

## Unmet Need for Contraceptives in Developing World Has Declined, But Remains High in Some Countries

Between 2003 and 2012, the proportion of women aged 15–49 in developing countries who wanted to avoid pregnancy increased from 54% to 57%, according to an analysis of data on contraceptive need and use throughout the developing world.<sup>1</sup> The number of such women increased by 151 million, though most of the increase (72%) is attributable to population growth. Among women who wished to avoid pregnancy, the proportion who had an unmet need for a modern method of contraception decreased from 29% in 2003 to 26% in 2012. Nonetheless, the proportion remained high in Sub-Saharan Africa (60%), western Asia (50%) and south Asia (34%). The analysis also revealed a shift away from use of the most effective method, sterilization, to greater use of injectables and barrier methods.

As part of the effort to monitor progress toward the goal of universal access to contraceptives outlined in Millennium Development Goal 5, the researchers estimated levels of modern contraceptive use and unmet need in developing countries. Modern contraceptive use was defined as the use by a woman or her partner of at least one of the following methods: sterilization, IUD, implant, injectable, oral contraceptives, male condoms or other supply methods (such as spermicide). Women were categorized as wanting to avoid pregnancy if they were using a modern method; if they did not use contraceptives but were married (or unmarried and sexually active), fecund and did not want a child in the next two years; or if they were pregnant (or experiencing postpartum amenorrhea) but had not wanted to become pregnant for at least two more years, if at all. Women who wanted to avoid pregnancy but were using no method or a traditional method (such as periodic abstinence or withdrawal) were considered to have an unmet need for modern contraceptives.

Using Demographic and Health Surveys and similar national surveys for developing nations, the researchers tabulated the proportions of women who were using modern

methods to avoid pregnancy and those who had unmet need. Estimates were made for 2003, 2008 and 2012; values for countries that lacked data were estimated from weighted subregional averages, information from previous studies or data from similar countries. For each country, separate estimates were made for women who were currently, formerly or never married (or in union); these proportions were applied to estimates (from United Nations and national survey data) of numbers of women in each marital status category. Also, the researchers calculated the proportion of women using each type of modern contraceptive. Country-specific results were aggregated to yield estimates for geographic regions and subregions, as well as for the 69 poorest countries.

In 2003, 716 million (54%) of the 1.32 billion women aged 15–49 in developing countries wanted to avoid pregnancy; in 2012, 867 million (57%) of the 1.52 billion women of reproductive age wished to do so. Seventy-two percent of the increase in the number of women who wanted to avoid pregnancy (108 million out of 151 million women) is attributable to population growth; the remainder reflects changing patterns of marriage and sexual activity and women's increasing motivation to avoid unintended pregnancy.

The proportion of women who wanted to avoid pregnancy varied greatly by region in 2012, ranging from less than half in central and western Asia and most regions of Africa to two-thirds or more in eastern Asia, southern Africa and South America. Although the proportion of women wanting to avoid pregnancy increased by three percentage points overall between 2003 and 2012, larger increases occurred in eastern Asia (from 66% to 72%), eastern Africa (from 39% to 45%), southern Africa (from 63% to 70%), the Caribbean (from 52% to 59%) and South America (from 62% to 68%).

Between 2003 and 2012, the number of women using a modern method increased by 139 million; 106 million of this increase can be attributed to population growth and the re-

maining 33 million to an increase in the proportion of women using modern methods. In 2012, levels of modern method use among those who wanted to avoid pregnancy were highest in eastern Asia (94%), southern Africa (83%), Central America (77%) and South America (79%). Levels of use were moderate (46–66%) in south Asia, western Asia and eastern Africa, and very low ( $\leq 26\%$ ) in middle and western Africa. However, between 2003 and 2012, method use increased substantially among women wanting to avoid pregnancy in southeast Asia (from 64% to 72%), eastern Africa (from 31% to 46%), southern Africa (from 75% to 83%), Central America (from 71% to 77%) and South America (from 73% to 79%), as well as in the 69 poorest developing countries (from 55% to 61%).

The most commonly used modern method in developing countries in 2012 was sterilization (38%), followed by IUDs (28%), oral contraceptives and barrier methods (13% each), and injectables or implants (9%). However, the predominant method varied by region: Sterilization was the most common method in Asia as a whole, as well as in Latin America and the Caribbean; IUDs predominated in eastern, central and western Asia; long-acting hormonal contraceptives (mostly injectables) were the most frequently used methods in Sub-Saharan Africa overall and in southeast Asia; oral contraceptives accounted for the largest proportion of method use in Northern Africa; and barrier methods were the most commonly used contraceptives in middle and western Africa. The number of women using each type of method increased between 2003 and 2012; however, the proportion of contraceptive users who relied on sterilization decreased, while barrier and long-acting hormonal methods each accounted for a growing share of the method mix.

The proportion of women wanting to avoid pregnancy who had an unmet need for modern methods declined from 29% in 2003 to 26% in 2012. Of the 222 million women in developing countries with an unmet need for modern methods, 162 million (73%) lived in

the 69 poorest countries. The proportion of women with unmet need decreased in every subregion between 2003 and 2012, but those proportions remained high in many areas, including middle Africa (81%), western Africa (74%), eastern Africa (54%), western Asia (50%) and south Asia (34%).

The researchers acknowledge several limitations. Notably, the sexual activity of unmarried women is likely to be somewhat underreported in Sub-Saharan Africa and Latin America, and extensively underreported in Asia and northern Africa (when available at all). In addition, in some cases the same data source was used for both 2003 and 2008, or both 2008 and 2012, because it was the only available source for both reference years; this may have resulted in an underestimation of

change, particularly for 2008–2012. Nonetheless, the researchers note that although the number of women who want to avoid pregnancy is rising, the proportion with unmet need for modern contraceptives appears to have declined, albeit only slightly. To address the remaining unmet need for modern contraceptives, developing nations “need to increase resources, improve access to contraceptive services and supplies, and provide high-quality services and large-scale public education interventions to reduce social barriers.”—*L. Melhado*

#### REFERENCE

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## Literature Review Identifies Under-Researched Topics in Adolescent Sexual and Reproductive Health

Over the last two decades, most studies on the correlates of adolescent sexual and reproductive health in developing countries have focused on Sub-Saharan Africa and on respondents’ individual-level characteristics, according to a recent literature review.<sup>1</sup> Moreover, of the 222 studies included in the analysis, almost half focused on condom use (60) or sexual initiation (45). In contrast, relatively little research has examined youth in Asia, Latin America or the Middle East, looked at family or community-level characteristics, or focused on such outcomes as pregnancy or sexual coercion.

The study updated a 2005 review by the World Health Organization, which assessed studies published in 1990–2002, by merging those findings with the results of a new analysis of studies published in 2003–2010. Both rounds examined peer-reviewed studies on the positive and negative correlates of adolescent sexual and reproductive health, including those related to sexual initiation, number of sex partners, use of condoms and other contraceptives, pregnancy, early childbearing, and HIV and other STIs. Studies were eligible for inclusion if they had been conducted in a low- or middle-income country, had a sample size of at least 100 youth aged 10–24 and had used multivariate analysis. The final analytic sample consisted of 222 articles—158 from the initial review and 64 from the second. Twenty-two additional studies met the

eligibility criteria but were excluded because they examined outcomes in a manner that precluded comparison with other studies (e.g., they looked at age at first sex rather than whether the respondent had ever had sex).

The majority of studies focused on Sub-Saharan Africa (133), while 47 centered on South and Southeast Asia, 37 on Latin America and the Caribbean, and five on the Middle East. The most common outcomes examined were condom use (60 studies) and sexual initiation (45 studies); pregnancy and childbearing, HIV, contraception, number of sex partners, and STIs other than HIV were each covered in 18–26 articles. Nine studies in the second round of review examined correlates of sexual coercion, a topic that had not been sufficiently studied to warrant inclusion in the original review. (Abortion was not adequately studied in either round.)

Together, the studies examined a total of 1,441 individual-level characteristics, such as demographic traits, knowledge and behaviors, in relation to adolescent sexual and reproductive health. Less commonly, studies included characteristics related to family (444), peers and partners (208), school (53) and community (41); the latter two categories were proportionally more common in the second round of the review than in the first, indicating that contextual characteristics may be increasingly viewed as important correlates.

The authors identified a number of characteristics that were significantly associated with adolescent sexual and reproductive outcomes in at least two-thirds of studies that examined them. Typically, being married, being younger, having a job, consuming alcohol, having peers or friends who had had sex, having experienced forced first sex, living in a rural area and being an orphan were positively associated with risky behaviors or negative outcomes, while having high educational attainment and having discussed reproductive health with a partner were associated with positive behaviors. Some key characteristics were linked with multiple outcomes; for instance, being relatively well-educated was associated with delayed sexual initiation, use of condoms and use of contraceptives in general.

Although adolescents’ family-level characteristics were generally understudied, one such characteristic—living with both parents—was consistently associated with reduced risks of pregnancy and childbearing. Having engaged in anal sex or commercial sex work and having had an STI in the past were associated with STI symptoms, STI diagnoses or both. The nine studies that examined sexual coercion established having been beaten by a partner, having had a reproductive tract infection and having used alcohol before sex as correlates.

The authors suggest that their findings not only help identify key correlates of risk among young people, but also indicate both met and unmet need for research. For instance, the high level of interest in Sub-Saharan Africa is likely a response to the severity of the HIV epidemic among adolescents in that region. However, increased analysis of the contexts of adolescents’ lives in other regions may be critical, especially given that “important demographic and social shifts are occurring throughout the world, including the increasing age [at] marriage, improved school enrollment, changing family structures, and transformations in technology.” In addition, they emphasize the importance of filling gaps in knowledge concerning abortion and sexual coercion among young people. Finally, noting the preponderance of individual-level analysis performed in existing research, the authors point out that neighborhood context has been established as an important correlate of adolescent sexual behavior in the United States, and recommend that community-level research be extended to developing-country contexts.—*H. Ball*

## REFERENCE

I. Mmari K and Sabherwal S, A review of risk and protective factors for adolescent sexual and reproductive health in developing countries, *Journal of Adolescent Health*, 2013, forthcoming.

## Home-Based Services May Increase HIV Testing In Rural South Africa

Rural South Africans who lived in areas where counselors offered home-based HIV testing as part of an intervention were more likely to take an HIV test than were those who could obtain services only at clinics (prevalence ratio, 1.5), according to a cluster-randomized, controlled trial.<sup>1</sup> Among individuals who underwent testing, those who had a home test were twice as likely as those tested at a facility to receive couples-based counseling and get tested together (prevalence ratio, 2.2). In addition, at the end of the study, residents of the intervention area were less likely than those of the control region to report having had multiple partners or a casual partner in the last three months (0.5 and 0.6, respectively).

Although the prevalence of HIV is very high in South Africa (17% in 2009), only a small proportion of residents have been tested for the virus, particularly in rural areas, where poverty and HIV stigma are common. To assess whether access to home-based HIV counseling and testing increases the prevalence of testing, researchers conducted an intervention in the uMzimkhulu subdistrict of KwaZulu-Natal province.

In 2008, researchers undertook a baseline survey of all of the subdistrict's households and used the resulting information to demarcate 16 clusters, half of which were randomly assigned to receive the intervention and half to a control group. More than 85% of households in each group completed the survey. Residents were eligible for the survey (and subsequent intervention) if they were at least 14 years old; minors were required to obtain parental permission. The 4,710 respondents had an average age of 41; about two-thirds were women (many men in the area migrate for work), one-third had ever had an HIV test and roughly half had no more than a primary education. Infrastructure was somewhat better in the control areas than in the intervention areas (e.g., higher proportions of residents had piped water and electricity in their home).

In the intervention clusters, researchers trained women who were experienced in community outreach to become HIV counselors. From September 2009 to November 2010, these counselors visited every household in the intervention area, offered information about HIV and rapid HIV tests, and provided pre- and posttest counseling. Residents who tested positive received follow-up counseling and a referral to a nearby health facility. In control clusters, no counselors visited the households, and HIV services were available only at area health facilities and mobile units; however, as part of an unrelated national HIV awareness campaign, the South African government began promoting testing in this area (but not the intervention area) midway through the trial period.

To assess changes in the prevalence of HIV testing and to measure the prevalence of risky sexual behavior after the intervention, researchers conducted a follow-up survey from February to May 2011; again, all residents of the two areas were invited to participate. The 4,154 respondents were split equally between the control and intervention clusters. The proportion of residents who had ever been tested rose from 32% at baseline to 69% in the intervention clusters, and from 31% to 47% in the control clusters. Among those who underwent an HIV test between the baseline and follow-up surveys, 58% of intervention area residents and 1% of control area residents reported having been tested at their home; 85% of those who obtained home-based services rated the quality of counseling as good or very good.

In multivariate analyses that adjusted for clustering, the likelihood of having been tested for HIV during the trial period was higher among respondents of the intervention areas than among those in the control areas (prevalence ratios, 1.5); the findings were similar when the analytic sample was limited to only men or only women. Among those who underwent testing, residents of the intervention areas were more likely than those who lived in the control areas to have been tested and counseled with their partner (2.2), and less likely to have experienced intimate partner violence following disclosure of their HIV status (0.6). Moreover, respondents of the intervention areas were less likely than their counterparts elsewhere to report having had multiple or casual sexual partnerships in the last three months (0.5 and 0.6, respectively). No differences between groups were found

for measures of HIV knowledge, condom use and experiences with HIV stigma.

Limitations of the study include the use of self-reported data from cross-sectional surveys, which could be subject to recall and social desirability bias, and its focus on a single small, rural subdistrict. However, the investigators point out that this type of study has never before been conducted in a rural location where HIV is prevalent, and that the findings may be relevant for the many other rural Sub-Saharan African communities where HIV stigma is high and male migration for work is common. Furthermore, by encouraging couples testing, the intervention could help reduce the likelihood of transmission between serodiscordant partners. Considering that the vast majority of intervention area respondents gave high ratings to the services they received at home, the researchers recommend that the South African government train community health workers in administering home-based tests and counseling to "achieve high uptake of HIV testing." Moreover, the lower likelihood of certain risk behaviors in the present study's intervention group suggests that wide-scale implementation of the program might reap "broader benefits beyond the actual testing."—S. Ramashwar

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## Intimate Partner Violence Linked to HIV Infection Among Ugandan Women

Intimate partner violence is associated with subsequent HIV infection among rural women in Uganda, according to a longitudinal study.<sup>1</sup> At their final assessment, 28% of participants reported having been sexually, physically or verbally abused by an intimate partner in the past year, and 59% reported having ever experienced such abuse. Women who had ever been abused by a partner were more likely than those who had not to be infected with HIV by the study's end (adjusted incidence rate ratio, 1.6). The researchers estimate that if the association between intimate partner violence and HIV is causal, then 22% of HIV infections in the study would not have occurred in the absence of such violence.

The data are from surveys conducted as part of the ongoing Rakai Community Cohort Study, which follows about 12,000 participants from 50 communities in southwestern Uganda. Participants are interviewed and tested for HIV every 10–18 months; those who drop out of the study are replaced. Each survey round collects data on experiences of intimate partner violence in the previous year; collection of data on other aspects of intimate partner violence (e.g., frequency of abuse) varies by survey year. The surveys also collect demographic information and data on participants' relationships (length, type and age differential between partners) and their sexual history and behavior (early sexual abuse, condom use, pregnancy intention and number of partners in the last year).

The authors used data on 10,252 women who had participated in at least two interviews in 2000–2009, been in a sexual relationship during all or part of that period and tested negative for HIV in 2000 (or at baseline if they entered after 2000). HIV infection was assumed to have occurred in the round in which a woman tested positive, unless test results were missing for the previous round, in which case time of infection was assumed to be the midpoint between the last negative and first positive test. Participants who reported having ever been abused completed an average of 5.7 years of follow-up, and those who reported no abuse an average of 5.2 years.

By the end of the study's follow-up period, 59% of participants had ever experienced intimate partner violence. Seventy-seven percent of these women were in a polygamous or monogamous marriage, and 13% had never been married; among women who reported no intimate partner violence, the proportions were 57% and 33%, respectively. Most women, regardless of experience of abuse, reported having engaged in certain risky sexual behaviors, including using alcohol before sex and not using condoms, but the vast majority reported having had only one partner in the past year.

In the final interview they completed, more than one-quarter (28%) of participants reported having experienced at least one type of intimate partner violence in the past year; 22% reported verbal abuse, 17% physical abuse and 16% sexual abuse. Of those who had been abused by a partner in the past year, 32% had experienced two forms of abuse, and 31% had experienced all three. Overall, 59% of women reported having ever been a victim of intimate partner violence; 53% re-

ported verbal abuse, 45% physical abuse and 35% sexual abuse.

In a multivariate analysis that adjusted for demographic and relationship characteristics, the risk of HIV infection was heightened among women who had ever experienced verbal abuse (incidence rate ratio, 1.7), physical abuse (1.6), sexual abuse (1.6) or any of the three (1.6). Rate ratios were lower, though still elevated, among women who in the past year had experienced physical abuse (1.4), verbal abuse (1.4) or any abuse (1.3). The associations between HIV and intimate partner violence tended to become stronger as the frequency of abuse increased: While there was no association between low levels of abuse (1–2 episodes) and subsequent HIV infection, the incidence rate ratio was elevated among those who reported 3–5 episodes (1.5) and reached 3.0 for those reporting more than 20 episodes over the course of a year. However, HIV risk did not differ according to the severity of abuse. Characteristics of participants' sexual history (pregnancy intention and early sexual abuse) did not modify the relationship between HIV and intimate partner violence, nor did condom use in the past year or number of partners in the past year.

Sixty-three percent of women who tested positive for HIV had been exposed to intimate partner violence at some point before the round in which HIV infection was detected. The authors estimated that if the relationship between intimate partner violence and HIV is causal, 22% of HIV infections in the study population would not have occurred in the absence of intimate partner violence.

The authors note several limitations of the study, including having limited rounds of data on some measures. In addition, they lacked data on men; such information, if available, could have shed light on whether the heightened HIV risk among abused women is attributable to elevated HIV rates among men who perpetrate abuse. Strengths of the study include its longitudinal design, large sample size and inclusion of all three forms of intimate partner violence.

While acknowledging that the pathway between intimate partner violence and HIV is not adequately understood, the authors note that women who experience abuse appear to be at increased risk of contracting the virus. They suggest that intimate partner violence be discussed in HIV-prevention programs, a step they believe may “lead to referring women who are experiencing [intimate part-

ner violence] or who have experienced past [intimate partner violence] for counseling, legal assistance, and other community services, as well as consideration for female-controlled HIV prevention interventions, such as pre-exposure prophylaxis.”—*H. Ball*

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## Characteristics Linked To Sexual Debut Vary Across Sub-Saharan Africa

The associations between urban youths' social and demographic characteristics and the timing and context of their sexual debut—such as whether it occurs before marriage and without contraception—often differ across cities and countries in Sub-Saharan Africa, according to an analysis of survey data from Kenya, Nigeria and Senegal.<sup>1</sup> For example, the likelihood that a young urban woman is unmarried the first time she has sex, and the probability that she used a contraceptive method, varies according to wealth in Kenya, but not in the other two countries. Education and age at first sex are positively related among young urban men in Senegal (odds ratio, 1.7), but negatively related among those in Kenya (0.6). Moreover, within a country, the circumstances surrounding sexual debut may differ according to city of residence; young men in Ilorin and Kaduna, Nigeria, for instance, are far more likely than their peers in Abuja to use a contraceptive method at first sex (4.0–4.3).

The study used baseline survey data from a program to improve reproductive health among poor urban residents of Kenya, Nigeria and Senegal. In each country, the program was implemented in three or four cities. The sampling procedure differed slightly across countries. In Kenya and Senegal, the researchers stratified primary sampling units as poor (informal slums) or nonpoor (formal settlements), then chose an equal number from each category; because primary sampling units in Nigeria could not be categorized, the researchers randomly selected a representative sample. In all three countries, the investigators randomly selected 21–41 households in each primary sampling unit, and recruited all women aged 15–49 who had spent the night in the household; in half of the house-

holds, men aged 15–59 who had spent the previous night were also invited to participate. Participants completed a detailed survey that covered a range of reproductive health issues.

The current analysis focused on youth aged 15–24; the number of young women in the analytic samples ranged from 2,307 in Kenya to 4,029 in Nigeria, while the male samples ranged from 738 in Kenya to 1,680 in Nigeria. In addition to compiling descriptive statistics, the investigators performed regression analyses to identify characteristics associated with age at sexual debut, marital status at first sex, and use of a modern contraceptive method at first sex.

Most young women and men in the three countries had a primary or secondary education and had never been married. Kenyan youth tended to be older than those in Nigeria and Senegal (seven in 10 were aged 20 or older, compared with half of those in the other two countries). The proportion of respondents who were Muslim ranged from one in seven in Kenya to nine in 10 in Senegal.

Most Kenyan youth had had sex (79% of males and 72% of females), but fewer than half of those in the other two countries had done so (28–35% of males and 32–44% of females). The vast majority of sexually experienced young men—about 96% in all three countries—had had sex for the first time before marriage; the corresponding proportion among females ranged from 36% in Senegal to 74% in Kenya. The proportion of sexually experienced youth who had used a modern method of contraception at first sex was higher among males (20–33%) than among females (8–17%); in most cases, the method was a condom.

In general, the predictors of age at first sex, premarital sex and contraceptive use at first sex varied across countries, especially among men. In all three countries, the likelihood that a woman had had sex at a given age was reduced among those with at least a secondary education and those who were working or in school. However, other characteristics did not show consistent associations. For example, in Nigeria, young women in the four least wealthy quintiles were more likely than those in the richest quintile to have had sex at each age (hazard ratios, 1.2–1.5); however, no association was apparent in Kenya, and in Senegal only women in the two poorest quintiles had an elevated likelihood of having had sex at a given age. Women who had moved in the past year were more likely than those who had al-

ways lived in the same place to have had sex, but only in Nigeria and Senegal (1.3 and 2.5, respectively). City of residence was largely unrelated to age at first sex.

Different patterns emerged among young men. In Senegal, males who had continued their education beyond the secondary level were more likely than those with less than a secondary education to have had sex at any given age (hazard ratio, 1.7), but in Kenya they were less likely to have done so (0.6). In Kenya, those who were working or in school were more likely than other men to have had sex (1.4), but the same was not true in the other two countries. Few associations were apparent between age at first sex and wealth, religion or duration of residence. City of residence was associated with sexual debut only in Nigeria; compared with their counterparts in Abuja, young men in Ibadan or Ilorin were more likely to have had sex by a given age, whereas young men from Kaduna were less likely to have done so.

Because nearly all male respondents had had premarital sex, the analysis of marital status at sexual debut was limited to females. In all three countries, the likelihood that first sex had occurred before marriage was inversely associated with age at first sex, and positively associated with education level; the latter finding was especially strong in Nigeria and Kenya, where the odds that first sex was premarital were far greater among women with a secondary education (odds ratios, 2.0–3.6) or more than a secondary education (7.9–9.8) than among those with a primary education or less. Muslim women were less likely than those who were neither Muslim nor Catholic to have had a premarital sexual debut (0.1–0.4). Other characteristics—including wealth, employment and schooling status, and duration of residence—were associated with premarital sex in at least one country, but not all three.

Finally, the researchers examined predictors of contraceptive use. In all three countries, young women were far more likely to have used a modern method at first sex if they had been unmarried (odds ratios, 2.6–7.3) or had more than a secondary education (4.0–4.8). Household wealth was consistently associated with contraceptive use only in Kenya, where the wealthiest women were more likely than others to use a method. Age at first sex was positively associated with contraceptive use in Kenya, but not elsewhere; Muslim women were less likely than other

women to use a method in Senegal.

Among young men, age at sexual debut and education were positively associated with contraceptive use at first sex. Few associations were apparent between contraceptive use and wealth, religion or duration of residence. However, use differed by city; in Nigeria, young men in Ilorin and Kaduna were more likely than those in Abuja to have used modern contraceptives (odds ratios, 4.3 and 4.0, respectively), while in Kenya men in Kisumu were more likely than those in Nairobi to have used a method (2.0).

One limitation of the study, the authors note, is that it did not distinguish between wanted and coerced first sex; other limitations include the study's focus on a small number of cities in each country—an issue that may be especially relevant for Nigeria, which is large and diverse—and its reliance on self-reported data.

Although some study findings were consistent across countries and between women and men—in particular, the finding that more educated youth were more likely than their peers to delay having sex and to use protection—other associations varied among countries, and findings even differed among cities in the same country. This variation, the authors note, underscores the need for regional policymakers and programs “to undertake needs assessments to understand the local context that influences the timing and circumstances of first sex.” The information that results from these assessments can, in turn, be used to “tailor programs to better reach youth [who are] engaging in premarital and unprotected sex.”—*P. Doskoch*

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