

# Why Are Condoms Used, and How Many Are Needed? Estimates from Orissa, India

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**Context:** *In Orissa, one of the most impoverished states in India, reproductive health is poor, and the use of condoms and other reversible contraceptives is uncommon. To promote condom use, it is important to know who is using condoms, whether condoms are used for pregnancy or disease prevention and how much potential for use exists in a community.*

**Methods:** *A cross-sectional population-based survey carried out in 1998 in the four coastal districts of Orissa among 2,087 men aged 18–35 collected data on fertility preferences, sexual behavior and condom use. Levels of use and need for condoms were estimated separately for sexual activity within and outside marriage. Aggregate levels of use and need were derived by applying individual-level estimates to the male population.*

**Results:** *Ninety percent of all condoms were used for sex within marriage (44% for spacing and 46% for limiting births). Condoms were used during 3% of marital sex acts and 15% of nonmarital sex acts. Two-thirds of the unmet need for condoms is for premarital or extramarital sex (53% and 13%, respectively). Given the current method mix, men in Orissa have an unmet need for 2.3 million condoms annually, but if users of traditional methods were encouraged to switch to modern methods, that total would reach 4.4 million.*

**Conclusions:** *Condoms should be promoted differently among different target groups: as an effective way to prevent HIV and other sexually transmitted diseases among the minority of men who engage in high-risk sexual behavior, as a means of preventing both pregnancy and disease among young unmarried men and as a spacing method among married couples.*

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Condoms can prevent unintended pregnancies and the transmission of sexually transmitted diseases (STDs), including HIV.<sup>1</sup> Renewed interest in promoting their use as part of strategies aimed at changing behavior has been prompted by the threat of AIDS and recognition of the public health importance of preventing STDs that facilitate the spread of HIV.<sup>2</sup> Even where STDs are not a priority concern, family planning programs increasingly recognize the need for wider contraceptive method choice.<sup>3</sup>

Behavior change theories acknowledge that good strategies require clarity about the specific behaviors being targeted.<sup>4</sup> For example, encouraging couples to use condoms to space births requires a different message than encouraging men to use condoms with sex workers. The need to quantify the gap between desired and actual behaviors seems obvious: It is important to know who current condom users are, the intent of use and the potential need for family planning or disease prevention. However, currently available studies measuring condom use and sexual behavior lack essential information to answer these simple programmatic questions.

Existing data on condom use for con-

traception within stable unions come mainly from large-scale surveys of women, such as the Demographic and Health Surveys (DHS). When interviewed, men tend to report higher levels of use than women.<sup>5</sup> Questions on coital frequency are generally not asked,<sup>6</sup> yet information on the frequency of intercourse is needed to estimate numbers of condoms used. On the basis of respondents' reported desire to postpone or limit childbearing and reported contraceptive use, these surveys also quantify the unmet need for contraception, but this measure is not method-specific. The few DHS surveys that interviewed men allow calculation only of unmet need for limiting births, as they do not ask about the desire to space.<sup>7</sup>

Sexual behavior surveys have made data on condom use outside marriage more widely available.<sup>8</sup> However, they do not allow the number of sex acts outside marriage to be quantified, either because they cover nonrepresentative populations or because they restrict questions to the number and type of partners. For example, most studies of condom use in India cover groups that tend to engage in high-risk behaviors.<sup>9</sup> Large comparative sex

surveys in developing and European countries have asked about the frequency of sexual intercourse only within marriage or stable relationships.<sup>10</sup>

In this article, we quantify fertility preferences, reported sexual behavior, and condom use within and outside marriage among a representative sample of men in the four coastal districts in Orissa surveyed in 1998. These data are used to calculate aggregate levels of condom use and unmet need for condoms.

The unmet need estimates assume that all nonmarital sex should involve condom use to prevent STDs and pregnancy. However, we make three sets of assumptions with regard to marital sex: The first two are that within marriage, condoms are needed only for family planning; under one assumption, estimates of unmet need are extrapolated from the current method mix, while the second scenario assumes a mix that excludes traditional methods.<sup>11</sup> The third is that married couples need protection from STDs and that unless couples are trying to conceive, they should use condoms at every act of intercourse.<sup>12</sup>

## Background

Orissa is a coastal state in East India with a population (as of 1991) of 32 million, 86% of whom live in rural areas. The population is 95% Hindu, 2% Muslim and 2% Christian. Although 22% of the population are tribal people, these groups do not live in the four districts chosen for this study—Balasore, Cuttack, Ganjam and Puri. Orissa is one of the poorest states in India; partly because of the level of poverty, reproductive health is poor and child mortality rates are among the country's highest.<sup>13</sup>

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**Table 1. Percentage distribution of respondents, by selected characteristics, according to marital status, four districts of Orissa, 1998**

Characteristic	Total (N=2,087)	Married men (N=958)	Single men (N=1,129)
<b>Residence</b>			
Urban	50.0	40.7	57.9
Rural	50.0	59.3	42.1
<b>District</b>			
Balasore	25.1	25.7	24.6
Cuttack	25.2	19.4	30.1
Ganjam	24.9	29.3	21.1
Puri	24.8	25.6	24.2
<b>Education</b>			
None	11.2	19.9	3.8
Primary/ nonformal	17.3	26.9	9.2
Secondary	34.7	36.1	33.5
Higher	36.8	17.0	53.5
<b>Caste</b>			
Upper	25.6	21.8	28.9
Scheduled	21.9	26.2	18.3
Other backward	49.5	48.5	50.4
Scheduled tribe	1.4	1.9	1.1
None (Muslim)	1.4	1.6	1.3
<b>Age-group</b>			
18-19	12.4	0.1	22.9
20-24	30.1	7.2	49.5
25-29	26.5	31.3	22.5
30-35	31.0	61.4	5.1
Total	100.0	100.0	100.0

Data on HIV and other STDs in Orissa are sparse and vary in quality, but some insight can be gleaned from other studies in India and elsewhere in the region. In the 1980s, some people argued that India's traditional norms of monogamy and universal marriage protected against these infections.<sup>14</sup> Yet in the early 1990s, as it became clear that AIDS was a real threat to India, it also seemed that rural women might be shouldering a large hidden burden of reproductive tract infections, including STDs.<sup>15</sup> Community-based studies showed high proportions of women reporting vaginal discharge,<sup>16</sup> and sexual promiscuity could not be discounted as a factor.

More recently, however, two well-designed studies based on clinical and laboratory diagnoses—one of urban women in Mumbai and one of rural women in Bangladesh—have shown that STDs are not common.<sup>17</sup> In South Asia, self-report-

\*A total of 3,275 men aged 18-35 resided in the sampled households; 80 students and 147 migrant laborers were currently away from home. Another 330 men lived away from home as salaried workers; we assumed that these men were living in another household and therefore had a chance to be sampled.

†We used two recall periods for marital sex because while men have better recall of events in the last week, some may not have had sex within that period.

ed vaginal discharge is a poor indicator of the prevalence of reproductive tract infections; such reports may stem from psychosocial distress, reflecting a general state of feeling unwell rather than the presence of STDs.<sup>18</sup>

An estimated four million Indians are infected with HIV. Some states detected their first HIV infection only in the last 3-5 years, but in urban populations of West and South India, 2% of antenatal clinic users have already tested HIV-positive.<sup>19</sup> In Orissa, 260 HIV infections had been reported by June 1997, and 1% of STD patients in Cuttack in 1995 were HIV-infected. By contrast, for all sentinel sites nationwide, HIV prevalence among STD patients averages 18% in major urban areas and 5% elsewhere.<sup>20</sup>

In Orissa, the total fertility rate is 2.5 births per woman in urban areas and 3.0 in rural areas. About one-third of women of reproductive age or their partners have been sterilized (28% and 3%, respectively), making sterilization the predominant contraceptive method; only 3% use reversible methods (fewer than 1%, condoms).<sup>21</sup> Qualitative studies show that the lack of contraceptive choice and information on different methods are important in explaining the continued unmet need for family planning; sterilization is often the only method available or even known.<sup>22</sup> Nationally, 2% of women of reproductive age report using condoms.<sup>23</sup>

## Methods

### The Survey

Our study was based on a population-based survey of 2,087 single and married men aged 18-35. Respondents were selected using multistage random sampling. In each selected cluster, all houses were mapped and numbered, and 33 were selected at random. All members aged 15 or older in the selected households were listed, and de facto resident men aged 18-35 were ranked by age. Male fieldworkers followed a strict system of selecting the youngest eligible male in the first household and the next oldest in each consecutive household. The selected respondent was asked to consent and was invited to a central location for a private interview, which was preceded by a half-hour rapport-building chat, as indicated by a questionnaire pretest.

The refusal and noncontact rate was lower than 1%. For statistical analysis, the sample was weighted to make it representative of the four districts and to correct for the fact that only one man was sampled per household.

**Table 2. Percentage distribution of married current contraceptive users, by method, according to reason for using**

Method	All (N=490)	Spacing* (N=132)	Limiting† (N=358)
Condom	6.2	9.3	5.0
Pill	20.3	27.3	17.6
IUD	2.6	1.5	2.8
Female sterilization	39.7	2.3	53.4
Male sterilization	0.4	0.0	0.6
Injectable	0.5	0.0	0.8
Withdrawal	8.9	21.2	4.2
Abstinence	9.7	15.2	7.5
Rhythm	10.2	18.2	7.3
Other	1.6	5.1	0.8
Total	100.0	100.0	100.0

\*Based on current users who want more children or are undecided.  
†Based on current users who want no more children.

Seven percent of men aged 18-35 were away from home as students or migrant laborers.\* Since these men may have a different pattern of sexual risk behavior than those living in households, we selected a convenience sample of eight college hostels and four migrant-worker camps, and interviewed 159 students and 150 migrant laborers (stone or brick workers, canal diggers, factory workers and construction workers). These men are not included in the tables, but their sexual behavior patterns are reported.

Marriage is virtually universal in India; therefore, we categorize sexual activity as either marital or nonmarital. "Nonmarital sex" denotes both premarital and extramarital sex. Unless otherwise noted, "sexual acts" and "intercourse" refer to penetrative vaginal sex. The wording of survey questions was informed by a qualitative study.

### Estimating Use and Unmet Need

Condom use was calculated separately within and outside marriage; for married men, it also was calculated according to reason for use (i.e., spacing vs. limiting births). The recall periods used were one week and one month for marital sex,<sup>†</sup> and one month for nonmarital sex. We calculated the annual average number of condoms used within marriage on the basis of the proportion of men reporting use and average coital frequencies, assuming one condom per act of intercourse. We estimated use outside marriage on the basis of the proportion of men who had had nonmarital sex (i.e., single men who had premarital sex and married men who had extramarital sex) during the last 12 months, the frequency of sexual intercourse and the proportion of men who said that they had used a condom at last sex.

The need for condoms was also calculated differently for men having sex within and outside marriage. A married man was categorized as needing contraception if he wanted to avoid future births or delay the next birth by at least two years, his wife was not pregnant and she had not given birth within the last year. To estimate the need specifically for condoms, we applied the proportion of all contraceptive users who rely on condoms to all men in need; we considered men in need who did not use any method of contraception to have an unmet need. For simplicity, we generally employed a conventional measure in which users of traditional methods are not deemed to be in need of contraception.

For nonmarital sex, need was calculated under the assumption that condoms should be used during all acts of sexual intercourse outside marriage, irrespective of whether the intent is to prevent STDs or pregnancy. We estimated unmet need for condoms for nonmarital sex from the proportion of last sexual encounters that did not involve use of a condom.

We derived the population levels of condoms used and needed by men aged 18–35 in the four districts of Orissa by applying the age-specific estimates of the average number of condoms per man to the 1998 population. This population was estimated from the 1991 census, projected for seven years on the basis of the 1981–1991 intercensal growth for each age-group.

## Results

### Background Characteristics

Overall, the men in the sample were equally divided among urban and rural residents, and among residents of the four districts (Table 1). The majority had at least a secondary education and were from lower castes; about one in 10 were younger than 20. The median age at marriage was 26, but urban men, residents of Cuttack and higher-caste men had married later than others (not shown); as a result, single men outnumbered married men. Married men were older than single men and had had less education. Twenty percent of married men had no education, compared with 4% of single men; 17% and 54%, respectively, had a postsecondary education.

Two-fifths of married men (39%) reported that they had not had sex in the last week, and 53% of these had abstained from sex for at least a month. The average frequency of intercourse, including those who had not had sex in the last week, was 1.9 times per week, or 7.7 times per month. Among those reporting sexual activity in the last week, 20% had had intercourse once, 30% twice, 20% three times and decreasing proportions more often. Frequency of sex was inversely related to age and marital duration.

Half of respondents did not want more children, and 47% of married couples were currently using some method of family planning. About three in 10 current users relied on traditional methods (with-

drawal, abstinence, rhythm or other methods), and the rest on modern methods (Table 2). Among the latter, female sterilization predominated (representing 40% of all use), and condoms held third place (6% overall). Traditional methods accounted for 60% of use among men interested in delaying the birth of the next child, but for only 20% of use among those wanting no more children. Condoms were the current method for 9% of spacers and 5% of limiters. Sixty percent of men who relied on condoms said that they used the method every time they had intercourse (not shown). Of the 12 men who were not consistent users, 10 said that they did not use condoms during the safe period, and six said that they used condoms when their wife was menstruating (some men gave more than one response).

### Condom Use and Need Within Marriage

Condoms are used for 3% of sexual encounters within marriage; their use is more common among couples who wish to limit childbearing (4%) than among those who want to space births (2%). Table 3 presents data on the actual use of and need for condoms within marriage, as well as the components of these measures. Because the numbers of current users in the younger age-groups are small, the calculations are based on overall proportions of condom users, rather than age-specific estimates.

The average number of condoms used

**Table 3. Measures of average condom use and the need for condoms within marriage, and components of those measures, by men's reason for using and age**

Measure	Spacing				Limiting			
	All (N=1,032)	20–24 (N=70)	25–29 (N=330)	30–35 (N=632)	All (N=1,032)	20–24 (N=70)	25–29 (N=330)	30–35 (N=632)
<b>Condom use per average man</b>								
% who want more children*	50.3	91.5	67.2	36.8	na	na	na	na
% who want no more children	na	na	na	na	49.7	8.5	32.8	63.2
% of couples using condoms	2.3	2.3	2.3	2.3	3.5	3.5†	3.5	3.5
Monthly coital frequency	9.1	12.5	9.8	7.6	6.3	9.3†	7.5	6.0
Annual avg. no. of condoms used per man	1.3	3.1	1.8	0.8	1.3	0.3†	1.0	1.6
<b>Need per average man</b>								
% who want more children*	50.3	91.5	67.2	36.8	na	na	na	na
% who want no more children	na	na	na	na	49.7	8.5	32.8	63.2
% whose wives are not pregnant	87.3	72.3	87.9	90.9	87.4	57.1†	76.5	90.8
% whose wives did not give birth in last year	76.0	74.5	76.9	75.5	79.5	64.1†	60.8	83.9
% wanting to wait ≥2 years‡	32.2	34.5	32.1	31.9	na	na	na	na
% in need for contraception§	10.7	17.0†	14.6	8.1	34.5	3.1†	15.3	48.1
Condom as % of all methods	9.3	9.3	9.3	9.3	5.0	5.0	5.0	5.0
Monthly coital frequency‡	10.4	17.4	11.6	7.8	7.0	9.5†	8.4	6.7
Total condoms needed**	1.2	3.3†	1.9	0.7	1.4	0.2†	0.8	1.9
<b>Unmet need per average man</b>								
% with need unmet	38.2	45.5†	45.8	29.4	19.3	66.7†	26.0	17.8
Annual unmet need for condoms per man	0.5	1.5†	0.9	0.2	0.3	0.1†	0.2	0.3

\*Includes men who are undecided. †Estimate is based on fewer than 25 respondents. ‡Based on men with nonpregnant wives and no children younger than one year. §A man is defined as needing contraception for spacing if he wants more children, his wife is not currently pregnant, he has no children younger than one (a proxy for wife's fecundity status) and he wants to wait for at least two years before having the next child. A man is defined as needing contraception for limiting if he wants no more children, his wife is not currently pregnant and he has no children younger than one. \*\*Calculated as the product of the proportion in need, the proportion of current users of modern methods who use condoms and the monthly coital frequency times 12. Note: na=not applicable.

**Table 4. Measures of average condom use and the need for condoms outside marriage, and components of those measures, by men's marital status, according to age**

Measure	All	18–19	20–24	25–29	30–35
<b>Single</b>	(N=1,055)	(N=248)	(N=530)	(N=227)	(N=50)
% who reported having sex in last year	9.2	7.7	10.9	7.9	4.0
Annual avg. no. of sexual encounters	12.0	11.2	11.9	13.7	9.1
% of last encounters in which a condom was used	18.6	18.6	18.6	18.6	18.6
Annual avg. no. of condoms used per man	0.21	0.16	0.24	0.20	0.07
Potential no. of condoms needed annually per man	1.1	0.9	1.3	1.1	0.4
Annual unmet need for condoms per man	0.9	0.7	1.1	0.9	0.3
<b>Married</b>	(N=1,032)	na	(N=70)	(N=330)	(N=632)
% who reported having extramarital sex in last year	4.5	na	11.4	5.5	3.3
Annual avg. no. of sexual encounters	6.9	na	2.7	11.2	4.9
% of last encounters in which a condom was used	6.5	na	6.5	6.5	6.5
Annual avg. no. of condoms used per man	0.02	na	0.02	0.04	0.01
Potential no. of condoms needed annually per man	0.3	na	0.3	0.6	0.2
Annual unmet need for condoms per man	0.3	na	0.3	0.6	0.2

Note: na=not applicable.

by married men for spacing purposes is the product of the proportion of men wanting more children, the proportion of couples using condoms for birth control and the monthly coital frequency times 12. Thus, the average married man used 1.3 condoms per year for postponing the next birth. Similar calculations, using the proportion who want no more children instead of the proportion who want more, show that on average, married men used 1.3 condoms for limiting future births. Condom use for spacing decreased as age increased, while use for limiting births increased with age.

To estimate the total number of condoms needed by the average married man, we first calculated the proportion in need of contraception: for spacing, the product of the proportions who want more children, whose wives are not currently pregnant, who have not had a child in the last year and who want to wait for at least two years before the next birth (32% overall). We multiplied this proportion by the proportion of condom users among all those practicing contraception for spacing and the coital frequency times 12 to get the yearly number of condoms needed for spacing (1.2 overall). Similar calculations for men wishing to limit births show that an average of 1.4 condoms are needed annually per man for this purpose.

Men who reported not wanting any more children were more likely to practice contraception than men wanting to postpone the next birth. Consequently, the proportion with unmet need was higher among those wanting a spacing method (38%) than among men who wanted to limit family size (19%). Multiplying these proportions by the average condom need per man reveals that the average married man has a yearly unmet need for 0.5 con-

doms for spacing births and 0.3 condoms for limiting purposes.

#### **Condom Use and Need Outside Marriage**

Few men reported premarital or extramarital partners (27% and 8%, respectively). On average, in the past year, 9% of single men had had sex and 5% of married men had had extramarital sex. Sixty-one percent of these single men and 68% of the married men had had only one partner. The frequency of nonmarital encounters was low, especially for extramarital sex.

The proportions of students and single migrant laborers reporting having had sex in the last year were also low—6% and 17%, respectively. Single men in the household sample who had more than a secondary education reported about the same rate of sexual activity as students (5%). Six percent of married migrant workers reported an extramarital partner in the last year; more than half lived with their wives in the camps, and only 27% had not seen their wives during the past month.

Overall, 19% of single men and 7% of married men used a condom during the last nonmarital sexual act (Table 4). Among condom users, 61% of single and 25% of married men reported pregnancy prevention as the main reason for use (not shown). Among men not using a condom during the last encounter, 30% had used one at some point in the past. The two main reasons men cited for not using a condom during the last encounter were that they disliked condoms or they thought that condoms diminish sexual pleasure (45%) and that the encounter had not been planned (35%). Some 28% of men's last encounters were with sex workers, and condom use was higher than average on these occasions (26%) than for en-

counters with a partner who was not a sex worker (11%) or for nonmarital encounters overall (15%). Since condoms were used during only 3% of sex acts within marriage, use per coitus was five times higher with partners other than the wife.

Whereas married men used an average of 2.6 condoms per year with their wives, they used only 0.02 condoms with other partners (calculated as the product of the first three lines of the second panel of Table 4). Single men used an average of 0.2 condoms per year (the product of the first three lines of the table). One percent of both single and married men reported anal intercourse with men in the last year (not shown). Among these 22 respondents, two had used a condom during the last act. Since frequency of anal intercourse was not asked, total condom use for anal sex could not be extrapolated.

Calculations of the potential need for condoms outside marriage assume that condoms are needed for all nonmarital sexual encounters. Thus, to protect all sex acts reported by single men, 1.1 condoms would be needed per man per year (the product of the first two lines of Table 4), while to protect all extramarital sex, only 0.3 condoms would be needed (the product of the first two lines of the second panel). Unmet need is thus 0.9 and 0.3 condoms per man for single and married men, respectively.

#### **Population-Level Estimates**

Applying the average frequencies of sex to the 1998 population of single and married men implies that 98% of all acts of sexual intercourse happen within marriage. Men aged 18–35 in the four coastal districts used an estimated total of 2.8 million condoms (Table 5). Ninety percent of these condoms were used by married men who were practicing family planning (44% to space and 46% to limit births), 1% by married men who had extramarital relations and 10% by never-married men.

Assuming that married couples who want to space or limit pregnancies take up contraception as per the current method mix, which includes considerable use of traditional methods, unmet need totals about 2.3 million condoms. Under this assumption, two-thirds of the total unmet need for condoms is for men having sex outside marriage (53% for never-married men and 13% for married men who have extramarital sex). However, if only modern methods are promoted and if traditional method users are encouraged to switch to modern methods, the unmet need for condoms almost doubles, and more than half of it is for spacing births

**Table 5. Measures of condom use, need and unmet need, by men's marital status and reason for using**

Measure	Married			Single	Total
	Spacing	Limiting	Extra-marital sex		
<b>Current use</b>					
Condoms per year (000s)	1,230	1,278	21	276	2,804
% of use	43.9	45.6	0.7	9.8	100.0
<b>Unmet need, assuming current method mix*</b>					
Condoms per year (000s)	521	266	298	1,206	2,291
% of unmet need	22.7	11.6	13.0	52.6	100.0
<b>Unmet need, assuming modern method mix†</b>					
Condoms per year (000s)	2,324	551	298	1,206	4,379
% of unmet need	53.1	12.6	6.8	27.5	100.0
<b>Unmet need, assuming condoms only‡</b>					
Condoms per year (000s)	26,178	32,187	298	1,206	59,870
% of unmet need	43.7	53.8	0.5	2.0	100.0

\*Estimated by assuming that all men with a partner at risk of a mistimed or unwanted birth who are using no contraceptive method will adopt the current method mix. †Estimated by assuming that all men with a partner at risk of a mistimed or unwanted birth who are using no modern method adopt the current mix of modern methods. ‡Estimated by assuming that condoms are used for all sex acts within marriage unless the couple wants to conceive.

within marriage. Finally, if all married couples who are not seeking to conceive use condoms regularly, 60 million condoms will be needed, and only 3% of the unmet need will be for nonmarital sex.

## Discussion

### Study Limitations

Levels of condom use presented in this study are estimates; their precision is affected by the sample size, the accuracy of reporting of sex and condom use, and the study design (particularly, the exclusion of certain high-risk groups, a lack of information on consistency of use and the limited age range). Some estimates used in calculating average numbers of condoms per man were based on small numbers, but errors are random in nature and the effect should be minimal and should not lead to bias.

Underreporting of sex outside marriage cannot be ruled out, because strong social norms restrict free discussion of sexual behavior in India. To compensate, interviewers were very well trained; all were involved in qualitative fieldwork preceding the survey and were comfortable talking about sexual practices. One indication that underreporting may not be a serious problem in our study is that while the levels of extramarital and premarital sex we found in Orissa (8% and 27%, respectively) are low, they are about double those reported in the only other Indian study among a representative sample of married men, in Uttar Pradesh (4% and 15%).<sup>24</sup> Our survey estimates are consis-

tent with the findings of the qualitative study that preceded the survey, which showed that sexual encounters outside marriage are mostly unplanned and that opportunities to meet partners and have sex are limited.<sup>25</sup> Once men admit to having nonmarital partners, they are not likely to underreport their coital frequency. Even if the proportion of men having sex outside marriage is underestimated, sex with nonmarital partners remains a fraction of marital sex.

A household-based sample could underestimate sex outside marriage by excluding those

who may have more opportunity to engage in activities outside social norms. The relatively low levels of sexual activity reported by the small convenience sample of students and migrant laborers refutes this assumption. However, in a study at stopping points along highways through states including Orissa, 40% of truck drivers reported having paid for sex in the previous year.<sup>26</sup> Although occupational groups with such high levels of sexual activity were missed in our study, they constitute only a small proportion of the total population.

Another concern is the level and consistency of condom use. We probably overestimate use by assuming one condom for every marital sex act. A question asking men about use during the last marital sex act could have overcome this bias by indicating the proportion of encounters in which a condom was used, but such a question was not asked.

The use of condoms during the wife's periods is an interesting finding. In India, menstrual blood is considered impure and polluting, and is believed to have properties that lead to "illnesses of heat."<sup>27</sup> It is commonly expected that couples avoid sex during menstruation. The question on condom use during menstruation was asked only of current but inconsistent users. Other men may use condoms to protect themselves from the impurities of menstrual blood, while not reporting use for family planning. This use would partly offset less-consistent use by other men.

Consistency of use for nonmarital sex

is not affected, since average use was extrapolated from the proportion of last encounters in which a condom was used. However, condoms used for anal intercourse with other men were not included. Nevertheless, even allowing for underreporting, protection during anal intercourse is low and condom use outside marriage would rise only slightly with the inclusion of men having sex with men.

The age range 18–35 was chosen because risky sexual behavior tends to peak before age 30,<sup>28</sup> and the contraceptive demand for spacing (i.e., for reversible methods) is particularly strong for women younger than 30, but diminishes quickly afterward.<sup>29</sup> Our data confirm this and clearly show that both premarital and extramarital activity peak before age 30. Premarital sex before age 18 or after age 35 is negligible. Since condoms for nonmarital sex were used mainly by single men, the balance for men older than 35 would tip even more toward use within marriage.

The magnitude of these potential biases is unknown. In a "worst-case" simulation, respondents could underreport nonmarital sex by 50%, the sample could miss 5% of the population having nonmarital sex at 20 times the rate of the men interviewed and men having sex with men could have anal intercourse five times per month. Under these conditions, estimated levels of sexual activity and condom use outside marriage would nearly triple. Furthermore, if inconsistent condom users among married men used condoms half the time, total use within marriage would be reduced by 20%. These four adjustments would shift condom use from 10% outside marriage to nearly 29%.

However, men older than 35 do have sex and use condoms. This is by far the largest bias and counteracts the others. A conservative estimate of the total number of condoms used by men older than 35 would equal the number used by men aged 30–35. In this case, use within marriage would increase by half and use outside marriage by 3%. Imposing all five worst-case assumptions would bring condom use for nonmarital sex to a maximum 20% of total use. It is probably less, and mainly determined by the last two assumptions. If inconsistent use is lower than 50%, and use by older men higher, condom use outside marriage could easily be less than 10% of total use.

Despite the above limitations, our study provides some of the best available data for looking at condom use. The finding that only 10% of condoms are used for

nonmarital sex contrasts starkly with the estimate that 60% of all condoms worldwide are used outside marriage.<sup>30</sup> The disparity may be real, and due to differences in sexual behavior patterns. Few populations beyond South Asia have such low levels of sexual activity outside marriage (though Chinese and Arab populations also have strict sexual norms and few data on behavior).

However, because of the size of South Asia's population, condom use estimates for this region should influence world estimates substantially. Thus, the worldwide estimate of 60% of total use with nonmarital partners is difficult to appraise, particularly since the estimation method was not detailed (other than to note that data from 63 countries were used), few Asian data were available and data on frequency of intercourse were scarce. The available data on condom use are inherently biased toward groups that engage in high-risk behavior and countries with mature AIDS epidemics. In a review of 72 studies measuring condom use in HIV preventive behavior, only three reported on frequency of sex.<sup>31</sup> Other studies, on frequency of intercourse with nonregular partners, were among groups reporting high-risk behavior.<sup>32</sup> Extrapolating these frequencies to all men who report nonregular partners would grossly overestimate sexual activity outside stable unions and may explain the 60% estimate.

Several assumptions were used in calculating unmet need. We combined responses to a number of survey questions to infer which couples are at risk of a mistimed or unwanted birth. Though this method is inherently imperfect on the individual level, the effect of misclassification at the aggregate level is quantitatively unimportant. Some couples not classified as being in need of contraception (e.g., those who want a birth within the next two years) may be using condoms, which would explain why average need among men who want more children is lower than average use (1.2 vs. 1.3 condoms per year).

Finally, the assumption about what kind of behavior change should be promoted (adopt the current method mix, promote modern methods only or advocate protection of all sex acts among couples not wanting to conceive) influences the aggregate unmet need estimates dramatically.

### **Implications of the Findings**

In brief, despite the low levels of nonmarital sex, about two-thirds of all unmet need for condoms is for use outside mar-

riage. Satisfying this unmet need by aiming for 100% use is an unrealistic goal, but having only 15% of nonmarital sexual encounters protected by condoms is clearly unacceptable. Awareness about the prophylactic use of condoms is still low in India,<sup>33</sup> and disease control programs have a history of being strongly curative.<sup>34</sup> In Madras, only 30% of STD patients in an observational study were given advice on using condoms to prevent infections.<sup>35</sup>

The results on unmet need indicate at least three target groups that will have to be considered in the development of social marketing strategies aimed at behavior change: men who engage in high-risk behavior, young unmarried men and married couples. Any strategy will have to weigh the trade-offs to be made if only one risk behavior is targeted.

Most high-risk behavior occurs among a minority of men. One perspective is that effective STD control efforts should be directed to this group, rather than being steered away from them out of concern for stigmatizing commercial sex workers and others with high transmission rates.<sup>36</sup> This seems particularly important in settings like Orissa, where the incidence of HIV is low.

On the other hand, the threat that HIV and other STDs pose to the general population should not be ignored, even though most sexual encounters carry a low risk of disease transmission. In this regard, young unmarried men are an important target for social marketing communication for behavior change. Furthermore, a majority of single men (61%) who use condoms want to prevent their partner from becoming pregnant. When these partners are young unmarried women, who are often powerless to protect themselves, condoms may be the only contraceptive option available. Young women who are known to have had sex before marrying may be punished harshly, and the loss of honor suffered by their families makes them difficult to marry off; therefore, pregnancies need to be avoided at all cost. Thus, promotion efforts aimed at young men should stress the dual prevention properties of condoms.

In encouraging single men to use condoms consistently with all partners, messages with a strong focus on contraception can provide a "constructive ambiguity": They legitimate use without offending any partner, since men need not acknowledge the use for disease prevention.<sup>37</sup> Lessons can be learned from successful safer-sex campaigns geared toward young men, such as programs that employ humor and

language used in sports to help create the opportunity for men to discuss taboo subjects openly.<sup>38</sup>

The third target group is married couples, for whom conventional messages stress the health benefits of spacing births. We show that more condoms are used for limiting births than for spacing. An earlier study in urban Orissa noted that a mistimed pregnancy is less troubling to men than to women: Although similar proportions of men and women want to space, a pregnancy that occurred earlier than desired "would have mattered a lot" for 73% of women interviewed, but for only 42% of men.<sup>39</sup>

Among married men in our study, 38% of those who wanted the next child to be born at least two years from the time of the interview and 19% of those who wanted no more children were not using any method of contraception. Among users, nearly half of spacers opted for the less-effective traditional methods, compared with fewer than 20% of limiters. Though sterilization dominates among limiters, some couples prefer effective alternatives. In South Asia generally, couples choosing modern reversible methods tend to do so only at the end of their reproductive careers. Local knowledge about contraception is grounded in a strong folk health culture, and modern methods, including condoms, are perceived to lead to long-term health risks.<sup>40</sup>

Unmet need for condoms is doubled when current users of traditional methods are considered to have an unmet need. Winning over all couples who have chosen traditional methods does not seem likely, nor does it seem a sensible aspiration for a program. Some couples may review their choice with the new understanding that additional information and awareness can bring. Making condoms more visible and increasing access will encourage debate and challenge local knowledge about contraceptives; well-designed materials may correct misperceptions about their health effects. The nearly 60 million condoms needed to prevent all possible infection within marriage by promoting condom use among all couples who are not trying to conceive totally outweighs the need outside marriage. However, a strategy aimed at eliminating infection within marriage is not a feasible or desirable option for India, given the low levels of sexual promiscuity in the general population.

More research quantifying sexual activity within and outside stable unions in general population samples is needed, to

assess the accuracy of the estimates presented in this article. Future sexual behavior surveys should consider adding a question on frequency of sex. Indeed, one of our most striking findings is the low frequency of sex with nonregular partners, with the result that fewer than 2% of all acts of sexual intercourse occur outside marriage.

The new Reproductive and Child Health program in India promotes reversible methods of contraception,<sup>41</sup> and Orissa's social marketing program started promoting condoms in 1995. The growing knowledge from successful social marketing efforts brings the possibility of innovative imitation in designing the right communication mix. Success in promoting condom use for both contraception and disease prevention will need to closely involve the three main target audiences in developing culturally appropriate and nonstigmatizing messages.

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## Resumen

**Contexto:** En Orissa, uno de los Estados más pobres de la India, la salud reproductiva es muy pobre y el uso del condón y de otros anticonceptivos reversibles es poco común. Para promover el uso del condón, es importante conocer quiénes los usan, si se usan para evitar el embarazo o para prevenir enfermedades y cuál es el potencial de uso que existe en una comunidad.

**Métodos:** Una encuesta transversal con base en la población realizada en 1998 en los cuatro distritos costeros del Estado de Orissa, en la cual participaron 2.087 hombres de entre 18 y 35 años, recopiló datos sobre las preferencias de fecundidad, la conducta sexual y el uso del condón. Se estimaron los niveles de uso y la necesidad de condones en forma separada para la actividad sexual dentro y fuera del matrimonio. Se derivaron los niveles agregados de uso y de necesidad de condones mediante la aplicación de estimaciones individuales de la población masculina.

**Resultados:** El 90% de todos los condones fueron utilizados durante relaciones sexuales dentro del matrimonio (44% para espaciar los hijos y el 46% para limitar el número de hijos). Los condones fueron usados en el 3% de los actos sexuales de las parejas casadas y en el 15% de los actos entre las parejas no casadas. Las dos terceras partes de la necesidad insa

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