

# INTERNATIONAL Family Planning Perspectives

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VOLUME 32, NUMBER 3



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*Ushma D. Upadhyay, Michelle J. Hindin and Socorro Gultiano*

## **Maternal and Social Factors Associated With Abortion in India: A Population-Based Study**

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**INDEXES.** *Abstracts on Hygiene and Communicable Diseases, Academic Search Premier, Biology Digest, CSA Sociological Abstracts, Cumulative Index to Allied Health Literature, Current Contents, Environmental Abstracts, Excerpta Medica, Index Medicus, ISI Alerting Services, JSTOR, Medline, PAIS, POPLINE, Research Alert, Social Sciences Citation Index, Social SciSearch, Sociological Collection and Statistical Reference Index.*

As age at marriage has risen in many developing countries, concern has grown about early sexual activity and the risks of unplanned pregnancy and HIV infection. Research has generally focused on identifying factors associated with early, premarital intercourse among young people and interventions that may be successful in preventing or delaying sexual initiation. Two articles in this issue of *International Family Planning Perspectives* take another look at the situation.

In the lead article, Ushma Upadhyay, Michelle Hindin and Socorro Gultiano explore patterns in the early emotional relationships and physical behaviors that adolescents engage in before they begin to have intercourse [page 110]. Overall, according to data from the Cebu Longitudinal Health and Nutrition Survey, adolescents move through a standard sequence: About two years after having their first crush (at a median age of 14 for males and 13 for females), they experience their first courtship, then their first romantic relationship and finally their first date. Although this sequence of relationships is the same for males and females, males progress through the sequence more quickly (a median of two years vs. four years). First intercourse tends to follow the first date by more than a year (the median age at first sex could not be calculated because only 31% of males and 20% of females aged 17–19 had had sex). The authors suggest that the period following an adolescent's first date provides an opportunity to ensure that the adolescent has access to the information and services needed to make informed choices about sexual behavior.

Alice Liu and colleagues look at factors related to sexual initiation in Thailand, where norms in premarital sexual behavior appear to have changed over the past two decades [page 126]. According to data from a survey of more than 1,700 vocational school students aged 15–21 in Chiang Rai, the median age at first sex was 17 for males and 18 for females. At any given age, both males and females were more likely to have had sex if they had used alcohol or methamphetamine. For males, having had sex was also associated with, among other factors, having parents who did not live together, having a friend as a confidant, smoking tobacco, a high perceived risk of HIV infection and a high level of STI knowledge. For females, additional factors were living away from family, lacking a family member as a confidant, ever having smoked marijuana, having a high perceived risk of STIs, and a younger age at interview. According to the authors, their data confirm previous evidence indicating that young women are starting to have sex at younger ages. They conclude that programs aiming to reduce the adverse consequences of early sexual activity should target youth who become sexually active at an early age and those engaged in patterns of generalized risk-taking, and should take into account the influence of family and peers.

#### Also in This Issue

- Using birth histories from India's 1998–1999 National Family Health Survey, Saseendran Pallikadavath and R. William Stones seek to determine whether abortion is associated at the national level with maternal and social factors, including the sex of a woman's last child [page 120]. The strongest predictor of abortion was education: The odds of abortion among women with at least a primary education were 1.9–6.7 times as high as the odds among women with no education. Women living in rural areas had a reduced risk of abortion. The sex of the previous child was not associated with the odds of abortion. While they found no indication that son preference is an important factor in abortion at the national level, the authors note that such influences may exist at the state or regional level, given recent evidence of highly skewed sex ratios in states such as Haryana.

- Although abortion is highly restricted in Guatemala, an estimated 65,000 abortions are performed in the country every year, according to calculations by Susheela Singh, Elena Prada and Edgar Kestler [page 136]. Using the estimated number of abortions and the annual number of unplanned births, the authors estimate that one in three pregnancies in Guatemala are unintended. Noting that the gap between desired and actual family size remains high (despite declines in both), and that almost half of Guatemalan women do not know of any method of contraception (a proportion that is higher among indigenous women and in rural areas), the authors argue that reducing the level of induced abortion will require providing widespread access to family planning information and services, with special attention to poor, rural and indigenous women and couples.

- Migration to urban areas of Guatemala from rural areas—where levels of contraceptive knowledge and practice are much lower—may be creating a need for reproductive health programs focused on new urban residents. According to research by David P. Lindstrom and Coralia Herrera Hernández, migrants' contraceptive knowledge increases with the number of years spent in an urban environment [page 146]. The level of contraceptive use among rural-to-urban migrants eventually comes close to that among urban natives, with the level of contraceptive knowledge being an important factor associated with use of modern methods. Because Mayan migrants do not accumulate this information at the same rate as Ladino migrants, perhaps because of cultural and linguistic barriers, the authors argue that programs should target recent arrivals—particularly indigenous Mayans—in urban areas.

—The Editors

**SMALL CHANGE IN DELIVERY MAY MAKE A BIG DIFFERENCE**

A slight delay in clamping the umbilical cord after delivery may prevent newborns from developing iron deficiency early in life.<sup>1</sup> As part of a study conducted between October 2003 and July 2004 in a large obstetrics hospital in Mexico City, 358 expecting mothers were randomly selected into two groups: early clamping, in which infants' umbilical cords were clamped an average of 17 seconds after delivery, and delayed clamping, in which the cords were clamped an average of 94 seconds after delivery. At six months of age, infants from the delayed clamping group had a higher average red blood cell volume (81.0 vs. 79.5 femtoliters), a greater concentration of the iron-binding protein ferritin (50.7 vs. 24.4 micrograms per liter) and greater total body iron (47.9 vs. 43.9 micrograms per kilogram of bodyweight) than did infants from the early clamping group. In addition, delayed clamping had greater effects among infants born to mothers who had low ferritin at delivery, those with birth weights of 2,500–3,000 grams and those still breastfed at six months. Given the high prevalence of maternal iron deficiency and of birth weights lower than 3,000 grams in developing countries, the authors comment that delaying clamping presents “an invaluable opportunity to increase an infant’s iron endowment at birth, thereby ensuring adequate iron status until other interventions can be more easily implemented.”

1. Chaparro CM et al., Effect of timing of umbilical cord clamping on iron status in Mexican infants: a randomized controlled trial, *Lancet*, 2006, 367(9527):1997–2004.

**BANGLADESHI WOMEN RARELY SEEK HELP FOR ABUSE**

Although the prevalence of physical violence against women by their husbands is high in Bangladesh, only a small proportion of women discuss the problem and an even smaller proportion seeks help.<sup>1</sup> Of 2,702 ever-married Bangladeshi women who participated in a cross-sectional survey, 40% of those living in urban areas and 42% of those living in rural areas had ever been physically abused by their husband. Among women who had experienced physical violence, 66% reported never talking to anyone about their abuse; common reasons for not talking included stigma, fear of repercussions and the belief that violence is the husband’s right. When abused women did talk to someone, the most common confidants were their parents, siblings or neighbors; only 2% of women sought assistance from institutional sources. More than half of women who had experienced physical violence re-

ported that nobody ever helped them. Given the small proportion of abused women who sought help from formal sources, the authors comment that “providing only institutional support to help women living in violent relationships would not achieve desirable goals.” They suggest that “education and mass media are probably the two most powerful tools” to help women overcome the barriers to accessing services.

1. Naved RT et al., Physical violence by husbands: magnitude, disclosure and help-seeking behavior of women in Bangladesh, *Social Science & Medicine*, 2006, 62(12):2917–2929.

**AN UNINTENDED CONSEQUENCE OF CHINA'S ONE-CHILD POLICY?**

Although China’s “one-child” policy has substantially reduced the country’s birthrate and women’s preferred family size, it seems to have increased the male-to-female birth ratio as well.<sup>1</sup> According to data from 39,585 women collected by the

Chinese National Family Commission between July and September 2001, women older than 35 had an average of 1.9 births and women younger than 35 who said they had completed their families had an average of 1.7 births; before the one-child policy, the average fertility rate was 2.9. The low fertility rate was accompanied by a preference for small families: Overall, 35% of women wanted to have one child and 57% wanted two; only 6% preferred to have more than two children. However, the male-to-female birth ratio across the entire cohort was 1.15, substantially higher than the normal sex ratio of 1.03–1.07. And when analyzed by five-year periods, the sex ratio was 1.21 in 1990–1995 and 1.23 in 1996–2001. The authors suggest the imbalance is most likely caused by sex-selective abortion, female infanticide, less aggressive management of newborn girls who are sick and nonregistration of girls.

1. Ding QJ and Hesketh T, Family size, fertility preferences, and sex ratio in China in the era of the one child policy: results from national family planning and reproductive health survey, *BMJ*, 2006, <<http://bmj.bmjournals.com/cgi/content/abstract/bmj.38775.672662.80v1>>, accessed Aug. 9, 2006.

**ANTENATAL CARE LEADS TO USE OF OTHER HEALTH SERVICES**

Women who receive antenatal care are significantly more likely than those who do not to use other maternal health services before, during and after delivery, according to a study using 2002 District Level Household Survey data from 11,454 currently married women aged 15–44 in Uttar Pradesh, India.<sup>1</sup> The study examined the factors associated with women’s use of maternal health services, including seeking treatment for pregnancy-related complications (among those who experienced problems), delivering a baby in a medical facility, re-

*Update is compiled and written by Jared Rosenberg, senior editor of International Family Planning Perspectives.*

ceiving assistance from a trained professional when delivering outside of a medical facility and seeking treatment for postpartum complications. In descriptive analysis, the proportions of women who used the four maternal health services varied by social, demographic and community characteristics. In multivariate analyses controlling for such characteristics, women receiving antenatal services had odds of using other maternal health services up to 4.9 times those of other women, depending on the service and the level of antenatal care received. Noting that women in Uttar Pradesh are at high risk of pregnancy-related morbidity and mortality because a majority deliver outside medical facilities, the authors conclude that "concerted efforts are required to motivate women to utilize antenatal services."

1. Ram F and Singh A, Is antenatal care effective in improving maternal health in rural Uttar Pradesh? Evidence from a district level household survey, *Journal of Biosocial Science*, 2006, 38(4):433-448.

### **SYNDROMIC MANAGEMENT: NOT FOR PREGNANT WOMEN**

The low effectiveness of syndromic management algorithms for women may leave many pregnant women with untreated vaginal infections that could lead to adverse pregnancy outcomes, according to a study of 250 pregnant women aged 15-40 who attended an antenatal clinic in Entebbe, Uganda, in March or April of 2004.<sup>1</sup> Laboratory tests determined that 48% of the women had bacterial vaginosis and 17% had trichomoniasis. However, 40% of women with bacterial vaginosis and 31% of those with trichomoniasis were asymptomatic, and thus would not have been treated under syndromic management guidelines. If the clinic's health workers had followed the syndromic manage-

ment algorithm exactly, the sensitivity in targeting bacterial vaginosis and trichomoniasis would have been 60% and 70%, respectively; however, as the workers tended to use their own judgment and deviate from the guidelines, the actual sensitivities were 50% and 67%, respectively. The authors comment that "While there is some evidence that effective treatment of vaginal infections during pregnancy may prevent adverse birth outcomes, reliance on syndromic management is unlikely to achieve this goal." They suggest that clinics institute presumptive treatment instead.

1. Tann CJ et al., Lack of effectiveness of syndromic management in targeting vaginal infections in pregnancy in Entebbe, Uganda, 2006, *Sexually Transmitted Infections*, 82(4):285-289.

### **NEONATAL INTERVENTIONS AND INFANT DEATHS IN CHILE**

Neonatal care interventions may help explain the reduction of mortality among newborns during the 1990s, according to an analysis of Chilean Ministry of Health data from 2.9 million births that occurred between 1990 and 2000.<sup>1</sup> The overall mortality rate in Chile among infants younger than 28 days decreased from 8.3 deaths per 1,000 live births in 1990 to 5.7 in 2000. This decrease, however, did not occur because of reductions in the rates of premature, low-birth-weight and very low birth weight deliveries, as those rates remained stable throughout the decade. When patterns of neonatal mortality were examined by birth weight and gestational age, reductions were observed in all groups; however, the greatest proportional reductions were seen in the lowest birth weight and gestational age categories. In analyses by year, reductions were more noticeable in the years after implementation of

certain neonatal care interventions nationwide, such as neonatal cardiorespiratory resuscitation training in 1994 and surfactant therapy in 1998. The authors conclude that such interventions may have "played a role in the decline of neonatal mortality that was observed between 1990 and 2000."

1. Gonzalez R et al., Reduction in neonatal mortality in Chile between 1990 and 2000, *Pediatrics*, 2006, <<http://pediatrics.aappublications.org/cgi/content/full/117/5/e949>>, accessed Aug. 17, 2006.

### **MIGRANT MEN MAY ACT AS A BRIDGE FOR HIV IN PAKISTAN**

Unsafe sex practices and low levels of HIV knowledge among migrant male workers in Pakistan could accelerate transmission of HIV from high-risk groups, such as sex workers, to the general population.<sup>1</sup> Of the sample of 590 migrant men in Lahore, Pakistan, who completed interviews, three-quarters were sexually experienced; of those, 22% had

ever had sex with a female sex worker. Only 10% of men had used a condom at last sex with a sex worker, and 72% reported never using condoms with sex workers. And although 87% of men were aware of AIDS, about two-thirds believed that a good diet was protective against infection, and only 11% believed that a person infected with HIV could look healthy. Furthermore, of men who were aware of AIDS and had had a nonmarital partner within the last year, 80% thought that they were at no risk of infection. The authors hypothesize that "If HIV spreads among sex workers...then further transmission to the general population via young migrant men...is a plausible scenario." They suggest that "renewed information and publicity about STI/HIV protection is clearly needed" and that "greater investment in condom social marketing might be justified."

1. Faisal A and Cleland J, Migrant men: a priority for HIV control in Pakistan? *Sexually Transmitted Infections*, 2006, 82(4):307-310.

### **MANY COUNTRIES' CONTRACEPTIVE USERS HAVE LIMITED CHOICE**

According to an analysis of 96 countries with a population of at least one million people and a Demographic and Health Survey conducted since 1980, 34 have a skewed contraceptive method mix—defined as 50% or more of all contraceptive users reporting use of a single method.<sup>1</sup> In 16 such countries, traditional methods (mainly periodic abstinence and withdrawal) prevail; most of these countries are located in Sub-Saharan Africa. In three Latin American countries and India, the contraceptive method mix is dominated by female sterilization. In the remaining 14 countries, a single reversible female method—the pill, the IUD or the injectable—accounts for at least half of all use. A complementary review of the literature on the topic of method choice finds that many factors contribute to skewed method mix, but suggests that government policies can strongly influence method prevalence, and limited method availability may result in a "self-perpetuating cycle of acceptance of a method that has been available and widely used for a long time." The authors comment that skewed contraceptive method mix is not a problem in itself, but is "particularly problematic if driven by supply factors such as a restrictive population policy, lack of availability of a range of methods, lack of information on method choices, or provider bias toward one or two methods."

1. Sullivan TM et al., Skewed contraceptive method mix: why it happens, why it matters, *Journal of Biosocial Science*, 2006, 38(4):501-521.

# Before First Sex: Gender Differences in Emotional Relationships and Physical Behaviors Among Adolescents In the Philippines

By Ushma D. Upadhyay,  
Michelle J. Hindin  
and Socorro Gultiano

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**CONTEXT:** Early age at first sex has been identified as a risk factor for unplanned pregnancy and HIV infection. However, the emotional relationships and physical behaviors that precede first intercourse, and how they differ by sex, also may provide important cues about how to prevent sexual risk behavior.

**METHODS:** The precoital activities of 2,051 adolescents aged 17–19 in Cebu, Philippines, are examined using 1998–2000 and 2002 data from the Cebu Longitudinal Health and Nutrition Survey. The timing and tempo of emotional relationships and physical behaviors for males and females are described. Cox proportional hazards models are used to identify the characteristics associated with age at first sex.

**RESULTS:** Males engage in precoital physical behaviors and first sex at younger ages than females. Although the standard order in which the two sexes engage in emotional relationships for the first time is the same, males progress through the sequence more quickly than females. After adolescents have progressed through the sequence of emotional relationships, there is a gap of at least a year before they begin to have sex. In the multivariate analysis, rapid progression through the sequence of emotional relationships was associated with initiating sex at a younger age for females (hazard ratio, 1.5), but not for males.

**CONCLUSION:** The period between first date and first sex experienced by both males and females provides an opportunity to ensure that adolescents have access to the information and services that will allow them to make informed choices about sexual behavior.

*International Family Planning Perspectives, 2006, 32(3):110–119*

Studying the progression toward first sexual intercourse could improve the understanding of adolescent sexuality in the developing world and aid in identifying and preventing the risky sexual behaviors young people engage in. Studies in the developing world point to early age at first sex as a risk factor for HIV infection and unplanned pregnancy.<sup>1</sup> It is likely, however, that poor reproductive health outcomes are predicted by factors that can be measured before first sex.

Miller and colleagues argue that the category of not being sexually active is too broad and that studying the behaviors that adolescents engage in before first sex can provide useful insight into their potential risk.<sup>2</sup> For example, their cross-sectional study of U.S. adolescents aged 14–17 who had not had sex found that those who engaged in more pre-coital behaviors, such as kissing and petting, were significantly more likely to anticipate having sex in the next year than were those who did not engage in any pre-coital behaviors. Studying the pace at which adolescents progress through increasingly more intimate pre-coital behaviors also helps anticipate when adolescents will first have sexual intercourse. Smith and Udry suggest that in cultures with normative expectations of a lengthy pre-coital period, adolescents tend to be better prepared for first sexual intercourse.<sup>3</sup>

The sequence of pre-coital behaviors that adolescents experience is generally consistent. Data from the 1994 Young

Adult Fertility Survey, a national study of Filipino adolescents, show that adolescents first had crushes, then had admirers or began admiring others, had their first group date, had their first boyfriend or girlfriend, and finally had their first single date.<sup>4</sup>

Studies in several other cultures have shown similar patterns. Adolescents experience these behavioral milestones, however, at different ages in different cultures. Further, males and females initiate specific pre-coital behaviors at different ages, with males doing so substantially earlier than females in most countries.<sup>5</sup>

Studies in Malaysia, Korea, Hong Kong and Slovenia<sup>6</sup> confirm that most adolescents gradually progress through a sequence of pre-coital activities, and that there are large differences between the sexes. For example, in a cross-sectional survey in Malaysia, 45% of the 1,181 participating adolescents had dated. Of those who had dated, almost 60% of males and 17% of females had kissed and necked, almost 50% of males and 10% of females had engaged in petting, and 27% of males and 5% of females had had sexual intercourse.<sup>7</sup> A 1996–1997 Hong Kong study among 4,116 heterosexual students found a gradual progression from holding hands, kissing and caressing to sexual intercourse. As in Malaysia, males were more likely than females to have engaged in every behavior examined.<sup>8</sup>

Although the Malaysian study was community-based,

the studies in Korea, Hong Kong and Slovenia used data collected from surveys done in schools. A limitation of studies done among students is that they may underestimate the true prevalence of precoital behaviors because those who are absent from or have dropped out of school may be more likely to have engaged in these behaviors.<sup>9</sup> The present study is community-based, and includes adolescents both in and out of school.

This analysis has several goals: First, we aim to understand the precoital behaviors of Filipino adolescents, including the prevalence of emotional relationships (crushes, courtships, romantic relationships and dating) and precoital physical behaviors (holding hands, kissing and petting), and how males and females differ. We hypothesize that males engage in each precoital behavior earlier than females and progress through behaviors at a faster pace. Second, we want to determine whether there is a consistent sequence of precoital behaviors; we hypothesize that a single, predominant pattern will emerge. Finally, we aim to discover whether progressing through types of emotional relationships quickly is related to the timing of first sex. We hypothesize that adolescents who progress through types of emotional relationships more quickly have sex earlier than peers who do not.

### **Gender and Sexual Behavior in the Philippines**

Both the timing of first sexual intercourse and the factors that influence it differ between males and females in many countries around the world. Most studies in developing countries, particularly in Asia, find that males become sexually active earlier than females because of greater tolerance for premarital sexual behavior for males.<sup>10</sup> A review of research on the risk and protective factors for early sexual initiation found that in eight of the 10 studies that included gender in their models, males were significantly more likely to have had sex than females.<sup>11</sup> Although this review did not examine the reasons males have sex earlier than females, in the countries studied, this practice is often acceptable.

Expectations about sexuality differ sharply for females and males in the Philippines. Males are encouraged to engage in sexual activities.<sup>12</sup> They initiate dating and sexual activities earlier than females, and are allowed more sexual freedom; many Filipino youth consider it natural for males to have multiple partners. In contrast, social norms about young women's behavior tend to be conservative. Females are expected to control and set limits on male sexuality.<sup>13</sup> Philippine society continues to uphold the value of *hiya*, or shame, which strongly influences female behavior.<sup>14</sup> Young people believe that females should adhere to strict roles in dating; subtle flirting is acceptable, but the outright wooing of men is not.

In the Philippines, premarital sex is generally not approved of for women, even during the engagement period;<sup>15</sup> the majority of Filipina women have sex for the first time after marriage. Nevertheless, premarital sex is becoming more common, especially in urban areas, as are many other behaviors, such as dating and kissing.<sup>16</sup>

Group dating is a common way for Filipino youth to initiate acquaintances with the opposite sex, particularly in urban areas.<sup>17</sup> Usually, adolescents begin to go out on group dates at ages 13–16, and then go on single dates a couple of years later.<sup>18</sup> National data from 2002 reveal that by age 19, 43% of single women and 48% of single men have ever had a boyfriend or girlfriend; those figures increase to 72% and 76%, respectively, by age 24.<sup>19</sup>

The median age at first sex in the Philippines is relatively high when compared with developed countries and many other developing countries.<sup>20</sup> National data, however, suggest it may be declining. According to the Young Adult Fertility and Sexuality Survey, the median age at first sex for all adolescents was 18.0 in both 1982 and 1994, but was 17.5 in 2002.<sup>21</sup>

Demographic and Health Survey (DHS) data find later ages at first sex, probably because the survey measures age at first sex among females only. In 1993, the reported median age at first intercourse among women aged 25–29 was 22.3; 10 years later, by 2003, it was 22.1.<sup>22</sup> In 2003 (when the DHS interviewed men as well), the reported median age at first sex was 21.0 among men aged 25–29.

## **METHODS**

### **Study Setting**

Cebu, an island in the Central Visayas region, is one of the most developed provinces in the Philippines. The study area, Metro Cebu, is a major port city and the second-largest metropolitan area in the country, with a population of almost 1.7 million in 2000. Metro Cebu accounts for 15% of the land area and 44% of the population of the entire province. Although Cebu is not as modern a city as Metro Manila, it embodies most of the characteristics of highly urbanized (and fast urbanizing) areas in the Philippines.

### **Data Collection**

The Cebu Longitudinal Health and Nutrition Survey (CLHNS) provides the data for the present study. The survey provides data from an ongoing study of a cohort of more than 3,000 Filipina women who gave birth between May 1, 1983, and April 30, 1984. The CLHNS followed these women and their newborns (the index children) in Metro Cebu. Follow-up surveys were conducted in 1991–1992, 1994–1995, 1998–2000 and 2002. The CLHNS follow-up surveys in 1998–2000 and 2002 also included extensive interviews with the then-adolescent index children. Because of survey implementation issues, the 1998–2000 round of the CLHNS was conducted first with all the female adolescents and then with males.

All rounds of the survey were conducted as approved by the University of North Carolina School of Public Health institutional review board for research involving human subjects; the 2002 survey was also approved by the Johns Hopkins Bloomberg School of Public Health Committee on Human Research.

The adolescents in the sample have become geographically dispersed since the 1983–1984 baseline survey and

**TABLE 1. Selected characteristics of adolescents participating in the Cebu Longitudinal Health and Nutrition Survey, by survey year and gender, Cebu, Philippines**

Characteristic	1998–2000		2002	
	Males (N=1,110)	Females (N=1,007)	Males (N=1,089)	Females (N=962)
<b>MEANS</b>				
Age	15.58	14.55***	18.18	18.19
Wealth index†	-0.73	-0.76	-1.81	-1.83
Highest grade completed	8.7	8.7	9.7	10.8***
<b>PERCENTAGES</b>				
Urban	71.5	72.1	74.4	73.9
Church attendance ≥3 times per month	58.9	72.0***	39.9	58.3***

\*\*\*Difference from males is significant at  $p < .001$ . †Index was calculated by assessing household assets based on the methodology described by Filmer and Pritchett. Principal components analysis was used to derive weights for each asset in the index. The index is a continuous variable ranging from -2.82 to 1.23. Source: **Wealth index**—reference 23.

now live in 172 different communities (*barangays*) scattered throughout Cebu province. Most adolescents were interviewed in their homes. On average, each interview took two sessions, for a total of 2.5 hours, to complete. In some cases, it took the interviewers several visits to the original household or to other households to complete an interview.

The 1998–2000 survey included 2,117 adolescents. By 2002, 101 of these adolescents were lost to follow-up, primarily because of out-migration. In the 2002 survey, however, 35 adolescents who had not been interviewed in the 1998–2000 survey were located and returned to the sample. The final sample in 2002 thus included 2,051 adolescents.

**Instruments**

Both the 1998–2000 and 2002 adolescent surveys asked respondents whether they had experienced several types of emotional relationships: crushes, courting, romantic relationships and dating. The 1998–2000 survey asked only those adolescents who had ever had a romantic relationship about all physical behaviors (holding hands, kissing, petting and sexual intercourse) because of concerns over asking young adolescents sexually explicit questions; those who had never had a relationship were asked only if they

**TABLE 2. Percentage of adolescents who had experienced specific emotional relationships and physical behaviors, by survey year and gender**

Relationships and behaviors	1998–2000		2002	
	Males (N=1,110)	Females (N=1,007)	Males (N=1,089)	Females (N=962)
<b>Mean age</b>	15.58	14.55	18.18	18.19
<b>Emotional relationships</b>				
Crush	81.5	86.5**	98.9	99.1
Courtship	36.3	42.5**	83.1	90.6***
Romantic relationship	34.1	18.4***	75.2	75.3
Dating	35.1	22.8***	72.1	69.2
<b>Physical behaviors</b>				
Holding hands	37.2	27.3***	89.1	87.7
Kissing	na	na	72.0	65.2***
Petting	na	na	53.7	33.6***
Sexual intercourse	na	na	30.8	19.5***

\*\*Difference from males is significant at  $p < .01$ . \*\*\*Difference from males is significant at  $p < .001$ . Note: na=not available.

had held hands. In 2002, however, all respondents were asked if they had engaged in each of the physical behaviors.

Unlike studies of pre-coital behaviors in other countries, the CLHNS includes questions that focus on emotional relationships (i.e., courting, dating, etc.), in addition to particular sexual activities (i.e., kissing, petting, etc.), thus providing richer data. In addition, the adolescents were asked to define the various emotional relationships asked about in the survey, and their responses from 2002 are reported here. Adolescents were asked open-ended questions such as, “What do you understand by courtship?” The responses were collected, categorized and then coded by native Cebuano speakers. Definitions for each emotional relationship reported by the adolescents were grouped into general categories. A categorical variable was created, with each category representing a different definition; chi-square testing was done to compare each categorical variable between females and males.

Independent variables include the order and pace of progression through types of emotional relationships. Models adjust for a set of social and demographic variables that includes a household wealth index (based on Filmer and Pritchett’s index),<sup>23</sup> whether the adolescent lived in a rural area, frequency of church attendance and highest grade completed.

**Data Analysis**

The data analysis was done in three parts. First, we examined the respondents’ progression through emotional relationships and physical behaviors. Second, we analyzed the timing and tempo of this progression. In this step, Kaplan-Meier plots were used to show the age in years at which respondents experienced their first crush, courtship, romantic relationship, date and sexual intercourse.

We created scales to assess the order and pace of adolescents’ movement through emotional relationships and physical behaviors. The scale assessing order was created by looking at the age at which each adolescent first experienced each type of emotional relationship (as reported when they were aged 17–19). These reported ages were then used to establish the order in which each adolescent experienced the different types of emotional relationships. The number of adolescents following each distinct order was calculated; the order that was most common was considered the dominant one. The scale assessing tempo, or how quickly males and females moved through types of relationships, divided the adolescents into three categories: Those who had experienced only 0–2 emotional relationships (in their lifetime), those who had experienced 3–4 emotional relationships slowly (over more than one year) and those who had experienced 3–4 emotional relationships quickly (within one year).

Bivariate analyses were conducted to examine the characteristics associated with ever having had sex, and multivariate survival analysis was conducted to examine the characteristics associated with males’ and females’ age at first sex, taking into account the effects of selected social and

demographic factors.

The Cox proportional hazards models control led for such demographic variables as wealth, urban residence, church attendance and highest grade of school completed. All analyses were done separately for males and females. Standard errors in the analysis were adjusted for clustering based on community of residence. All analyses were conducted using STATA version 7.<sup>24</sup>

## RESULTS

The final sample included 1,110 males and 1,007 females aged 14–16 in 1998–2000 and 1,089 males and 962 females aged 17–19 in 2002. Table 1 shows selected characteristics of the sample in both years. The only variable that demonstrated unanticipated differences over time was church attendance: Rates fell significantly between survey rounds. In addition, a sizable gender gap was evident in both rounds, with significantly more females reporting frequent church attendance than males. In 2002, females had significantly more years of education than males.

### Emotional Relationships

Table 2 shows the percentage of adolescents who reported engaging in specific emotional relationships and physical behaviors. Gender differences in reports of emotional relationships were apparent in the 1998–2000 survey, when the males were interviewed later than the females. Many of the differences found in 1998–2000 were no longer significant in 2002, when males and females were interviewed at the same age.

For example, at ages 14–16, 82% of males and 87% of females reported having had a crush on someone of the opposite sex; crushes were reported by almost all respondents at ages 17–19. When asked at ages 17–19 to define a crush, about 40% of both males and females said that it is an attraction to or fascination with attitudes, physical aspects, abilities or talents in another person. About 45% of males and 26% of females said it was a liking or fondness for another person, and 9% of males and 28% of females said a crush is admiration or appreciation of another. Overall, the distribution of the definitions differed significantly between males and females ( $p \leq .001$ ; data not shown).

Between ages 14–16 and 17–19, the proportion of adolescents who reported having courted someone or having been courted increased from 36% to 83% among males and from 43% to 91% among females. Differences between males and females were significant in both surveys, with females significantly more likely to report having been courted. When asked at ages 17–19 to define courting, 19% of males and 28% of females said it was liking, being fond of or attracted to a girl or boy, and 19% of males and 15% of females said it was expressing one's feelings toward the person one liked; the distribution of the definitions was significantly different between males and females ( $p \leq .001$ ; data not shown).

About 34% of males and 18% of females reported having had a romantic relationship by ages 14–16, a difference

**TABLE 3. Median number of years between types of romantic relationships (and range), by gender, 2002**

Relationships	Males	Females
	(N=1,089)	(N=962)
First crush and first courtship	2.00 (–4–13)	2.00 (–6–12)
First courtship and first romantic relationship	0.00 (–3–8)	0.00 (–3–8)
First romantic relationship and first date	0.00 (–9–6)	0.00 (–9–8)
First date and first sex	1.00† (–8–11)	1.00† (–4–10)
First crush and first date	2.00 (–5–12)	4.00 (–6–12)
First crush and first sex	4.00† (–3–14)	5.00† (0–13)

Note: Ranges include negative numbers because in some cases, adolescents experienced emotional relationships in a nonstandard sequence. †Median age between first date or first crush and first sex is underestimated because half of the sample had not yet had sex.

that was significant. This proportion rose to 75% of both males and females by ages 17–19. Among the females who reported having been in a romantic relationship by ages 17–19, 84% had older partners. Among those who reported having been in a romantic relationship (not shown), similar proportions of the males (63%) and females (60%) reported ever having had one or two romantic partners; the rest reported more. Two males and one female reported having a cumulative total of 20 or more romantic partners.

The proportion of males who reported ever having been on a date increased from 35% at ages 14–16 to 72% at ages 17–19. For females, those proportions were 23% and 69%, respectively. At ages 14–16, significantly fewer females reported having been on a date than males but when asked again at ages 17–19, the difference was no longer significant. When asked what they understood by the word “date,” 35% of males and 34% of females said it meant going out alone with a boyfriend or girlfriend, and 27% of both males and females reported a date was simply talking alone with boyfriend or girlfriend. Another 13% of males and 18% of females said it was going out and talking with an admirer. Once again, the distribution of the definitions differed significantly between males and females ( $p \leq .001$ ; data not shown).

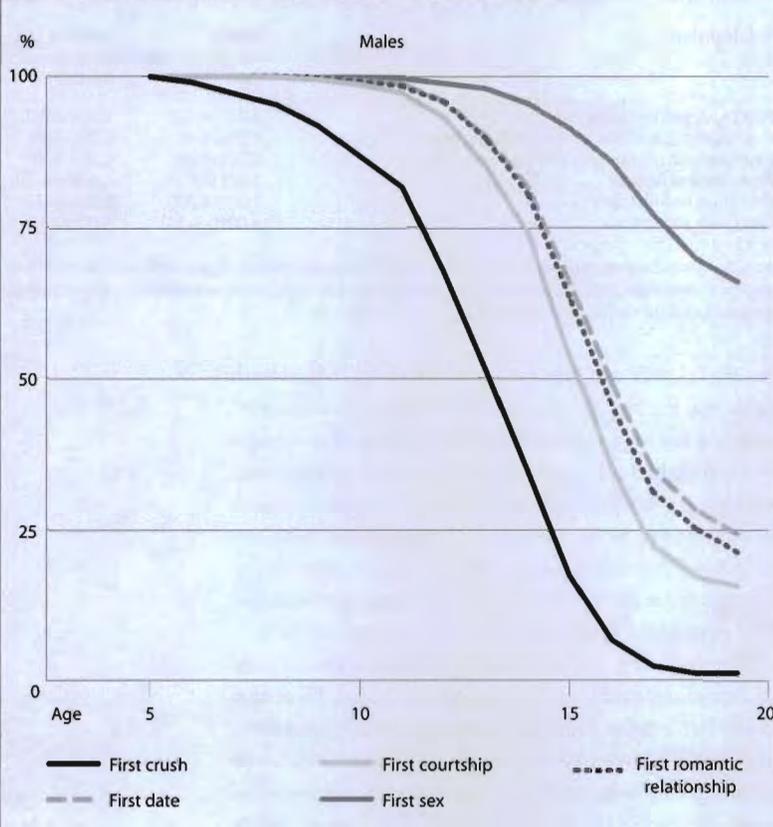
In 2002, 67% of males and 46% of females reported that their first date had been unchaperoned ( $p \leq .001$ ; data not shown). Females were significantly more likely than males to report that their first date had been chaperoned (18% vs. 10%;  $p \leq .001$ ), and were also significantly more likely to report that their first date had occurred as part of a group (36% vs. 23%;  $p \leq .001$ ).

The specific activities of first dates varied widely, but the most common one was going to the mall, plaza or school ground and eating together, with 29% of females and 23% of males who had ever been on a date reporting having done so. A significantly higher proportion of males than females reported just talking on their first date (25% vs. 17%). Just 10% of males and 12% of females reported going to a movie alone on their first date (data not shown).

### Physical Behaviors

There were also significant differences between males and females in the reported experience of physical behaviors (Table 2). At ages 14–16, 37% of males and 27% of females

**FIGURE 1. Proportion of male adolescents who had not yet experienced selected types of emotional relationships and sexual intercourse, by age**



reported having held hands. At ages 17–19, these proportions were similar—89% and 88%, respectively. Because information on other physical behaviors was not collected from the full sample in the earlier survey, we report only the 2002 data. In that survey, each of these behaviors was reported by a significantly higher percentage of males than females. Among males, 72% reported ever having kissed and 54% reported having engaged in petting; among females, those proportions were 65% and 34%, respectively. Twenty-five percent of the sample (data not shown) reported ever having had sex, with significantly more males reporting having done so than females (31% vs. 20%).

Of those who reported having had sex, 97% of females

and 52% of males reported that their first time was with their boyfriend or girlfriend. For 5% of males and 2% of females, their first time was with someone who had previously been a romantic partner, and 39% of males and fewer than 1% of females said it was with someone with whom they did not have an emotional relationship (unpaid). Finally, 4% of males and no females said they had paid for their first sexual encounter. Among those who reported having had sex, 24% of males and 37% of females said they had had sex for the first time at their partner's house, while 13% of males and 28% of females said they had had sex for the first time at their own homes; 12% of both males and females said they had first had sex at a rented cottage, hotel, inn or brothel (data not shown).

**Timing and Tempo of Relationships and First Sex**

Figures 1 and 2 show the proportions of males and females by the age at which they first engaged in each type of emotional relationship and in sexual intercourse, as reported in 2002. Both males' and females' reported first crushes occurred well before other types of relationships. In general, males and females reported experiencing their first courtship, their first romantic relationship and their first sex for males were significantly different from those for females ( $p \leq .001$ ).

Median ages were 14 for males and 13 for females at first crush, 16 for males and 15 for females at first courtship, 16 for both sexes at first romantic relationship, and 16 for males and 17 for females at first date. The reported median age at first intercourse was not estimated because at least half of the sample had not yet experienced intercourse. The median number of years between reported first crush and first date was two years for males and four years for females (Table 3, page 113).

In general, there was more time between events for females than for males. There was a considerable amount of time between reported first crush and first sex for both sexes, but this gap was even longer for females than for males. These results suggest that when adolescents begin engaging in emotional relationships, sexual intercourse tends to follow after several years.

According to the emotional relationships scale constructed with 2002 data, 87% of males and 83% of females experienced emotional relationships in a particular order: They first experienced crushes, then courting, romantic relationships and dating (Table 4). Males and females differed significantly in the number of emotional relationships they had experienced in order. For example, significantly more males than females experienced a crush before courting, a romantic relationship or dating.

Almost 12% of males and 16% of females had experienced emotional relationships in an order other than the dominant one. Many reported not having experienced all of the emotional relationships stages yet, but a clear pattern was still apparent. Females who followed other pat-

**TABLE 4. Percentage of adolescents following standard sequence of emotional relationships, by gender, 2002**

Sequence	Males (N=1,089)	Females (N=962)
No emotional relationships	1.1	0.8
Crush only	14.0	7.9***
Crush before courting	6.0	10.5***
Crush before courting before romantic relationship	6.4	10.1**
Crush before courting before romantic relationship before dating	60.9	55.0**
Another sequence	11.7	15.7**
Total	100.0	100.0

\*\* $p < .01$ . \*\*\* $p < .001$ . Note: Percentages may not total 100.0 because of rounding.

terms were about half as likely to have ever had sex as females who followed the dominant order (odds ratio, 0.5;  $p=.01$ , not shown), but this was not seen among males. The majority of adolescents who followed patterns other than the dominant ones reported experiencing their first date before their first romantic relationship, which is fairly common in other countries. Among the 127 males who followed patterns other than the dominant one, 95% reported experiencing their first date before their first relationship. Among the 151 females who went out of order, 91% reported experiencing their first date before their first relationship.

Many of the adolescents reported experiencing several of these emotional relationships for the first time in a single year. Similar proportions of males and females reported having experienced only 0–2 emotional relationships in their lifetime (Figure 3). Among those who reported experiencing 3–4 emotional relationships, males were significantly more likely than females to experience them quickly: More than 49% of males and 32% of females were considered to be progressing through types of relationships quickly.

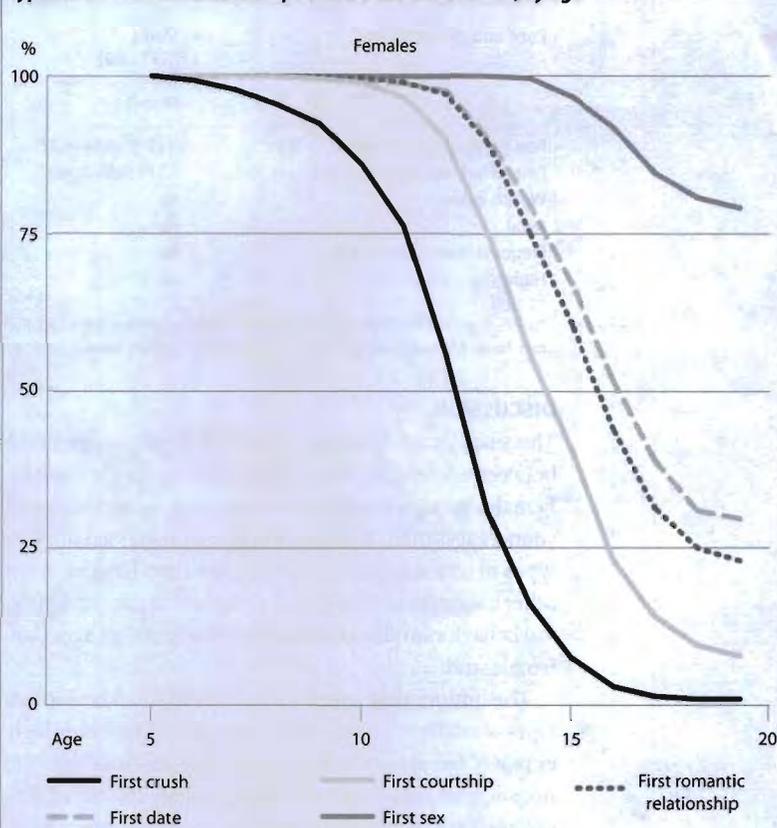
#### Characteristics Associated with Delayed Sex

The effect of experiencing emotional relationships quickly on having sex at an early age was examined among males and females separately. Taking age into account, we therefore ran Cox proportional hazards models to identify the factors associated with the risk of having sex.

In Table 5 (page 116), Model 1 shows the unadjusted association between the pace of progression through types of emotional relationships and the hazard of having had sex at any given age for males and females. The middle category, 3–4 emotional relationships experienced slowly, is the reference group. Males who had experienced 0–2 emotional relationships in their lifetime were significantly less likely to have had sex than males who had experienced 3–4 emotional relationships slowly (hazard ratio, 0.1). Males who had experienced 3–4 emotional relationships quickly were more likely to have had sex than males who had experienced the same number of emotional relationships slowly (hazard ratio, 1.2), but this association was not significant at the  $p \leq .05$  level and the effect dissipated when social and demographic variables were added to the model (Model 2). After adjustment for these variables, the strength and magnitude of the effect of having few emotional relationships remained. In addition, for males, living in rural areas (hazard ratio, 0.6) and having achieved more education (hazard ratio, 0.9) were associated with a lower risk of first sex at a given age.

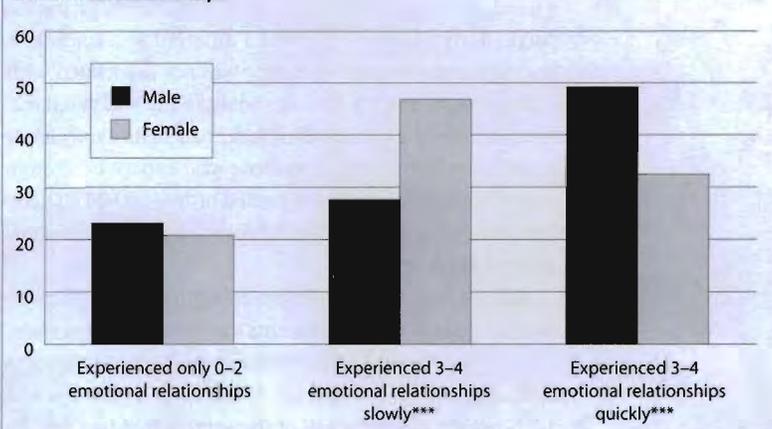
Among females, the pace of progression through types of emotional relationships and the hazard of having had sex at a given age were also associated. Model 1 shows that females who had experienced emotional relationships quickly were at a significantly increased risk of having had sex than females who had experienced 3–4 types of relationships slowly. The hazard ratio for females who experienced

**FIGURE 2. Proportion of female adolescents who had not yet experienced selected types of emotional relationships and sexual intercourse, by age**



only 0–2 relationships was 0 because none of those females reported ever having had sex. When social and demographic variables were added to the model, the association between a fast progression through types of relationships and the hazard of having sex remained (hazard ratio, 1.5). Model 2 shows that females who attended church frequently were about 40% less likely to have had sex than females of the same age who did not attend frequently (hazard ratio, 0.6). In addition, for each additional year of education, adolescents' hazard of having sex at any given age was reduced by 17% (hazard ratio, 0.8).

**FIGURE 3. Percentage of males and females, by pace of progression through types of emotional relationships**



\*\*\*Differences between males and females are significant at  $p \leq .001$ .

**TABLE 5. Hazards ratio (and 95% confidence intervals) from multivariate models predicting risk of having sex at a given age, by pace of progression through types of emotional relationships and selected social and demographic characteristics**

Pace and characteristic	Males (N=1,089)		Females (N=962)	
	Model 1	Model 2	Model 1	Model 2
Few emotional relationships (0–2)‡	0.12*** (0.07–0.22)	0.12*** (0.06–0.23)	0‡	0§
Fast-paced relationships (3–4)‡	1.17† (0.93–1.48)	1.16 (0.96–1.40)	1.85*** (1.39–2.47)	1.47*** (1.17–1.85)
Wealth index	na	0.92 (0.78–1.09)	na	0.89 (0.68–1.16)
Rural	na	0.62*** (0.49–0.78)	na	0.84 (0.62–1.13)
Frequent church attendance	na	0.88 (0.69–1.11)	na	0.62*** (0.49–0.77)
Highest grade completed	na	0.94*** (0.90–0.98)	na	0.82*** (0.79–0.85)

\*p≤.05. \*\*p≤.01. \*\*\*p≤.001. †p≤.10. ‡Reference category is slow-paced relationships (3–4 over more than one year). §Cell size was too small to calculate standard errors. Notes: All models adjusted for clustering by community. na=not applicable.

**DISCUSSION**

This study found significant differences in precoital behavior between adolescent males and females in the Philippines. Females experienced some emotional relationships at younger ages than did males, but males progressed through types of relationships at a faster pace than females. As in other countries in Asia,<sup>25</sup> males engaged in precoital physical behaviors and sexual intercourse at younger ages than females did.

The finding that females who moved quickly through types of emotional relationships were at a significantly higher risk of having sex at a younger age than those who did not suggests that those who move quickly through different types of emotional relationships probably move quickly through physical behaviors as well. For males, experiencing emotional relationships quickly is not associated with an increased risk of having sex at a younger age, perhaps because many males are having sex outside of their emotional relationships.

Most adolescents in the Philippines advanced through relationships in an ordered progression—experiencing crushes, courtships, romantic relationships, dating and then sexual intercourse, a pattern similar to that found in a national study and elsewhere.<sup>26</sup> It is possible that males’ and females’ differing definitions of emotional relationships affect how they report experiencing them; this may explain some of the differences between males and females.

Although most adolescents in the Philippines followed a standard sequence in their emotional relationships, some—particularly females—followed a different sequence. Following a nonstandard sequence was not associated with younger age at first sex. Females who experienced emotional relationships in a nonstandard order had significantly fewer romantic relationships than those who experienced emotional relationships in the expected order (p=0.04). Therefore, following a nonstandard order should not be considered a risk behavior.

Adolescents in the Philippines begin their physical relationships later than adolescents in other developing countries,<sup>27</sup> which is apparent in this sample. Among both males and females who had had sex, median age at first sex was 17; however, not even half of the sample had had sex. By the time all have had sex, the median age at first sex in this

sample will likely be at least one or two years older than it would be if calculated now.

The precoital behaviors of the adolescents in this sample reveal important cues about their future sexual activity. Most males and females had crushes early on, and a few years later they engaged in courting, dating and romantic relationships, all around the same time. It is not until a few years later that they engaged in sexual intercourse. Females started to have emotional relationships earlier than did males, and they waited longer to have sex. As Smith and Udry proposed, engaging in precoital behaviors over an extended period of time may allow the adolescent to become prepared mentally and emotionally for sexual intercourse, as well as to obtain contraceptive protection.<sup>28</sup> This period before an adolescent begins to have sex also offers parents, schools and adolescent health programs an opportunity to help adolescents make informed choices about sexual intercourse.

One of the primary limitations of the current research is that all data come from adolescent self-reports, and may be subject to recall bias or social desirability bias. Because of the strong conservative culture in the Philippines, the self-reported data may not reflect true behavior. Many females may be uncomfortable discussing their sexual behavior, and thus underreport it. Young men, on the other hand, may overreport their sexual experiences to give the impression that they are conforming to societal expectations.<sup>29</sup>

Because the adolescent participants have been involved in this longitudinal survey for almost two decades, the interviewers have established a strong rapport with them. Although the respondents may be embarrassed to report their sexual behaviors to someone they know well, the interviewers have been trained to reassure the adolescents that their responses will be kept confidential.

The findings in the present study can be checked against the results from other studies of Filipino adolescents. According to national data collected in 2002, much lower proportions—26% of males and 9% of females aged 17–19—reported ever having had sex.<sup>30</sup> An unpublished survey using a self-administered questionnaire among 1,196 students aged 15–24 in Dumaguete City in the Philippines found that 50% of males and 10% of females were sexually active.<sup>31</sup> According to DHS data for the Philippines from

2003, 28% of males and 21% of females had had sex by age 19.<sup>32</sup> The current data fall well within these ranges, with 31% of males and 20% of females aged 17–19 reporting that they had had sex. However, given the cultural norms against premarital sex, these studies may all provide underestimates of true levels of sexual activity.

This study has several important strengths. The CLHNS provides a unique opportunity to consider relationship progression from both a physical and an emotional perspective. Rarely do studies consider the behaviors of adolescents before first sex, much less their emotional relationships. In addition, unlike earlier studies, this study considered the pace at which adolescents moved through types of emotional relationships. Many other studies of sexual behavior among adolescents have been done in schools, which excludes young people who are absent, are out of school, stay at home or go to work; having a population-based sample allows for more accurate estimates of sexual activity because in a school-based sample, those who are out of school are also more likely to engage in high-risk behaviors, which would lead to underestimates of sexual activity.<sup>33</sup> Although the results from this study may not apply to cities where premarital sex is more common, such as Manila,<sup>34</sup> the results are likely to be generalizable to other major metropolitan areas.

Currently, several governmental and nongovernmental initiatives in the Philippines address the reproductive health needs of adolescents; unfortunately, they face many challenges. The most important is addressing the lack of high-level political support for contraception in general, a problem that is magnified for family planning information and service delivery to adolescents.<sup>35</sup> Cultural disapproval of unmarried youth using contraceptives, negative attitudes among health care providers, pressure from the church and lack of adequate supplies at the local health system level all help to form barriers to adolescent sexual and reproductive health.<sup>36</sup>

Programs should reflect the reality of adolescent sexual behavior, and tailor interventions to address the unique needs of males and females. It is clear from our findings that adolescents are engaging in sexual behaviors and have immediate reproductive health needs. Males are sexually active earlier than females, and many first have sex outside of an emotional relationship. In general, females progress through their emotional relationships more slowly than do males, but those who progress through them quickly are at significantly greater risk of having sex at a relatively young age. Most females have sex for the first time with their current romantic partner. As young people become increasingly likely to engage in pre-coital behaviors and premarital sex, it is important for parents to ensure that their children have access to the information and services they need for sexual activity. This study suggests that this preparation must start earlier for boys, but girls too need information and counseling before marriage, beginning when parents realize that their adolescents are engaging in emotional relationships.

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## RESUMEN

**Contexto:** Las relaciones sexuales a temprana edad han sido identificadas como un factor de riesgo de los embarazos no planeados y de la infección por VIH. Sin embargo, las relaciones personales románticas y las actividades que preceden la primera relación sexual, y la forma en que difieren las mismas entre un sexo y otro, también pueden ofrecer importantes datos sobre las posibles estrategias de prevención de una conducta sexual riesgosa.

**Métodos:** Se examinaron las actividades previas al coito de 2.051 adolescentes, de 17-19 años de edad, en Cebú, Filipinas, mediante el uso de datos de la Cebu Longitudinal Health and Nutrition Survey realizada en 1998-2000 y en 2002. Se describieron el momento y la duración de las relaciones personales románticas y de las actividades físicas de hombres y mujeres. Se utilizaron modelos de riesgo proporcionales de Cox para identificar las características relacionadas con la edad de los jóvenes en el momento de la primera relación sexual.

**Resultados:** Los hombres se inician y mantienen su primera relación sexual antes que las mujeres. Aunque ambos grupos inician las relaciones personales románticas en la misma orden estándar, los hombres avanzan en la secuencia de pasos románticos más rápidamente que las mujeres. Después que los adolescentes han progresado por esta secuencia de pasos de relaciones románticas, hay una brecha de por lo menos un año antes de que comiencen a mantener relaciones sexuales. En el análisis multivariado, se relacionó la progresión rápida por los pasos de relaciones románticas con la iniciación temprana de la actividad sexual entre las mujeres (razón de riesgo, 1,5), pero no entre los hombres.

**Conclusión:** El período entre la primera cita y la primera relación sexual, tanto entre hombres como entre mujeres, ofrece una oportunidad para asegurar que los adolescentes tengan acceso a la información y los servicios que les permitirán observar una conducta sexual informada y adecuada.

## RÉSUMÉ

**Contexte:** L'âge précoce au moment des premiers rapports sexuels a été identifié tel un facteur de risque de grossesse non planifiée et d'infection à VIH. Les relations affectives et les comportements physiques qui précèdent les premiers rapports sexuels, de même que la manière dont ils diffèrent en fonction du sexe, peuvent cependant aussi apporter d'importants indices quant à la manière de prévenir les comportements sexuels à risques.

**Méthodes:** Les activités pré-coïtales de 2.051 adolescents de Cebu (Philippines) âgés de 17 à 19 ans sont examinées dans les données de 1998-2000 et 2002 de l'Étude longitudinale de Cebu sur la santé et la nutrition. Le moment et le rythme des relations affectives et des comportements physiques masculins et féminins sont décrits. Les modèles de risques proportionnels de Cox servent à identifier les caractéristiques associées à l'âge au moment des premiers rapports sexuels.

**Résultats:** Les garçons s'engagent dans des comportements physiques pré-coïtaux et ont leurs premiers rapports sexuels à un

âge plus jeune que les filles. L'ordre normatif dans lequel les deux sexes s'engagent pour la première fois dans des relations affectives est identique, mais les garçons progressent plus rapidement que les filles à travers les étapes successives. Après que les adolescents ont progressé à travers la succession des relations affectives, il apparaît un intervalle d'au moins un an avant qu'ils commencent à avoir des rapports sexuels. Dans l'analyse multivariée, la progression rapide à travers la succession de relations affectives est associée à des premiers rapports sexuels à un âge plus jeune pour les filles (rapport de risques, 1,5), mais pas pour les garçons.

**Conclusion:** La période entre le premier rendez-vous et les premiers rapports sexuels des garçons et des filles offre une occasion d'assurer l'accès des adolescents à l'information et aux services qui leur permettront d'effectuer des choix informés sur leurs comportements sexuels.

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# Maternal and Social Factors Associated with Abortion In India: A Population-Based Study

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**CONTEXT:** A cultural preference for sons may be a factor driving recourse to abortion in India, as women carrying female fetuses may decide to terminate their pregnancies. To assess this hypothesis, more information on the incidence of abortion, and on maternal and social correlates of the procedure, is needed.

**METHODS:** Birth order–specific abortion ratios were calculated using the birth histories of 90,303 ever-married women aged 15–49 who participated in India's 1998–1999 National Family Health Survey. For the first four births, the association between abortion and various maternal and social variables, including the sex of the respondent's last child, was assessed using logistic regression.

**RESULTS:** The overall abortion ratio was 17.0 per 1,000 pregnancies. The ratio increased from 5.3 per 1,000 pregnancies for first-order births to 25.8 per 1,000 pregnancies for third-order births and then declined. The strongest predictor of abortion was maternal education: Women with at least a primary education were more likely than those with no education to have had an abortion (odds ratios, 1.9–6.7). Rural residence was associated with a reduced likelihood of abortion (0.6). There was no association between the sex of a woman's previous child and the odds that she subsequently had an abortion.

**CONCLUSION:** At the national level, it is likely that unintended pregnancy, rather than the sex of the previous child, underlies demand for abortion in India. Rising educational attainment among women may lead to an increase in the demand for abortion.

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Under the 1971 Medical Termination of Pregnancy Act, a woman in India can legally obtain an abortion if her pregnancy carries the risk of grave physical injury, endangers her mental health, is the result of contraceptive failure (in a married woman) or rape, or is likely to produce a child with physical or mental abnormalities.<sup>1</sup> Legal abortions may be obtained through more than 11,000 approved clinics.<sup>2</sup> Estimates of the number of abortions performed annually in India vary considerably, from 0.6 million to 6.7 million.<sup>3</sup> The former is an official figure, whereas the latter is an estimate derived from a field study; the difference could be an indication of the extent of illegal abortion.

Although abortion has been legal in India for more than three decades, access to safe services remains limited for most women. For example, it has been estimated that nearly 90% of abortions in India are performed under potentially unsafe conditions in unapproved facilities, by providers ranging from qualified doctors to those without any training or qualifications.<sup>4</sup> Women use these providers because there is a dearth of medical provision in most rural areas and because many women are unaware of or unable to travel to the safe facilities that do exist. There are no definitive studies linking maternal deaths to unsafe abortions in rural settings, but official statistics from 1998 suggest that about 9% of maternal deaths in rural India are due to complications of abortion.<sup>5</sup> This figure, however, does not take into

consideration the very large differences in maternal mortality between the country's northern and southern states, or the difficulty of identifying deaths that occur early in pregnancy, before women have come to the attention of maternal health services. The Medical Termination of Pregnancy Act was amended in 2002 and 2003 to improve women's access to safe abortion, in part by giving village committees (Panchayats) more input regarding health services,<sup>6</sup> but the impact of these changes on the number and safety of abortions has not yet been evaluated.

In cultures where there is a strong preference for children of a particular sex and where prenatal sex identification techniques are widely accessible, abortion may be used for sex selection.<sup>7</sup> This is thought to be an important reason why women seek abortion in India,<sup>8</sup> particularly in areas where technologies that can determine the sex of a fetus are available.<sup>9</sup> However, evidence from several small studies suggests that the reasons why women in India seek abortions are diverse. For example, a study conducted in Maharashtra found that the need to space children was the most-cited reason that adolescents had abortions; most of these young women did not have experience using contraceptives.<sup>10</sup> Another study, in Tamil Nadu, showed that nonconsensual sex, sexual violence and women's inability to refuse their husband's sexual demands were the factors that most frequently led to unwanted pregnancy and abortion.<sup>11</sup>

Identifying these and other factors that lead to abortion has important policy implications. If a preference for sons is the main driver of induced abortion in India, then making contraceptive services widely available would have relatively little effect in reducing the demand for the procedure. However, if policymakers attribute too much importance to the role of sex preference, they may undermine programs that provide needed contraceptive services to couples who wish to limit their family size or postpone their next birth. To shed light on the factors that lead women in India to have abortions, the objectives of the present study are to calculate birth order-specific abortion ratios using nationally representative data and to examine the associations between abortion and various maternal and social variables, including the sex of a woman's last child.

## METHODS

### Survey Instrument

The data in this study are from the 1998–1999 National Family Health Survey (NFHS-2), in which a nationally representative, population-based sample of 90,303 ever-married women aged 15–49 were asked questions about their fertility, family planning, reproductive health, use of reproductive health services and nutritional status. The survey methodology has been reported in detail.<sup>12</sup> The present analysis includes data from all Indian states, including Tripura, which was not included in the official NFHS-2 report because fieldwork in the area was delayed due to security issues.

The primary resource for the present study was the complete birth history that each participant provided. During data collection, interviewers sought details about respondents' induced abortions, miscarriages and stillbirths in the context of their birth history; this method is likely to enhance recall of these events. Interviewers were specially trained to ask questions that could help distinguish among induced abortions, miscarriages and stillbirths.

### Variables

Independent variables included in our analysis were maternal age at the time of subsequent live birth, maternal age at marriage, the sex of the previous child, maternal education, standard of living, religion, caste and place of residence (urban or rural). These variables were selected on the basis of their known associations with reproductive outcomes in other settings and studies, and their capacity to discriminate between the influence of related but distinct domains such as caste and educational attainment. Maternal age at subsequent live birth refers to a woman's age at the birth that followed a particular birth, abortion, miscarriage or stillbirth. Respondents were not asked to state the age at which each of their births, abortions or miscarriages occurred; however, a woman's age at the time of a live birth could be calculated by subtracting the age of her child (which was recorded in the survey schedule) from her current age. Age at marriage refers to the age, in completed years, at which respondents first married, grouped into four categories: younger than 15, 15–19, 20–24, and 25 or older.

**TABLE 1. Numeric distribution of pregnancies, by birth outcome and abortion ratios (and 95% confidence intervals) among ever-married women aged 15–49 in India who completed the 1998–1999 National Family Health Survey, by birth order**

Birth order	Birth outcome					Abortion ratio†
	All	Abortions	Stillbirths	Miscarriages	Births	
<b>Total</b>	<b>295,720</b>	<b>5,040</b>	<b>6,241</b>	<b>14,366</b>	<b>270,073</b>	<b>17.04 (16.5–17.5)</b>
1	89,162	470	2,634	5,680	80,378	5.27 (4.8–5.8)
2	73,479	1,270	1,352	3,409	67,448	17.28 (16.4–18.3)
3	52,892	1,365	871	2,167	48,489	25.81 (24.5–27.2)
4	33,864	848	569	1,305	31,142	25.04 (23.4–26.7)
5	20,503	516	359	750	18,878	25.16 (23.1–27.5)
6	12,118	258	206	494	11,160	21.29 (18.8–24.1)
7	6,783	169	134	289	6,191	24.91 (21.4–29.0)
≥8	6,919	144	116	272	6,387	20.81 (17.6–24.5)

†Abortion ratio=induced abortions per 1,000 pregnancies.

Maternal education was categorized as none, primary, secondary or higher. The NFHS-2 report included a standard of living index, which was derived from such indicators as the household's water source and toilet facilities and whether the family owned irrigated land, livestock and various durable goods (e.g., car, refrigerator, sewing machine). Scores on the index were classified as low (36% of households), medium (44%) or high (18%)\* as per the original NFHS-2 report. The other demographic variables included in the analysis are self-explanatory.

Abortions that occurred between live births are said to have occurred during a closed birth interval, whereas abortions that were not followed by a live birth are classified as having occurred during an open birth interval.

### Estimation of Induced Abortion Ratios

The abortion ratio was defined as the number of induced abortions per 1,000 pregnancies. Ratios were calculated for each birth order from one to seven; we calculated a single ratio for birth orders of eight or more, because the number of cases for birth orders higher than eight was extremely low. The ratio for first births includes all induced abortions that occurred before a respondent's first live birth; it also includes all induced abortions reported by women who had not yet had a live birth at the time of the survey. The denominator includes all first live births as well as all induced abortions, miscarriages and stillbirths that occurred before a first live birth. The ratio for second births includes all induced abortions that occurred after a woman's first live birth but before her second, as well as all abortions reported by women who had had one live birth but not a second (i.e., women in an open birth interval). A similar approach was taken for the remaining birth orders. If there were two or more induced abortions in a particular birth order, both were assigned that order. Similarly, twins were assigned the same birth order.

\*Percentages do not total 100% due to rounding.

**TABLE 2. Adjusted odds ratios (and 95% confidence intervals) from logistic regression analysis assessing associations between maternal and social characteristics and induced abortion during closed birth intervals, according to birth order**

Characteristic	Birth order			
	1	2	3	4
<b>Maternal age at marriage</b>				
<15 (ref)	1.00	1.00	1.00	1.00
15-19	1.48 (0.97-2.25)	1.60 (1.16-2.20)**	1.23 (0.89-1.69)	1.01 (0.68-1.48)
20-24	0.89 (0.52-1.51)	2.22 (1.56-3.16)***	1.48 (0.99-2.22)*	0.74 (0.40-1.35)
≥25	1.01 (0.49-2.05)	2.38 (1.45-3.90)***	2.07 (1.40-4.12)*	0.39 (0.06-2.42)
<b>Maternal age at subsequent live birth</b>				
<20 (ref)	1.00	1.00	1.00	1.00
20-29	2.19 (1.63-2.92)***	2.02 (1.59-2.56)***	1.02 (0.72-1.46)	2.56 (0.78-8.42)
≥30	2.44 (0.97-6.15)*	2.04 (1.33-3.11)***	1.33 (0.80-2.20)	6.30 (1.84-21.62)**
<b>Sex of previous child</b>				
Male (ref)	na	1.00	1.00	1.00
Female	na	0.96 (0.83-1.11)	0.92 (0.76-1.13)	0.90 (0.67-1.22)
<b>Maternal education</b>				
None (ref)	1.00	1.00	1.00	1.00
Primary	1.58 (1.08-2.32)**	2.39 (1.83-3.10)***	3.04 (2.24-4.14)***	1.85 (1.20-2.85)*
Secondary	2.27 (1.60-3.21)***	4.06 (3.19-5.16)***	5.01 (3.70-6.78)***	3.57 (2.33-5.45)***
≥Secondary	3.67 (2.38-5.65)***	5.24 (3.90-7.03)***	6.70 (4.40-10.21)***	6.31 (3.26-12.21)***
<b>Standard of living</b>				
Low (ref)	1.00	1.00	1.00	1.00
Medium	1.45 (0.99-2.12)*	1.05 (0.82-1.35)	1.05 (0.77-1.43)	0.94 (0.62-1.43)
High	1.38 (0.88-2.14)	1.31 (0.99-1.73)	1.32 (0.92-1.88)	1.55 (0.94-2.56)
<b>Religion</b>				
Hindu (ref)	1.00	1.00	1.00	1.00
Muslim	1.10 (0.77-1.56)	0.72 (0.55-0.95)**	1.07 (0.79-1.44)	0.62 (0.37-1.01)*
Other	0.83 (0.52-1.34)	1.05 (0.82-1.36)	1.45 (1.04-2.05)*	1.08 (0.57-2.03)
<b>Caste</b>				
Scheduled caste (ref)	1.00	1.00	1.00	1.00
Scheduled tribe	0.70 (0.33-1.47)	0.87 (0.56-1.33)	0.95 (0.57-1.57)	1.08 (0.55-2.13)
Other backward class	1.11 (0.73-1.67)	1.17 (0.90-1.51)	0.97 (0.71-1.39)	0.98 (0.61-1.58)
Other castes	1.32 (0.89-1.97)	1.13 (0.88-1.46)	1.04 (0.75-1.44)	1.19 (0.74-1.88)
<b>Residence</b>				
Urban (ref)	1.00	1.00	1.00	1.00
Rural	0.60 (0.46-0.78)***	0.55 (0.48-0.66)***	0.57 (0.46-0.72)***	0.61 (0.43-0.86)**

\*p<0.05. \*\*p<0.01. \*\*\*<0.001. Notes: ref=reference group. na=not applicable.

**Statistical Analysis**

We developed logistic regression models for each birth order up to four, beyond which the sample sizes for individual birth orders became too small to be informative. The dependent variable was whether or not a woman had an induced abortion within a given birth-order period. By definition, age at subsequent live birth was included only in analyses of closed birth intervals.

Because it is possible that the sex composition of all of a woman's living children, rather than the sex of the last child, influenced the decision to have an abortion, we also performed logistic regression analyses among women who had either all boys or all girls. Three separate logistic regressions were modeled, one each for parities 2-4.

We tested for multicollinearity among the independent variables; in no case was the tolerance value less than 0.2 or the variance inflation factor greater than 10. There was no significant interaction between age at marriage and age at first birth.

**RESULTS**

**Abortion Ratio**

Overall, respondents had had 17.0 induced abortions per 1,000 pregnancies. Table 1 (page 121) shows all birth outcomes for each birth order, as well as the associated abortion ratios. The abortion ratio was lowest for the first birth order (5.3) and highest for the third birth order (25.8), after which it declined. The relationship between abortion ratio and birth order was nonlinear.

**Closed Birth Intervals**

Logistic regression revealed several factors associated with the odds of abortion during closed birth intervals (Table 2). The odds of abortion increased with women's age at marriage, but only for birth orders two and three. For example, for these birth orders, the odds of abortion among women who were 25 or older when they married were more than twice that of women who married before age 15 (odds ratios, 2.4 and 2.1, respectively).

In general, the odds of abortion increased with older maternal age at subsequent live birth. For birth order one, the odds of abortion among women whose subsequent birth occurred when they were 20 or older were more than twice the odds among women who were younger than 20 at their subsequent birth. The pattern was similar for birth orders two and four.

However, the sex of a respondent's previous child was not significantly associated with induced abortion in any birth order. Moreover, analyses comparing women who had all boys with those who had all girls found no significant differences in their odds of abortion (data not shown). For example, the likelihood of having had an abortion among women with three sons (odds ratio, 1.1; 95% confidence interval, 0.9-1.4) was not significantly different from that among women with three daughters.

The variable that was most strongly and consistently associated with induced abortion was maternal education. The odds of abortion among women who had more than a secondary education were significantly higher than those among women with no education (odds ratios, 3.7-6.7); odds were intermediate for women with a primary or secondary education. The only association between abortion and standard of living was in the first birth order: The odds of abortion were higher among women with a medium standard of living (odds ratio, 1.5) than among women with a low standard of living. Religious affiliation was not associated with abortion in the first birth order; in the second and fourth birth orders, Muslim women had 28-38% lower odds of abortion than did Hindu women.

For all four birth orders, women who lived in rural areas were less likely than their counterparts in urban areas to have had an abortion (odds ratios, 0.6).

**Open Birth Intervals**

Logistic regression revealed that the factors associated with abortions during open birth intervals (Table 3) were generally similar to those associated with abortions during

**TABLE 3. Adjusted odds ratios (and 95% confidence intervals) from logistic regression analysis assessing associations between maternal and social characteristics and induced abortion, during open birth intervals**

Characteristic	Odds ratio
<b>Maternal age at marriage</b>	
<15 (ref)	1.00
15–19	1.20 (1.05–1.38)**
20–24	1.40 (1.12–1.64)***
≥25	1.25 (1.00–1.57)*
<b>Sex of previous child</b>	
Male (ref)	1.00
Female	0.95 (0.88–1.04)
<b>Maternal education</b>	
None (ref)	1.00
Primary	1.89 (1.68–2.15)***
Secondary	2.07 (1.84–2.34)***
≥secondary	1.93 (1.64–2.26)***
<b>Standard of living</b>	
Low (ref)	1.00
Medium	1.31 (1.15–1.49)***
High	1.69 (1.45–1.97)***
<b>Religion</b>	
Hindu (ref)	1.00
Muslim	0.81 (0.70–0.93)**
Other	1.03 (0.89–1.18)
<b>Caste</b>	
Scheduled caste (ref)	1.00
Scheduled tribe	0.57 (0.46–0.71)***
Other backward class	1.11 (0.96–1.27)
Other castes	1.17 (1.02–1.34)*
<b>Residence</b>	
Urban (ref)	1.00
Rural	0.57 (0.52–0.63)***

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ . Note: ref=reference group.

closed birth intervals. For example, women who were 15 or older when they married were more likely than women who married before age 15 to have an abortion during an open birth interval (odds ratios, 1.2–1.4).

The sex of the previous child was not associated with induced abortion. To examine whether such an association might exist in particular regions of India, we conducted additional analyses for each of the country's major states (not shown). Haryana was the only one of the 26 states in which the sex of the previous child was significant in the multivariate analysis; the odds of abortion were higher if the previous child was a girl than if it was a boy (odds ratio, 1.8).

Women's education was again associated with induced abortion: The odds among women who had a primary, secondary or higher education were about double (odds ratios, 1.9–2.1) those among women without any education. The odds of abortion were higher among women with a medium or high standard of living (1.3–1.7) than among those with a low standard of living.

Muslim women had odds of induced abortion 18% lower than those among Hindu women (odds ratio, 0.8). Although caste was not associated with abortion during closed birth intervals, for open intervals women who belonged to scheduled tribes had lower odds of abortion (0.6) than did women who belonged to scheduled castes. Women who

reported belonging to castes other than the scheduled or "other backward class" communities—i.e., those traditionally in a more favorable position in the caste system—had elevated odds of induced abortion (1.2). Finally, women who lived in rural areas had lower odds of induced abortion (0.6) than women in urban areas.

## DISCUSSION

The present analysis is based on all reported induced abortions among a nationally representative sample of more than 90,000 ever-married women in India. At the national level, there was no association between the sex of a child and the likelihood that its mother would have an abortion the next time she became pregnant. This suggests that when other relevant factors are taken into account, sex preference is not an important driver of abortion in India.

This conclusion is consistent with qualitative studies conducted across India<sup>13</sup> and Nepal<sup>14</sup> that have shown that the most common reason that women seek abortions is to limit or space births, irrespective of the sex of their children. Other studies indicate that abortion is strongly associated with unintended pregnancy<sup>15</sup> and that nonuse of contraception is the most common reason that unintended pregnancy occurs in India.<sup>16</sup> Providing women of low parity with easy access to contraceptives and a wide choice of methods, and providing permanent methods for women of higher parities, may reduce the incidence of unintended pregnancy. This, in turn, could offset the rise in demand for abortion that may well follow from current policy and program initiatives to increase the availability of safe abortion.

It should be noted, however, that although our findings indicate that the desire for sons is not the primary reason that women in India seek abortions, this desire may nevertheless contribute to the demand for abortion in regions where prenatal sex determination technologies are widely available and the preference for sons is high.<sup>17</sup> In a recent analysis of data from the 1998 Indian Special Fertility and Mortality Survey, Jha and colleagues observed a low female-to-male ratio among children born in 1997.<sup>18</sup> Their conclusion, that the most likely explanation for the low sex ratio is selective abortion of female fetuses following prenatal testing, contrasts with our findings. A possible explanation is that our data included all pregnancies reported by ever-married women, thus giving a perspective over many years, whereas Jha and colleagues' analysis included only births that occurred in 1997. Our analysis did reveal the possible influence of sex selection on births in Haryana, a state in which Jha and colleagues found an exceptionally low sex ratio.

We found several factors that were associated with recourse to induced abortion. Marriage at age 15 or older was associated with increased odds of abortion for birth orders two and three and for open birth intervals, although it was not associated with abortions before the first live birth. This suggests that, regardless of their age at marriage, women typically want to have their first child as soon as possible in order to establish their social position in the family. How-

ever, age at marriage did influence the odds of a subsequent abortion, suggesting that unintended pregnancy subsequently plays a role in the desire to obtain an abortion.

The odds of induced abortion also generally increased with older maternal age at the time of women's subsequent live birth. This suggests that the need for spacing may have triggered the decision to obtain an abortion. Consistent with this conclusion is a report that young women in the Indian state of Tamil Nadu view frequent childbirth as shameful and use abortion as a spacing method.<sup>19</sup>

Women's education was significantly associated with abortion for all closed birth orders as well as for open birth intervals. These findings, which are consistent with a review of qualitative studies conducted in India,<sup>20</sup> could be due in part to women's need to postpone births to meet the demands of ongoing education or to take up or continue employment; the desire to limit family size in the absence of effective and accessible contraception may lead to abortion.<sup>21</sup> Another likely factor is that educated women are more likely than uneducated women to have information about and access to abortion services. Because educational attainment and access to abortion services are both expected to increase among women in India, as a result of current national policies and programs and the country's general economic development, a rise in abortion ratios can be anticipated.

For first-order births, women with a medium standard of living were more likely than their counterparts with a low standard of living to have had an abortion. In addition, women with a medium or high standard of living were more likely than those with a low standard of living to have had an abortion during an open birth interval. This may reflect the need for women employed outside the home to postpone their first birth. For example, a study in Tamil Nadu found that women working in the pharmaceutical industry are not allowed to become pregnant.<sup>22</sup>

Although religious affiliation was not associated with abortion in the first birth order, Muslim women were less likely than Hindu women to have had abortions in the second and fourth birth orders and during open birth intervals. This may reflect both less access to and less demand for induced abortion among Muslim women owing to religious norms. Caste affiliation was not associated with abortion during closed birth intervals, perhaps because caste differentials disappeared when socioeconomic status was taken into account.

Women living in rural areas had lower odds of induced abortion than did women living in urban areas. This may reflect not only a lack of abortion services in rural areas but also a lower demand for abortion due to limited exposure to the media and to the outside world.

Our study has several limitations. First, women may not have recalled details of abortions that occurred long before the survey. During data collection, however, interviewers sought details about abortions, miscarriages and stillbirths in the context of each woman's complete birth history, an approach that is likely to enhance recall; in addition, in-

terviewers were trained to ask questions that could help distinguish among induced abortions, miscarriages and stillbirths. Nonetheless, due to a variety of factors, retrospective surveys tend to underestimate the incidence of induced abortion;<sup>23</sup> thus, it is possible that despite all efforts, some underreporting of abortions occurred in the NFHS-2. Another limitation is that the survey did not include never-married women, whose behavior with regard to abortion could differ from that of married women.

In conclusion, our findings are consistent with the idea that unintended and unwanted pregnancy, rather than a preference for sons, has been the main driver of abortion in India. However, given recent evidence on sex ratios that may well reflect the influence of sex preference on abortion at the state or regional level, there is a need for further research on the individual-, family- and community-level factors that influence recourse to abortion.

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## RESUMEN

**Contexto:** La preferencia por los hijos varones en la India puede ser un factor que impulsa a las mujeres con fetos del sexo femenino a someterse a abortos inducidos. Para evaluar esta hipótesis, es necesario disponer de más información sobre la incidencia del aborto y los factores maternos y sociales que están asociados con este procedimiento.

**Métodos:** Se calcularon las razones de abortos por orden de nacimiento utilizando los datos sobre los nacimientos de 90.303 mujeres alguna vez casadas de 15–49 años de edad, que participaron en la National Family Health Survey de 1998–1999 realizada en la India. Con respecto a los cuatro primeros nacimientos, se evaluó la relación entre el aborto y las diversas variables maternas y sociales, incluido el sexo del último hijo de la mujer, mediante el uso de análisis de regresión logística.

**Resultados:** La razón global de abortos fue de 17,0 abortos por cada 1.000 embarazos. Dicha razón aumentó de 5,3 por cada 1.000 embarazos de primer orden hasta 25,8 por cada 1.000 embarazos de tercer orden, y luego disminuyó. La variable de predicción del aborto más sólida fue la educación de la madre: las mujeres que habían cursado por lo menos instrucción primaria eran más proclives que aquellas que carecían totalmente de instrucción a haberse sometido a un aborto (razones de momios, 1,9–6,7). Las que residían en zonas rurales presentaban una menor probabilidad de haber tenido un aborto (0,6). No se registró una relación entre el sexo del hijo o hija anterior y las probabilidades de que luego la mujer se sometiera a un aborto.

**Conclusión:** A nivel nacional, es probable que los embarazos no planeados, en vez del sexo del hijo o hija anterior, sean la

causa probable por la cual se recurre a un aborto en la India. El logro de un mayor nivel educativo entre las mujeres puede conducir a un aumento de la demanda del aborto.

## RÉSUMÉ

**Contexte:** La préférence culturelle des enfants de sexe masculin peut être un facteur de recours à l'avortement en Inde, les femmes enceintes de fœtus féminins pouvant décider d'interrompre leur grossesse. L'évaluation de cette hypothèse exige une information plus complète sur l'incidence de l'avortement et sur les corrélats maternels et sociaux de la procédure.

**Méthodes:** Les rapports d'avortement par ordre de naissance ont été calculés en fonction des antécédents de naissances de 90.303 femmes de 15 à 49 ans, mariées ou l'ayant jamais été, ayant participé à l'Enquête nationale sur la santé familiale menée en Inde en 1998–1999. Pour les quatre premières naissances, l'association entre l'avortement et diverses variables maternelles et sociales, y compris le sexe du dernier enfant de la répondante, a été évaluée par régression logistique.

**Résultats:** Le rapport d'avortement global a été calculé à 17,0 pour mille grossesses. Ce rapport passe de 5,3 pour mille grossesses pour les naissances de premier rang à 25,8 pour les naissances de troisième rang, avant de décliner aux rangs suivants. L'éducation maternelle s'est avérée le plus fort prédicteur d'avortement. Les femmes instruites, pour le moins, au niveau primaire se sont révélées plus susceptibles que celles non scolarisées d'avoir recouru à l'avortement (rapport de probabilités, 1,9–6,7). La résidence rurale est apparue associée à une probabilité d'avortement réduite (0,6). Aucune association n'est apparue entre le sexe de l'enfant précédent d'une femme et la probabilité qu'elle se soit ensuite fait avorter.

**Conclusion:** Au niveau national, il est probable que la grossesse non planifiée, plutôt que le sexe de l'enfant précédent, préside à la demande d'avortement en Inde. L'éducation croissante des femmes pourrait mener à un accroissement aussi de la demande d'avortement.

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# Sexual Initiation, Substance Use, and Sexual Behavior And Knowledge Among Vocational Students In Northern Thailand

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**CONTEXT:** Thailand has undergone dramatic social changes in the last two decades, yet little is known about factors related to sexual initiation among adolescents.

**METHODS:** A survey using the audio computer-assisted self-interviewing method was conducted to assess social and demographic characteristics, substance use, sexual behavior, and knowledge of HIV and STIs among 1,725 vocational school students aged 15–21 living in northern Thailand. Gender differences for these factors were evaluated using chi-square and Mann-Whitney U tests. Multivariate survival analysis using Cox proportional hazards models assessed associations between these variables and sexual initiation for each gender.

**RESULTS:** Males initiated sexual intercourse at an earlier age than females (median ages of 17 and 18, respectively). At any given age, sexual initiation was associated with having a nonagricultural background and using alcohol or methamphetamine (adjusted rate ratios, 1.3–2.9). For males, initiation was also associated with having parents who did not live together, having a friend as a confidant, tobacco use, high perceived risk for HIV and high STI knowledge (1.3–1.7). For females, other factors associated with earlier initiation were younger age at interview, living away from family, lacking a family member as a confidant, high perceived risk for STIs and ever having smoked marijuana (1.3–2.4).

**CONCLUSIONS:** Interventions to ameliorate the adverse consequences of early sexual initiation need to address social influences such as parents and peer groups. Programs should identify and target high-risk subgroups, such as those who are sexually experienced at an early age and those engaged in patterns of generalized risk-taking.

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Among unmarried young people in Thailand, sexual behavior norms have changed substantially over the last two decades. One important change has been the increased acceptability of premarital sex among young women, which has resulted in a trend toward earlier sexual initiation for Thai females. A nationwide partner relations survey conducted in 1990 found that 13% of female participants aged 15–19 reported having had sexual intercourse, compared with 34% of males.<sup>1</sup> Other studies from the same period found that young Thai women had higher levels of experience, though they were still less likely to be sexually experienced than their male counterparts.<sup>2</sup>

Thai cultural norms generally have granted sexual freedom to males, but imposed constraints on female sexual behavior. In the past, unmarried males often experienced sexual initiation with female sex workers, and young unmarried females were expected to maintain premarital chastity.

Studies over the last decade have suggested that the norms governing sexual practices among Thai adolescents and young adults have changed.<sup>3</sup> A growing proportion of adolescent females report having had sexual intercourse, while male patronage of sex workers has decreased substantially. Most Thai men now have their early sexual experience with noncommercial partners.<sup>4</sup> Males' age at sexual initiation in Thailand does not appear to have changed

in recent decades; however, as social controls have eased, young women appear to be having sex earlier. Yet a key difference remains: Young unmarried males usually have more partners, particularly more casual partners, than their female counterparts.<sup>5</sup>

These shifts in sexual behavior have potentially adverse consequences for Thai youth, particularly for young women. In other countries, sexually active young people have an increased risk of HIV infection and other STIs, as well as elevated rates of unplanned teenage pregnancy and pregnancy termination.<sup>6</sup> Understanding the factors associated with initiation of sexual intercourse is crucial in trying to design and deliver interventions for Thai youth (particularly females) who are likely to have sex at ages earlier than the norm.

Two studies have reanalyzed data from a national survey of 15–24-year-old Thais conducted in the mid-1990s<sup>7</sup>; they focused on the association of age at sexual initiation with risk-taking behaviors, social and psychological factors, variables related to family and friends, and social and demographic characteristics. One analysis looked at the entire age range of survey participants, and the other considered only 15–19-year-olds. Several qualitative studies have also explored this subject.<sup>8</sup> Growing up without both parents and having sexually experienced friends were found to be associated with premarital sexual initiation.<sup>9</sup> For fe-

males, urban residence<sup>10</sup> and going to nightclubs<sup>11</sup> were associated with a greater likelihood of having premarital sex; for males, poor family relationships,<sup>12</sup> living apart from family<sup>13</sup> or living with parents,<sup>14</sup> and high levels of alcohol consumption<sup>15</sup> were related to a greater likelihood of premarital sexual activity.

Research in other countries has used various models to explore which factors are related to age at sexual initiation—for example, biological and behavioral correlates such as pubertal development and leisure activities, as well as social factors such as the influences of family, peers and institutions (education and religion).<sup>16</sup> Other studies have looked at substance use and mental health problems, but these have generally lacked an overarching conceptual framework.

In this study, we assessed factors associated with age at sexual initiation among adolescents from Chiang Rai, Thailand's northernmost province. It borders Laos and Myanmar in the Golden Triangle region, which is known for drug production and trafficking. Most of the 1.3 million people of Chiang Rai province are northern Thai and live in rural, agricultural lowlands; 13% are ethnic highland minorities ("hill tribes").<sup>17</sup> The province's HIV prevalence was among the highest in the country during the early years of the Thai epidemic,<sup>18</sup> prevalence peaked among female sex workers in 1991 (62%), with subsequent peaks among 21-year-old male military conscripts (17% in 1993) and primigravid women (11% in 1994). Deaths among men and women aged 20–29 increased 9–10-fold in subsequent years. From analyses of the age distribution of AIDS cases and AIDS-related deaths, most HIV infection likely occurred during adolescence and young adulthood.<sup>19</sup>

Our sample comprised students recruited from vocational schools that provided upper secondary and post-secondary education in a variety of manual trades and occupations. The lone previous study of Thai vocational students found lower levels of HIV risk behavior among students in Bangkok than among factory workers and such traditional risk groups as clients of STI clinics.<sup>20</sup> Upper secondary and postsecondary education of all kinds is increasingly common in Thailand<sup>21</sup> and serves as an avenue for social mobility, especially for rural and urban youth in provincial areas. The schools that we sampled were located in rural and urban areas and, as vocational institutions, did not draw from the most economically advantaged strata of Thai society. Therefore, we believed they were an appropriate sample for examining sexual and drug use risks in a population exposed to recent social change.

The literature provides a limited theoretical framework for assessing the factors related to sexual initiation. We believed it was important to consider the range of social and behavioral factors that have been treated in past studies, including modifiable factors such as drug and alcohol use, recent sexual behavior, peer norms, relationships with parents, and knowledge of HIV and STIs, as well as factors that are less amenable to intervention, such as age, family structure, urban or rural residence, and family background. We

**TABLE 1. Characteristics of vocational school students aged 15–21, according to gender, Chiang Rai, Thailand, 1999**

Characteristic	Male (N=893)	Female (N=832)
<b>Demographic</b>		
Gender (%)	51.8	48.2
Mean (median) age	18.5 (18)	18.4 (18)
Age		
15–17 (%)	29.1	27.8
18–19 (%)	43.4	45.1
20–21 (%)	27.4	27.2
Northern Thai (%)	92.7	94.8
Parent works in agriculture (%)	69.3	68.9
Parents live together (%)†	81.0	77.0
Lives with parents (%)	61.8	57.1
<b>Substance use</b>		
Ever went out dancing or drinking (%)	92.0	83.3***
Drank any alcohol in past 3 mos. (%)	92.5	80.5***
Ever drove motorcycle after having ≥3 drinks (%)	77.5	52.5***
Smoked cigarettes in past 3 mos. (%)	52.4	14.5***
Ever used methamphetamine (%)	39.2	18.0***
Ever used marijuana (%)	21.5	3.6***
<b>Sexual behavior</b>		
Had no sexual contact or intercourse (%)‡	33.8	41.6**
Had sexual contact only (%)	17.9	15.3
Mean (median) age at first contact	16.0 (16)	17.2 (17)***
Had sexual intercourse (%)	48.3	43.1
Mean (median) age at first intercourse	16.7 (17)	17.7 (18)***
Used condom at first intercourse (%)	23.2	25.6
Had steady sexual partner(s) in past 3 mos. (%)§	41.8	46.6*
Had casual sexual partner(s) in past 3 mos. (%)	16.2	4.8***
Mean (median) lifetime number of sexual partners	4.6 (2)	2.8 (1)***
Ever bought sex (%)	6.5	0.5***
Ever sold sex (%)	2.7	3.1
Ever been coerced to have sex (%)††	6.5	21.0***
Homosexual or bisexual (%)	9.1	11.2

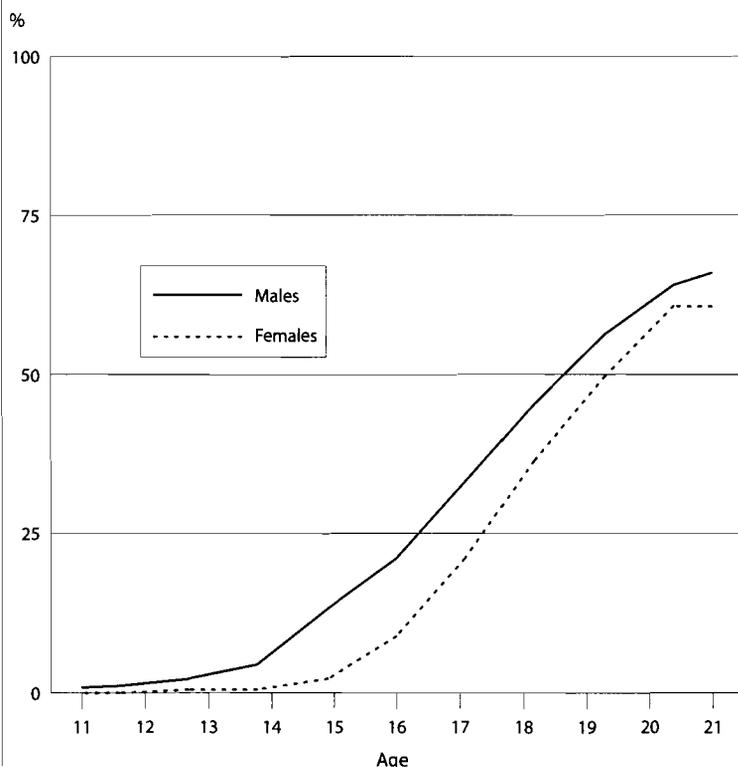
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . †Marriages are commonly not legally registered in Thailand, particularly in rural areas, hence "parents live together" includes both registered and unregistered marriages. ‡Sexual contact was defined as the respondent touching someone else's genitals, or someone else touching the respondent's genitals, for the purpose of erotic stimulation; this included oral sex, but not vaginal or anal penetration. §A steady sexual partner was someone the respondent had known for at least two months, had sexual contact or intercourse with regularly, and felt an emotional bond with; a casual partner was someone whom the respondent had sexual contact or intercourse with and who was not a steady partner, and with whom no money was exchanged. ††Coerced sex included forced sexual contact and intercourse.

also included variables that have emerged as important correlates of risk behavior in Thailand, such as sexual coercion<sup>22</sup> and sexual orientation.<sup>23</sup> This study's primary objective was to identify factors that should be incorporated into interventions aimed at improving the sexual health of Thai adolescents and young adults.

## METHODS

### Sample

In November and December 1999, we invited 1,736 students aged 15–21 who attended three vocational schools in Chiang Rai to participate in a cross-sectional survey of sexual and drug use behavior. After providing written informed consent (persons 15 or older do not need parental consent in Thailand),<sup>24</sup> 1,725 students completed computer-administered questionnaires in a classroom equipped as a computer laboratory, using monitors with hoods to maximize privacy. Equal enrollment quotas were set for males and females, as well as for each of the six grade levels in the schools. The study protocol was approved by the ethical review committee of the Thai Ministry of Public

**FIGURE 1. Percentages of male and female vocational school students in Chiang Rai, Thailand, who had had sexual intercourse, by age**

Health and by the institutional review board of the U.S. Centers for Disease Control and Prevention. A detailed description of the study procedures has been reported elsewhere.<sup>25</sup>

### Measurement

The study's questionnaire was administered using the audio computer-assisted self-interviewing (audio-CASI) method, which has been shown to increase reporting of sensitive behaviors (e.g., sexual behavior, drug use, violence) and to provide better reliability and validity than face-to-face interviews or self-administered questionnaires.<sup>26</sup>

Demographic characteristics included age, ethnicity, whether either parent worked in agriculture, parents' marital status and whether they lived together, student's living situation and several social network variables—having a family member or close friend as a confidant, and if they felt pressured by friends to use methamphetamine (scored on a five-point scale from absolutely true to absolutely untrue, and dichotomized to absolutely untrue vs. all other levels). The presence of depressive symptoms was assessed by five items on the frequency of symptoms during the past three months (i.e., how often the participant felt “energetic,” “down or depressed,” “bored with your life,” “lonely” or “optimistic about [the] future,” each scored on a five-point scale from never to always; Cronbach's alpha=0.70);<sup>27</sup> this measure was dichotomized into low and high levels based on the number of always and almost always responses.

Participants were asked a series of questions about their use of alcohol and drugs: whether they ever went out danc-

ing or drinking (i.e., went to settings where people often meet partners for casual sex), had drunk alcohol or smoked cigarettes in the past three months, had driven a motorcycle after having three or more drinks, or had ever used methamphetamine or marijuana.

For questions on sexual behavior and experience, sexual initiation was defined as the first occurrence of vaginal or anal intercourse. Students who said they had had intercourse were then asked a series of questions: their age at first intercourse; whether they had used condoms at first sex; whether they had had steady or casual partners in the past three months; their lifetime number of sexual partners; whether they had ever bought or sold sex; condom use with steady, casual and commercial partners, as well as at last intercourse (regardless of partner type); and whether they had ever been forced to have sexual contact or intercourse (and if so, at what age).

Male participants were asked about their sexual orientation. They were categorized as heterosexual if they identified themselves as such and stated that they were sexually attracted to women only. Participants expressing other combinations of sexual identity and same-sex attraction were identified as homosexual or bisexual.

Perceived risk for HIV infection was assessed by two items on the perceived risk of getting HIV and worry about getting HIV, using five-point scales from never to always (interitem  $r=0.58$ ;  $p<.001$ —not shown). Perceived risk for STIs was assessed by two similar items (interitem  $r=0.55$ ;  $p<.001$ ). Both scales were dichotomized based on the number of often and always responses. Answers to an 11-item HIV knowledge scale (e.g., can HIV be transmitted by: sexual intercourse, from mother to child, by sharing needles and syringes, by insect or mosquito bites, by touching people infected with the virus) and a five-item STI knowledge scale (e.g., STIs can make women infertile, STIs can be passed from mother to child) were broken into categories of low, intermediate and high, depending on the number of correct responses (i.e., agree, disagree or not sure).

### Statistical Analysis

Gender differences were evaluated using the chi-square test for categorical variables and the Mann-Whitney U test for continuous variables. Survival analysis was used to compare the reported age at first sexual intercourse for male and female participants.<sup>28</sup> Correlates of the timing of sexual initiation were evaluated separately for male and female students using Cox proportional hazards models. We expected that different models would result for males and females, because of gender differences in age at sexual initiation and gender-specific social norms for sexual behavior in Thailand.<sup>29</sup> The variables were first entered individually to identify factors correlated with time to first intercourse in univariate analyses; rate ratios with 95% confidence intervals were calculated for these associations. Variables that were statistically significant at  $p<.05$  in the univariate analyses and variables of theoretical interest were then entered into multivariate Cox survival analyses, stratified by gender.

**TABLE 2. Percentage of students who had had sexual intercourse, and unadjusted rate ratios (and 95% confidence intervals) from Cox regression survival analysis assessing associations between selected characteristics and time to sexual initiation, stratified by gender**

Characteristic	Male		Female		Characteristic	Male		Female	
	%	Rate ratio	%	Rate ratio		%	Rate ratio	%	Rate ratio
<b>Age</b>					<b>Ever went out dancing or drinking</b>				
15-17	26.2	0.8 (0.6-1.1)	22.1	2.3 (1.6-3.4)***	Yes	51.5	4.3 (2.1-8.7)***	48.3	2.9 (1.9-4.4)***
18-19	48.2	0.8 (0.7-1.0)	47.5	1.4 (1.1-1.8)**	No	11.3	ref	17.3	ref
20-21	71.8	ref	57.5	ref	<b>Smoked cigarettes in past 3 mos.</b>				
<b>Parent works in agriculture</b>					Yes	60.3	1.9 (1.6-2.3)***	62.0	1.8 (1.4-2.3)***
Yes	44.4	ref	41.4	ref	No	35.1	ref	39.9	ref
No	56.9	1.6 (1.3-1.9)***	47.1	1.4 (1.1-1.7)**	<b>Ever used methamphetamine</b>				
<b>Parents not living together</b>					Yes	64.3	2.0 (1.7-2.5)***	62.0	2.0 (1.6-2.6)***
Yes	61.8	1.5 (1.2-1.9)***	46.6	1.2 (0.9-1.6)	No	37.9	ref	39.0	ref
No	45.1	ref	42.1	ref	<b>Ever used marijuana</b>				
<b>Lives in boarding house or rented room</b>					Yes	70.3	1.8 (1.5-2.2)***	76.7	2.2 (1.5-3.4)***
Yes	52.8	1.1 (0.9-1.3)	53.1	1.4 (1.1-1.7)**	No	42.2	ref	41.9	ref
No	46.3	ref	38.3	ref	<b>Sexual orientation</b>				
<b>Has family member as confidant</b>					Homosexual or			na	na
Yes	48.4	ref	39.2	ref	bisexual	37.0	0.9 (0.6-1.2)	na	na
No	47.6	1.1 (0.9-1.4)	56.2	1.9 (1.5-2.3)***	Heterosexual	49.4	ref	na	na
<b>Has close friend as confidant</b>					<b>Perceived risk for HIV</b>				
Yes	50.1	1.5 (1.1-2.2)*	42.7	0.9 (0.6-1.3)	High	60.7	1.5 (1.1-2.0)*	65.5	1.4 (1.1-2.0)*
No	31.8	ref	51.1	ref	Low	47.0	ref	42.1	ref
<b>Depressive symptoms scale</b>					<b>Perceived risk for STIs</b>				
High	50.0	1.0 (0.8-1.3)	43.2	1.1 (0.9-1.4)	High	41.7	1.0 (0.6-2.0)	62.1	1.8 (1.1-2.9)*
Low	47.6	ref	43.1	ref	Low	48.4	ref	42.5	ref
<b>Peer pressure to use methamphetamine</b>					<b>AIDS knowledge</b>				
High	44.4	0.9 (0.6-1.3)	50.8	1.5 (1.0-2.1)*	High	50.8	1.7 (0.9-3.3)	44.5	2.2 (0.8-5.4)
Low	48.6	ref	42.6	ref	Intermediate	42.5	1.6 (0.8-3.0)	42.3	2.3 (0.9-6.3)
<b>Had ≥3 alcoholic drinks at one time in past 3 mos.</b>					Low	32.3	ref	20.0	ref
Yes	52.4	2.4 (1.6-3.6)***	51.3	2.0 (1.6-2.6)***	<b>STI knowledge</b>				
No	21.2	ref	25.8	ref	High	62.3	1.5 (1.1-2.0)**	46.7	1.0 (0.7-1.5)
<b>Ever drove motorcycle after having ≥3 drinks</b>					Intermediate	49.7	1.2 (0.9-1.4)	46.8	1.2 (0.9-1.5)
Yes	55.2	2.1 (1.6-2.9)***	53.3	1.7 (1.4-2.1)***	Low	41.8	ref	38.6	ref
No	24.4	ref	31.9	ref					

\*p<.05. \*\*p<.01. \*\*\*p<.001. Notes: ref=reference group. na=not applicable for female participants self-identified as homosexual or bisexual, as sexual intercourse was defined as penile penetration of the vagina or anus.

We did not identify a particular age as defining "early" sexual initiation. Instead, we used survival analysis to examine how demographic characteristics, social factors, knowledge of AIDS and STIs and perceptions of risk, and sexual and substance use behaviors were related to the age at which sexual intercourse first occurred. This permitted examination of cumulative trends in the sample by age, rather than associations with a particular age. We chose not to conduct an extreme group analysis (e.g., using very early or very late ages as reference points) or one based on median split for age because of the problems of dichotomizing dependent variables that are inherently continuous in their measurement.<sup>30</sup> Age-specific analyses run the risk of missing cumulative factors and may be handicapped by small cell sizes for some independent variables. To achieve parsimonious models, we used backward, stepwise elimination to remove variables that did not contribute independently at p<.05.

## RESULTS

Of the 1,725 participants, the mean age was 18.4 years. Overall, 52% were male, more than nine in 10 were northern Thai and two-thirds had at least one parent who worked in agriculture (Table 1, page 127). The parents of eight in 10 participants lived together, and six in 10 students lived with their parents. Large proportions of males and females had drunk alcohol in the past three months (93% and 81%, respectively) and ever driven a motorcycle after having three or more drinks (78% vs. 53%). Levels of substance use for males and females were significantly different, with higher proportions of males having used tobacco in the past three months (52% vs. 15%) and having ever used methamphetamine (39% vs. 18%) or marijuana (22% vs. 4%).

Some 15% of female and 18% of male students reported having had sexual contact only (defined as the respondent touching someone else's genitals, or someone else touching the respondent's genitals, for erotic stimulation,

**TABLE 3. Adjusted rate ratios (and 95% confidence intervals) from Cox regression survival analysis assessing associations between selected characteristics of male students and time to sexual initiation**

Characteristic	Adjusted rate ratio
Ever went out dancing or drinking	2.9 (1.4–5.9)**
High perceived risk for HIV	1.7 (1.3–2.3)***
High STI knowledge	1.7 (1.2–2.2)**
Ever used methamphetamine	1.6 (1.3–2.1)***
Has close friend as confidant	1.6 (1.1–2.4)*
Neither parent works in agriculture	1.5 (1.2–1.9)***
Smoked cigarettes in past 3 mos.	1.5 (1.2–1.9)**
Parents not living together	1.3 (1.1–1.7)*

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . Note: Variables were eliminated from the model in the following order: sexual orientation, has family member as confidant, age, lives in boarding house or rented room, ever used marijuana, had  $\geq$  three alcoholic drinks at one time in past three months, peer pressure to use methamphetamine and STI knowledge.

including oral sex), whereas 43% of females and 48% of males had had intercourse. Among those with any sexual experience, the mean ages at first sexual contact and first intercourse were significantly earlier for males (16.0 and 16.7, respectively) than for females (17.2 and 17.7, respectively). One quarter of participants had used a condom at first intercourse.

Approximately 10% of both males and females identified themselves as homosexual or bisexual. Nearly half of participants reported having a steady sexual partner in the past three months (42% of males and 47% of females), and smaller proportions reported having a casual partner (16% and 5%, respectively). Males reported a higher cumulative number of sexual partners than females (4.6 vs. 2.8), and a larger proportion had ever bought sex (7% vs. 1%). Three percent of students had ever sold sex, and 21% of females reported ever being coerced to have sex.

On average, males initiated sexual intercourse earlier than females (rate ratio, 1.3;  $p < .001$ —not shown). By age 17 for males and age 18 for females, more than one quarter reported having had intercourse (Figure 1, page 128). By age 19, 56% of males and 50% of females had had intercourse.

**TABLE 4. Adjusted rate ratios (and 95% confidence intervals) from Cox regression survival analysis assessing associations between selected characteristics of female students and time to sexual initiation**

Characteristic	Adjusted rate ratio
Age (compared with 20–21-year-olds)	
15–17	2.4 (1.6–3.5)***
18–19	1.4 (1.1–1.8)**
Ever went out dancing or drinking	2.2 (1.4–3.5)**
High perceived risk for STIs	1.9 (1.2–3.1)**
Ever used marijuana	1.6 (1.0–2.6)*
Has no family member as confidant	1.5 (1.2–1.9)**
Had $\geq$ 3 alcoholic drinks at one time in past 3 mos.	1.4 (1.0–1.9)*
Ever used methamphetamine	1.4 (1.1–1.8)*
Neither parent works in agriculture	1.3 (1.1–1.7)*
Lives in boarding house or rented room	1.3 (1.0–1.6)*

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . Note: Variables were eliminated from the model in the following order: has close friend as confidant, parents not living together, smoked cigarettes in past three months, peer pressure to use methamphetamine and perceived risk for HIV.

In the univariate analysis for males, several factors were associated with a shorter time to sexual initiation: not having a parent who worked in agriculture, having parents who did not live together, having a close friend as a confidant, a perceived high risk for HIV infection and high STI knowledge (rate ratios, 1.5–1.6—Table 2, page 129). All substance use measures were also strongly associated with earlier initiation of intercourse: having ever gone out dancing or drinking, having had three or more alcoholic drinks at one time in the past three months, having ever driven a motorcycle after consuming alcohol, having smoked cigarettes in the past three months, or having ever used methamphetamine or marijuana (1.8–4.3).

Among females, those aged 15–17 and 18–19 were more likely to have initiated sexual intercourse at an earlier age than those aged 20–21 (rate ratios, 2.3 and 1.4, respectively). Other factors associated with earlier intercourse were not having a parent who worked in agriculture, living in a boarding house or rented room, not having a family member as a confidant, high peer pressure to use methamphetamine and perceived high risk for HIV and for STIs (1.4–1.9). For females, as for males, all substance use measures showed associations with shorter time to the initiation of intercourse (1.7–2.9).

In the multivariate analysis, earlier sexual initiation for males was associated with not having a parent who worked in agriculture, having parents who did not live together, having a close friend as a confidant, a perceived high risk for HIV infection, a high level of STI knowledge, having ever gone out dancing or drinking, recent tobacco use and having ever used methamphetamine (adjusted rate ratios, 1.3–2.9—Table 3).

Independent correlates of earlier sexual initiation for females included being in the age-groups 15–17 or 18–19, not having a parent who worked in agriculture, living in a boarding house or rented room, not having a family member as a confidant, a perceived high level of risk for STI infection, having ever gone out dancing or drinking, having recently had three or more drinks at one time, and having ever used methamphetamine or marijuana (adjusted rate ratios, 1.3–2.4—Table 4).

## DISCUSSION

Our findings suggest that age at sexual initiation may be influenced by a number of social factors and demographic characteristics, as well as several risk-taking behaviors, although the specific factors vary by gender. This study adds to a literature that has found that Thai females are initiating sexual intercourse at a younger age,<sup>31</sup> a trend that coincides with premarital sex for females becoming more accepted among Thai youth.<sup>32</sup>

More than half of female participants reported having had intercourse by age 19, which suggests that their age of sexual initiation has declined over the past decade.<sup>33</sup> In our sample, females in the 15–17 and 18–19 age-groups reported having had sexual intercourse at an earlier age than 20–21-year-olds. When interpreting these data, we must consid-

er that our use of a school-based population may select for older females who had less sexual experience, because women who became pregnant or married may have dropped out of school. Nevertheless, these results are indicative of earlier sexual initiation for women in Thailand—albeit at a later age than adolescent females in some other countries.<sup>34</sup>

Most of this shift in sexual behavior for Thai females appears attributable to the increased acceptability of premarital sex among young women. Other Thai studies have indicated that although attitudes regarding premarital relations for women have become more permissive in the past two decades,<sup>35</sup> gender norms continue to dictate passive roles for females within intimate relationships, thereby limiting opportunities for sexual self-assertion.<sup>36</sup> Hence, women are not expected to initiate discussions about sex, display sexual knowledge or initiate condom use. In general, expression of sexuality is more widely accepted in Thai culture for males than for females, and these norms tend to be maintained even by Thai women.<sup>37</sup> Thai men and women also tend to view men as having much stronger sexual drives and needs than women.<sup>38</sup>

Thai men have greater freedom in their sexual lives than women, as exemplified by the society's tolerance of sexual experimentation and patronage of female sex workers by men.<sup>39</sup> Available data suggest that age at first sex for males has changed little over the past decade.<sup>40</sup> However, dramatic changes have occurred in males' premarital partners. Sex worker patronage among young Thai men has declined, and sex workers are no longer men's most common first sexual partners.<sup>41</sup> Steady partnerships with girlfriends have become common, although substantial numbers of young men also have casual partners.<sup>42</sup> The declining patronage of sex workers occurred with the rapid emergence of the HIV epidemic among Thai sex workers and their partners,<sup>43</sup> which was accompanied by media campaigns that linked HIV infection to sex workers.<sup>44</sup> This may have contributed to the increased frequency of noncommercial sex partners and accelerated the trend toward greater acceptability of premarital sex for young women, which had begun before the start of the HIV epidemic.

We found that social variables appeared to be associated with earlier sexual initiation, although some influences were markedly different for males and females. Coming from an agricultural background was associated with delayed sexual initiation for both genders. A previous national survey had obtained similar findings, but only for females.<sup>45</sup> Living in a rural village in Thailand typically provides more opportunities for parents and others in the community to monitor and oversee courtship among adolescents and young adults,<sup>46</sup> although this has diminished in recent decades.<sup>47</sup> Rural villages may also present adolescents with fewer opportunities to engage in sexual relationships, although travel to vocational schools in urban or periurban Chiang Rai would widen these opportunities. The Thai population remains predominantly rural, yet mass media, transportation and migration to urban areas by villagers have

reduced the influence of rural values, and increasing urbanization will likely continue this trend.

Other associations between family characteristics and sexual initiation were gender-specific. For males, those whose parents did not live together tended to initiate intercourse earlier than those in intact families; for females, not having a family member as a confidant and living on one's own were associated with earlier sexual initiation. Studies in other countries have found that dual-parent families, higher levels of parental monitoring and the quality of parent-adolescent communication were associated with the postponement of sexual initiation.<sup>48</sup> One national study found that having been raised in a two-parent household was associated with later sexual initiation among Thai adolescents.<sup>49</sup> Furthermore, parental monitoring of courtship has focused primarily on daughters,<sup>50</sup> which would appear to be consistent with our finding that earlier sexual initiation among females was associated with not having a family member as a confidant and with living away from home; however, another study found that the quality of parent-adolescent relationships was more strongly related to the likelihood of earlier sexual initiation for males than for females.<sup>51</sup>

Peer influence was a significant factor only for males, for whom the presence of a close friend as a confidant was associated with earlier sexual initiation. Although having a peer confidant does not necessarily connote "peer pressure," other research has suggested that the peer group exerts a great deal of influence over young Thai males' sexual experience and exploration.<sup>52</sup> Research conducted elsewhere has found that those who think their peers are having sex are more likely to initiate sex themselves.<sup>53</sup> This may also be the case in Thailand, where peer norms have been found to be associated with whether adolescents and young adults have had sexual intercourse.<sup>54</sup>

The perception of a high personal risk for HIV infection (among males) or STIs (among females) was associated with earlier sexual initiation. Moreover, young men who had had intercourse had better STI knowledge than those without such experience. The cross-sectional design of the study makes it difficult to infer how STI knowledge was temporally related to sexual experience, but research in other cultures suggests that poorer knowledge of reproductive biology is predictive of early sexual initiation.<sup>55</sup> Hence, it would seem likely that greater knowledge of STIs may be a consequence of earlier sexual experience.

We observed no relationship between depressive symptoms and sexual initiation for either gender. On the other hand, alcohol and drug use were associated with earlier onset of sexual intercourse for males and females, as were a variety of risky behaviors assessed in this study and noted elsewhere.<sup>56</sup> Whether experimentation with drugs predisposed individuals to engage in risky behaviors is unclear; however, such patterns have been noted in other populations.<sup>57</sup> Sex education could be improved by including material on how substance use affects sexual risk behavior. Such efforts may be particularly valuable among these youth.

### Limitations

This study has several limitations. Its cross-sectional design does not allow us to evaluate the causality of the reported associations; a longitudinal design would be necessary to determine directionality. Also, recall bias may affect the reported age at first intercourse, although respondents may remember this kind of experience better than more mundane events.<sup>58</sup> Underreporting of sensitive behaviors may have occurred; however, the use of audio-CASI probably maximized the level of such reporting in our study, relative to other methods.<sup>59</sup> Another limitation is that our use of survival analysis did not fix specific bounds on what age constituted early sexual initiation, yet it did permit us to investigate the probability of sexual initiation at any age in relation to the explanatory variables, and to examine overall trends rather than those arbitrarily linked to a specific age.

Because the study was conducted in vocational schools in northern Thailand, it may not be representative of the adolescent population at large. Nonetheless, 2.5 million of the 7.5 million Thais aged 15–21 attend upper secondary and higher education, including vocational schools.<sup>60</sup> This population tends to come from rural backgrounds, and education represents a means for upward economic mobility and preparation for the urban workforce. Hence our sample may provide some insight into a large and important segment of Thai society that is seeking economic advancement and that may be particularly affected by the social changes occurring in Thailand.

### Implications

Addressing sexual risk behavior in Thailand is a challenge because open discussion of sex-related topics is considered a societal taboo, particularly for young women, although some interventions have been able to address communication in mixed-gender groups.<sup>61</sup> Effective sex education may be difficult to achieve in Thailand: Sex education as a formal subject is currently limited in Thai school curricula,<sup>62</sup> and instructors are often reluctant to teach it in the classroom. Similar problems have been noted in other service professions that have significant contact with adolescents and young adults.<sup>63</sup> There is a critical need to inform young Thais about the possible adverse consequences of sexual activity—such as unplanned or unwanted pregnancy, STIs and HIV—and about ways to protect themselves against these risks. Although early sexual initiation in our sample was associated with social variables, most of the related factors appear to be amenable to intervention.

More attention needs to be directed to social influences such as parents and peer groups. Our findings indicate that parents play an influential role as monitors of their daughters' sexual behavior,<sup>64</sup> and efforts to improve parent-adolescent communication about sexuality issues may be particularly effective. Peers appear to influence the sexual behavior of young Thai men,<sup>65</sup> and interventions directed at peer norms may be especially helpful to them. These kinds of interventions have had significant effects on the sexual attitudes and intentions of Thai youth.<sup>66</sup>

In general, sex education needs to consider sexual behavior in the context of substance abuse and generalized risk-taking, and also take into account that some early sexual experience may be coerced or unwanted. Different messages targeted at sexually inexperienced and sexually experienced youth are more likely to influence them to reduce their risk-taking behavior. Youth who have not initiated sex may not recognize that acquiring HIV or STIs is a potential consequence of sexual initiation, and experienced youth may be unaware of the additional risks to which they are exposed because of their behavior. Targeted interventions may better prepare Thai youth to ably negotiate the sexual and health challenges of their adolescent years.

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## RESUMEN

**Contexto:** Durante las últimas dos décadas, cambios sociales dramáticos han ocurrido en Tailandia; no obstante, hay pocos conocimientos sobre los factores relacionados con la iniciación sexual de los adolescentes.

**Métodos:** Se llevó a cabo una encuesta mediante audio-entrevistas asistidas por computadora para evaluar las características sociales y demográficas, el uso de sustancias, la conducta sexual, y los conocimientos acerca de la infección del VIH y las ITS. Se entrevistaron a 1.725 estudiantes de escuelas vocacionales, de 15-21 años de edad, residentes en la región norte de Tailandia. Las diferencias entre los géneros con respecto a estos factores se evaluaron mediante pruebas de chi cuadrada y pruebas U de Mann-Whitney. Se evaluaron las relaciones entre estas variables y la iniciación sexual de cada género a través del análisis multivariado de supervivencia utilizando modelos de Cox de riesgo proporcional.

**Resultados:** Los varones iniciaron sus relaciones sexuales a una edad más temprana que las mujeres; la edad mediana de la primera relación fue de 17 y 18 años, respectivamente. La iniciación sexual estuvo relacionada con haber pertenecido a un entorno no agrícola y al uso de alcohol o metanfetamina (razones de riesgo ajustadas, 1,3-2,9). En el caso de los hombres, la iniciación sexual también estuvo relacionada con otros factores, incluidos la separación de sus padres, tener un amigo confidente, consumo de tabaco, tener un riesgo percibido elevado de la infección por VIH, y tener un nivel alto de conocimiento de las ITS (1,3-1,7). Con respecto a las mujeres, los factores relacionados con la iniciación sexual a temprana edad eran la menor edad, vivir fuera del núcleo familiar, no poder compartir sus confidencias con un miembro de su familia, riesgo percibido elevado de las ITS y haber fumado marihuana alguna vez (1,3-2,4).

**Conclusiones:** Las intervenciones dirigidas a mejorar las consecuencias adversas de la iniciación sexual a temprana edad deben abordar las influencias sociales tales como las relaciones con los padres y con los pares. Los programas deben identificar y concentrar la atención en los subgrupos de alto riesgo, tales como aquellos que a temprana edad ya tienen experiencia sexual y los que presentan conductas proclives a tomar riesgos.

## RÉSUMÉ

**Contexte:** La Thaïlande a enregistré une profonde transformation sociale ces 20 dernières années. Les facteurs d'initiation sexuelle des adolescents demeurent toutefois peu connus.

**Méthodes:** Une enquête basée sur la méthode d'auto-entrevue audio assistée par ordinateur a été menée pour évaluer les caractéristiques sociales et démographiques, l'usage de substances intoxicantes, le comportement sexuel et la sensibilisation aux VIH et IST parmi 1.725 élèves de l'enseignement professionnels âgés de 15 à 21 ans dans le nord de la Thaïlande. Les différences entre les sexes ont été évaluées, pour ces facteurs, par tests chi carré et Mann-Whitney U. L'analyse de survie multivariée, par modèles de risques proportionnels de Cox, a permis d'évaluer les associations entre ces variables et l'initiation sexuelle de chaque sexe.

**Résultats:** Les garçons connaissent leurs premiers rapports se-

xuels à un âge plus jeune que les filles, l'âge médian au moment des premiers rapports étant, respectivement, de 17 et 18 ans. L'initiation sexuelle s'est révélée associée à des antécédents non agricoles et à la consommation d'alcool ou de méthamphétamine (rapports de taux ajustés, 1,3–2,9). Pour les garçons, l'initiation était aussi associée au fait d'avoir des parents ne vivant pas ensemble, à celui d'avoir un ami comme confident, à l'usage du tabac, à un haut risque perçu de VIH et à une haute sensibilisation aux IST (1,3–1,7). Côté féminin, d'autres facteurs associés à l'initiation se sont avérés le jeune âge, la vie séparée de la famille, l'absence d'un parent comme confident, le haut risque perçu d'IST et le fait d'avoir jamais fumé de la marijuana (1,3–2,4).

**Conclusions:** Les interventions visant à améliorer les conséquences adverses de l'initiation sexuelle précoce doivent considérer les influences sociales telles que les parents et les groupes

de pairs. Les programmes doivent identifier et cibler les sous-groupes à risques élevés: les jeunes sexuellement expérimentés à un âge précoce et ceux engagés dans des modèles de prise de risque généralisée.

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# Induced Abortion and Unintended Pregnancy In Guatemala

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**CONTEXT:** Although Guatemalan law permits induced abortion only to save a woman's life, many women obtain abortions, often under unsafe conditions and in response to an unintended pregnancy. Recent studies indicate that unsafe abortion is a key factor contributing to maternal morbidity and mortality in the country, but no national data on the incidence of abortion exist.

**METHODS:** Surveys of all hospitals that treat women for postabortion complications and of 74 professionals who are knowledgeable about the conditions of abortion provision in Guatemala were conducted in 2003. Indirect estimation techniques were used to calculate the number of induced abortions performed annually. Abortion rates and ratios and the level of unintended pregnancy were calculated for the nation and its eight regions.

**RESULTS:** Nearly 65,000 induced abortions are performed annually in Guatemala, and about 21,600 women are hospitalized for treatment of complications. Abortions occur at a rate of 24 per 1,000 women aged 15–49, and there is one abortion for every six births. The abortion rate is higher than average in the Southwest (less developed, mainly indigenous population) and Metropolitan (more developed, mainly nonindigenous population) regions (29–30 per 1,000 women). Over a quarter of all births are unplanned; combining unplanned births with abortions yields estimates that 32% of pregnancies in Guatemala are unintended, with an unintended pregnancy rate of 66 per 1,000 women.

**CONCLUSIONS:** Unsafe abortion has a significant impact on women's health in Guatemala. Comprehensive government programs are needed to address the issues of unintended pregnancy and unsafe abortion, with attention to regional differences.

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Unsafe abortion is a leading cause of reproductive morbidity and mortality in countries where abortion is illegal or severely restricted, as is the case in Guatemala.\* In these settings, abortion is a clandestine event that is poorly documented and difficult to study. Little empirical research on abortion has been conducted in Guatemala, and no national-level data on abortion incidence are available. As a result, there is limited public awareness of the issue of unsafe abortion, its consequences for women's health or its impact on the health care system.

In Guatemala, abortion is against the law except to save a woman's life.<sup>1</sup> Nonetheless, the little evidence that is available suggests that induced abortion is common. Much of this evidence is based on women hospitalized for treatment of abortion complications. However, Ministry of Health reports of the number of women treated for abortion complications in all hospitals are acknowledged to be undercounts.<sup>2</sup> A large-scale surveillance initiative, part of the Postabortion Care Program of the Epidemiological Research Center in Sexual and Reproductive Health (CIESAR), re-

ported that 13,928 incomplete abortions were treated in 22 public hospitals between July 2003 and December 2004.<sup>3</sup> Other hospital-based studies further support the conclusion that induced abortion is common. One study of abortion patients treated in six hospitals between August 1993 and July 1994 found that about 50% were likely to have had induced abortions<sup>4</sup>; a 1995 Ministry of Health study found that 76% of abortion patients in seven hospitals had had a previous abortion.<sup>5</sup> Treatment of abortion complications results in substantial costs to hospitals: In a study conducted over five months in 2000 at a Coatepeque hospital, 30% of the maternity budget and 10% of the total hospital budget were spent treating abortion complications.<sup>6</sup>

According to a recent government study on maternal mortality, abortion is the third most important cause of maternal deaths.<sup>7</sup> A four-year surveillance program carried out in the Guatemala City metropolitan area found that between 1993 and 1996, 110 of 435 maternal deaths were due to infection, and 34 of these were related to induced or spontaneous abortion.<sup>8</sup> The study did not provide a breakdown by type of abortion, but it is likely that induced abortion was a key factor.

In Guatemala, as in other countries, women may resort to abortion when they have an unintended pregnancy. Some are unable to care for a child; some already have all the chil-

\*Unsafe abortion is defined as a procedure for terminating pregnancy either by persons lacking the necessary skills or in an environment lacking the minimal medical standards, or both (source: World Health Organization (WHO), *The Prevention and Management of Unsafe Abortion*, Geneva: WHO, 1992).

dren they want; others do not want the pregnancy because it is the result of forced sex or incest; and some women's lives or health are at risk if they continue with the pregnancy. A number of other factors also contribute to unintended pregnancy and abortion, including insufficient and inaccurate information about contraception, inadequate access to services and supplies, and incorrect and inconsistent contraceptive use. Survey data from 2002 showed that, on average, actual family size was 4.4 but the desired size was 3.7, and that 28% of all recent births were unplanned, a level similar to the 29% estimated for Latin America.<sup>9</sup> Although overall contraceptive use increased from 23% in 1987 to 43% in 2002,<sup>10</sup> this is still substantially lower than use in the region as a whole (71%).<sup>11</sup> In addition, between 1987 and 2002, the unmet need for contraception among currently married Guatemalan women grew from 19% to 28%.

The government of Guatemala has recently enacted policies and plans to improve women's reproductive health, but no studies have assessed their impact.<sup>12</sup> However, the issue of maternal death and illness resulting from unsafe abortion has not been properly addressed, and the lack of comprehensive and reliable data makes effective action difficult. Because unsafe abortion is a critical factor in maternal morbidity and mortality in Guatemala, and because it represents a significant cost for meager hospital budgets, quantitative indicators are needed to assess the extent of the practice, how it affects women's health and how reproductive health services, including postabortion care, could be improved.

In this article, we apply an established indirect estimation methodology and draw on new data collected from health facilities and health professionals to generate estimates for the basic indicators of unsafe abortion in Guatemala—the number of women hospitalized each year for the treatment of complications following unsafe induced abortions, and national and regional estimates of the incidence of induced abortion. In addition, we combine these abortion data with survey and other data on the planning status of births to obtain estimates of the rate of unintended pregnancy among Guatemalan women.

## DATA AND METHODS

### Data Sources

The key data sources for the estimates of abortion incidence were two surveys designed and fielded for this study—a survey of hospitals that treat postabortion patients and a survey of knowledgeable key informants. The study design and protocols were based on prior research that developed a methodology for estimating abortion incidence, and were adapted to the Guatemalan situation.<sup>13</sup> Questionnaires for both surveys were pretested in early September 2003; the surveys were fielded from late September through October 2003. Details of the study design and fieldwork are described below.

Other data sources included the 1995 Demographic and Health Survey (DHS) and the 2002 Guatemala National Survey of Maternal and Child Health (ENSMI), which pro-

vide information on contraceptive use, planning status of births and unmet need for contraception. Sample sizes were 12,403 and 9,155 women aged 15–49 for the DHS and ENSMI, respectively. Although the 1995 survey did not include the Petén region, both surveys were based on nationally representative samples.\*

• *Health Facilities Survey.* An inventory of hospitals was drawn from Ministry of Health lists and telephone directories; this list was updated during fieldwork with information provided by respondents. A total of 225 hospitals were initially identified. Of these, 42 were eliminated; 23 did not provide treatment for abortion complications, 13 did not exist at the time fieldwork was carried out and six were listed twice. Because the number of hospitals that provide postabortion care in Guatemala is relatively small, all 183 of the eligible hospitals—127 private and 56 public facilities—were surveyed. Public facilities are those operated by any branch of government, and include hospitals that are part of the Social Security system.

The respondent for each hospital was the senior professional deemed the most knowledgeable about the postabortion care provided at the facility, and was typically the chief of the obstetrics and gynecology department or an obstetrician-gynecologist. In five cases, we interviewed the next most senior professional. We completed interviews for 178 hospitals; of the five missing cases (all of which were private facilities), two respondents did not complete the interview and three refused to be interviewed, resulting in an overall response rate of 97%. The response rate was 96% for private hospitals and 100% for public hospitals.

The Health Facilities Survey provided estimates of the number of women treated for postabortion complications. Respondents were asked a series of questions, including: whether treatment of abortion complications is provided in an outpatient or inpatient setting, or both; and for the categories that apply, the total number of postabortion patients (spontaneous and induced) treated as outpatients and inpatients in the average month and in the past month. Specifying these two time frames increased the likelihood of accurate recall and of capturing variation from month to month. These two numbers were averaged and multiplied by 12 to produce an estimate for the calendar year. This information formed the basis for estimating the incidence of abortion using an indirect estimation methodology, described below.

• *Health Professionals Survey.* On the basis of information gathered from program planners and other stakeholders, the research team prepared a list of health professionals who were known to be familiar with postabortion services, covering all sectors and a wide range of professions, including clinicians, policymakers, researchers and women's activists. A purposive sample of 85 professionals was selected, and 74 were successfully interviewed. These professionals came from 21 of the 22 departments of Guatemala

\*Petén is home to only 3% of the total population, suggesting that its exclusion from the 1995 DHS did not significantly affect the representativeness of the survey.

**TABLE 1. Measures related to calculating the number of women treated for complications of induced abortion at a hospital in 2003, by region**

Region	No. treated for abortion complications*	No. of live births	No. of miscarriages†	No. treated for miscarriages‡	No. treated for induced abortion complications§
<b>Total</b>	<b>27,014</b>	<b>405,017</b>	<b>13,811</b>	<b>5,389</b>	<b>21,625</b>
Metropolitan	8,844	74,373	2,536	1,823	7,021
North	1,014	47,200	1,610	409	605
Northeast	2,237	35,469	1,209	514	1,723
Southeast	2,040	30,634	1,045	348	1,692
Central	3,000	41,537	1,416	670	2,330
Southwest	7,112	100,899	3,441	1,056	6,056
Northwest	2,058	59,553	2,031	408	1,650
Petén	709	15,352	524	161	548

\*Includes both spontaneous and induced abortions. †Miscarriages at 13–22 weeks' gestation, calculated as 3.41% of all live births. ‡Calculation assumes that the proportion of women with miscarriages who obtain treatment is the same as the proportion of women who deliver in hospitals. §The total number treated for any abortion complication minus the number treated for complications of spontaneous abortions. Sources: **No. treated for abortion complications**—Health Facilities Survey. **No. of live births**—based on age-specific fertility rates from the 2002 ENSMI and the number of women in each five-year age-group according to 2002 census data. **Proportion of women who deliver in hospitals**—based on the 2002 ENSMI.

(Petén, the most remote and difficult to reach, was not represented in the survey). The majority were working in urban areas, but an effort was made to include professionals who were familiar with the conditions related to abortion in rural areas and among indigenous women. Of the entire group, 30% had worked in rural areas for six months or longer and about one in seven worked primarily in rural areas; 51% felt they were knowledgeable about both indigenous and nonindigenous populations (7% felt knowledgeable about only the indigenous and 42% about only the nonindigenous population).

The Health Professionals Survey was designed to elicit the perceptions of knowledgeable key informants on various aspects of induced abortion in Guatemala. This survey provided the necessary information to calculate the "multiplier" factor, which is used to adjust the estimate of the number of women who have induced abortions to include those who experience no complications, those who do not seek medical care or do not obtain treatment in a formal medical facility, and those who die as a result of the abortion. The multiplier is based on a series of questions: the distribution of all women seeking abortion, according to type of provider; the probability that women would experience complications requiring medical care, according to type of provider; and the probability that women who have a complication will receive medical care from a health facility.

• *Data collection.* CIESAR organized and conducted the fieldwork for both surveys. The fieldwork staff consisted of 15 female physicians—three regional coordinators and 12 interviewers. Women were chosen to field the survey because they are believed to be better interviewers on abortion and to have better knowledge about unsafe abortion than men.

\*Although some women who experience spontaneous pregnancy loss at 12 or fewer weeks of gestation may seek medical care, many are likely to do so on an outpatient basis, and so relatively few will be hospitalized. Pregnancy losses at 23 or more weeks are not considered because they are usually classified as fetal deaths rather than spontaneous abortions.

Health professionals were chosen as interviewers because respondents are more willing to talk about abortion with their colleagues than with persons outside the profession.<sup>14</sup>

Field staff were organized into five teams. One regional coordinator managed the team for the Metropolitan region, which included four interviewers; the other two coordinators were each in charge of two teams, each of which consisted of two interviewers. In August 2003, all fieldwork personnel attended a three-day training workshop to become familiar with the study, the questionnaires and the instructions for implementing the fieldwork.

• *Adjustment for nonresponse.* Because we included the universe of all health facilities that provide postabortion care in Guatemala, the only weighting necessary was a minor adjustment to compensate for nonresponse. The weighting factor used for nonrespondents was the inverse of the ratio between the actual and expected number of interviews. Weighting factors for private hospitals were 1.012 for the Metropolitan region, 1.068 for the Central and Northeast regions, 1.105 for the Southwest and 1.052 for the Petén; factors for other regions were 1.000. Weights were applied to the data from interviewed health facilities to obtain estimates for the total of 183 facilities nationwide.

#### Estimating the Incidence of Induced Abortion

Following an approach used in prior studies,<sup>15</sup> we calculated the incidence of induced abortion by first estimating the annual number of women receiving treatment for abortion complications and then applying the multiplier, or inflation factor, that represents the proportion of women having an abortion who do not need treatment or do not obtain it at a health facility.

• *Women treated for abortion complications.* Using data from the Health Facilities Survey, we estimated that 27,014 Guatemalan women were treated for complications of spontaneous or induced abortion in 2003 (Table 1). Because complications of induced and spontaneous abortion often are similar, and because legal restrictions on induced abortion may lead to underreporting, it is difficult to correctly categorize postabortion cases according to the cause of pregnancy loss; we therefore used an indirect estimation approach to separate this total into complications of spontaneous and induced abortion.

We used available data on the biological pattern of all spontaneous abortions (unrelated to hospitalization), established by clinical studies,<sup>16</sup> to indirectly estimate the number of Guatemalan women who have miscarriages at 13–22 weeks' gestation; these women are assumed to require care at a health facility.\* Miscarriages at 13–22 weeks account for 2.9% of all recognized pregnancies, and live births for 84.8%; therefore, such miscarriages are equal to 3.4% of all live births. The number of births in Guatemala in 2003 was estimated using age-specific fertility rates from the 2002 ENSMI and estimates of the number of women in each five-year age-group, nationally and for each region from the 2002 census, the most recent sources for these types of data.<sup>17</sup> According to these calculations, an estimated 405,017 live

**TABLE 2. Measures of postabortion care and abortion morbidity, by facility ownership and region, 2003**

Measure	Total	Public	Private	Metro- politan	North	North- east	South- east	Central	South- west	North- west	Petén
<b>Availability of postabortion care</b>											
Total no. of facilities*	183	56	127	51	9	28	9	20	43	13	10
No. of facilities per 100,000 women aged 15–49	6.7	2.0	4.7	7.3	4.0	12.3	4.2	6.8	6.8	3.8	12.7
No. of beds in facilities per 100,000 women aged 15–49	279	207	72	395	184	363	217	312	234	169	331
% of facilities offering only inpatient care†	61	70	57	54	44	59	78	80	60	54	75
% of facilities offering vacuum aspiration procedure‡	30	54	20	27	25	30	11	35	34	39	38
<b>Annual no. of abortion complications per facility§</b>											
All facilities	148	365	52	175	127	79	227	150	158	158	86
Public sector	365	na	na	891	145	188	600	472	380	199	144
Private sector	52	na	na	60	72	36	40	43	58	66	32
<b>Annual abortion morbidity¶</b>											
<b>All</b>											
No. of complications treated in all facilities	27,014	20,460	6,553	8,844	1,014	2,237	2,040	3,000	7,112	2,058	709
Rate of complications treated in all facilities per 1,000 women aged 15–49	9.9	7.5	2.4	12.6	4.6	9.8	9.4	10.2	11.2	6.0	9.0
<b>Induced</b>											
No. of complications treated in all facilities	21,625	16,380**	5,243**	7,021	605	1,723	1,692	2,330	6,056	1,650	548
Rate of complications treated in all facilities per 1,000 women aged 15–49	8.0	na	na	10.0	2.7	7.6	7.8	7.9	9.6	4.8	7.0
<b>Total no. of women aged 15–49 (in 000s)</b>	<b>2,718</b>	<b>na</b>	<b>na</b>	<b>703</b>	<b>222</b>	<b>227</b>	<b>216</b>	<b>296</b>	<b>633</b>	<b>342</b>	<b>78</b>

\*All facilities provide treatment for abortion complications. †One hundred and eight facilities offer only inpatient care, of which 52 are located in two regions (27 in the Metropolitan region and 25 in the Southwest). The number of facilities in different regions varies between four and 27. ‡Fifty-three facilities offer vacuum aspiration, of which 13 are located in the Metropolitan region and 14 in the Southwest. The number of facilities in different regions varies between one and 14. §Includes spontaneous and induced abortion complications. \*\*Assuming that public facilities treat 76% of abortion complication patients (20,460/27,014= 75.7%) and private facilities the remaining 24% (6,553/27,014= 24.3%). Note: na=not applicable. Source: Total no. of women aged 15–49—reference 17.

births and 13,811 late spontaneous abortions occurred in 2003 in Guatemala.

A further adjustment was needed because only a certain proportion of women who need treatment for complications of late spontaneous abortion have access to a health facility. We assumed that this proportion was equivalent to the proportion of women giving birth who deliver in a hospital—39% in Guatemala.\*<sup>18</sup> We estimated that 5,389 women are treated in health facilities each year for complications of spontaneous abortion.† Therefore, 21,625 women are treated for complications of unsafe induced abortion each year in all public and private facilities.

• *Number of induced abortions.* To estimate the total number of abortions, we derived a national multiplier that represents the number of other induced abortions that occur for each woman who is hospitalized for treatment of induced abortion complications. This multiplier is a function of the degree of safety of abortion services and of access to hospital care. Where abortion services are safe and easily accessible, the multiplier is higher, because for every woman receiving treatment for unsafe induced abortion, there are many others who do not experience complications and so do not require or receive medical care. Likewise, the less safe and accessible abortion services are, the lower the multiplier, because more women have serious complications and require or receive treatment.

We derived the multiplier from information in the Health Professionals Survey. The reported proportions of women

obtaining abortions according to type of provider were multiplied by the proportion who would be expected to experience complications, for each provider type. The resulting overall proportion of women having abortions who experience a serious complication was then multiplied by the proportion who are likely to obtain care from a hospital. Because conditions vary greatly by socioeconomic status and place of residence, these questions were asked separately about each of four subgroups of women: urban poor and nonpoor, and rural poor and nonpoor. The preceding calculations were done for each subgroup, producing the proportion expected to be hospitalized for abortion complications. These proportions were weighted by the relative sizes of the four groups nationally to arrive at a multiplier for the country as a whole.

Because direct experience in treating women with abortion complications may influence key informants' perceptions, we estimated the multiplier for different groups of respondents: physicians (i.e., those directly involved in clin-

\*This proportion varied by region, and region-specific proportions were used in the calculations: 72% in the Metropolitan region, 25% in the North, 43% in the Northeast, 33% in the Southeast, 47% in the Central region, 31% in the Southwest, 20% in the Northwest and 31% in the Petén (source: reference 10)

†The number of women who are hospitalized was estimated to be 5,389 (13,811 x 39.02%). Information available on weeks of gestation of all postabortion patients from a study of 22 public hospitals (source: reference 3) was not used because these data are for both spontaneous and induced abortions, and because it is not known how representative the 22 facilities are of all 178 surveyed facilities that provide postabortion care in Guatemala.

**TABLE 3. Number of women aged 15–49 treated in a hospital for complications of induced abortion; and estimated number of induced abortions, by multiplier to account for women not treated for complications in a hospital; all according to region, 2003**

Region	No. of women treated	Estimated no. of induced abortions		
		2	3	4
<b>Total</b>	<b>21,625</b>	<b>43,349</b>	<b>64,974</b>	<b>86,599</b>
Metropolitan	7,021	14,073	21,094	28,114
North	605	1,213	1,818	2,424
Northeast	1,723	3,454	5,177	6,900
Southeast	1,692	3,392	5,084	6,776
Central	2,330	4,671	7,001	9,331
Southwest	6,056	12,139	18,195	24,251
Northwest	1,650	3,307	4,957	6,607
Petén	548	1,099	1,647	2,196

ical care) and those who are not physicians, and those who work primarily in the public sector (which receives the larger number of postabortion patients and the more severe cases) and those who work in the private sector. The results show that key informants who are physicians and those who work in the public sector perceive that the probability of medical complications is greater (resulting in lower multipliers) than do those who are not physicians and those who do not work in the public sector (multipliers of 2.47 and 2.26 vs. 3.00 and 3.13, respectively).<sup>19</sup> Those who are directly involved in clinical care are likely to be influenced by the acute and severe postabortion complications they treat; as a result, they may overstate the degree to which abortion service provision is unsafe and their estimate of the multiplier is likely to be low. In contrast, those informants who are somewhat removed from direct postabortion care are likely to provide a more comprehensive, representative and accurate perspective on the overall abortion situation. Therefore, we based the estimates of abortion in Guatemala on the multiplier of 3, reflecting the responses of the latter group of respondents.

Given the assumptions underlying our estimates of the total number of abortions in Guatemala, we calculated a range of estimates using multipliers of 2, 3 and 4, nationally and for each region. The middle set of results is believed to be the most accurate estimate. Because the multiplier depends on both the degree of safety of abortion services

**TABLE 4. Estimates of the abortion rate and the abortion ratio in 2003, by multiplier to account for women not treated in a hospital, according to region**

Region	Abortion rate			Abortion ratio		
	2	3	4	2	3	4
<b>Total</b>	<b>16</b>	<b>24</b>	<b>32</b>	<b>11</b>	<b>16</b>	<b>21</b>
Metropolitan	20	30	40	19	28	38
North	6	8	11	3	4	5
Northeast	15	23	30	10	15	20
Southeast	16	24	31	11	17	22
Central	16	24	32	11	17	23
Southwest	19	29	38	12	18	24
Northwest	10	15	19	6	8	11
Petén	14	21	28	7	11	14

Notes: The abortion rate is the number of induced abortions per 1,000 women aged 15–49 per year. The abortion ratio is the number of induced abortions per 100 live births.

and access to hospital care, the range of estimates for each region provides an indication of possible variation within regions based on their specific circumstances.

### Estimating Unintended Pregnancy

To estimate numbers and rates of unintended pregnancy, we first calculated the number of unplanned births by applying the proportion of births that are unplanned (mistimed or unwanted at the time of conception, from the 2002 ENSMI) to the estimated total annual number of live births. Combining this number with the number of induced abortions yielded an estimate of the number of unintended pregnancies for 2003. We then calculated the rate of unintended pregnancies per 1,000 women of reproductive age and the proportion of pregnancies that were unintended.

### Measuring Contraceptive Use and Unmet Need

We obtained the proportion of women using contraceptives from the 1995 DHS and the 2002 ENSMI. We look separately at modern methods (male and female sterilization, IUDs, pills, injectables, implants, condoms and spermicides) and traditional methods (periodic abstinence, withdrawal and country-specific methods, including lactational amenorrhea when it is mentioned). We present data for women who are married (legally or consensually) and for women who are unmarried but currently sexually active (defined as having had intercourse in the past three months). Using these two surveys, we also estimate unmet need for contraceptives among married women aged 15–49.

## RESULTS

### Provision of Postabortion Care

The 183 health facilities that treat postabortion complications are unevenly distributed across the country, being concentrated in the Southwest and Metropolitan regions (43 and 51 facilities, respectively—Table 2, page 139). The ratio of facilities per 100,000 women aged 15–49 also varies substantially across regions: The Northeast and Petén regions have 12–13 facilities per 100,000 women, whereas the ratio is much lower in the Metropolitan, Central and Southwest regions (seven facilities per 100,000), and even lower in the remaining three regions (four per 100,000). However, regions ranked differently on a more exact measure of availability of postabortion services, the number of beds per 100,000 women: The Metropolitan region has the best availability (395 beds per 100,000), followed by the Northeast, Central and Petén regions (312–363 beds per 100,000). The other four regions have poorer availability (169–234 beds per 100,000). The average annual number of abortion patients treated per site is highest in the Southeast region (227), somewhat lower in five regions (127–175), and much lower in the Northeast and Petén (79–86).

Of the 183 facilities that offer postabortion care, 69% are in the private sector and 31% are in the public sector (not shown). Although private facilities outnumber public facilities, the annual caseload of abortion complications per facility is seven times as high in public facilities as in private

ones (365 vs. 52 patients). The public sector treats 76% of all postabortion patients, and has 74% of all hospital beds. Six in 10 of all facilities provide only inpatient postabortion care; most of the others provide both inpatient and outpatient care. Nearly a third of all facilities offer the vacuum aspiration procedure, but half of public facilities do so, compared with only a fifth of private facilities. Almost all facilities use the D&C (dilation and curettage) procedure.

### Abortion Morbidity

A total of 27,014 women of reproductive age received postabortion care (including treatment for both spontaneous and induced abortions) in health facilities in Guatemala in 2003. Nationally, the annual rate of abortion complications treated at formal health facilities was 10 per 1,000 women; the rate was higher in the Metropolitan region (13 per 1,000), much lower in the North and Northwest (5–6 per 1,000), and moderate in the five remaining regions (9–11 per 1,000).

Subtracting the estimated number of women treated for spontaneous abortion complications from the total number treated leaves 21,625 women who were treated for complications from induced abortions. This means that eight out of every 1,000 women of reproductive age were hospitalized for complications of unsafe abortions each year. Morbidity from unsafe abortion treated at health facilities was somewhat higher than average in the Metropolitan and Southwest regions (10 per 1,000 women), about average in the Northeast, Southeast, Central and Petén regions, and lower than average in the North and Northwest regions (3–5 per 1,000).

According to the Health Professionals Survey, about two-thirds of abortions among relatively well-off urban women are performed by trained health professionals, such as physicians, nurses or midwives (not shown); however, only about four in 10 abortions among nonpoor women in rural areas are thought to be performed by professionals, and about the same proportion are done by less safe providers, particularly traditional birth attendants or *comadronas tradicionales*.<sup>20</sup> Poor women (living in either urban or rural areas) and indigenous women have a similar distribution according to type of abortion provider.\* These disadvantaged groups are considered to obtain abortions primarily from birth attendants (49–63%), with only 15% or fewer going to each of the two categories of more highly trained providers (physicians and trained nurses or midwives); small proportions of these women go to pharmacists or self-induce. However, complications may result from procedures carried out by trained providers who have little experience or who work in unhygienic settings. In addition, a substantial proportion of abortions in all subgroups of women entail a high risk of complications because they are carried out by untrained providers (traditional healers, lay practitioners, pharmacists or the women themselves).

\*Fifty-four percent of Guatemala's people live in rural areas, and 41% are indigenous (source: reference 17).

### Abortion Incidence

Almost 65,000 induced abortions are estimated to have occurred in Guatemala in 2003 (Table 3). This is the medium estimate in a range that extends from 43,000 to 87,000 (using multipliers of 2, 3 and 4). The medium estimate indicates that, on average, one woman is hospitalized for every three who obtain induced abortions. We consider this estimate to be the best approximation of the number of induced abortions.

The estimated national abortion rate in 2003 is 24 induced abortions per 1,000 women aged 15–49 (based on the medium multiplier of 3—Table 4); the low estimate is 16 per 1,000 and the high estimate is 32 per 1,000 (based on multipliers of 2 and 4, respectively). Rates are higher than average in the Metropolitan and Southwest regions (29–30 per 1,000, based on a multiplier of 3), followed by the Northeast, Southeast, Central and Petén regions (21–24 per 1,000). The North and Northwest regions have substantially lower rates (8–15 per 1,000).

The abortion ratio is estimated to fall between 11 and 21 abortions per 100 live births, with a medium value of 16 per 100 births. This means that in Guatemala as a whole and in four regions with average rates (Northeast, Southeast, Central and Southwest), about one pregnancy is interrupted by an induced abortion for every six that result in a birth. In the Metropolitan region, however, there is one induced abortion for every four births. The lowest abortion ratios are found in the North, Northwest and Petén regions, where about one or fewer abortions occur for every 10 births.

### Abortion in the Context of Unintended Pregnancy

To understand the context in which induced abortion occurs in Guatemala, it is important to examine the planning status of recent births. Although the overall proportion of unplanned births (mistimed or unwanted at the time of conception) has remained the same from 1995 to 2002 (28–29%—Table 5), rates have increased by 15–16% in three regions (North, Central and Southwest), and decreased by 13% and 27% in two regions (Southeast and Metropolitan, respectively).

Each year, an estimated 557,000 pregnancies occur in

**TABLE 5. Percentage of live births that were unwanted, mistimed and unplanned at the time the woman became pregnant, by year, according to region**

Region	Unwanted		Mistimed		Unplanned	
	1995	2002	1995	2002	1995	2002
<b>Total</b>	<b>11</b>	<b>14</b>	<b>18</b>	<b>14</b>	<b>29</b>	<b>28</b>
Metropolitan	15	11	22	16	37	27
North	12	16	15	16	27	32
Northeast	15	17	16	13	31	30
Southeast	15	16	21	16	36	32
Central	9	15	21	21	30	36
Southwest	8	14	15	13	23	27
Northwest	7	10	12	8	19	18
Petén	na	19	na	9	na	29

Notes: Unplanned births are the sum of unwanted and mistimed births. Percentages are based on live births in the five years before interview. The Petén region was not included in the 1995 DHS. na=not available.

**TABLE 6. Estimates of number of pregnancies, unintended pregnancy rate, percentage of pregnancies that were unintended and pregnancy rate, according to region, 2003**

Region	No. of pregnancies	Unintended pregnancy rate*	% of pregnancies that were unintended	Pregnancy rate†
<b>Total</b>	<b>557,492</b>	<b>66</b>	<b>32</b>	<b>205</b>
Metropolitan	112,451	59	37	160
North	58,640	77	29	264
Northeast	48,258	70	33	212
Southeast	42,353	68	35	196
Central	57,546	75	38	195
Southwest	141,093	72	32	223
Northwest	76,916	46	21	225
Petén	20,234	77	30	258

\*Number of unintended pregnancies (unplanned births + abortions) per 1,000 women aged 15–49 per year.  
 †Number of pregnancies (live births + induced abortions + spontaneous abortions) per 1,000 women aged 15–49 per year. Spontaneous pregnancy loss was estimated using a formula based on the biological pattern of pregnancy loss: 10% of abortions and 20% of live births. Notes: Age-specific fertility rates and the planning status of births obtained from the 2002 ENSMI were assumed to apply to 2003; population estimates for 2003 were based on the 2002 census.

Guatemala (Table 6); 12% end as induced abortions, 16% as spontaneous abortions and the remaining 72% as births (not shown). The wide range in number of pregnancies among regions reflects variations in both population sizes and pregnancy rates.

Nationally, 66 unintended pregnancies occurred per 1,000 women in 2003, and one-third of all pregnancies were unintended. All but two regions had higher-than-average unintended pregnancy rates (68–77 per 1,000). The Northwest region had a noticeably lower than average unintended pregnancy rate (46 per 1,000), as well as the lowest proportion of unintended pregnancies (21%). The Metropolitan region had a somewhat lower than average unintended pregnancy rate (59 per 1,000), but a higher-than-average percentage of unintended pregnancies (37%), presumably reflecting both its higher levels of contraceptive use and its more educated population, which is likely to be more motivated to achieve fertility preferences.

Overall, 205 pregnancies occurred per 1,000 women aged 15–49 in 2003. The pregnancy rate varied substantially across regions, being lowest in the Metropolitan region (160 per 1,000) and highest in the Petén and North regions (258 and 264 per 1,000, respectively).

## DISCUSSION

The abortion rate in Guatemala—24 per 1,000 women of reproductive age—is similar to the WHO estimated rate for Central America.<sup>21</sup> However, although the overall rate in Guatemala is substantially lower than that of Latin America in 2000 (34 per 1,000 women),<sup>22</sup> the two most populous regions of the country—the Metropolitan and Southwest regions—have abortion rates closer to the WHO Latin America regional estimate for 2000 and to rates that prevailed in some Latin American countries around 1990.<sup>23</sup>

Several decades ago, the conditions of abortion provision in Latin America were considered to be very unsafe: A 1965 Chilean study estimated that one in three abortions resulted in serious complications that required hospitalization.<sup>24</sup> The same level of risk was estimated for Guatemala

in 2003, suggesting that abortion provision in this country is also very unsafe, more so than in other Latin American nations in recent years: Estimates for six countries in the early 1990s found that about one in five abortions resulted in a complication that was treated at a hospital.<sup>25</sup> Further evidence of unsafe abortion services in Guatemala is the high annual rate of hospitalization for complications (eight per 1,000 women). The burden of postabortion care falls primarily on the public sector, which treated three in four of the almost 22,000 women who were hospitalized with induced abortion complications in 2003.

Demographic factors—particularly preferences for family size and timing of births, as well as contraceptive use patterns—may explain the variation in abortion rates across the country. The Metropolitan region, which has a higher-than-average abortion rate (30 per 1,000), also has the highest rate of contraceptive use (60%), the lowest rate of unmet need for contraceptives (18%), and a small gap between actual and wanted family size (3.2 vs. 2.8).<sup>26</sup> This region also has a lower-than-average unintended pregnancy rate, but a higher-than-average proportion of unintended pregnancies that end in abortion (51% vs. 10–40% in other regions). Education could be a factor in this elevated rate, because the more educated a woman is, the higher her motivation to terminate an unintended pregnancy and the greater her access to services. In the Metropolitan region, 52% of women aged 15–49 have secondary or higher education, whereas this proportion in the other regions is 21% or lower.<sup>27</sup> In the Southwest region, where the abortion rate is also higher than average (29 per 1,000), other likely factors are found: Contraceptive use is lower than average (36%), the proportion of women with unmet need is among the highest in the country (34%), and the gap between actual and wanted family size (5.0 vs. 4.2) is wider than in the Metropolitan region. In the North and Northwest regions, both actual and desired fertility rates are much higher than the average; abortion rates are low (eight and 15 per 1,000 women, respectively), as is contraceptive use (32% and 27%, respectively).<sup>28</sup>

Nationally, women are having smaller families, which declined from an average of 5.6 children in 1987 to 4.4 children in 2002.<sup>29</sup> At the same time, desired family size also declined, from 4.9 to 3.7, and the gap between the number of children women are actually having and the number they want continues to be substantial. The estimated number of pregnancies ending in abortion (one in eight) and the high level of unintended pregnancy (32%) indicate that unmet need for contraceptive services in Guatemala is likely to be high. Other evidence indicates that unmet need for effective contraception in all regions of the country increased between 1987 and 2002. In 1987, about one in five married women aged 15–49 did not want a child soon or at all but were not using a contraceptive method (19%); this proportion increased to 24% in 1995 and 28% in 2002.<sup>30</sup> In the Metropolitan and Central regions, unmet need increased by 20% or less over the same period, but in the remaining regions it increased by 36–45%.

The relatively low use of contraceptives in Guatemala may be attributed to a number of factors: lack of knowledge of birth control methods and of sources for services, and barriers related to ethnicity, poverty and access to health services. In 2002, 45% of all women did not know of any contraceptive method.\*<sup>31</sup> The lack of knowledge was higher in rural areas (56%), among indigenous women (66%), and in the Northwest, North and Southwest regions (78%, 57% and 52%, respectively). These high levels of inadequate knowledge are likely related to the government's longstanding resistance to providing family planning in public health facilities.<sup>32</sup> Although the government recently approved a family planning law that guarantees universal, equitable access to voluntary family planning methods and adequate sex education, there is still strong opposition from religious and conservative groups to implementation of the law.<sup>33</sup>

Extreme poverty is another barrier that makes access to contraceptives and health facilities more difficult. More than half of Guatemalan families live below the poverty line (56%, including 16% who cannot afford a basic basket of food), and poverty is even higher in the indigenous population (76% and 27%, respectively).<sup>34</sup> In addition, public health facilities tend to be underutilized due to the poor quality of services. People who can afford to often prefer to use private facilities, and the poorest frequently rely on care from members of their household or on self-medication.<sup>35</sup> Considering that 41% of the Guatemalan population is of Mayan descent, family planning education campaigns should take into account Mayan values and beliefs. Furthermore, since Guatemala is still a predominantly rural country (54% of its people live in rural areas), there is a great need to improve the availability of and access to contraceptive services, as well as the quality of services in these areas.

### Limitations

Documenting the incidence of abortion is very difficult in countries where abortion is highly restricted by law and where official data may not exist or may be incomplete. Researchers have developed indirect estimation methodologies in response to the need for such estimates.<sup>36</sup> Although the present methodology has been widely used and tested in several countries over the past 15 years, it relies on a number of assumptions, as outlined earlier. Because women often underreport their use of abortion services, we rely on the perceptions of health professionals who are knowledgeable about abortion service provision to estimate the proportion of all women having abortions who will be hospitalized for treatment of complications. We selected key informants who have a broad range of experience and who are familiar with the context of abortion in rural and urban areas; information was obtained on differences according to poverty level and ethnicity to improve the estimates.

We also depend on senior hospital officials to estimate

the number of women treated at their facility for postabortion complications in the past month and in an average month. Their estimates are likely to be approximate, but are unlikely to be biased overall. Comparison with a surveillance program in 22 public hospitals provides some support for this study's estimates of the number of women treated for postabortion complications.<sup>37</sup> The surveillance program covered an 18-month period (July 2003 to December 2004), while our estimate was for the 12 months of 2003. After adjustments to have a comparable 12-month period, the number of incomplete abortions reported in our study was similar—only 17% higher than the number reported in the surveillance study. Several factors might explain this difference. The surveillance program extracted information from medical records on patients who had been diagnosed as having or probably having an incomplete abortion, whereas we asked key informants at each hospital to estimate the number of inpatients and outpatients treated for abortion complications. Furthermore, the different calendar periods covered may result in some differences in number of patients. In addition, despite efforts to minimize underregistration in the surveillance study, some cases may have been missed, particularly outpatients. In contrast, our facilities survey specifically asked about postabortion treatment provided on an outpatient basis.

### Conclusions

New estimates of the incidence of unintended pregnancy in Guatemala should help to raise awareness among policymakers and program managers of the difficulty that women and couples are having in planning pregnancies and births. These estimates highlight the inadequate access to contraceptive information and services. The increase between 1987 and 2002 in the proportion of married women who have an unmet need for contraception further indicates that provision of family planning services is falling increasingly behind the demand as the motivation to have smaller families continues to grow. National and regional estimates of the incidence of abortion and abortion morbidity, now available for the first time, provide evidence that unsafe abortion is occurring in all parts of the country and is having a substantial impact on women's health.

There is a critical need for a comprehensive and coordinated effort to assist the large numbers of women who want smaller families and want to space births, but who are not practicing contraception and are therefore at high risk of unintended pregnancy and unsafe abortion. The variation in fertility preferences across regions, as well as in the incidence of unintended pregnancy and abortion, suggests that informed and innovative policies and programs are needed. Governmental responses must also address the special needs of poor, rural and indigenous women and couples.

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## RESUMEN

**Contexto:** Si bien la ley guatemalteca sólo permite la práctica del aborto inducido para salvar la vida de la mujer, muchas mujeres con embarazos no planeados se someten a abortos, con frecuencia en condiciones de riesgo. Aunque no existen datos a nivel nacional sobre la incidencia de este procedimiento, estudios recientes indican que los abortos practicados en condiciones de riesgo son un factor clave que contribuye a la morbilidad y mortalidad materna en ese país.

**Métodos:** En 2003 se realizaron encuestas en todos los hospitales que tratan mujeres con complicaciones postaborto y a 74 profesionales que tienen conocimientos acerca de las condiciones en que se practican los abortos en Guatemala. Se utilizaron técnicas indirectas de estimación para calcular el número de abortos inducidos realizados anualmente. Se calcularon las tasas y razones de abortos, y el nivel de embarazos no planeados correspondientes a todo el país y a cada una de sus ocho regiones.

**Resultados:** En Guatemala, se realizan casi 65.000 abortos inducidos por año y aproximadamente 21.600 mujeres son hospitalizadas para tratamiento de complicaciones postaborto. Se realizan 24 abortos por cada 1.000 mujeres de 15-49 años de edad, y ocurre un aborto por cada seis nacimientos. La tasa de abortos es más elevada que el promedio en la región Sur-Occidente (una región relativamente menos desarrollada, cuya población es en su mayoría indígena) y en la región Metropolitana (la región más urbanizada, con una población en su mayoría no indígena) (29-30 por cada 1.000 mujeres). Más de la cuarta parte de todos los nacimientos no son planeados; al combinar los nacimientos no planeados con los abortos inducidos se concluye que aproximadamente el 32% de los embarazos en Guatemala no son planeados, y la tasa de embarazos no planeados es de 66 por cada 1.000 mujeres.

**Conclusiones:** El aborto practicado en condiciones de riesgo tiene un impacto significativo en la salud de la mujer en Guatemala. Es necesario contar con programas gubernamentales integrales, los cuales prestan particular atención en las diferencias regionales, para abordar el embarazo no planeado y el aborto en condiciones de riesgo.

#### RÉSUMÉ

**Contexte:** Malgré la restriction de la législation guatémaltèque sur l'avortement aux seuls cas où la vie de la femme est en danger, beaucoup de femmes se font avorter, dans des conditions souvent non médicalisées et en réponse à une grossesse non planifiée. De récentes études indiquent que l'avortement non médicalisé constitue un facteur clé de morbidité et mortalité maternelle dans le pays. Il n'existe cependant pas de données nationales sur l'incidence de l'avortement.

**Méthodes:** Une étude de tous les hôpitaux traitant les complications de l'avortement et une enquête auprès de 74 professionnels au courant des conditions de l'avortement au Guatemala ont été menées en 2003. Les techniques d'estimation indirecte ont permis de calculer le nombre d'avortements pratiqués chaque année. Le taux et rapport d'avortement et le taux de grossesse non planifiée ont été calculés pour le pays et ses huit régions.

**Résultats:** Près de 65.000 avortements sont pratiqués chaque année au Guatemala et quelque 21.600 femmes sont hospitalisées pour le traitement de complications. L'avortement se pra-

tique à un taux de 24 pour mille femmes âgées de 15 à 49 ans; l'avortement se calcule à un pour six naissances. Le taux d'avortement est supérieur à la moyenne dans le sud-ouest (moins développé, abritant principalement une population indigène) et dans les régions métropolitaines (plus développées, habitées surtout par les populations non indigènes) (29-30 pour mille femmes). Plus de 25% des naissances ne sont pas planifiées. La combinaison des naissances non planifiées et des avortements donne à penser que 32% des grossesses survenant au Guatemala ne sont pas planifiées, soit un taux de grossesse non planifiée de 66 pour mille femmes.

**Conclusions:** L'avortement non médicalisé produit un impact significatif sur la santé des femmes au Guatemala. Il serait nécessaire d'entreprendre des programmes d'État globaux visant les problèmes de grossesse non planifiée et de l'avortement non médicalisé et tenant compte des différences régionales.

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# Internal Migration and Contraceptive Knowledge And Use in Guatemala

By David P. Lindstrom and Coralia Herrera Hernández

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**CONTEXT:** Levels of modern contraceptive knowledge and use among people living in rural areas of Guatemala differ substantially from those of people living in urban areas. Understanding the pace and extent of rural-to-urban migrants' adoption of urban contraceptive practices is important in determining if there is a strong need for migrant-focused reproductive health programs.

**METHODS:** Bivariate and multivariate analyses of data on 971 married male and female respondents in the 1999 Guatemalan Migration and Reproductive Health Survey were used to examine how migration status and duration of residence in an urban area are associated with knowledge of modern contraceptive methods and current contraceptive use.

**RESULTS:** Migrants' contraceptive knowledge was positively associated with the number of years they had lived in an urban area. Mayan migrants in Guatemala City did not accumulate contraceptive knowledge at the same rate as non-Mayan migrants, perhaps due to cultural and linguistic barriers to obtaining knowledge of and access to contraceptives. Rural-to-urban migrants eventually achieve a level of modern contraceptive use slightly below that of urban nonmigrants, with the level of contraceptive knowledge being an important factor associated with use of modern methods.

**CONCLUSIONS:** Migrants possess limited knowledge of modern contraceptive methods and, therefore, may experience unmet need for contraception or may have a limited choice of modern contraceptive methods during their first years in an urban destination. Programs designed to raise contraceptive awareness and use should target recent migrants—particularly indigenous Mayans—in urban areas.

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Guatemala is a predominantly rural country with among the lowest levels of awareness and use of modern contraceptives, and one of the highest levels of fertility, in Latin America. Rural-urban differences in contraceptive use and total fertility are substantial: Twenty-six percent of rural women aged 15–49 use a modern contraceptive method, compared with 47% of urban women, and the total fertility rate in rural areas is 5.2 children per woman, compared with 3.4 in urban areas.<sup>1</sup>

Guatemala is also an ethnically divided country. Indigenous Mayans constitute approximately half of the population, with Ladinos—people of mixed European and indigenous ancestry—making up the other half. The Mayan population consistently scores below the Ladino population on common indicators of socioeconomic well-being and health. Mayans have particularly low levels of awareness and use of modern contraceptives: Of married women aged 15–49, 17% of Mayans use a modern method, compared with 43% of Ladinos.<sup>2</sup> Cultural and linguistic factors are the principal barriers to contraceptive use in the indigenous population, although access is also a problem in the more remote areas of the country.<sup>3</sup>

Migration from rural areas into towns and cities is slow but steadily shifting the rural-urban balance of the pop-

ulation, giving Guatemala Latin America's highest projected rate of urban growth. It is projected that by 2015, more than 50% of Guatemala's population will live in urban areas.<sup>4</sup> Given the substantial differences in rural and urban fertility practices, the gradual redistribution of the population from rural to urban areas could have an important effect on the future rate of population growth.

In this study, we use survey data to examine the pace at which and extent to which individuals who migrate from rural to urban areas of Guatemala attain urban levels of modern contraceptive knowledge and use. Also, we explore whether the relationship between migration experience and contraceptive knowledge and use differs between Mayans and Ladinos.

## BACKGROUND

The fertility behavior of rural-to-urban migrants in urbanizing countries has been extensively studied by demographers because of its potential to accelerate the rate of population growth in urban areas.<sup>5</sup> In addition, studies have examined migrant reproductive health and health services utilization in destination areas.<sup>6</sup> Contraceptive awareness and use among migrants, however, has not been well studied, even though it is a key determinant of fertility and re-

productive health.<sup>7</sup> This lack of attention is due, in part, to the relative scarcity of surveys that collect both detailed migration histories and data on contraceptive knowledge and use. For example, the 2002 Guatemalan National Survey of Maternal and Infant Health does not include any questions on migration, and the 1995 and 1998–1999 versions of the same survey record place of birth, but not duration of stay in current place of residence.<sup>8</sup>

Migrants' contraceptive awareness and use has relevance not only for the pace of fertility change in urban areas, but also for the pace of fertility change in rural places of origin and for the spread of STIs, including HIV. The pace at which migrants from rural areas acquire contraceptive knowledge and experience in their urban destinations clearly affects their ability to control their fertility in response to the new opportunities and constraints they encounter. In addition, migrant populations are often considered to be an important vector for the spread of HIV.<sup>9</sup> Finally, because rural-to-urban migrants often remain in close contact with nonmigrant family and friends, they can play a role in the diffusion of urban contraceptive knowledge and fertility practices to their rural communities of origin.<sup>10</sup> For example, in an analysis of health survey data collected in rural Guatemala, having kin who had migrated to urban areas or to other countries was associated with greater contraceptive knowledge and a greater likelihood of modern method use.<sup>11</sup>

Rural-to-urban migration can affect modern contraceptive knowledge and use through changes in both supply and demand for contraceptives. Urban areas provide greater exposure to information about family planning through print and broadcast media, and they provide a greater range and supply of family planning services and distribution outlets than rural areas. Migrants to urban areas, however, do not immediately have improved access to information and services, but rather accumulate knowledge over time as they learn more about their new environment and expand their range of social contacts. Therefore, we would expect a migrant's level of contraceptive knowledge to increase with length of stay in an urban area.

Migration also entails a change in the social and economic context of family life that affects the desire for additional children and the demand for contraceptive methods and services. In moving to towns and cities, migrants from rural areas—especially women—encounter increased family maintenance costs, increased access to education, a wider array of consumer goods and more widespread income opportunities. The constraints on family size imposed by the higher costs of raising children and the opportunity costs that occur if women forgo earning wages to raise large families are encountered by migrant couples from the time of arrival, or in the case of single migrants, at the outset of family formation. Because contraceptive learning may lag behind the demand for birth control, migrants may experience a period of unmet contraceptive need, or adopt an unsuitable method because they must choose from the limited set of contraceptive options with which they are familiar. With time, we expect the urban context of contraceptive supply

and demand to produce levels of modern contraceptive knowledge and use among rural-to-urban migrants higher than those of rural nonmigrants, and similar to those of their nonmigrant urban neighbors. A strong relationship between contraceptive use and duration of stay in urban areas is consistent with a gradual process of migrant adaptation.

In examining the relationship between rural-to-urban migration and contraceptive knowledge and use, we need to consider the possibility of selectivity. Migrants are not randomly drawn from the populations in which they originally live, but rather are often selected for attributes that are associated with desired family size and contraceptive use. This positive selection may occur according to observable characteristics such as age and education, as well as unobserved characteristics such as mobility aspirations, tolerance for risk and openness to innovation. In our analysis, we control for social and demographic characteristics that are important predictors of fertility intentions and contraceptive awareness and use, and we include a dummy variable for migration status to control for migrant selectivity along unobserved characteristics. Findings of significantly higher contraceptive knowledge and use among migrants compared with rural nonmigrants, along with weak or insignificant duration effects, would be consistent with positive migrant selectivity.

## **METHODS**

### **Data**

The data for this study come from the 1999 Guatemalan Migration and Reproductive Health Survey, which was part of a four-nation comparative study on internal migration designed to identify the impact of rural-to-urban migration experience on change in women's reproductive behavior and health status. The survey used household and individual questionnaires to collect detailed data on migration and reproductive health in 24 purposively selected locations in Guatemala, including the Guatemala City metropolitan area, Quetzaltenango, and selected towns and villages (Table 1, page 148). In Guatemala City and Quetzaltenango, selected neighborhoods were sampled, whereas in the towns and villages, the entire population was sampled.

The areas were chosen to provide a diversity of migrant places of origin and destination, with different ethnic compositions and development levels. The Guatemala City metropolitan area has more than two million inhabitants and is by far the most important destination for urban-bound migrants from rural areas. The seven neighborhoods included in the study range from very poor to middle class, and encompass different stages of migrant settlement, from recently arrived migrants to well-established migrants. Quetzaltenango, the country's second largest city, is also a major destination for migrants from the predominantly indigenous western highland area of the country; households were sampled from the central zone of the city, which has an ethnically and socially diverse population. Five towns from three areas of the country were selected because they are migrant destinations for local rural populations, as well as

**TABLE 1. Sample areas and sample sizes, Guatemalan Migration and Reproductive Health Survey, 1999**

Sample location	Population	No. of households sampled	No. of respondents in analysis
<b>Metropolitan area</b>			
Guatemala City (7 neighborhoods)	>2 million	447	223
<b>Small city</b>			
Quetzaltenango (central zone)	100,000	312	147
<b>Towns</b>			
Santa Rosa (3 towns)	5,000–15,000	272	135
Zacapa	5,000–15,000	250	109
Santa Cruz de Quiché	5,000–15,000	163	95
<b>Rural communities</b>			
Santa Rosa (2 villages)	100–500	114	57
Zacapa (3 villages)	100–500	164	76
Quiché (6 villages)	100–500	221	129
Total	na	1,943	971

Note: na=not applicable.

important sources of migrants for Guatemala City. Three towns were selected from the department of Santa Rosa, which is located on the Pacific coast and is an important zone of commercial agriculture. The towns of Zacapa and Santa Cruz de Quiché are important regional markets and administrative centers, located in the predominantly Spanish-speaking northeast and the western highlands, respectively. Finally, 11 villages and hamlets were selected: one village near each of two towns in Santa Rosa, three villages near Zacapa and six villages near Santa Cruz de Quiché.

Work in each location began with the construction of a sampling frame based on a street-by-street enumeration of all residences. Listed residences were numbered and randomly selected for interviewing. Bilingual (Spanish-Mayan Kich'è) interviewers were used in the study areas populated predominantly by indigenous Mayan speakers. For each selected residence, the interviewer collected a complete migration history for the head of the household; in households headed by couples, interviewers randomly selected either

the husband or the wife. In addition to the migration histories, the study collected information on contraceptive knowledge, current contraceptive use, and household and social background characteristics. The sample consisted of 1,943 households, with an approximate balance of individual interviews with currently married men and women.

A weakness of the sample is that it did not include remote rural communities, although migrants from these places who were residing in urban areas were included in the sampled urban areas.\* Overall, the sample is under-representative of rural areas: Roughly two-thirds of all households in Guatemala are in rural areas, compared with around one-quarter of the households in the sample. Because contraceptive knowledge and use are lowest in rural areas, especially in remote rural areas, we are likely to underestimate the full effect of the urban migration experience on increasing migrant contraceptive knowledge and use beyond the levels of rural nonmigrants. The survey does not include weights, nor do we attempt to develop weights to adjust for the oversampling of urban areas.

### Analysis

For our analysis, we used data collected from currently married women aged 15–49 and from men currently married to women aged 15–49;† 972 households were excluded due to our age and marital criteria. In 97 households, both the husband and the wife were interviewed; in those cases, we randomly excluded one of the marital partners from the analytic sample. Thus, from the 1,943 households, we used data from 971 married women and men.

Whether the sample is representative of the overall population is always an issue for studies based on purposively selected communities. As we mentioned above, our sample overrepresents urban areas. For comparison purposes, we present the distribution of current contraceptive use in rural and urban areas for the married men and women in our sample and for married women from the 1998–1999 Guatemalan National Survey of Maternal and Infant Health (Table 2). The levels of use of specific methods in rural and urban areas in our sample are remarkably close to those in the Guatemalan National Survey sample. The one exception is female sterilization, which is less prevalent in our sample. One possible explanation for this difference is that married men underreport their wife's sterilization as a current contraceptive method. Because we include place of residence as a variable in our regression models, we are likely to minimize any bias in our estimates due to the undersampling of rural areas by the Guatemalan Migration and Reproductive Health Survey.

We used information from the migration histories to divide the sample into three groups by migration status: rural nonmigrants, rural-to-urban migrants and urban nonmigrants. Rural nonmigrants include women and men na-

**TABLE 2. Percentage distribution of married women aged 15–49, by modern contraceptive method currently used, according to survey and rural or urban residence**

Modern method	1999 Migration and Reproductive Health Survey		1998–1999 National Survey of Maternal and Infant Health	
	Rural (N=262)	Urban (N=709)	Rural (N=2,271)	Urban (N=1,693)
None	80.5	59.5	78.6	56.5
Pill	5.0	7.2	2.9	7.8
IUD	1.1	5.4	1.0	3.7
Injectable	3.4	7.1	3.3	4.6
Condom	1.9	2.7	1.7	3.1
Female sterilization	7.0	16.1	12.2	22.7
Male sterilization	1.1	1.4	0.3	1.5
Other	0.0	0.6	0.0	0.1
Total	100.0	100.0	100.0	100.0

\*We define places with 2,500 inhabitants or more as urban.

†In this article, we treat consensual and formal unions as marriages, and include a dummy variable for union type in our regression models.

tive to the rural area in which they live (rural natives), those who have moved from other rural areas (rural-to-rural migrants) and those who have lived in other areas but returned to their rural place of origin (rural-return migrants). Rural-to-urban migrants are individuals born in rural places residing in urban areas at the time of the survey. Urban nonmigrants include those native to the urban area in which they live (urban natives), those who have moved from other urban areas (urban-to-urban migrants) and those who have lived in other areas but returned to their urban place of origin (urban-return migrants).

Our two dependent variables of interest are knowledge and current use of modern contraceptive methods. First, we estimated a negative binomial regression model\* to examine the determinants of knowledge about modern contraceptives in our sample. Then, we excluded from the sample women who were pregnant at the time of the survey and men married to such women, and estimated a logistic regression model to identify the factors associated with current contraceptive use. In each case, we began with a simple model that included only migration variables, to formally test for significant bivariate differences in contraceptive knowledge and contraceptive use by place of residence and migration status. Then, we added variables for social and demographic characteristics (ethnicity, age, age-squared,† gender, education, working status of the woman or wife, union status and the number of surviving children), duration of stay in an urban area and other measures to the models, to examine the pace of contraceptive learning and migrant adaptation, controlling for migrant selectivity.

In an analysis of migration and contraceptive use based on Demographic Health Survey data from 14 African countries, contraceptive use among rural-to-urban migrants rose sharply in the second and third years after moving to the city.<sup>12</sup> Thus, we included variables to measure the association between duration of stay in an urban area and current contraceptive use. Ideally, we would have used a series of dummy variables corresponding to relatively short intervals, but because of our small sample size, we used two dummy variables corresponding to recent migrants (1–5 years) and settled migrants (six or more years). If migrants to Guatemala City are positively selected for modern contraceptive use, then we would expect little difference between recent and settled migrants, net of other effects. On the other hand, if migrants gradually adjust to urban conditions and adopt modern contraceptive methods at a slower pace, then we would expect the odds ratio for settled migrants to be substantially larger than the odds ratio for recent migrants.

## RESULTS

There were substantial differences in the characteristics of the three migration groups (Table 3). Slightly more than half (52%) of rural nonmigrants were Mayan, compared with one-quarter of rural-to-urban migrants and urban nonmigrants (26% and 25%, respectively). Some 55% of rural nonmigrants had no schooling, compared with 25% of

**TABLE 3. Selected characteristics of currently married women and men aged 15–49, by migration status**

Characteristic	Rural nonmigrant (N=262)	Rural-urban migrant (N=140)	Urban nonmigrant (N=569)
<b>% distributions</b>			
<b>Gender</b>			
Male	55.0	55.7	46.9
Female	45.0	44.3	53.1
<b>Ethnicity</b>			
Mayan	51.5	25.7	25.3
Ladino	48.5	74.3	74.7
<b>Education</b>			
None	55.3	25.1	6.2
Primary	26.7	41.4	27.6
Secondary	8.8	12.1	24.6
Postsecondary	9.2	21.4	41.6
<b>Woman/wife works</b>			
Yes	21.8	32.1	25.0
No	78.2	67.9	75.0
<b>Union type</b>			
Formal	70.6	61.4	72.1
Consensual	29.4	38.6	27.9
<b>No. of surviving children</b>			
0	5.3	7.1	4.7
1–4	58.7	69.3	69.3
≥5	36.0	23.6	26.0
<b>Age at migration</b>			
0–11	na	36.4	na
12–19	na	22.2	na
≥20	na	41.4	na
<b>Currently using a modern method</b>			
Yes	19.5	35.7	41.5
No	80.5	64.3	58.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Means</b>			
Age	34.7	35.5	36.7
No. of modern methods known	0.7	1.7	1.4

Note: na=not applicable.

rural-to-urban migrants and 6% of urban nonmigrants; at the other extreme, 42% of urban nonmigrants reported postsecondary education, compared with 21% of rural-to-urban migrants and 9% of rural nonmigrants. Women's participation in the labor force was greatest among rural-to-urban migrants: Thirty-two percent of migrant women and the wives of migrant men worked outside of the home or in a family business, compared with 25% of urban nonmigrants and 22% of rural nonmigrants. Also, the proportion of respondents in consensual unions was higher among rural-to-urban migrants than among rural and urban nonmigrants. Approximately one-fourth of rural-to-urban migrants and urban nonmigrants had five or more surviving children, compared with about one-third of rural nonmigrants. Among rural-to-urban migrants, 64% had first moved to an urban location when they were adolescents

\*Negative binomial regression is appropriate for modeling count data in which the variance is greater than the mean, a condition known as overdispersion (source: Cameron AC and Trivedi PK, *Regression Analysis of Count Data*, Cambridge, UK: Cambridge University Press, 1998).

†We included age-squared to allow the underlying rate of contraceptive learning to decline as women age and reach the end of their reproductive age span. In preliminary contraceptive use models, the age-squared term was not significant. We excluded it from the final models and used a simple linear term to control for age differences in contraceptive use.

**TABLE 4. Beta coefficients from negative binomial regression models estimating the number of modern contraceptive methods known, by model**

Variable	Model 1	Model 2	Model 3	Model 4
<b>Migration</b>				
Rural nonmigrant (ref)	na	na	na	na
Rural-urban migrant				
In small urban area	0.724**	0.435*	0.292	0.296
In metro area	0.948**	0.689**	0.487*	0.539*
Urban nonmigrant				
In small urban area	0.499*	-0.014	0.032	0.036
In metro area	1.083**	0.651**	0.679**	0.608**
Duration of stay in urban area	na	na	0.011**	0.010**
Duration of stay in urban area x metro area	na	na	0.006	0.008
<b>Social and demographic</b>				
Mayan	na	-0.504**	-0.509**	-0.530**
Mayan x metro area	na	na	na	0.319
Mayan x duration of stay in urban area x metro area	na	na	na	-0.036*
Age	na	0.071*	0.074*	0.080*
Age-squared	na	-0.001*	-0.001**	-0.001**
Male	na	0.195	0.203	0.206
Education				
None (ref)	na	na	na	na
Primary	na	0.268	0.259	0.238
Secondary	na	0.586**	0.527**	0.511**
Postsecondary	na	0.871**	0.798**	0.774**
Woman/wife works	na	0.049	0.062	0.067
Formal union	na	0.115	0.090	0.076
Surviving children				
0 (ref)	na	na	na	na
1-4	na	0.285	0.283	0.302
≥5	na	0.125	0.114	0.129
α	0.757**	0.488**	0.474**	0.458**
Log pseudolikelihood	-1452.5	-1383.5	-1378.3	-1375.0

\*p<.05. \*\*p<.01. Notes: Standard errors adjusted for clustering at the place level. na=not applicable.

or adults, whereas 36% had moved as children.

On average, rural-to-urban migrants knew 1.7 modern methods, whereas urban nonmigrants knew 1.4 and rural nonmigrants knew 0.7. The level of current contraceptive use for rural-to-urban migrants (36%) was almost twice that for rural nonmigrants (20%), but slightly less than that for urban nonmigrants (42%).

### Multivariate Analysis

• *Contraceptive knowledge.* In the first analytical model in Table 4, which included only the migration variables, urban nonmigrants living in small urban or metropolitan areas and urban-to-rural migrants had greater levels of contraceptive knowledge than did rural nonmigrants. Among respondents living in a metropolitan area, the number of modern methods known by migrants was slightly lower than the number known by nonmigrants; however, among those living in small urban areas, the result was reversed, with migrants knowing more methods than nonmigrants.

When social and demographic characteristics were added to the analysis (model 2), the association between being a migrant in a small urban area and the number of methods known was reduced by 40%; being a nonmigrant in a small urban area became nonsignificant. In contrast, the contraceptive knowledge of rural-to-urban migrants and urban nonmigrants of Guatemala City area continued to be sig-

nificantly greater than that of rural nonmigrants. These results are consistent with migrant learning and adaptation in urban areas, as well as with migrant selectivity.

In the third model, we included two variables of duration of stay to separate migrant learning and adaptation from the potential effect of selectivity. The first duration variable measured total years spent in an urban location. The second variable was an interaction term that compared the rate of contraceptive learning in Guatemala City with that in small urban areas. The main duration variable was positively associated with contraceptive knowledge; the interaction term, however, was nonsignificant. With the duration variables added to the model, the association between being a migrant in the metropolitan area and level of contraceptive knowledge decreased by 30%; being a migrant in small urban areas was no longer significant.

These results suggest that migrants to small urban areas arrive with rural levels of contraceptive knowledge and then gradually acquire knowledge. On the other hand, migrants to Guatemala City appear to have better contraceptive knowledge than rural nonmigrants at the outset of migration and acquire additional knowledge over time. Migrants to the metropolitan area seem to acquire contraceptive knowledge at the same rate as migrants to smaller urban areas.

Finally, we ran a fourth model, which included a term testing for an interaction between Mayan ethnicity and rural-urban migrant status. This interaction term tested whether Mayan migrants in the metropolitan area were a highly selected group with greater contraceptive knowledge than expected (based on their background characteristics) or an especially disadvantaged group with less knowledge than expected. In addition, we included a three-way interaction term among Mayan ethnicity, duration of stay in an urban area and migration to the metropolitan area. This term tested whether Mayan migrants in the metropolitan area acquire contraceptive knowledge at a slower or faster pace than Ladino migrants. The Mayan-metro interaction was not statistically significant, indicating that Mayans who migrate to the metropolitan area are neither more nor less selected than Ladinos with respect to contraceptive knowledge. The three-way interaction, however, was negatively associated with contraceptive knowledge and, in fact, cancels out the positive effect of duration of stay in an urban area (i.e., for Mayan migrants, contraceptive knowledge does not increase with duration of stay in an urban area).

In part, this result may reflect the selective assimilation into the Ladino population of the fastest contraceptive learners among Mayan migrants. Mayan ethnicity in Guatemala constitutes a continuum based on cultural identity and language. Assimilation into Ladino culture and ethnic switching is not uncommon, particularly among rural-to-urban Mayan migrants.<sup>13</sup> Although our definition of "Mayan" includes men and women who identify themselves as Ladino but grew up speaking a Mayan language, our sample likely includes assimilated Mayan migrants who identified themselves as Ladinos and did not report having ever learned a Mayan language. The selective assimilation of

Mayan contraceptive learners into the Ladino population will result in a self-identified Mayan migrant population that is increasingly selected for low contraceptive knowledge as duration of stay in the metro area increases.

Our results for the ethnicity and duration interactions should be interpreted with caution, given the relatively small size of the sample and the fact that it is not representative at the metropolitan level. Nevertheless, the results provide evidence that Mayan women and men who migrate to Guatemala City increase their knowledge of modern contraceptive methods at a slower rate than Ladino migrants. Compared with Ladino nonmigrants, Mayan migrants appear to be triply disadvantaged with regard to contraceptive knowledge: They have lower levels of education, have lower initial levels of contraceptive knowledge (even after accounting for their lower education) and appear to take more time to acquire contraceptive knowledge, as indicated by the negative interaction between Mayan ethnicity and duration in a metro area. This important ethnic difference in contraceptive learning is consistent with the relative linguistic and cultural isolation of indigenous migrants in the metro area, and it suggests the importance of targeting Mayan migrants in particular for family planning services.

• **Current contraceptive use.** In our initial model estimating the bivariate relationships between migration experience and current contraceptive use, the odds of currently using contraceptives were significantly higher for migrants to the metro area (odds ratio, 2.7—Table 5) and for urban nonmigrants in small urban areas and Guatemala City (2.6 and 4.4, respectively) than for rural nonmigrants.

When social and demographic variables were included in the analysis (model 2), current contraceptive use was positively associated with education and having one or more surviving children (2.0–6.0) and negatively associated with Mayan ethnicity and older age (0.5 and 0.98, respectively); these results are consistent with other studies.<sup>14</sup> Although attenuated, the odds of current contraceptive use remained significantly higher for migrants and nonmigrants in the metropolitan area than those for rural nonmigrants, (1.9 and 2.7, respectively). Being a nonmigrant in a small urban area, however, was no longer associated with contraceptive use. This result is consistent with what we found in regard to contraceptive knowledge: The higher levels of contraceptive knowledge and use in small urban areas than in rural areas may be attributable to compositional differences in the characteristics of the populations rather than to differences in the effect of place per se.

As with the findings on contraceptive knowledge, the association between being a migrant in the metro area and using contraceptives may be due to migrant selectivity or migrant adaptation. From previous research,<sup>15</sup> we expected that migrants would adopt modern contraceptives fairly soon after migrating to the metro area (rather than gradually, as is the case with contraceptive learning), given the increased economic pressures to control fertility. However, the results from the third model, which included two dummy variables for duration of stay in an urban area, sug-

**TABLE 5. Odds ratios from logistic regression models estimating the likelihood of current use of modern contraceptives, by model**

Variable	Model 1	Model 2	Model 3	Model 4
<b>Migration</b>				
Rural nonmigrant (ref)	1.00	1.00	1.00	1.00
Rural-urban migrant				
In small urban area	1.83	1.36	1.37	0.98
In metro area	2.66**	1.90*	na	na
Urban nonmigrant				
In small urban area	2.60*	1.43	1.44	1.42
In metro area	4.38**	2.72**	2.74**	1.91**
Duration of stay in metro area				
1–5 yrs.	na	na	1.20	0.94
≥6 yrs	na	na	2.17*	1.24
<b>Contraceptive knowledge</b>				
No. of methods known	na	na	na	4.60**
<b>Social and demographic</b>				
Mayan	na	0.50**	0.50**	0.62**
Age	na	0.98**	0.98**	0.98**
Male	na			
Education				
None (ref)	na	1.00	1.00	1.00
Primary	na	2.01*	2.02*	1.95*
Secondary	na	2.55**	2.53**	2.07*
Postsecondary	na	2.77**	2.77**	1.91
Woman/wife works	na	0.89	0.89	0.88
Formal union	na	1.38	1.36	1.32
Surviving children				
0 (ref)	na	1.00	1.00	1.00
1–4	na	5.95**	5.98**	5.71**
≥5	na	3.77**	3.78**	3.62*
Log pseudolikelihood	–596.5	–552.8	–552.2	–496.5

\* $p < .05$ . \*\* $p < .01$ . Notes: Standard errors adjusted for clustering at the place level. na=not applicable.

gest gradual adaptation rather than rapid adaptation or selectivity. The odds of currently using a modern contraceptive were more than twice as high among rural-to-urban migrants who have been in Guatemala City for more than five years than they were among rural nonmigrants (2.2), whereas recent migrants' contraceptive use did not differ significantly from that of rural nonmigrants. In addition, the odds of using a modern contraceptive method were almost three times as high among urban nonmigrants in the metropolitan area as they were among rural nonmigrants (2.7).

For our final model, we added a variable for contraceptive knowledge to determine how important knowledge is for current use and whether the pace of contraceptive learning is a factor in the likelihood of current contraceptive use among migrants. To reduce the potential problem of endogeneity (contraceptive use automatically requires knowledge of at least one method), we rescaled contraceptive knowledge into three categories: 0–1 methods, 2–4 methods and 5–10 methods. This rescaling follows the approach taken by DeGraff and others to modeling the effect of contraceptive knowledge on current contraceptive use.<sup>16</sup>

When contraceptive knowledge was added to the analysis (model 4), the odds of contraceptive use among migrants living in the metropolitan area for more than five years were not significantly different from those for rural nonmigrants. In addition, the odds of contraceptive use associated with being a nonmigrant in Guatemala City, being Ladino and having a primary or higher education decreased. These re-

sults suggest that lack of knowledge and familiarity with modern contraceptive methods remains an important barrier to modern contraceptive use in Guatemala, particularly in the indigenous population. In addition, the ability of migrants to adopt urban contraceptive practices seems to be impeded by their limited contraceptive knowledge and, therefore, may be closely linked to the pace at which they learn about modern contraceptive methods in their new environment.

## DISCUSSION

Compared with urban nonmigrants, individuals who migrate from rural areas to Guatemala City are less able to effectively control their fertility. On average, they are less educated and have lower levels of contraceptive knowledge and, if they migrate as adults, they begin their residence in the city with less knowledge of where and what reproductive health services are available. However, like urban natives, they encounter place-specific cost constraints on childbearing and childrearing. Research on the interrelationship of migration and fertility in developing countries often finds migrant fertility to be lower than that of rural nonmigrants, but still above levels of urban natives.<sup>17</sup> A common explanation for the persistence of a fertility differential between migrants and natives, even after accounting for other factors, is that migrants do not fully assimilate in terms of urban fertility norms and practices.

Our results from Guatemala suggest that contraceptive knowledge may be another factor limiting migrants' adaptation to nonmigrant urban fertility levels, especially in countries where modern contraceptive use remains relatively low in rural areas. The migrants in our sample reached and even surpassed urban nonmigrants in terms of the numbers of modern contraceptive methods known, which suggests a strong interest among migrants in learning about and perhaps trying alternative contraceptive methods. The strong positive association between duration of residence in the metro area and contraceptive knowledge suggests that migrants arrive in the metro area with lower levels of contraceptive knowledge and then gradually acquire more knowledge of and familiarity with modern methods. If the demand for effective birth control increases more quickly than contraceptive knowledge, the level of unmet need will be fairly high during the initial period after migration.

Because of sample size limitations, we were unable to identify precisely at what duration of stay in the metro area the odds of modern contraceptive use among migrants rose above rural levels. We did find, however, that migrants who had lived in the metropolitan area for more than five years were more likely than rural nonmigrants to use modern contraceptives. Furthermore, the likelihood of modern contraceptive use is closely linked to contraceptive knowledge, which is accumulated over time.

Studies of rural-to-urban migration in developing countries often find that recently arrived migrants are spatially concentrated in areas of recent settlement.<sup>18</sup> These areas are likely to have fewer reproductive health services than

more settled areas. Our results suggest that unmet need may be greatest during the period soon after arrival. The spatial concentration of recent migrants in areas with poor services would make it easier to specifically target migrants for family planning interventions and suggests that interventions in such areas will potentially have the greatest impact on reducing unmet contraceptive need.

Our results highlight the importance of targeting migrants from ethnic groups that experience significant cultural and linguistic barriers to contraceptive awareness and adoption. Interventions designed to raise contraceptive awareness and use among migrant populations can have multiple payoffs. In addition to reducing unmet contraceptive need among migrant couples, interventions provide knowledge of modern contraceptive methods and practices that migrants may carry back to relatives and friends in their rural home communities.<sup>19</sup> In addition, programs designed to raise awareness of HIV/AIDS and safer-sex practices can be incorporated into contraceptive outreach programs and thereby reduce the risk of HIV transmission in both urban destinations and rural home communities.

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## RESUMEN

**Contexto:** Son bastante diferentes los niveles de conocimiento y el uso de anticonceptivos modernos entre las personas que residen en las zonas rurales de Guatemala y aquellas radicadas en los centros urbanos. Es importante comprender el ritmo y la medida en que las personas que emigran del campo a la ciudad adoptan las prácticas anticonceptivas de la ciudad para determinar si hay una necesidad sólida de concentrar los programas de salud reproductiva en los grupos migratorios.

**Métodos:** Se utilizaron análisis bivariados y multivariados con los datos obtenidos en base a entrevistas a 971 hombres y mujeres casadas que participaron en la Encuesta sobre Salud Reproductiva a Emigrantes Rurales en Guatemala en 1999, para determinar la relación entre la condición y duración de la residencia urbana y el conocimiento de métodos anticonceptivos modernos y el uso actual de dichos métodos.

**Resultados:** El nivel de conocimientos sobre anticonceptivos de los migrantes estuvo relacionado positivamente con el número de años que tenían de residencia en una zona urbana. Los migrantes de origen maya en la ciudad de Guatemala no adquirían los conocimientos sobre anticonceptivos con la misma rapidez que los migrantes no mayas, probablemente debido a las barreras culturales y lingüísticas que impedían su conocimiento y acceso a los métodos anticonceptivos. Los migrantes de las zonas rurales a los centros urbanos eventualmente presentaban

un nivel de conocimientos sobre métodos anticonceptivos modernos un poco menor que las personas que habían nacido en la ciudad; el nivel de conocimientos de anticonceptivos es un importante factor con respecto al uso de los métodos modernos.

**Conclusiones:** Durante sus primeros años de residencia en los centros urbanos, los migrantes poseen un limitado conocimiento sobre los métodos anticonceptivos modernos; por lo tanto, es posible que tengan una necesidad insatisfecha de anticoncepción y que dispongan de un número limitado de opciones de anticonceptivos moderno. Los programas dirigidos a propagar el conocimiento y uso de métodos anticonceptivos deben concentrar la atención en los migrantes recientes—en particular los indígenas mayas—en los centros urbanos.

## RÉSUMÉ

**Contexte:** Les niveaux de connaissance et de pratique de la contraception moderne parmi les habitants des régions rurales du Guatemala diffèrent substantiellement de ceux des régions urbaines. Il importe de comprendre le rythme et l'étendue de l'adoption, par les migrants des milieux ruraux vers les centres urbains, des pratiques contraceptives urbaines, afin de déterminer l'importance du besoin de programmes de santé reproductive axés sur les migrants.

**Méthodes:** Les analyses bi- et multivariées des données relatives à 971 hommes et femmes mariés ayant répondu à l'enquête guatémaltèque de 1999 sur la migration et la santé reproductive ont servi à examiner l'association entre, d'une part, l'état de migrant et la durée de résidence en milieu urbain et, d'autre part, la connaissance des méthodes contraceptives modernes et la pratique courante de la contraception.

**Resultats:** La connaissance contraceptive des migrants s'est avérée positivement associée au nombre d'années vécues en milieu urbain. Les migrants mayas de Guatemala City se sont révélés ne pas acquérir leur connaissance de la contraception au même rythme que leurs homologues non mayas, en raison peut-être d'obstacles culturels et linguistiques à l'obtention de cette connaissance et à l'accès aux contraceptifs. Les migrants des régions rurales vers les villes finissent par atteindre un niveau de pratique de la contraception moderne légèrement inférieur à celui des natifs des milieux urbains, le niveau de connaissance de la contraception s'avérant un facteur important de pratique des méthodes modernes.

**Conclusions:** Les migrants possèdent une connaissance limitée des méthodes contraceptives modernes. Ils peuvent par conséquent présenter un besoin non satisfait de contraception ou ne disposer que d'un choix limité de méthodes modernes durant leurs premières années de vie en milieu urbain. Les programmes visant à accroître la sensibilisation à la contraception et sa pratique devraient cibler les migrants récents—d'origine indigène maya en particulier—dans les milieux urbains.

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## Risks of Adverse Obstetric and Perinatal Outcomes Increase with Severity of Female Genital Mutilation

Women who have undergone female genital mutilation have a higher risk for adverse obstetric outcomes than women who have not, and the risks seem to be greater with more severe mutilation, according to the first large-scale prospective study of the effects of female genital mutilation on maternal and neonatal outcomes.<sup>1</sup> Relative to women who have not undergone genital mutilation, those who have are more likely to have cesarean sections, heavy postpartum blood losses and extended hospital stays. The infants of women who have undergone female genital mutilation are more likely to require resuscitation at delivery and are at higher risk for inpatient perinatal death than are infants born to women who have not undergone genital mutilation.

Although more than 100 million women worldwide have undergone some form of genital mutilation, there is little information on obstetric outcomes in this population. The few investigations that have been conducted have had a small number of cases or methodological limitations. In the present study, researchers sought to identify associations between the severity of genital mutilation and outcomes for the women and their infants during and immediately after delivery.

Between March 2001 and November 2003, 28,393 women presenting for singleton delivery at 28 obstetric centers in Burkina Faso, Ghana, Kenya, Nigeria, Senegal and Sudan were interviewed about their personal, medical and obstetric histories and examined to determine if they had undergone genital mutilation. Using the classification system designed by the World Health Organization, trained study midwives divided the women into three groups, according to the type of mutilation—removal of the prepuce, with or without removal of all or part of the clitoris; removal of the clitoris, with total or partial removal of the labia minora; or removal of all or part of the external genitalia and stitching of the vaginal opening. Excluded from the sample were women scheduled for cesarean section, those for whom labor was too advanced to facilitate the required genital examination and those unable to give consent.

The study sites ranged from rural hospitals to urban teaching hospitals; deliveries were handled according to the protocol in place at each study center. The women and infants in the study were followed up until the mother's discharge from the hospital. Follow-up information included whether the woman had had a cesarean section, an episiotomy or perineal tear, the baby's birth weight and Apgar score, and whether there had been a stillbirth or a neonatal or maternal death.

Adjusted odds ratios from unconditional logistic regression analyses were used to calculate relative risks of obstetric complications. The final model adjusted for parity; maternal age, height, education and socioeconomic status; urban or rural residence; travel time to hospital; number of prenatal visits; and study site.

In all, 75% of participants had undergone genital mutilation; some 24% the least severe type, 27% the moderately severe type and 23% the most severe type. There were wide variations in the prevalence and severity of genital mutilation across countries. For example, overall prevalence among the study participants ranged from 40% in Ghana to 88% in Nigeria. Moreover, in Ghana, Nigeria and Senegal, only 1% of participants had undergone the most severe type of mutilation, compared with 73% in Sudan.

When compared with women who had not, women who had undergone the moderately or most severe type of mutilation were significantly more likely to have postpartum blood loss of at least 500 ml (relative risks, 1.2 and 1.7, respectively) and to have had a cesarean section (1.3 and 1.3). Among women who delivered vaginally, the relative risk of staying in the hospital for longer than three days was higher among women who had undergone the moderately or most severe types of genital mutilation than among those who had not undergone any type (1.6 and 2.3). The relative risk of a longer hospital stay was not affected by whether a woman had given birth before.

Among women who had never given birth before, 41% of those without genital mutilation had episiotomies; 88% of women with the most

severe type had one. Among women who had given birth before, the percentage having an episiotomy ranged from 14% among women without genital mutilation to 61% among women who had undergone the most severe type of mutilation. As with length of hospital stay, the relative risks of episiotomy for primiparous women increased according to the type of mutilation, from 1.3 among women with the least severe mutilation to 1.8 among those with the most severe type. The relative risks were even higher for multiparous women, rising with the severity of mutilation from 1.8 to 2.2.

Further analyses examined the risk of perineal tears associated with genital mutilation among women who had not had an episiotomy. For women who had never given birth before, the relative risk rose from 1.3 among women with the least severe type of mutilation to 3.2 among those with the most severe type; for multiparous women, the relative risk rose from 1.4 to 1.9. A total of 54 women died before discharge, 45 of whom had undergone genital mutilation; there were too few deaths to calculate reliable risk estimates.

The infants born to women who had undergone genital mutilation were also at elevated risk for adverse outcomes. Infants born to women who had undergone the moderately severe and most severe types of mutilation were more likely to have required resuscitation at delivery (relative risks, 1.3 and 1.7) and more likely to have died while their mother was an inpatient (relative risks, 1.3 and 1.6) than infants born to women who had not had genital mutilation.

For women with any type of genital mutilation, the summary relative risk of stillbirth or infant death during the mother's hospital stay was 1.3 compared with the risk for women who had not undergone mutilation; thus, about 22% of perinatal deaths among infants born to women with genital mutilation can be attributed to the mutilation, although this figure should be interpreted with caution.

According to the researchers, the results indicate that childbirth is significantly more likely to be complicated by adverse outcomes in

women who have undergone any type of genital mutilation than in women who have not. They note that the study's findings may be limited by the fact that it took place in hospitals, even though the countries with the largest proportions of women who have had genital mutilation are among those with the most limited health care infrastructures. For that reason, they say, women who can afford hospital costs and those with high-risk deliveries may be over-represented in the sample; still, the finding that women who have undergone genital mutilation are at higher risk for obstetric complications is likely to be widely applicable. The investigators conclude that "adverse obstetric and perinatal outcomes can...be added to the known and harmful immediate and long-term effects" of female genital mutilation.—*L. Melhado*

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## Frequent Male Condom Use Decreases Women's Risk of HPV Infection

The more consistently women's male sex partners use condoms, the less likely women are to acquire genital human papillomavirus (HPV) infection, according to a longitudinal study among newly sexually active young women.<sup>1</sup> Compared with their counterparts whose male partners used condoms less than 5% of the time for vaginal intercourse, women whose partners used them at least half the time had a 50% lower risk of infection and women whose partners used them every time had a 70% lower risk. The pattern was similar in analyses restricted to types of HPV associated with a low risk of cervical cancer as well as those associated with a high risk.

Researchers invited female university students aged 18-22 years who were sexually inexperienced or newly sexually active to participate in the study. Every four months, the women underwent gynecologic examinations during which cervical and vulvovaginal samples were collected for HPV testing (by a polymerase chain reaction assay that detects 37 types of the virus) and for Pap testing. The women also recorded information about their daily sexual behavior in a Web-based diary every two weeks. The time that women were

considered to be at risk for infection began on the date of first intercourse, and factors potentially affecting the risk of HPV infection—the number of instances of vaginal intercourse, the number of new partners, the frequency of use of condoms by male partners, each partner's circumcision status and each partner's number of previous partners—were summarized for the eight-month period before each HPV test. Factors showing a statistical association at  $p < .10$  in univariate analyses were included in multivariate analyses.

Study results were based on 82 women who reported their first sexual intercourse with a male partner during the study or the two weeks before enrollment. On average, the women were about 19 years old and were followed for 34 months. The median number of instances of sexual intercourse reported was 48 per year, and the median number of new partners reported was one per year.

A total of 40 women experienced 126 type-specific HPV infections after first sexual intercourse, corresponding to a 37% cumulative incidence of a first HPV infection over a 12-month period. For every 100 woman-years at risk, there were roughly 38 infections when condoms were used by male partners for 100% of instances of vaginal intercourse in the preceding eight months, 62 infections when condoms were used 50-99% of the time, 160 when condoms were used 5-49% of the time and 89 when condoms were used less than 5% of the time.

In a multivariate analysis, women's likelihood of acquiring an HPV infection decreased significantly as the frequency of condom use increased. Relative to women whose partners used condoms for 5% or fewer instances of intercourse, women whose partners used them 50-99% of the time had a 50% lower risk of infection (hazard ratio, 0.5) and women whose partners used them 100% of the time had a 70% lower risk (0.3). The results were similar when analyses were restricted to infections with high-risk types of HPV, low-risk types of HPV or the four types covered by the HPV vaccine. Moreover, among women whose partners used condoms all of the time, the decrease in the risk of HPV infection did not vary by whether or not the women also had unprotected, nonpenetrative genital contact with their partners.

In addition, women whose partners had not had any previous partners had a markedly lower risk of becoming infected with HPV relative to their counterparts whose partners had

had at least one or an unknown number of previous partners (hazard ratio, 0.0). Women who had one new sexual partner or more than one had a sharp increase in risk relative to their counterparts who did not have any new partners (4.8 and 6.9, respectively). Neither the number of instances of vaginal intercourse nor a partner's circumcision status significantly affected the likelihood of acquiring an HPV infection.

A total of 15 women developed precancerous lesions of their cervix after first intercourse, corresponding to a 15% cumulative incidence of these lesions over a period of 24 months. For every 100 woman-years at risk, there were no lesions when condoms were used by male partners for 100% of instances of vaginal intercourse in the preceding eight months, 17 when condoms were used 50-99% of the time, 16 when condoms were used 5-49% of the time and 11 when condoms were used less than 5% of the time.

In a multivariate analysis, the frequency of condom use did not significantly influence women's risk of developing cervical lesions. However, compared with women who did not have any new sex partners, women who had one or more than one new partner had a sharply elevated risk (hazard ratios, 6.5 and 23.3, respectively).

Use of male condoms appears to reduce the risk of HPV transmission from men to women, the researchers conclude, while noting that the study's findings may not apply to older women or to women of lower socioeconomic status (proxied by lack of college education). Some HPV infections are to be expected despite consistent condom use because the virus can be spread by nonpenetrative genital contact and condoms are not always used correctly, they point out; nonetheless, the benefit observed is "encouraging" because the women studied were new to both intercourse and condom use. Given the reductions in risk achieved across broad categories of the virus, the researchers assert that even though the HPV vaccine is known to be effective against the four types of the virus that put women at highest risk for cervical cancer, "consistent condom use by their partners may protect women against infection with other high-risk types of HPV...."

—*S. London*

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## Improving Work Situations During Pregnancy May Help Improve Outcome

Women whose jobs expose them to physically difficult and psychologically stressful conditions are at increased risk of having an infant who is small for gestational age, and the risk increases with the number of such conditions if they remain throughout pregnancy. However, according to a study of women who gave birth in Quebec, Canada, in the late 1990s, if potentially detrimental conditions are removed before 24 weeks' gestation, a woman is at no greater risk than she would have been if the conditions had not existed at the start of her pregnancy.<sup>1</sup>

The study population consisted of women who delivered live singleton infants in six regions of Quebec between January 1997 and March 1999. To examine the relationship between occupational conditions and having an infant who was small for gestational age (i.e., whose birth weight was below the 10th percentile for gestational age), researchers conducted telephone interviews shortly after delivery with women who had worked at least 20 hours per week and had only one job at a time while pregnant. During the computer-assisted interview, women provided details about their work schedule, the posture and physical effort demanded by their job, the structure of their workday (e.g., breaks and work process), psychosocial conditions on the job (e.g., psychological demands and women's latitude to make decisions) and workplace environment (e.g., noise and exposure to secondhand smoke). They also provided information about their obstetric history, medical profile, family responsibilities and socioeconomic characteristics, and about their newborn's characteristics. A total of 5,977 women completed interviews—1,536 whose infant was small for gestational age and 4,441 controls.

Seven in 10 women reported that at the beginning of their pregnancy, they had been exposed to at least one of six specific occupational conditions that could pose a threat to their health or the health of their fetus: night working hours, irregular or shift work, standing at least four hours daily, regularly lifting loads weighing seven kilograms or more, noise, and a moderate or high level of job strain combined with little on-the-job support. About half had been exposed to one or two of these conditions, and one in five had been exposed to

three or more. In Quebec, pregnant women in potentially risky occupational situations are legally entitled to be assigned to other tasks or, if that is not possible, to take a leave from work, receiving 90% of their salary until four weeks before their expected delivery date. Half of the women interviewed had taken advantage of one or both of these benefits.

In one set of logistic regressions, the researchers examined possible predictors of having one's job modified or taking leave from work to avoid exposure to potentially harmful occupational conditions. Results indicated that socioeconomic, lifestyle and medical characteristics were at best only weakly associated with the likelihood that women took these measures to reduce work-related risks. However, the likelihood was strongly associated with the presence of potentially harmful conditions at the beginning of pregnancy. Compared with women reporting none of the specified conditions, those reporting one had nearly three times the odds of taking preventive measures (odds ratio, 2.6); the differential grew steadily and sharply with the number of conditions (odds ratios, 7.1 for two conditions, 14.3 for three and 25.9 for four or more).

Another set of logistic regression analyses examined associations between a woman's likelihood of having an infant who was small for gestational age and her occupational conditions. These analyses indicated that the odds that an infant was small for gestational age increased steadily with the number of risky conditions present at the beginning of pregnancy; they were 30% higher among women with 4–6 conditions than among those with none. Moreover, if the conditions were not eliminated during pregnancy, the risk was significantly elevated (odds ratios, 1.3 for women with two potentially adverse conditions, 1.4 for those with three and 2.3 for those with 4–6). By contrast, if the conditions were eliminated before 24 weeks of gestation, the risk was no higher than it would have been in the absence of any potentially detrimental conditions at the beginning of pregnancy.

The researchers observe that their work largely confirms findings of earlier studies; however, they add, it builds on previous research by providing insight into the potential benefit of preventive measures. Their study, they conclude, "underscores the importance of taking into account modification of working conditions over the course of pregnancy in order to adequately evaluate their effects on pregnancy outcomes."—D. Hollander

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## In Malawi, Breast-Feeding Does Not Pose Health Risks For HIV-Positive Women

In Malawi, HIV-positive women who breast-feed their infants are no more likely to become ill or die than their counterparts who do not breast-feed, according to an analysis of longitudinal data from HIV-infected mothers and their newborns.<sup>1</sup> This finding was not affected by women's frequency or pattern of breast-feeding. In addition, the women's breast-fed infants were about 60% less likely to die in the first two years of life than their non-breast-fed counterparts, whether or not they were infected with HIV.

The data came from a pair of clinical trials conducted in Malawi in 2000–2003 that tested antiretroviral therapy for preventing mother-to-infant transmission of HIV. Blood samples were collected from HIV-positive mothers at the time of delivery to measure their HIV load and their hemoglobin level, and from their newborns to test for HIV infection. Social, demographic, medical and reproductive information was recorded at delivery. At each of 10 visits over the next two years, mothers were examined and were asked if they were breast-feeding; those who were breast-feeding their infants were asked how frequently they did so and whether they were giving their infants only breast milk (classified as exclusive breast-feeding) or breast milk plus other liquids or solids (classified as mixed breast-feeding). Multivariate analyses assessed associations of breast-feeding with maternal health and survival, and with infant survival, controlling for maternal age, initial maternal viral load and hemoglobin level, and body mass index (weight for height) at the follow-up visits.

A total of 2,000 women and their singleton infants were enrolled in the trials. On average, the women were about 25 years old and had had three live births. Eleven percent had not attended school, 63% had attended primary school and 26% had a higher level of education.

Slightly more than 2% of mothers died in the two years after delivery. The cumulative probability of death was 18 per 1,000 at one year and 32 per 1,000 at two years. Maternal

deaths were most commonly due to tuberculosis, pneumonia, malaria and diarrhea; the cause was unknown in about one-fifth of cases. About 16% of infants died in the two years after delivery. The cumulative probability of death was 132 per 1,000 at one year and 195 per 1,000 at two years. Infant and child deaths were most commonly due to respiratory infections, gastroenteritis and septicemia; the cause was unknown in about one-seventh of cases. The estimated proportion of infants and children surviving and not infected with HIV was 80% at one year and 73% at two years.

On average, women breast-fed their infants for 15 months overall, exclusively breast-fed for 2.4 months and practiced mixed breast-feeding for 11.7 months. In a comparison of measures of maternal health between women who did and did not breast-feed in the first year (to assess the possibility that health itself influenced this practice), the two groups of women did not differ with respect to initial HIV viral load or hemoglobin level, or body mass index at visits.

Women who breast-fed did not have a significantly different risk of death than their counterparts who did not breast-feed. In addition, the risk did not vary between women who breast-fed five or more times in a 24-hour period and those who did so less frequently, or between women who exclusively breast-fed and those who did not breast-feed. Women who practiced mixed breast-feeding had a lower risk of death than did those who did not breast-feed (hazard ratio, 0.3). In terms of other factors, the likelihood of maternal death was positively associated with initial viral load (3.8–3.9), and negatively associated with initial hemoglobin level (0.8) and body mass index (0.9).

Breast-feeding in general, its frequency and its pattern were not associated with increased risks of illness among the women, as assessed with three measures—hospitalization and use of medicines, the presence of HIV symptoms and the need for assistance with daily activities. In fact, the likelihood of hospitalization and use of medicines was lower among women who exclusively breast-fed than among those who did not breast-feed (odds ratio, 0.8), and the likelihood of needing help with daily activities was lower among women who breast-fed in general (0.7) and those who practiced mixed breast-feeding (0.7) than among women who did not breast-feed. All three measures of illness were positively associated with initial viral load (1.2–1.6), and negatively associated with initial hemoglobin level (0.9–1.0) and with body mass index (0.9). Also, women

younger than 25 years of age were less likely to experience illness than their older counterparts (0.6–0.7).

Infants and children who were breast-fed had a lower risk of death than their non-breast-fed counterparts (hazard ratio, 0.4). Both mixed and exclusive breast-feeding were protective when compared with no breast-feeding (0.5 and 0.4, respectively). In addition, infants' and children's risk of death was positively associated with their mother's initial viral load (2.6), but was negatively associated with maternal body mass index (0.9).

The association between breast-feeding and lower mortality remained when infants and children were stratified by their HIV status at 6–8 weeks of age. Specifically, compared with the risk of death among infants who were not breast-fed, the risk was lower among HIV-negative and HIV-positive infants alike who were breast-fed, regardless of pattern (hazard ratios, 0.3 and 0.4, respectively), those who received both breast milk and supplemental

foods (0.4 and 0.4) and those who were exclusively breast-fed (0.1 and 0.4).

The researchers conclude that breast-feeding by HIV-positive mothers does not appear to hasten the progression of their illness or their death; moreover, this practice can be life-saving for their children, although it also poses a risk of infection. These findings, they assert, support recommendations adopted by several countries for breast-feeding when breast milk substitutes are not available, despite maternal HIV infection. They note that AIDS, as measured by viral load, remains the main risk factor for death among mothers and children alike. "Therefore, providing antiretroviral treatment to mothers (and their children) should be a major priority in order to save lives," they contend.—S. London

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## In Guatemala, Men's Views of Wives' Decision-Making Power Affect Wives' Use of Health Facilities for Births

In western Guatemala, the more involved a woman feels in making household decisions, the greater her likelihood of reporting that in preparing for a recent birth, she and her husband developed a plan for addressing problems during the pregnancy, delivery and postpartum period.<sup>1</sup> A woman's sense of involvement in decision making is not, however, associated with two other behaviors that can ensure maternal and infant health. By contrast, the more a man feels that his wife plays a role in household decision making, the less likely she is to have delivered in a health facility. These findings, along with other results from a 2003 household survey, provide insight both into women's decision-making power in this part of Latin America and into the importance of including men in studies of relationships between couple dynamics and preventive health behaviors.

The survey, undertaken to measure the impact of the national Maternal and Neonatal Health Program, was conducted in three departments of western Guatemala. Interviewers surveyed all women aged 15–49 in selected households who were pregnant or had given birth in the previous 12 months, as well as the husbands of female respondents in every other household. Survey questions for women

and men were similar, and covered demographic and socioeconomic characteristics; household decision making; and knowledge about, attitudes toward and behavior regarding maternal health.

To measure women's decision-making power, analysts constructed scores based on responses to four questions: who in the household made the final decisions on the purchase of household items, on what to do if a child became ill, on whether to buy medicine for a sick family member and on what to do if a pregnant woman in the household became very ill. Possible responses were woman only, man only, couple, father-in-law, mother-in-law, father, mother and other. For each decision, the response was scored 1 if the woman was involved (solely or with her husband) and 0 otherwise; the sum of the scores represented an overall index of a woman's decision-making power. Using logistic regression, the analysts examined the associations between these scores and three behavioral outcomes, measured among couples in which the wife had given birth within the previous 12 months: whether they had planned for an emergency during pregnancy, delivery and the postpartum period; where the baby had been born; and whether the mother

and child had seen a health professional within four weeks after the birth.

Data were available for 546 couples, who made up the analytic sample. On average, the women were 27 years old and had had three children. Thirty-five percent had had no schooling, 44% a primary education and 20% a secondary or higher level of schooling; 22% worked for pay, and 53% reported a Mayan mother tongue. About half said that their household owned a means of transport, and about half reported that the household owned at least two of four specified items (radio, television, refrigerator and telephone). Of the 391 women who had recently given birth, 38% said that they had had a plan for emergencies related to the pregnancy or birth, 27% had delivered at a health facility and 37% had seen a health professional within four weeks after delivering.

For each type of decision explored in the survey, one or both spouses in the majority of couples (59–65%) said that the wife was involved in the final decision. In roughly half of these cases (29–34% of couples overall), both members of the couple reported that they made the decision jointly. Sole decision making by the wife was rarely reported by either spouse, but for each situation, about one-third of couples agreed that the husband made the decision alone. Couples' level of agreement about who made final decisions was high (64–74%). In three of the four specified situations, the proportion of couples in which both spouses reported that the wife participated in decision making increased with the woman's level of education and was higher if both partners were educated than if only one had been to school; in all four instances, it was greater among couples in which the wife was employed than among those in which she did not work outside the home. On average, both women and their husbands said that women were involved in two of the four types of decisions.

In multivariate analyses, women's self-reported decision-making role was positively associated with the likelihood that a couple had had a plan for addressing an emergency during pregnancy, delivery and the postpartum period: For every point that a woman scored on the decision-making index, her odds of this outcome increased by 32%. The odds of having delivered in a health facility and of having received professional care soon after giving birth were not associated with the number of decisions the woman reported playing a role in. Men's reports suggest a very different relationship between women's decision-making role and preventive

behavior. Each one-point increase in the score reflecting a man's perception of his wife's participation in household decisions was associated with a 12% decline in the odds that she had given birth in a health facility.

In discussing their findings, the researchers comment on the lack of association between women's decision-making scores and two of three preventive behaviors. Data limitations, they suggest, may be partly responsible. However, they also contend that inadequate knowledge of the importance of skilled health care, documented in an earlier study, may prevent women in western Guatemala from obtaining appropriate care.

In the analysts' view, their findings yield important lessons about the role of men in decision making and in couples' health behavior. They observe that because spouses do not always agree on the wife's role in decision making, "to understand couple dynamics regarding household decisions, men need to be interviewed." Nevertheless, they conclude, the finding that couples often agreed that the husband was the main decision maker "can help program planners working on maternal health to include men as targets for maternal health interventions."—D. Hollander

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## In Egypt, Beaten Wives Are Less Likely to Use Prenatal Care or Contraceptives

Egyptian women who have been beaten by their spouse are less likely than other women to use modern contraceptives or to have received professional prenatal care during their last pregnancy, according to an analysis of data from the 1995 Demographic and Health Survey (DHS).<sup>1</sup> When compared with women who reported no domestic violence, those reporting that they had ever been beaten by their husband were significantly less likely to have received prenatal care when pregnant with their last child (odds ratio, 0.2). Moreover, women reporting three or more incidents of abuse in the past year were significantly less likely than those reporting one or two incidents to be current users of female contraceptives (0.5).

Analyses were based on 6,566 currently married women aged 15–49 who completed the women's status module of the DHS as well as the main questionnaire. Participants provided data on their socioeconomic and demographic characteristics; knowledge, attitudes and practice regarding family planning; access to health information and services; and attitudes related to domestic violence and family planning. Information was also collected on their husbands and on couple dynamics. In addition, women were asked whether they had been beaten since they were married, who had perpetrated the violence, and how many times they had been beaten in the past year. The researchers examined whether women had received prenatal care for the last child born in the past 12 months; the average number of prenatal visits during that pregnancy (1–3 vs. four or more); and current use of female contraceptives. Univariate and multivariate logistic regressions were used to identify relationships between women's experience of domestic violence and use of prenatal care and contraceptives.

The majority of respondents were aged 25–39, lived in rural areas and had not completed secondary school (53–68%). Ninety-five percent were Muslim, and 82% did not work for cash. The women had a mean of 3.6 births, and more than one-half were married to men aged 30–44. Nearly six in 10 husbands had less than a secondary education. Thirty-four percent of respondents reported that they had ever been beaten by their husband; of these, 47% had been beaten in the past 12 months. Among women who reported violence during the past year, 38% had experienced three or more beatings in that period. Moreover, 54% of women who had ever been beaten reported that they had never talked to anyone about the abuse; of these, 52% said they kept quiet because it was "no use," and 8% said that being beaten was "part of life."

Substantial proportions of all respondents reported that their freedom of movement outside the home was restricted. Yet compared with women who had not been abused, significantly higher proportions of those reporting domestic violence were limited in their ability to go to the doctor (36% vs. 33%), visit relatives or friends (43% vs. 41%) or go into the neighborhood for recreation (90% vs. 83%).

Univariate analyses revealed several correlations between women's experience of domestic violence and use of prenatal care and contraceptives. Having ever been beaten and having been beaten in the past year were as-

sociated with decreased odds of having received prenatal care (odds ratios, 0.5 each). Among women who had experienced violence in the past year, those who had been beaten three or more times had higher odds of having received prenatal care than those who had been beaten once or twice (2.6), but were less likely to use contraceptives (0.7).

Multivariate analysis confirmed only one of the three bivariate associations between having been beaten and prenatal care: Women who had ever been beaten were less likely than those who had not to have received prenatal care when pregnant with their last child (odds ratio, 0.2); however, among women who had received prenatal care, those who had ever been beaten had higher odds of having made

four or more visits (36.5). The association between the frequency of being beaten and the use of contraceptives remained as well: Women who reported three or more beatings during the past year had lower odds of current contraceptive use than did those reporting one or two incidents (0.5). The number of reasons women gave to justify wife beating was negatively associated with their odds of reporting four or more prenatal visits (0.7).

The researchers acknowledge that the lack of information on the respondents' husbands and the larger socioeconomic and political environment in which the women live limited the study's ability to examine contextual factors. However, they note that their findings indicate "that wife beating is associated with negative

health outcomes, and that controlling behaviors play as important a role in abusive relationships in Egypt as they do in more industrialized societies." They recommend that campaigns be undertaken to increase knowledge and change attitudes about wife beating as well as to decrease the behavior itself. Moreover, they maintain that "it is crucial that specialized health services be provided in public as well as private institutions, and that the availability of such resources be made known to all women."—*R. MacLean*

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1. Henshaw SK and Van Vort J, Abortion services in the United States, 1991 and 1992, *Family Planning Perspectives*, 1994, 26(3):100-106 & 112, Table 4.

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2. Hatcher RA et al., *Contraceptive Technology*, 16th ed., New York: Irvington Publishers, 1994.

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