area. In year 2000, the ACDIS counted approximately 11,000 households, 66,600 residents (77 percent of the total population), and an additional 19,800 non-residents (23 percent).

ACDIS data indicate that adult mortality in the population rose by 20 percent between the mid-1980s and 2000. AIDS with or without tuberculosis is the single largest cause of death in the DSA, accounting for 48 percent of all adult deaths. In 2000, 66 percent of all deaths in the age group 15-44 were attributed to AIDS, comprising 72 percent and 61 percent of female and male deaths, respectively. HIV prevalence among women attending antenatal clinics in the more urban part of Umkhanyakude District was 42 percent (95% CI 38.3-46.0).[23] Among women bringing their children to immunisation clinics, prevalence was 29.7 percent in 2000 (95% CI 26.4-33.1).[24] Population-based HIV prevalence and incidence data are currently being collected and analyzed.

ACDIS collects demographic data from households three times per year. These data include births, deaths, in- and out-migration of household members, and other changes in

household structure and composition. Other social, health and economic data, including data on contraceptive use and socio-economic status, are collected annually from households in the total population or in embedded cross-sectional or cohort studies. Full pregnancy and maternity histories are collected among all women ages 15 to 49 upon registration into ACDIS or turning age 15. Baseline data on contraceptive use and age at first sexual intercourse are also collected upon registration. Thereafter, pregnancies are captured longitudinally in each round of ACDIS.

This paper presents retrospective data on fertility and contraceptive use derived from the initial pregnancy history, collected between January 2000 and March 2002 among 21,847 women aged 15 to 49. (Data were also collected among a small number of women older than 49 or younger than 15, and some age misreporting is likely among older women; see "Data quality".) Fertility data in this paper are presented for years up to the completed calendar year 2000; i.e., data include all births before January 1, 2001 among the population of women who were members of households within the DSA as of January 1, 2001.

For the sake of comparison with ACDIS, we present data from another demographic surveillance system (DSS) in rural South Africa, in place since 1992 in **Agincourt**. Agincourt is located in a former "homeland", now part of the Limpopo Province, near the Mozambican border. The population covered by the Agincourt DSS was about 65,000 persons in 1994, and has grown slowly since that year. Full maternity histories, with date of birth for all live births, survival status and date of death were collected among 17,402 resident women at the second annual census, conducted in late 1993 and early 1994. These data permitted the reconstruction of past fertility trends and patterns since the mid-1970s for women aged 15-54 at the second census.

A third data source used for analyses presented in this paper is the **1998 South Africa Demographic and Health Survey**. The 1998 SADHS used a nationally representative, two-

stage sample selected from 1996 South African census data. The survey used Census Enumeration Areas (EAs); sample numbers of households were selected with probability proportional to size based on the number of households residing in each EA. Each of South Africa's nine provinces was stratified into urban and non-urban groups. A total of 972 primary sampling units were selected, with 690 in urban areas and 282 in non-urban areas. For reasons explained in the SADHS report,[25] the sample design was not self-weighting at a national level. Weighting factors were applied to the data to account for sample design effects. Members of 12,540 households were interviewed using several questionnaires between January and September 1998. For this study, we analyzed data collected from 11,735 women ages 15 to 49 using the Woman's Questionnaire.

Data quality (ACDIS)

As has been documented by Brass and others, fertility data from birth histories collected among women in less developed countries are subject to errors, typically including miss-reporting of ages at first pregnancy by younger women, omissions of births by older women and misallocations of past births in time.[26] There is evidence that such error exists in the ACDIS data; we estimate that the rate of probable reporting error (defined as the number of births reported to women over age 50 or under age 12, divided by the total number of births for the period) was 0.48 percent for the period 1970 to 2001. As a result, fertility rates at older ages (35 and older) and in earlier periods (prior to 1990) tend to be underestimated. The speed of fertility decline over the period may also have been underestimated. Because we expect the effect on such error on the estimates to be small, we have not adjusted the data; however the reader should bear in mind a modest bias to the ACDIS estimates presented for earlier years and older ages.

In this paper we present no analyses of pre-marital and marital fertility, shown to be important for understanding patterns of fertility in other areas of South Africa,[27] as data on age at first marriage or first long term-cohabitation with a regular partner did not yet exist in ACDIS. However, other data on marital status and partnership patterns in ACDIS show that in the Africa Centre Demographic Surveillance Area (ACDSA), marriage rates are very low, though typical for KZN: approximately 50 percent of women and men aged 40-44, and 62 percent of women aged 20-69 are not currently married. At the same time, rates of regular, non-marital partnership are high for younger women: while 85 percent of women aged 25-29 have never been married, 76 percent currently have a regular non-marital partner.[*] Given this context, patterns of fertility related to nuptiality in the ACDSA are likely to differ from those seen in southern African populations with higher marriage rates.

Data analysis

Estimation of the retrospective trend in fertility rates for the ACDSA was computed by dividing births by person-years of exposure, for each year of age of the mother, over the years of occurrence from 1970 to 2001. Person-years were calculated using a Lexis diagram, reconstructed from the population on January 1, 2001. Age-specific and total fertility rates were then calculated for various time periods and age groups. Fertility trend lines were calculated using linear regression to estimate trends in fertility observed over the period 1970-2001.

Estimation of mean rates of decline in fertility in ACDIS was computed from the slope of decline for selected ages, using the formula *log* (T2/T1)/(T2-T1), i.e. by comparing the end point (2001) and the starting point (1970), and assuming a constant rate of decline. Finally, fertility

[*] See Hosegood & Preston-Whyte[28] for a more detailed explanation of cultural and economic factors underlying low marriage rates in KZN.

rates in the ACDSA were compared to corresponding values in Agincourt and the SADHS using standard two-sided T-tests with 95 percent confidence intervals.

For our analysis of the link between HIV and fertility, we assume a 20% reduction in fertility among HIV seropositive women based upon prior research in sub-Saharan Africa. Garenne's[29] review of the mid-1990s literature concluded, based on studies conducted in Zaire[30] and Uganda,[31] that fertility was reduced by approximately 20% among HIV seropositive women, after controlling for factors such as exposure and contraception. Stover[32] drew a similar conclusion, based on newer studies conducted in Uganda and Zimbabwe. In his projection model of the demographic impact of HIV/AIDS Stover recommended a 20% reduction of fertility among HIV seropositive women aged 20-49, and a 50% reduction of fertility among HIV positive women aged 15-19. As we did not find much evidence of a strong fertility reduction among women 15-19, we calculated the 20% reduction for all ages 15-49. Conclusive findings on the impact of HIV on fertility in this population await the results of longitudinal HIV serosurveillance in the ACDSA, which is currently in progress; our estimates of the effect of HIV on fertility in the ACDSA should be regarded as preliminary.

Results

Trends in total fertility in the ACDSA and the nation

Figure 1 shows reconstructed trends in period fertility among African and rural women in South Africa over the past thirty years. Official estimates for African women for the period 1970 to 1994 were derived from South African government census data.[33] Moultrie and Timaeus noted that precision may be limited for estimates of fertility from certain of these census surveys.[34] They re-analyzed data from selected censuses and population-based surveys; results of their

analyses are shown for African women for the years 1985-96. Figure 1 also presents the total fertility rate (TFR) among rural women for 1995-98 from the 1998 SADHS (because of sampling issues, SADHS data for rural women may be more comparable with the ACDSA than the data for African women; in any case the majority of rural residents in South Africa are of African descent). Finally, we show the reconstructed trend in period fertility in ACDIS for 1980 through 2000, and the replacement fertility level calculated for the ACDSA.

As displayed in Figure 1, the fertility transition in South Africa appears to have begun at least thirty years ago. The fertility decline has been underway for as long as it can be measured, and indeed, the beginning of the transition is difficult to identify due to a paucity of reliable data to measure it. Yet both Mostert's official estimates and also Moultrie and Timaeus' analyses of census and population-based survey data on fertility among African women show a rapid and steady decline in fertility over the past thirty years. Mostert's estimates show a decline in total fertility from 6.3 children per African woman in 1970-74 to 4.0 per woman in 1990-94. Moultrie and Timæus' estimates from censuses and surveys of African women show a decline from 5.2 in 1985 to 3.5 in 1996. ACDIS data indicate that fertility decline has been steady over the past 20 years, from 4.8 children per woman in 1980-84, 4.4 in 1985-89, 4.1 in 1990-94, 3.4 in 1995-99, to 2.8 in 2000-01 (which is lower than the national average for African women, based on other national data; see Figure 1). Though there are uncertainties about the precision of the official estimates of fertility, the combined set of findings indicate that the speed of fertility decline in the ACDSA is consistent with other estimates.

From ACDIS data for the year 2000-01, women's mean age at reproduction was 29 years. The probability of surviving to age 29 was 0.760 for females, the sex ratio at birth was 1.00, and the net reproduction rate, computed from single year age specific fertility and mortality rates,

was 1.08. Based upon mortality levels in 2000-01, the TFR necessary for reproduction was 2.63 children per women. Therefore, given the speed of the fertility decline in the ACDSA, the population will have reached below replacement level fertility by the year 2003.

Fertility decline in ACDSA by age group

Figure 2 show the trends in age-specific fertility in the ACDSA since 1985 by five-year age group. As shown, the age pattern of fertility shifted since late 1980s from the traditional "inverted U" pattern, with the mode at age group 25-29, to a unique, atypical rectangular pattern in 1995-99. The age pattern of decline is characterized overall by a fast decline in the age group 20-29, virtually no change before age 20, and minor changes in absolute values among older women. Figure 3 shows a detailed view of the unusually flat pattern observed for the period 1997-2001. Age-specific fertility rates (ASFRs) hovered narrowly between 0.12-0.14 for all ages between 18 and 35, the peak reproductive ages. This atypical pattern is due to sustained high adolescent fertility, coupled with a stronger reduction in fertility among younger women (19-34) than among older women. The current pattern is quite new, and did not exist before 1990.

Table 1 shows cumulative fertility and the mean annual rate of fertility decline from 1980 to 2000 by unconventional age groups. The marked fertility decline over the period 1980 to 2000 affected all women aged 18 and older. Cumulated fertility for women aged 18-27 declined sharply, from 2.09 children per woman in 1980-84 to 1.19 per woman in 2000-01. For women aged 28-37, the TFR declined more gradually, from 1.75 in 1985-89 to 1.12 children per women in 2000-01. In contrast, cumulated fertility in adolescents (aged 12 to 17), declined just slightly from 0.32 children per woman in 1980-84 to 0.23 in 2000-01. The rate of decline was most pronounced among younger women aged 18-27 (-0.032 per year), followed by women aged

28-37 (-0.029), and women 38-47 (-0.025). Cohort effects could explain the slower rate of decline among older women: fertility decline is well documented after 1985 in the ACDSA, and was probably small before, given the high level of fertility at baseline. Older cohorts had therefore already achieved a large part of their family size by 1985 (they were already above age 35). The rate of decline among adolescents aged 12 to 17 was yet smaller and hardly significant (-0.005), indicating that despite the overall fertility decline, patterns of adolescent childbearing have not changed markedly over the past twenty years.

HIV effects on the current age pattern of fertility

The high AIDS-related mortality rates observed in this population, and high HIV prevalence rates observed in the antenatal clinic population, would raise questions as to whether HIV has suppressed fertility levels among women in their twenties. Our preliminary modelling indicates, however, that the impact of HIV on fertility would be small compared to that of contraceptive use. We computed the expected effect of HIV/AIDS on fertility by multiplying the age specific seroprevalence rates among pregnant women in the ACDSA by the effect of HIV/AIDS (assumed to reduce fertility by 20 percent). We found that HIV/AIDS could explain only a change of –0.3 children ever borne-- a small part of the fertility decline observed since the 1980s. Therefore, most of the fertility decline is attributable to other determinants, in particular to contraceptive use. This concurs with the findings presented in Moultrie,[35] which sought to identify the effects of HIV/AIDS on the length of women's birth intervals using the 1987-89 and 1998 DHS datasets. No statistically significant effect was found.

Current contraceptive use

Figure 4 shows the percentage of women who have ever had sex, were ever pregnant, ever used contraception, and used contraception at last sex, by five-year age group. Most adolescents (61 percent) are sexually active, and virtually all women are sexually active by their early twenties. Of adolescents 15-19 who have started having sex, only 20 percent have ever used a modern contraceptive method. Some 25 percent have had at least one pregnancy. Contraceptive use rates are three times higher among women 20 to 24 (60 percent) relative to adolescents, but women ages 25 to 29 are most likely to have ever used a method (71 percent). Adolescents are the least likely of all age groups to have ever used contraception, followed by those ages 44 to 49 (37 percent). Use of a modern contraceptive method at the last sexual intercourse was rare overall at 23 percent; only 12 percent of sexually active adolescents used any method at last sex, while 31 percent and 32 percent of women in their early and late 20s, respectively, used a method at the last sexual intercourse.

Our data support the findings of recent research suggesting that the need for family planning for sexually active adolescents has not yet been adequately addressed. Research in South Africa suggests that low contraceptive use and high fertility among adolescents is influenced by both demand-related factors-- including desire to bear a child in order to prove womanhood, fidelity and love, and to establish intimacy and binding partnerships with male partners--[36-38] and also supply-related barriers to access to contraception, such as lack of knowledge or perceived risk of pregnancy,[39-41] provider bias against method provision to adolescents (less so for those who already have a child),[42, 43] and policy-level financial and logistical barriers to getting to family planning clinics.[44]

Cohort trends in age at sexual debut and first contraceptive use

Table 2 shows the mean and median age at first sexual intercourse, first pregnancy and first use of modern contraception by age group. Interquartile ranges are shown for the median ages (i.e. the ages at which 50 percent of women first had sex, were pregnant, and used contraception.) Although an unknown degree of social desirability bias may have influenced the reported age at first sexual intercourse, the data suggest that the age at first sex may have declined slightly over the past three decades. While the mean and median age of sexual debut for women 25 and older was roughly 18, half of those in their early twenties reported a sexual debut by age 17, and half of adolescents reported a sexual debut by age 16.

Data for mean age at first pregnancy, however, are not subject to the same social desirability bias, though some age mis-reporting among older women is possible. The data show a decline in the age at first pregnancy from 20.0 among women 40-44 to 18.7 among those 20 to 24. (R^2 for the linear regression trend line = 0.82). Age at first use of contraception dropped from a mean of 28.8 among women 45-49, to 19.5 among women 20-24 (R^2 for the linear regression trend line =0.996; not shown). This seems primarily a period effect, as the national family planning program has expanded in local clinics over the past three decades, and therefore older women were less likely to have had access to these services at a younger age.

Contraceptive use remains limited for adolescents, and apparently, access to modern methods for adolescents has not markedly increased over the past two to three decades. At the same time, sexual debut may be occurring earlier; data showing a decline in the reported age at first sexual intercourse are matched by a decline in the age at first pregnancy. This would pose a counterweight to any modest increase in contraceptive use among adolescents. In a situation of

delayed marriage and increasing contraception, the decline in mean age at first pregnancy must be due to earlier intercourse or increasing fecundability. Yet overall, adolescent fertility and childbearing patterns remain relatively similar today to those seen two to three decades ago.

Comparison of the ACDSA with national and Agincourt data

Figure 5 shows a comparison of recent period age-specific fertility rates for the ACDSA, the SADHS, and Agincourt. Fertility levels in the age group 15 to 19 are similar in the two rural DSS populations and the national SADHS, with values ranging from 0.08 to 0.09; however, adolescent fertility is slightly higher in the national rural subset of the SADHS (0.099) than in the ACDSA (0.086) or Agincourt (0.089), and is lowest in the national SADHS population (0.076). The national SADHS data are for all population groups, and include urban areas, so one would expect national estimates to be lower than in the other study populations. By ages 20-24, however, pronounced differences in fertility levels are seen: while levels are similar in the rural populations, national SADHS rural data show much higher fertility among women 20-29.

Compared to other study populations, fertility levels in the ACDSA remain unusually level throughout the peak reproductive ages. For the national study populations, fertility peaks at ages 25-29 (and 20-24 in Agincourt) and drops thereafter. Differences are apparently due to the higher contraceptive use among women 20-29 in the ACDSA relative to other rural areas in South Africa, but with contraceptive rates for women over 30 that are similar those seen in other places.

Comparisons of the ACDSA with Agincourt and South Africa showed that, relative to the pattern of age-specific fertility in South Africa overall (SADHS), fertility is significantly higher in the ACDSA (at $p<.01$) among women 15 to 19 (RR=1.13), 30 to 34 (RR=1.35), 35 to 39

(RR=1.34) and 40 to 44 (RR=1.64) (data not shown). Estimates for those under 15 and 20-29 show no statistically significant differences in age-specific fertility. Relative to the age-specific fertility levels observed in Agincourt, levels in the ACDSA are significantly higher (at $p<.001$) for all age groups except those 15-19 and 40-49. The differences were greatest among women 30-34 (RR=1.47), followed by those 25-29 (RR=1.30) in the ACDSA relative to Agincourt.

Table 3 present a comparison of contraceptive use among the study populations. "Ever use" of contraception in the ACDSA population was much lower than in the national SADHS population (51.7 percent vs. 86.1 percent), but similar to current use in the national rural sub-sample (with a current contraceptive prevalence of 52.7 percent.) Unfortunately, comparisons of "current use" is not possible as data on current use are not yet available for ACDIS, and there are no data on contraceptive use at last sex in the SADHS. No comparable contraceptive prevalence data are available for Agincourt. The method mix is much more limited in the ACDSA than in the nation overall, with 61.2 percent of method use comprised of injectable use (Table 3). ACDIS data indicate that there is virtually no use of long-acting or permanent methods such as IUD or female sterilization, which would presumably have a greater effect on fertility levels than shorter-term methods such as injectables.

Discussion

In the context of the World Summit on Sustainable Development held in Johannesburg in August 2002, the Global Science Panel on Population and Environment[45] argued that slowing population growth in high fertility populations was a priority to resolve environmental problems and ensure sustainable development. By this statement, authors seemed to target African countries, the last continent where fertility remains high. If few people will contest their broad

statement, researchers in the field will argue that fertility decline is well underway in African countries. In more-developed countries such as South Africa, not only is the fertility transition progressing fast, but also its end is now in sight. In this study we showed that in a rural area of Kwazulu-Natal, the province with the highest fertility in South Africa, fertility had been declining rapidly for about two decades, and if recent trends continued will have reached below replacement level by 2003.

In their study of fertility trends in Africa, Garenne and Joseph[46] showed that fertility decline is underway in most African countries for which data are available, and progressing especially fast in urban areas. Extrapolation of current trends in fertility since the 1960s suggests that replacement fertility in urban areas will be achieved in the current decade (2000-2009) in two thirds of the 27 countries investigated. In other countries, urban fertility is also declining, and overall fertility is likely to reach replacement level some 10 to 15 years later. It appears quite likely that fertility will be low throughout Africa by 2025.

The ACDSA case study shows that rural KZN follows the general pattern of fertility decline. Although it remains late for South Africa, the decline in KZN appears quite advanced for a rural area in the African context. An apt comparison could be made with rural areas of Kenya, where fertility declined since the early 1970s from very high levels of 8 children ever borne to below 5 in the mid-1990s. The ACDSA fertility transition appears to be about 10 to 15 years ahead of that of rural Kenya, and is progressing at a similar speed. It can be seen as a typical example of a relatively fast fertility transition, and an early one for rural Africa.

The fertility transition appears to have been driven largely by the dramatic uptake of modern contraceptives upon the inception of South Africa's powerful family planning program. Moultrie and Timaeus[47] have discussed in detail the problems of data quality on fertility in South

Africa. Whatever the corrections made for undercount, it is clear that fertility has been declining consistently for about 30 years in South Africa, and that all population groups tend towards replacement fertility, already achieved by the white population and by the Asian population. This convergence of fertility behavior is remarkable, given the level of differences in income, education and various socio-economic indicators between the groups. Family planning appears to have taken hold throughout all sectors of South African society, comparably to the situation of some Asian and Latin American countries often taken as a reference. This implies that investments in family planning should be sustained and improved to meet the needs of women and families across the African continent. What has been already achieved is a good incentive to expand the provision of appropriate services throughout Africa, since it shows that there are no obvious cultural barriers to birth control.

Fertility decline in the ACDSA was quite rapid among younger women, and produced a unique age pattern, with flat fertility values in the peak reproductive age groups. This indicates that women aged 20-35 had a good access to modern contraceptive methods, confirmed by data showing a high prevalence of contraceptive use (about 60 percent in women aged 25-29). In contrast, fertility among adolescent women was abnormally high, and hardly changed over the years 1985 to 2001. Most adolescent women had had sexual intercourse (60 percent), but few had ever used contraception (20 percent) and even less were currently using contraceptives (10 percent users at last sex). High adolescent fertility was already observed in Agincourt,[48] and was attributed to the lack of access of adolescents to appropriate contraceptive methods. The bias of the family planning program in Limpopo seems to repeat itself in KZN, and probably for the same reasons: ignorance of adolescents' needs for access to contraceptives, and cultural biases

against the provision of sexual and reproductive health services and information to adolescents—a problem certainly not limited to Africa.

We did not find evidence of a major impact of HIV/AIDS on fertility level and pattern yet in the ACDSA. Our computations show that the high seroprevalence of HIV explains only a small part (12 percent) of the fertility decline in the 20-29 age group. This is not to say that this effect will not be bigger in the near future, since the HIV epidemic in South Africa is maturing, and its impact on fertility is likely to become more pronounced. However, the most important demographic effect in the long run may be the imbalance between low fertility and high HIV seroprevalence. Should the current trends continue in the future, below replacement fertility, together with high mortality due to AIDS, could soon lead to negative natural population growth. Our findings suggest that efforts to improve access to family planning methods and prevent HIV/AIDS among adolescents should be expanded and strengthened, particularly in rural areas where services are limited. Policies and programs should be further developed to limit the vertical transmission of HIV, and to mitigate the mortality effect among already infected women by improving access to life-sustaining drugs. Failure to address the dual problems of high HIV mortality and high adolescent fertility could have a major impact on population dynamics of rural Kwazulu-Natal, with numerous economic and social consequences.

References

1. Posel D, 1991, *The Making of Apartheid, 1948-1961: Conflict and Compromise,* Oxford: Clarendon Press.
2. Caldwell JC and Caldwell P, 1993, "The South African fertility decline", *Population and Development Review 19*(2):225-262.
3. Kaufman CE, 1998, Contraceptive use in South Africa under apartheid. *Demography,* 35(4), 421-434.
4. Moultrie TA and Timæus IM, 2002, *Trends in South African fertility between 1970 and 1998: An analysis of the 1996 Census and the 1998 Demographic and Health Survey,* Cape Town: Medical Research Council.<http://www.mrc.ac.za/bod/trends.pdf.>
5. Garenne M and Joseph V, 2002, The timing of the fertility transition in sub-Saharan Africa. *World Development*, 30(10).
6. Oosthuizen K, 2000, Demographic changes and sustainable land use in South Africa. *Genus* 56(3-4):81-107.
7. Mostert WP et al., 1998, *Demography: Textbook for the South African Student,* Pretoria: Human Sciences Research Council.
8. Moultrie TA, 2002, *Apartheid's Children: Social Institutions and Birth Intervals During the South African Fertility Decline, 1960-1998,* Unpublished PhD thesis, London: University of London.
9. Cohen B, 1993, Fertility levels, differentials, and trends, in: Foote KA, Hill KH and Martin LG, eds., *Demographic Change in Sub-Saharan Africa,* Washington DC: National Academy Press, pp. 8-67.

10. Lightbourne RE, 1985, Individual preferences and fertility behaviour, in: Cleland J and Hobcraft J, eds., *Reproductive Change in Developing Countries: Insights from the World Fertility Survey,* Oxford: Oxford University Press, pp. 165-198.
11. Moultrie TA, 2002, op. cit. (see reference 8).
12. Mostert WP, 1978, Gesinsbeplanning in 1977 [Family planning in 1977]. *Journal of Racial Affairs* 29(3):86-88.
13. Mostert WP, 1972, *Die Gesinsbouproses by Bantoes in die Metropolitaanse Gebied van Durban [The Family Building Process among Bantus in the Metropolitan Area of Durban]*. Report S-16 (1972). Pretoria: Human Sciences Research Council.
14. Mostert WP and du Plessis JL, 1972, *Die Gesinsbouproses by Bantoes in die Metropolitaanse Gebied van Pretoria [The Family Building Process among Bantus in the Metropolitan Area of Pretoria],* Report S-17 (1972). Pretoria: Human Sciences Research Council.
15. Mostert WP and Engelbrecht J,1972, *Die Gesinsbouproses by Bantoes in die Metropolitaanse Gebied van Kaapstad [The Family Building Process among Bantus in the Metropolitan Area of Cape Town],* Report S-15 (1972). Pretoria: Human Sciences Research Council.
16. Mostert WP and van Eeden IJ, 1972, *Die Gesinsbouproses by Bantoes in die Metropolitaanse Gebied van Johannesburg: Soweto [The Family Building Process among Bantus in the Metropolitan Area of Johannesburg: Soweto]*. Report S-18 (1972). Pretoria: Human Sciences Research Council.
17. Lötter, JM and van Tonder JL, 1976, *Fertility and Family Planning among Blacks in South Africa: 1974,* Report S-39. Pretoria: Human Sciences Research Council.

18. 'Letsema', 1982, Family planning in South Africa - A kind of genocide? *African Communist* 90:73-88.
19. van der Vliet V, 1991, Traditional husbands, modern wives - constructing marriages in a South African township, *African Studies* 50(1-2):219-241.
20. Kaufman CE, 1996, *The Politics and Practice of Reproductive Control in South Africa: A Multilevel Analysis of Fertility and Contraceptive Use,* Unpublished PhD thesis, Ann Arbor: University of Michigan.
21. Department of Health, Republic of South Africa, 2002, *South Africa Demographic and Health Survey 1998: Final Report,* Pretoria, South Africa: Department of Health.
22. Garenne M, Tollman S and Kahn K, 2000, Marital and premarital fertility in a rural area of South Africa: a challenge to existing population policy. *Studies in Family Planning*, 31(1), 47-54.
23. Sturm W, 2002, Unpublished serosurveillance data on antenatal population (pregnant women) from Hlabisa clinics. Hlabisa, South Africa: Africa Centre for Health and Population Studies.
24. Rawlins N, Cassol S, and Dedicoat M, 2002, Unpublished serosurveillance data on childhood immunization population (mothers) from Hlabisa clinics. Hlabisa, South Africa: Africa Centre for Health and Population Studies.
25. Department of Health, Republic of South Africa, 2002, op. cit. (see reference 21).
26. Brass W, 1996, Demographic data analysis in less developed countries: 1946-1996. *Population Studies*, 50(3), 451-467 (p.458).
27. Garenne M, Tollman S and Kahn K, 2000, op. cit. (see reference 22).

28. Hosegood V and Preston-Whyte, E, 2002, 9-11 May, *Changing marital and partnership patterns in rural South Africa,* Paper presented at the IUSSP, Atlanta, U.S.A.

29. Garenne M, 1999, Impact démographique du sida en Afrique : données et interpretation, in: Becker C, Dozon JP, Obbo C, Touré M, eds., *Vivre et penser le sida en Afrique / Experiencing and understanding AIDS in Africa*, Paris: Codesria-IRD-Karthala, 1999 (707 pages): 151-165.

30. Ryder RW et al., 1991, Fertility rates in 238 HIV-1 seropositive women in Zaire followed for 3 years post-partum, *AIDS*, 5:1521-1527

31. Sewankambo NK et al., 1994, Demographic impact of HIV infection in rural Rakai District, Uganda: results of a population-based cohort study, *AIDS,* 1994 Dec; 8(12):1707-1713.

32. Stover J, 2002, *Spectrum / AIM A computer program for making HIV/AIDS projections and examining the social and economic impact of AIDS*, Washington, The Future's Group International. SPECTRUM / AIM manual,<http://www.futuresgroup.com/software/Spectrum/AimmanE.pdf>

33. Moultrie TA and Timæus IM, 2002, op. cit. (see reference 4).

34. Ibid.

35. Moultrie TA, 2002, op. cit. (see reference 8).

36. Varga CA, 1997, Sexual decision-making and negotiation in the midst of AIDS: youth in KwaZulu-Natal, South Africa, *Health Transition Review*, 7(Supplement 3), 45-67.

37. Varga C and Makubalo E, 1996, Sexual (non)-negotiation among black African teenagers in Durban, South Africa, *Agenda*, 28, 31-38.

38. Preston-Whyte EM and Zondi M,1992, African teenage pregnancy: whose problem? In: Burman S. and Preston-Whyte EM, eds., *Questionable Issue: Illegitimacy in South Africa*, Oxford, U.K.: Oxford University Press.

39. Rutenberg N et al., 2001, *Transitions to Adulthood in the Context of AIDS in South Africa: Report of Wave 1* (Technical Report), New York, U.S.A.: Population Council.

40. Jackson E and Harrison A, 1999, December, *Sexual myths around HIV/AIDS and sexuality: The gap between awareness and understanding among rural South African youth,* Paper presented at the IUSSP, Durban, South Africa.

41. Kaufman CE, de Wet T and Stadler J, 2000, *Adolescent Pregnancy and Parenthood in South Africa* (Monograph 136), New York, U.S.A.: Population Council.

42. Abdool-Karim QA, Preston-Whyte EM and Abdool-Karim S, 1992, Teenagers seeking condoms at family planning services. Part 1: A user's perspective, *South African Medical Journal,* 82, 301-302.

43. Walker L, 1995, The practice of primary health care: a case study, *Social Science and Medicine*, 40(6), 815-824.

44. Kaufman C, 1998, op. cit. (see reference 3).

45. Global Science Panel on Population and Environment (G.S.P.P.E.), 2002, Population should be on the Johannesburg agenda. *Nature*, 418(17), [letter].

46. Garenne M and Joseph V, 2002, op. cit. (see reference 5).

47. Moultrie TA and Timæus IM, 2002, op. cit. (see reference 4).

48. Garenne M et al., 2000, op. cit. (see reference 22).

Acknowledgements

This study was supported by a grant from the Wellcome Trust (050512/Z/97/D/WRE/MJS) to the Africa Centre for Health and Population Studies. The authors thank the South African Department of Health for giving permission for the 1998 South African Demographic and Health Survey to be analyzed in this manuscript. We also thank Michael Bennish of the Africa Centre for his detailed review of the manuscript. At the time of writing, Carol Camlin was a University of Michigan Population Fellow supported by funding from the U.S. Agency for International Development. Michel Garenne's travel to South Africa was supported by the French Ministry of Foreign Affairs.

Table 1: Cumulative fertility and mean annual rate of fertility decline, by major age groups, ACDSA, 1980-2001

Age group	Cumulative fertility					Mean annual rate of fertility decline, 1980-2001
	1980-84	1985-89	1990-94	1995-99	2000-01	
12-17	0.321	0.265	0.207	0.198	0.227	-0.005
18-27	2.089	1.969	1.703	1.425	1.186	-0.032
28-37		1.746	1.634	1.386	1.124	-0.029
38-47			0.495	0.428	0.282	-0.025

Africa Centre for Health and Population Studies, 2002

Table 2: Age at first sex, first pregnancy and first use of modern contraception, women of reproductive age, by age group (ACDIS 2001)

Age Group	Age at first sexual intercourse			Age at first pregnancy			Age at first use of modern contraception		
	Mean	Median (Interquartile range)	*n*	Mean	Median (Interquartile range)	*n*	Mean	Median (Interquartile range)	*n*
Total	17.7	17 (16-19)	15,008	19.4	19 (17-21)	14,588	22.5	21 (19-25)	9,153
15-19	16.1	16 (15-17)	2,036	17.1	17 (16-18)	1,612	17.2	17 (16-18)	728
20-24	17.4	17 (16-19)	3,544	18.7	19 (17-20)	3,055	19.5	19 (18-21)	2,184
25-29	18.1	18 (16-20)	2,867	19.5	19 (17-22)	2,777	21.6	21 (19-24)	2,141
30-34	18.0	18 (16-19)	2,187	19.8	19 (17-22)	2,317	23.7	23 (20-27)	1,587
35-39	18.1	18 (16-20)	1,908	20.2	20 (17-22)	2,057	25.3	25 (21-29)	1,255
40-44	18.1	18 (16-20)	1,531	20.0	19 (17-22)	1,705	27.3	26 (21-33)	852
45-49	18.4	18 (16-20)	935	20.7	20 (18-23)	1,063	28.8	28 (23-34)	406

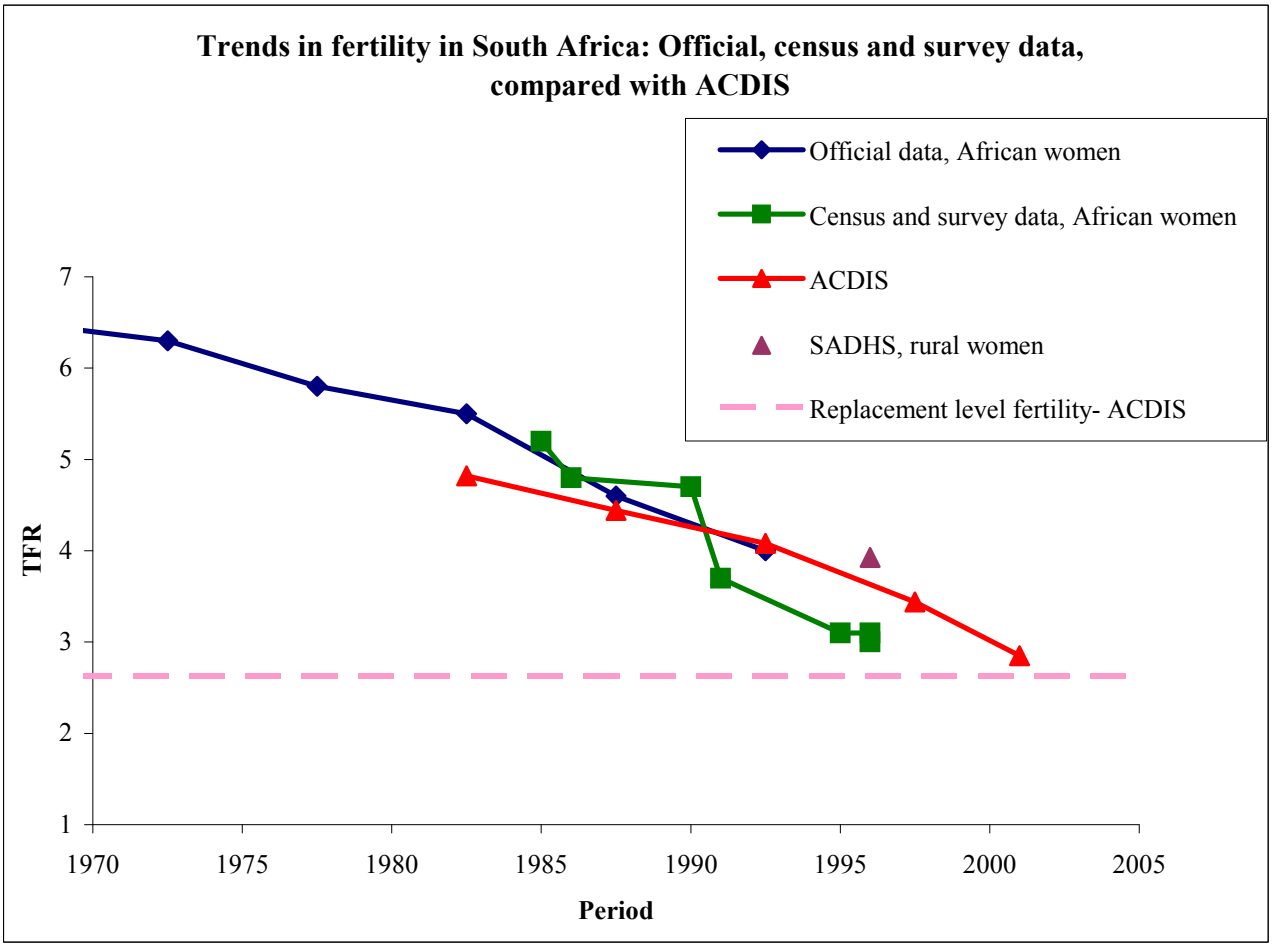
Africa Centre for Health and Population Studies, 2002. Note: Data are shown for women ages 15-49 who report ever having had sexual intercourse, ever been pregnant and ever used contraception, respectively.

Table 3: Percentage of women aged 15-49 who ever used a modern method, by method type, Umkhanyakude (ACDIS 2001) and South Africa (SADHS 1998)

Modern FP Method	ACDIS 2001 *		SADHS 1998 †	
	n	%	n	%
Any modern method	**18,741**	**51.7**	**6,062**	**86.1**
Injectables (Depo-Provera or Nuristerate)	7,757	41.4	3,908	64.5
Pill	2,183	11.6	2,923	48.2
Male condom	2,155	11.5	1,492	23.0
IUD	213	1.1	739	12.2
Female sterilization	47	0.3	729	12.0
Male sterilization	214	1.1	135	2.2
Diaphragm/foam/jelly	6	0.0	76	1.3
Emergency contraception	27	0.1	--	NA

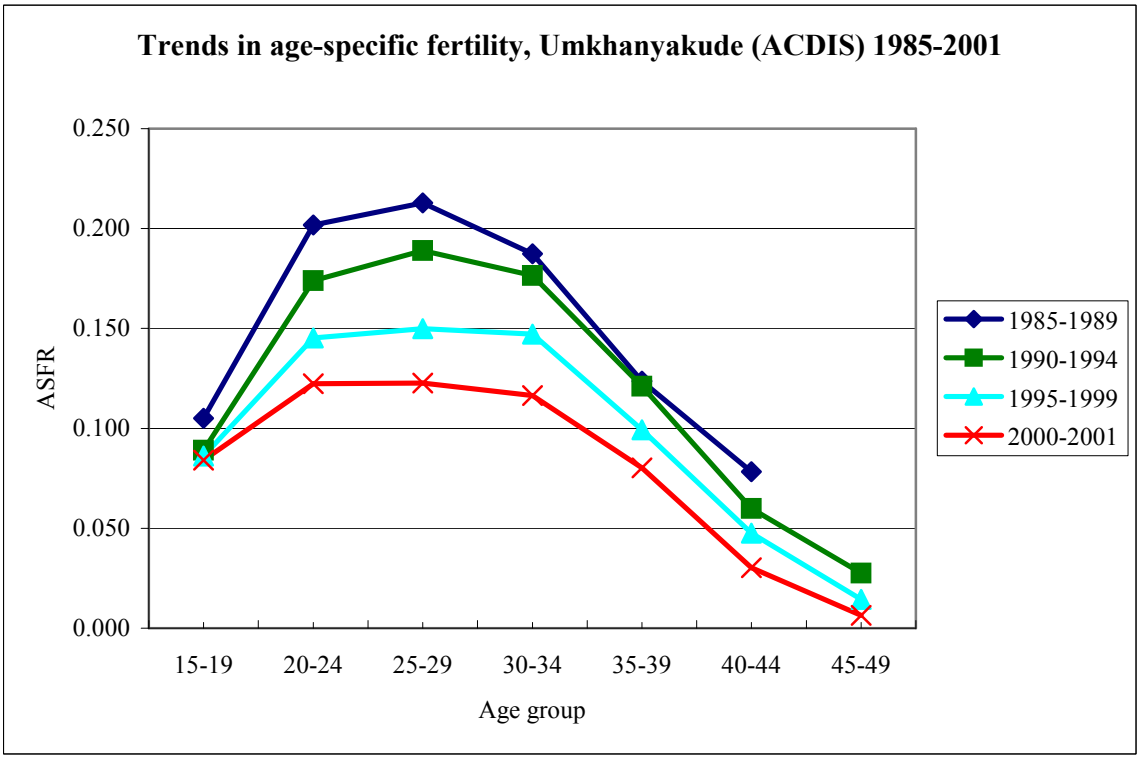
* Africa Centre for Health and Population Studies, 2002. Data shown for women ages 15-49 who report ever having had sexual intercourse.
† South Africa Demographic and Health Survey, 1998. Data are shown for sexually active women ages 15-49 (i.e. those who had sexual intercourse in the past four weeks).

Figure 1



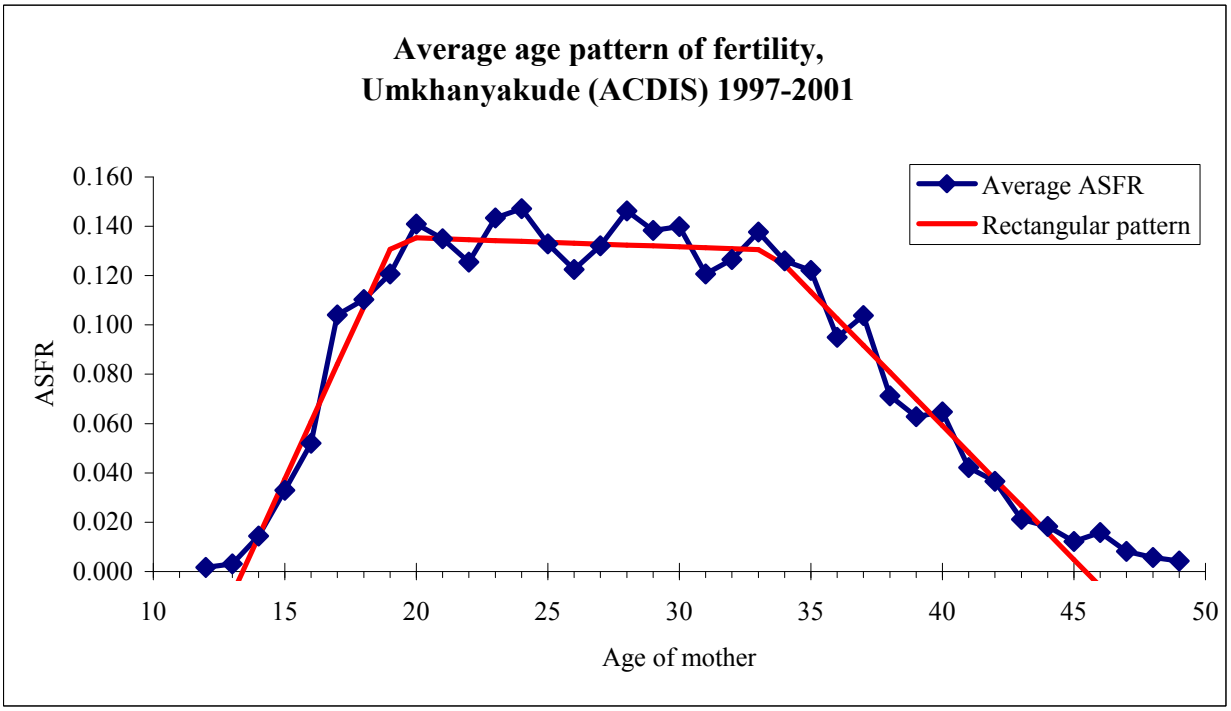
Sources: Official data: Mostert et al.; Surveys: Moultrie and Timaeus; SADHS: South Africa Department of Health; ACDIS: Africa Centre for Health and Population Studies.

Figure 2



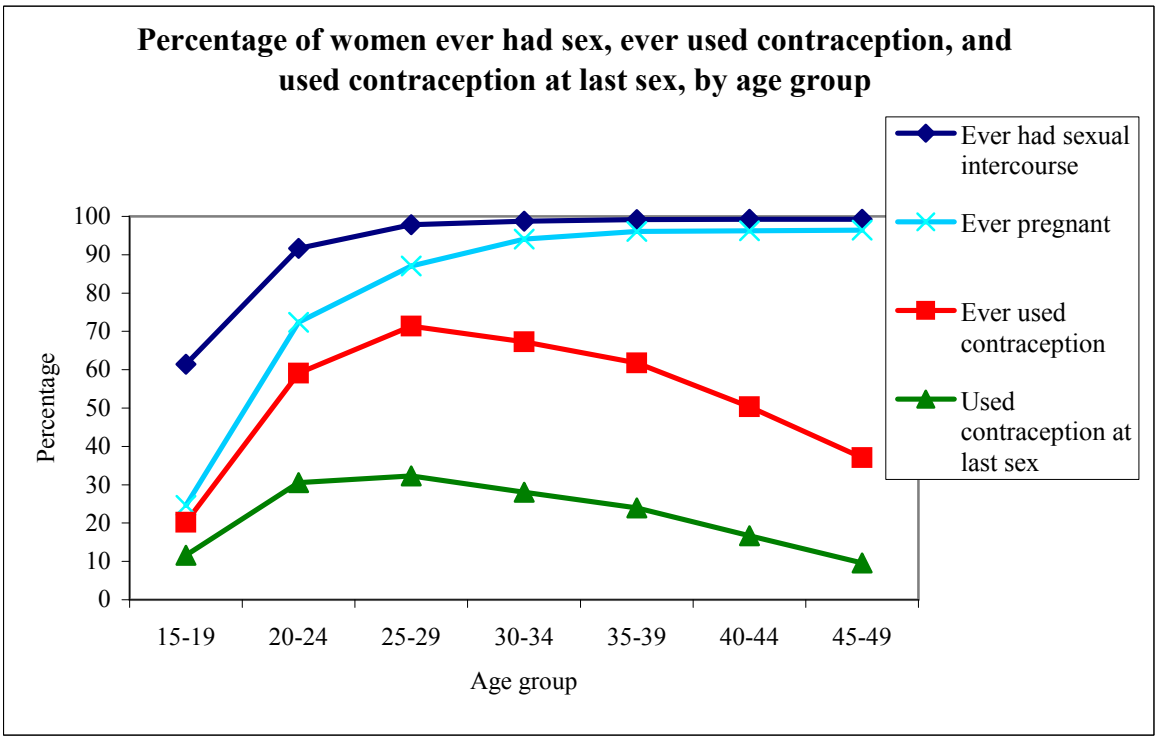
Africa Centre for Health and Population Studies, 2002.

Figure 3



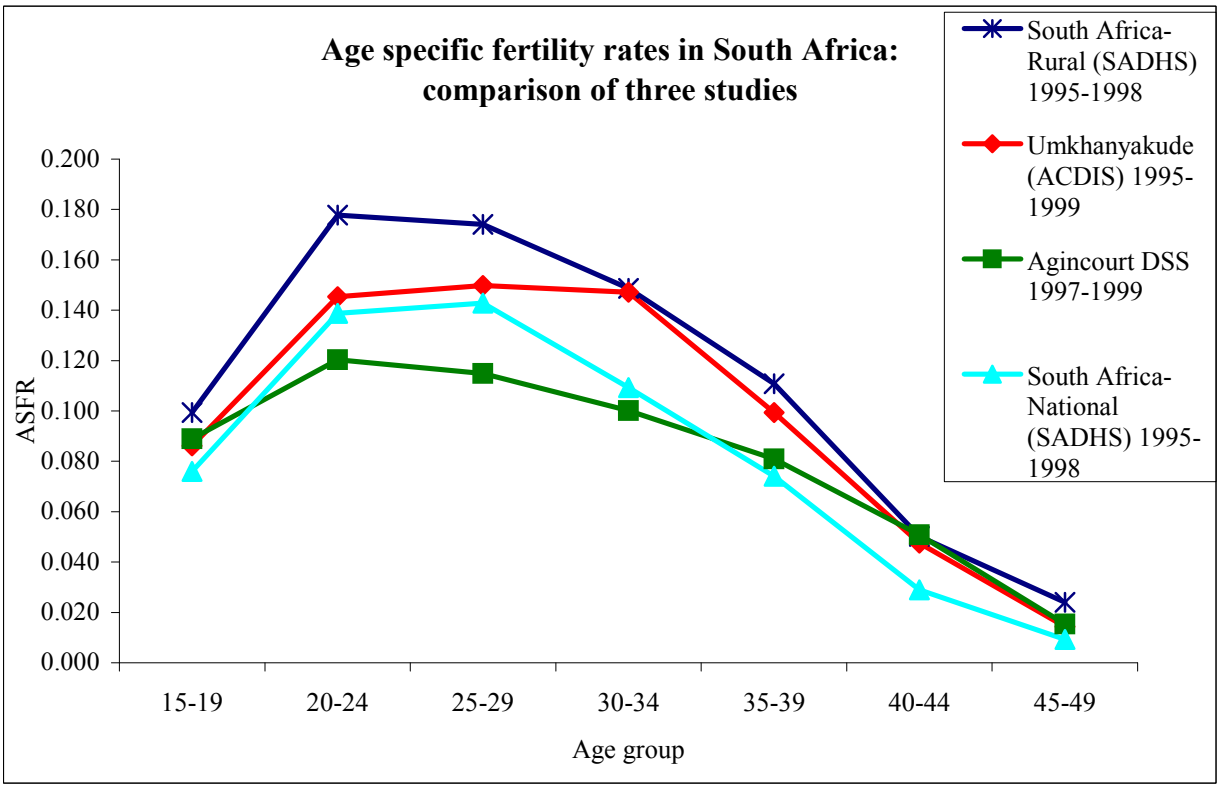
Africa Centre for Health and Population Studies, 2002.

Figure 4



Africa Centre for Health and Population Studies, 2002. Note: Denominators for the percentages of women who have ever used contraception and who used contraception at last sex are the number of women in each age group who have ever had sex.

Figure 5



Sources: SADHS: South Africa Dept. of Health; Agincourt: University of the Witswatersrand; ACDIS: Africa Centre for Health and Population Studies.

Source data for Figures 1-5:

Figure 1: Trends in fertility in South Africa: Official, census and survey data, compared with ACDSA

	Official estimates: Mostert et al.		Census and surveys estimates: Moultrie & Timaeus		1998 DHS survey		ACDSA		
Period	**Official data, African women**		**Census and survey data, African women**		**SADHS, rural women**		**ACDSA**		**Replacement level fertility-ACDSA**
	Time	TFR	Time	TFR	Time	TFR	Time	TFR	
1950-54	1952.5	6.8							2.63
1955-59	1957.5	6.7							2.63
1960-64	1962.5	6.7							2.63
1965-69	1967.5	6.5	1985	5.2					2.63
1970-74	1972.5	6.3	1986	4.8					2.63
1975-79	1977.5	5.8	1990	4.7					2.63
1980-84	1982.5	5.5	1991	3.7			1982.5	4.82	2.63
1985-89	1987.5	4.6	1995	3.1			1987.5	4.44	2.63
1990-94	1992.5	4.0	1996	3.1			1992.5	4.08	2.63
1995-99	1997.5		1996	3.0	1996	3.93	1997.5	3.44	2.63
2000-01	2002.5						2001.0	2.85	2.63
	2005.0								2.63
Rate of fertility decline		-0.019		-0.050				-0.028	

Figure 2: Trends in age-specific fertility, ACDSA 1985-2001

	ASFRs			
Age group	**1985-1989**	**1990-1994**	**1995-1999**	**2000-2001**
<15	0.011	0.005	0.005	0.035
15-19	0.105	0.089	0.086	0.084
20-24	0.202	0.174	0.145	0.122
25-29	0.213	0.189	0.150	0.123
30-34	0.187	0.176	0.147	0.117
35-39	0.124	0.121	0.099	0.080
40-44	0.078	0.060	0.048	0.030
45-49		0.028	0.014	0.006

Figure 3: Average age pattern of fertility, ACDSA 1997-2001

Age	ASFR, 1997-2001	Rectangular pattern
12	0.0017	-0.032
13	0.0031	-0.009
14	0.0144	0.014
15	0.0329	0.037
16	0.0520	0.061
17	0.1041	0.084
18	0.1103	0.107
19	0.1206	0.131
20	0.1409	0.135
21	0.1349	0.135
22	0.1254	0.135
23	0.1433	0.134
24	0.1471	0.134
25	0.1329	0.134
26	0.1225	0.133
27	0.1321	0.133
28	0.1463	0.132
29	0.1383	0.132
30	0.1399	0.132
31	0.1207	0.131
32	0.1265	0.131
33	0.1376	0.131
34	0.1259	0.124
35	0.1222	0.113
36	0.0950	0.103
37	0.1038	0.092
38	0.0713	0.081
39	0.0628	0.070
40	0.0648	0.059
41	0.0421	0.048
42	0.0365	0.037
43	0.0212	0.027
44	0.0184	0.016
45	0.0122	0.005
46	0.0158	-0.006
47	0.0082	-0.017
48	0.0058	-0.028
49	0.0043	-0.039

Figure 4: Percentage of women ever had sex, ever used contraception, and used contraception at last sex, by age group

5-year age groups	Ever had sexual intercourse			Ever used any modern FP (of those had sex)			Ever pregnant			Used FP at last sex (of those who ever had sex)		
	No	Yes	Total	No	Yes	Total	No	Yes	Total	No	Yes	Total
15-19	2549	4056	6605	3221	814	4035	4976	1629	6605	3566	469	4035
	38.59	61.41	100	79.83	20.17	100	75.34	24.7	100	88.38	11.62	100
20-24	355	3897	4252	1587	2291	3878	1173	3079	4252	2695	1183	3878
	8.35	91.65	100	40.92	59.08	100	27.59	72.4	100	69.49	30.51	100
25-29	70	3150	3220	896	2236	3132	417	2803	3220	2120	1012	3132
	2.17	97.83	100	28.61	71.39	100	12.95	87.1	100	67.69	32.31	100
30-34	32	2474	2506	806	1658	2464	149	2357	2506	1773	691	2464
	1.28	98.72	100	32.71	67.29	100	5.95	94.1	100	71.96	28.04	100
35-39	18	2170	2188	826	1335	2161	86	2102	2188	1643	518	2161
	0.82	99.18	100	38.22	61.78	100	3.93	96.1	100	76.03	23.97	100
40-44	13	1809	1822	896	908	1804	69	1753	1822	1503	301	1804
	0.71	99.29	100	49.67	50.33	100	3.79	96.2	100	83.31	16.69	100
45-49	8	1117	1125	698	411	1109	40	1085	1125	1003	106	1109
	0.71	99.29	100	62.94	37.06	100	3.56	96.4	100	90.44	9.56	100
Total	3109	18831	21940	9046	9695	18741	7059	14881	21940	14448	4293	18741
	14.17	85.83	100	48.27	51.73	100	32.17	67.83	100	77.09	22.91	100

Figure 5: Age specific fertility rates in South Africa: comparison of three studies

Age group	South Africa: Rural 1995-98	Umkhanyakude (ACDIS) 1995-1999	Agincourt 1997-1999	South Africa: National 1995-1998
15-19	0.099	0.086	0.089	0.076
20-24	0.178	0.145	0.120	0.139
25-29	0.174	0.150	0.115	0.143
30-34	0.149	0.147	0.100	0.109
35-39	0.111	0.099	0.081	0.074
40-44	0.050	0.048	0.051	0.029
45-49	0.024	0.014	0.015	0.009