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Surveillance update

## Increasing levels of abortion and decreasing abortion-related mortality

ICDDR,B surveillance data were used to explore trends in levels of abortion and deaths from unsafe abortion over time. In general, marital abortion ratios have increased (e.g., from 40 to 100/1000 live births in Abhoynagar). At the same time, all causes of maternal death have decreased, with abortion related-deaths decreasing from approximately 100 per 100,000 pregnancies to under 25 per 100,000 pregnancies. The continued importance of abortion as a cause of maternal death despite decreasing levels of abortion related mortality highlights the need for further efforts to decrease use of unsafe abortion.

Globally, unsafe abortion is an important public health issue because of its direct impact on the lives of women and girls. It remains a leading cause of maternal mortality in many developing countries, despite the fact that deaths from unsafe abortion are preventable. In most countries this issue is addressed either through legalization of abortion or through attempts to



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prevent unwanted pregnancy. Bangladesh is unique in including menstrual regulation (MR) as part of its family planning programme. MR is evacuation of the uterus without official confirmation of pregnancy and is permitted as an “interim method of establishing non-pregnancy for a woman at risk of being pregnant, whether or not she actually is pregnant”. The National Menstrual Regulation Programme is the most decentralized system of pregnancy termination globally and from its beginnings it has prioritised getting services to women at the primary care level. Although it is anticipated that the availability of MR has reduced unsafe abortion, the programme has not been systematically evaluated. Thus, understanding the situation with regard to both abortion and menstrual regulation in Bangladesh is important for defining the magnitude of abortion and the risk of pregnancy termination.

Data from ICDDR,B surveillance in Abhoynagar, Matlab and Mirsirai were used to explore time trends in abortion ratios and total abortion rates among married women from 1982 through 2004. Data from a series of verbal autopsy studies in Matlab were used to look at changes in levels and causes of maternal mortality from 1976 to 2001. Data from Matlab provide the only available information on maternal deaths from abortion over time in Bangladesh. To create this data set, following a death of a woman of reproductive age reported to the Matlab surveillance system, an interviewer conducted a verbal autopsy with surviving family members. After the verbal autopsy, cause of death was assigned.

### **Trends in levels of abortion<sup>1</sup> among married women over time**

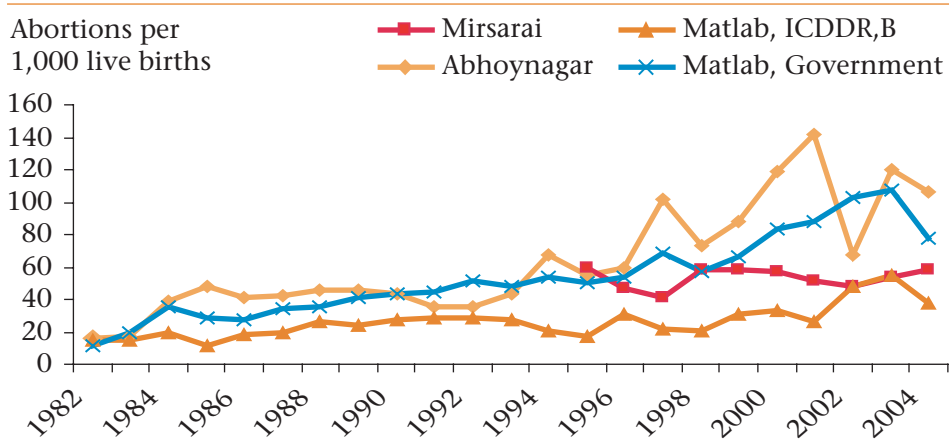
An abortion ratio (the number of reported abortions divided by the number of reported live births in a given period) is a proxy for the probability that a woman will abort a pregnancy if she becomes pregnant. Figure 1 extends prior work (1) on abortion ratios among married women in Abhoynagar and Matlab (both the ICDDR,B and government service areas) to 2004. Data from Mirsirai, which was not included in the prior analysis, are presented from 1994, the year when surveillance began there.

While the abortion ratio among married women in Mirsirai has remained fairly constant since the mid-1990s, at just below 60 per 1,000 live births, the ratio in Abhoynagar has approximately doubled during the same time period from close to 40 per 1,000 live births to over 100 abortions per 1,000 live births. In both the ICDDR,B and government service areas of Matlab ratios among married women have also increased but in the government area, the increase has been fairly steady since the 1980s, whereas in the ICDDR,B area the increase occurred mainly after 1998. Over time, ratios have been consistently higher in the government area.

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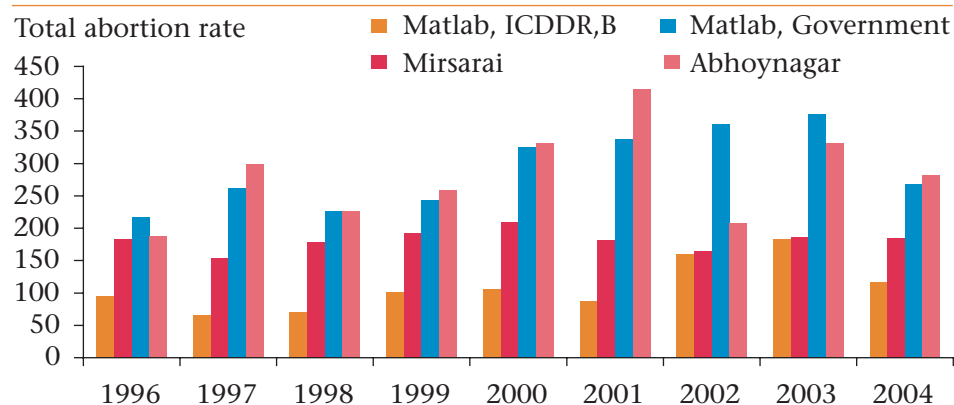
<sup>1</sup>Abortion is used here to refer to both induced abortion and MR.

*Figure 1: Abortion ratios among married women in ICDDR,B surveillance sites, 1982-2004*



As a proxy for the probability that a woman will abort a pregnancy if she becomes pregnant, the abortion ratio does not provide information on the number of abortions women have. The total abortion rate (TAR) is an alternative measure, calculated in the same way as the total fertility rate, that is by first calculating the number of abortions to women in a specific age group in one year divided by the number of women in that age group, and then cumulating the age-specific rates. The TAR estimates the number of abortions a woman would have over the course of her lifetime if current age-specific abortion rates prevail. Figure 2 shows the TAR per 1,000 married women of reproductive age in each of the ICDDR,B surveillance sites from 1996-2004.

*Figure 2: Total abortion rates per 1,000 married women of reproductive age, ICDDR,B surveillance sites, 1996-2004*



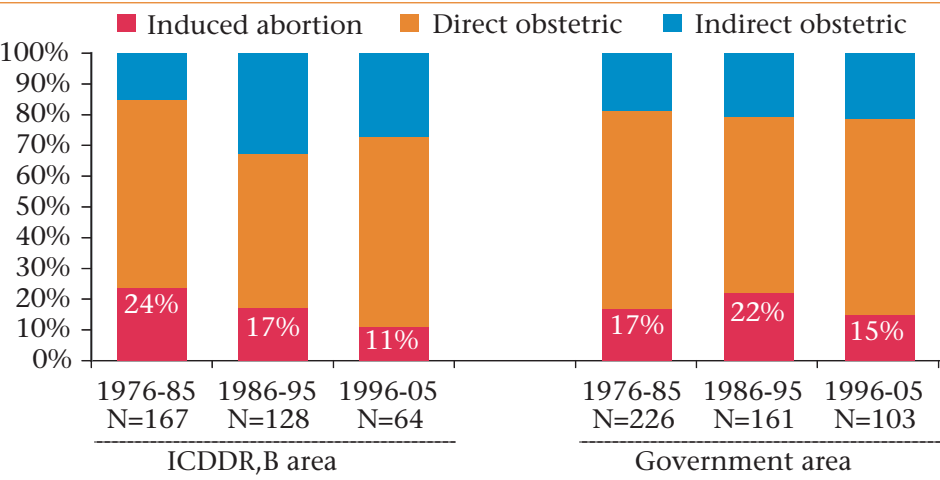
The TAR varies across the different sites, and is highest in the Matlab government area and Abhoynagar and lowest in the Matlab ICDDR,B area. The TAR has remained relatively constant over time in Mirsarai. On the other hand, in both Matlab areas, the TAR has increased over time; in the government area from close to 200 to 400 and in the ICDDR,B area from less than 100 to almost 200. In Abhoynagar the picture is less clear; rates appear to have increased in the late 1990s but then to have decreased some after 2001. However rates in more recent years are generally higher than they were prior to the peak in 2001. The drop in the TAR in 2004 in almost all areas requires further exploration.

### Abortion-related mortality

Analysis of verbal autopsy data shows that during 1976-2005 in the ICDDR,B area substantial reductions took place in all causes of maternal deaths including abortion. In the ICDDR,B area abortion related-deaths consistently decreased from 99 to 12 per 100,000 pregnancies between 1976 and 2005. In the government area abortion related deaths also decreased from a peak of 107 per 100,000 pregnancies in 1981-85 to 24 per 100,000 pregnancies in 2001-2005. However, in 2001-2005 twice as many women died from abortion per 100,000 pregnancies in the government area as in the ICDDR,B area.

The proportion of maternal deaths attributable to abortion decreased from 24% to 11% in the ICDDR,B area between 1976-1985 and 1996-2005 (Figure 3) (2). The trend is not consistent in the government area, where

Figure 3: Causes of maternal deaths in ICDDR,B and Government areas in Matlab, 1976-2005



17% of maternal deaths were attributable to abortion in 1976-1985, 22% in 1986-1995, and 15% in 1996-2005. The most recent rates in both areas are comparable to rates from developing countries in Asia for 2000 (13%) (3), and lower than earlier reported rates in Bangladesh (4,5).

Reported by: Health Systems and Infectious Diseases Division, Public Health Sciences Division, ICDDR,B

Supported by: ICDDR,B

### **Comment**

These data highlight that levels of MR and abortion as measured using both abortion ratios and abortion rates, appear to be increasing, at least in some areas of Bangladesh. This means that both the number of abortions/MRs and the probability that a pregnancy will end in an abortion/MR are increasing. However, the data also suggest significant regional variation in use of abortion/MR. Such variation is also seen in the Bangladesh Demographic and Health Survey (2004), which found the largest proportion of women reporting ever use of MR in Barisal (10.1%) and the lowest proportion in Chittagong (4.2%) and showed that women in urban areas were twice as likely to report abortion/MR as women in rural areas.

As in all studies of abortion where it is illegal or culturally sensitive, women's reports of abortion in Bangladesh are likely to underestimate actual use. Thus, the above data should be interpreted with caution. They may also reflect changes in the willingness to report over time rather than an actual change in levels of abortion and MR. Likewise, the differences between reported levels in the ICDDR,B and government areas of Bangladesh warrant further exploration. While actual differences may exist, this pattern could also reflect differential reporting caused by factors like attitudes of data collectors about abortion or perceptions of women about ICDDR,B's acceptance of abortion.

While use of abortion and MR appears to be increasing, at least in some areas of Bangladesh, mortality from abortion has fallen. At the same time, abortion remains an important cause of maternal mortality. These findings suggest that while the MR Programme may have had a positive effect on abortion related mortality, unsafe abortions still occur. Unsafe abortions are likely to also result in morbidities, although these have not been documented. Both abortion-related deaths and morbidity have important consequences for the lives of women, their families and communities. The findings of this analysis reinforce the need to provide all women with access to safe means to avoid unwanted pregnancy and unsafe abortion and also to ensure adequate treatment for women who have abortion complications.

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## Non-marital sexual behaviour of men in Bangladesh: implications for HIV transmission

A survey on sexual behaviour was conducted among 7122 males (aged 18-49 years) in six districts (3 urban and 3 rural) in Bangladesh. Overall 18% of the respondents reported ever having sexual intercourse outside of marriage (10% with female sex workers, 9% with casual female partners and 2% with males/transgenders) in the past year. Among the respondents who had non-marital sex in the past year, 35% used a condom during their last episode of such sex and the majority (56%) had more than one partner. Non-marital sex was more frequent among those <30 years (24%) of age, never-married (27%) and with <10 years of formal schooling (20%). Condom use rate was low among those ≥40 years (24%) of age, ever-married (30%), with low knowledge of HIV infection (15.4%), with no formal education (22%) and in low socio-economic status (23%). Non-marital sex with high-risk partners (i.e. female sex worker) is common among the general male population in Bangladesh. Low condom use and sex with multiple partners further augments the risk of HIV transmission in the community. To limit a generalized epidemic, effective behaviour change activities focused on reducing rates of sexual partner change and increasing condom use are urgently needed.

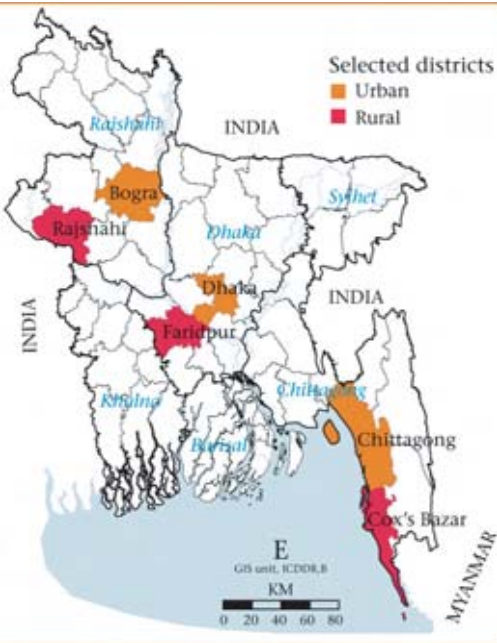
In Bangladesh, HIV prevalence is still low (<1%) among all the most-at-risk populations (sex workers, males who have sex with males, transgenders, heroin smokers, transport workers etc.) except among injecting drug users (1.5%) (1). So far, almost all intervention programmes for HIV prevention have been targeted to these groups. There are limited data on the sexual behaviour and sexual networks of males in the general population and understanding these behaviours and networks may help identify potential trends and patterns of HIV transmission in the country. This study aimed to estimate the prevalence of various non-marital sexual behaviours of males in the community. It also investigated variation of such behaviours among different socio-demographic groups.

A survey was conducted during February-August 2005 among men aged 18-49 years in three purposively selected urban (Dhaka metropolitan, Chittagong metropolitan, and Bogra town) and rural areas (Faridpur, Rajshahi, and Cox's Bazar districts) of Bangladesh (Figure 1). In each study area, a multistage cluster sampling technique was employed for selecting subjects. In urban areas – ‘mahallas’ (the smallest identifiable areas within city corporation/municipality), and in rural areas – ‘mouzas’, (a revenue village with a jurisdiction list number) were considered as clusters.

In each study area, 30 clusters were selected by probability-proportional-to-size. In each of the selected cluster among all the eligible respondents (males, aged 18-49 years, who were resident in the area for at least the last one year or visited home at least once in the last one year) were identified though household listing; 50 were systematically selected for interview.

Respondents who provided their informed consent were interviewed by one of two interview techniques--conventional face-to-face interview or confidential ballot-box method with audio support. For simplicity of this article, only pooled estimates are presented. Method-wise variation in sexual behaviour is described elsewhere (2). Trained male interviewers conducted the interviews using structured questionnaires.

Figure 1: Study areas (selected districts)



**Operational definition of various high-risk sexual behaviours:**

‘Non-marital sex’ was defined as vaginal or anal penetrative sex with a person the interviewee was not married to. ‘Female sex workers’ were defined as females who participated in vaginal or anal penetrative sex in exchange for money. ‘Casual female partners’ was defined as a female neighbour, friend or relative with whom the respondent participated in vaginal or anal penetrative sex without exchange of money. ‘Males/trans-genders’ were defined as either actively or passively participated in anal sex with another males or transgenders.

Among 9,000 potential study subjects, 7,122 (79%) were successfully interviewed. (3623 face-to-face and 3499 by the ballot-box method). The most common reasons for not completing the interview were internal migration (12%) and inability to contact the respondent after five visits to the home (8%). Only 38 subjects (0.4%) refused to participate.

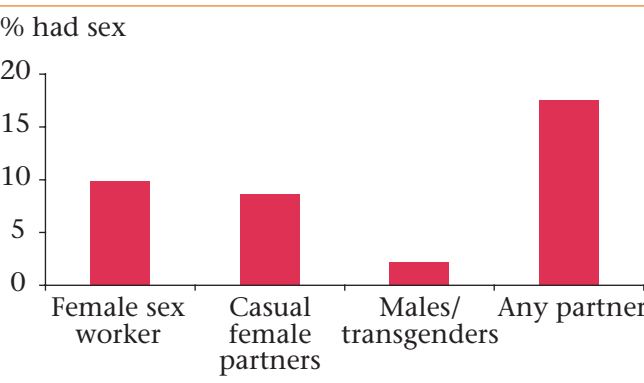
**Background characteristics of respondents**

Fifty-two percent of the respondents were from urban areas. About three-fourths of the respondents were aged 20-39 years, and less than 10% were aged less than 20 years. Twenty-two percent of the respondents never attended school and 30% had more than 10 years of schooling. About one-third (32%) of the respondents were never-married. The study population was predominantly Muslim. More than half (59%) of the respondents had monthly family expenditure of Tk. 5000 or less. However, 30% of the respondents spent Tk. 5000-10,000 per month. More than three-fourths of the respondents were from four professional categories which included general services, business, farming, and transportation workers.

**Prevalence of non-marital sex by type of partner**

Overall 18% of the respondents reported having non-marital sex in the past year, 10% with female sex workers, 9% with casual female partners and 2% with males/transgenders (Figure 2.)

*Figure 2: Percentages of males (aged 18-49 years) who had non-marital sex in the last one year by type of partner\**



\* Multiple response possible

## Variation of non-marital sex by socio-demographic characteristics

The proportion of men reporting non-marital sexual activity was similar in the 6 settings (Table 1). Of the respondents  $\leq 19$  years of age, 25%

reported at least one episode of non-marital sexual intercourse in the last year; this proportion decreased with increased age. Only about 9% of the respondents aged 40 years or above had such a relationship in the last one year (Table 1). More never-married men reported non-marital sexual activity (27%) than ever-married respondents (13%). Men with  $<10$  years of schooling were more likely to report non-marital sexual intercourse (20%) compared to men with  $\geq 10$  years of schooling (13%). Muslims reported higher non-marital sexual exposure (18%) than the respondents of other religion (13%). Men whose monthly family expenditure was less than Taka 10,000 (US\$ 141) more commonly reported having non-marital sex (18%) compared to men who spent more than Taka 10,000 per month (12%).

### Prevalence of condom use

Men reported using a condom in their last episode of penetrative sex 40% of the time with a female sex worker, 30% of the time

Table 1: Percentage of respondents who had non-marital sex in the last one year by selected socio-demographic characteristics

| Socio-demographic characteristics | n     | % of respondents |
|-----------------------------------|-------|------------------|
| <b>Study area</b>                 |       |                  |
| Dhaka metro                       | 1,227 | 17               |
| Chittagong metro                  | 1,244 | 17               |
| Bogra town                        | 1,203 | 20               |
| Faridpur town                     | 1,055 | 17               |
| Cox's Bazar town                  | 1,197 | 21               |
| Rajshahi town                     | 1,196 | 17               |
| p value                           |       | 0.01             |
| <b>Age (years)</b>                |       |                  |
| $\leq 19$                         | 677   | 25               |
| 20-29                             | 2,750 | 23               |
| 30-39                             | 2,154 | 13               |
| $\geq 40$                         | 1,541 | 9                |
| p value                           |       | $<0.01$          |
| <b>Marital status</b>             |       |                  |
| Never-married                     | 2,246 | 27               |
| Ever-married                      | 4,876 | 13               |
| p value                           |       | $<0.01$          |
| <b>Schooling (years)</b>          |       |                  |
| 0                                 | 1,722 | 18               |
| 1-4                               | 1,178 | 21               |
| 5-9                               | 2,230 | 20               |
| $\geq 10$                         | 1,992 | 13               |
| p value                           |       | $<0.01$          |
| <b>Religion</b>                   |       |                  |
| Islam                             | 6,419 | 18               |
| Others*                           | 703   | 13               |
| p value                           |       | 0.02             |
| <b>Monthly family expenditure</b> |       |                  |
| $\leq 3,000$                      | 2,599 | 17               |
| 3,001-5,000                       | 2,231 | 18               |
| 5,001-10,000                      | 1,813 | 19               |
| $>10,000$                         | 479   | 12               |
| p value                           |       | 0.02             |

\* Hinduism/Christianity/Buddhism

with a casual female partner and 9% of the time with a male/transgender (Figure 3).

### Variation in condom use by socio-demographic characteristics of respondents

Men in urban areas reported using condoms more frequently than men in rural areas (Table 2). Among men who reported non marital sexual intercourse in the last year, those with  $\geq 10$  years of formal education (49%), with monthly family expenditure of > Taka 10,000 (US\$ 141), or never-married (40%) were more likely to use condoms. Increased knowledge level of the respondents about prevention of HIV infection was associated with increased condom-use.

### Distribution of number of non-marital sexual partners

Of the respondents who reported non-marital sex in the last one year, the majority (56%) had more than one non-marital partner. One-third (36%) of the respondents had 2-3 and another one-fifth (20%) had >3 non-marital partners.

When segregated by type of non-marital partner, of the respondents who had sex with female sex workers, about 62% had sex with more than one female sex worker. Similarly, 35% and 49% had sex with more than one casual female partner and male/transgender respectively (Figure 4).

Figure 3: Condom-use rates among males during last sex with different types of non-marital partners

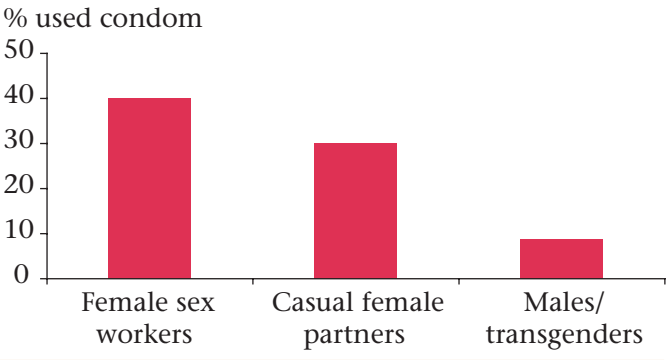
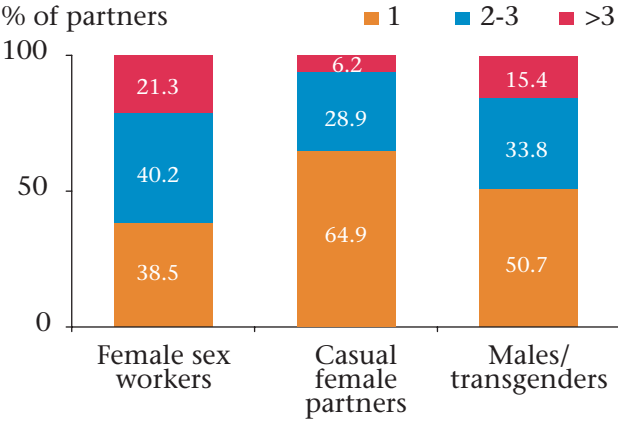


Figure 4: Distribution (%) of the number of different types of non-marital sexual partners in the last one year



Reported by: Public Health Science Division, ICDDR,B  
Supported by: Family Health International (FHI)

Table 2: *Percentage of respondents who used a condom during last non-marital sex in the past one year by demographic characteristics*

| Socio demographic characteristics | n    | % of respondents |
|-----------------------------------|------|------------------|
| <b>Study area</b>                 |      |                  |
| Dhaka metro                       | 203  | 40               |
| Chittagong metro                  | 213  | 36               |
| Bogra town                        | 237  | 35               |
| Faridpur rural                    | 170  | 33               |
| Cox's Bazar rural                 | 249  | 24               |
| Rajshahi rural                    | 194  | 27               |
| p value                           |      | <0.01            |
| <b>Age (years)</b>                |      |                  |
| ≤19                               | 176  | 42               |
| 20-29                             | 687  | 35               |
| 30-39                             | 275  | 36               |
| ≥40                               | 128  | 24               |
| p value                           |      | 0.08             |
| <b>Marital status</b>             |      |                  |
| Never-married                     | 641  | 40               |
| Ever-married                      | 625  | 30               |
| p value                           |      | <0.01            |
| <b>Schooling (years)</b>          |      |                  |
| 0                                 | 293  | 22               |
| 1-4                               | 258  | 31               |
| 5-9                               | 444  | 37               |
| ≥10                               | 271  | 49               |
| p value                           |      | <0.01            |
| <b>Monthly family expenditure</b> |      |                  |
| ≤3000                             | 439  | 23               |
| 3001-5000                         | 418  | 34               |
| 5001-10000                        | 352  | 39               |
| >10000                            | 55   | 62               |
| p value                           |      | <0.01            |
| <b>Religion</b>                   |      |                  |
| Islam                             | 1155 | 35               |
| Other*                            | 111  | 40               |
| p value                           |      | 0.55             |

**Comment**

The major strength of this study is that in each district we enrolled a large representative sample of the general male population and thus the estimates are reliable for modelling the HIV epidemic in the country. In this survey 27% of never-married men, and 13% of ever-married men reported having non-marital sex in the past one year. In Bangladesh only a few studies reported non-marital sexual behaviour of males in the community. Several studies found prevalence of life-time non-marital sex in the general male population ranging between 8% and 24% (3). Two other small sub-national surveys reported 47% (4) and 56% (5) of males ever had pre-marital and extra-marital sex respectively. A recent large study among adolescents in Bangladesh found 22% of males having a history of pre-marital sex (6). But all the previous studies were either too small or not nationally representative or did not cover a wide range of age group and therefore not appropriate for modelling

\* Hinduism/Christianity/Buddhism

potential HIV transmission.

Assuming our studied populations are nationally representative of men their age, then extrapolation to the general male population in Bangladesh suggests there are some 44.2 million non-marital sexual contacts, annually, involving men age 18 – 49 years (19.2 million with female sex workers, 14.8 with casual female partners and 10.2 with males/transgenders). This survey did not include representatives from all age-groups of the general male population, but did, however, cover what is believed to be the most sexually active age-groups.

A finding, which should be of concern, is that among the sexual contacts reported in this survey, some three-fourths (31.2 million) were unprotected by condoms (estimated based-on condom use rate during the last sex act). Of these unprotected sexual acts, about 11.4 million were with female sex workers, 10.6 millions with casual female partners and 9.2 millions with males/transgenders. This behaviour clearly places not only a large number of young men at risk of HIV but also their partners.

The combination of high levels of commercial sex and multiple sexual partners, combined with very limited condom protection, points to a potentially explosive situation. There are two usual approaches for responding to this situation. One is to encourage men to limit their number of sex partners. The other one is to increase condom use during sex with non-spousal partners (7,8,9). This suggests that to prevent a generalized epidemic, there is an urgent need to implement an effective behaviour change communication programme with males to reduce rates of sexual partner change and increase condom use.

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## Chronic disease burden among people over 60 years of age in rural Bangladesh

As the population of Bangladesh ages, greater numbers of people are likely to be living with chronic illnesses. We assessed population-based data on prevalence of chronic disease and causes of death from two rural sub districts in Bangladesh. Overall, 73% of those surveyed in Mirsarai and 44% in Abhoynagar reported being diagnosed with at least one chronic condition. Arthritis (37%) and hypertension (27%) were the most common chronic conditions reported. Verbal autopsy data show that at least 42% of all deaths in these areas in this age group were due to chronic conditions. In contrast, hospitalizations of persons aged over 60 in the upazila health complexes were rare. In order to improve the lives of older people in Bangladesh, the national health system should allocate resources and design strategies to prevent and treat chronic disease.

The age structure of Bangladesh's population is changing markedly. Rapid fertility declines in the 1980s have decreased the proportion of young persons (1), and reductions in child mortality have increased life expectancy from 44 years in 1975 to 60 years in 2001 (2). The population aged over 60 years currently represents about 7% of the 140 million population of Bangladesh (1) and is projected to represent 16% of the total population by 2050 (3). As the older population grows, the prevalence of chronic disease is also likely to grow. Understanding the burden of chronic disease in

Bangladesh will guide the design of strategies to prevent chronic illness and provide health care to increasingly larger numbers of older people with chronic conditions.

In order to assess the burden of chronic disease in people over 60 years of age in Bangladesh, we examined the prevalence of chronic disease and causes of hospitalization and death in this age group using data from Mirsarai Upazila of Chittagong District and in Abhoynagar Upazila of Jessore District. To assess the prevalence of chronic illness we surveyed persons aged over 60 currently enrolled in ICDDR,B's surveillance sites in Mirsarai and Abhoynagar. In these two sites, demographic events, marriage, pregnancies, births, deaths and migration are routinely collected; the sampling procedure of the demographic surveillance system has been described elsewhere (4). All people aged over 60 years in the households were listed and then divided into three age groups, 60-69, 70-79, and over 80. Two hundred and fifty males and 250 females from each of these age groups were randomly selected from the populations of each surveillance site for inclusion in the survey. From July to October 2005 respondents were asked to report having ever been medically diagnosed with selected chronic diseases.

We obtained data on causes of hospitalization for persons aged over 60 years from 2002 to 2005 from the Bangladesh government's statistics from Mirsarai and Abhoynagar upazila health complexes. Data on causes of death were also obtained from the government system at these two facilities from 2002 to 2005. Cause of death data from verbal autopsies carried out at the Mirsarai and Abhoynagar surveillance sites from 2000 to 2003 were also examined. Two public health physicians following the 9th version of the International Statistical Classification of Diseases and Related Health Problems (ICD-9) assigned causes of death from verbal autopsies. Surveillance data on causes of death from 2004 to 2005 were not included because of the revision in data collection methods since 2004.

A total of 1515 people over age 60 enrolled in surveillance in Mirsarai and Abhoynagar, out of the 3000 selected for the study, were surveyed. (Table 1) We were unable to survey all persons selected for the study due to resource constraints. The proportion of participants from each age group included in the survey was similar to the proportion of that age group in the population under surveillance. The majority of respondents lived with extended families. Although life expectancy for men and women in Bangladesh is similar, many more women than men had experienced the loss of a spouse. Smoking was commonly reported by male respondents (Table 1).

*Table 1: Selected characteristics of people over 60 years of age by gender surveyed in Mirsarai and Abhoynagar from July to October 2005*

| Selected characteristics                                     | Mirsarai       |                | Abhoynagar     |                |
|--------------------------------------------------------------|----------------|----------------|----------------|----------------|
|                                                              | Male           | Female         | Male           | Female         |
| Population over 60 yrs. enrolled in demographic surveillance | 1,429          | 1,625          | 878            | 869            |
| Study sample total                                           | 398            | 370            | 374            | 373            |
| 60-69                                                        | 213            | 215            | 218            | 238            |
| 70-79                                                        | 125            | 118            | 117            | 107            |
| 80 +                                                         | 60             | 37             | 39             | 28             |
| Mean age $\pm$ SD                                            | 69.7 $\pm$ 7.9 | 69.4 $\pm$ 7.4 | 69.0 $\pm$ 7.4 | 69.1 $\pm$ 7.2 |
| Currently married (%)                                        | 92             | 28             | 82             | 37             |
| Currently living in an extended family (%)                   | 65             | 76             | 64             | 62             |
| Currently smoking tobacco (%)                                | 50             | 0.5            | 39             | 3              |

Overall, 73% of those surveyed in Mirsarai and 44% in Abhoynagar reported being diagnosed with at least one chronic condition; prevalence varied by sex. (Table 2) Participants most frequently reported being diagnosed with arthritis (54% in Mirsarai, 17% in Abhoynagar) and hypertension (32% in Mirsarai, 20% in Abhoynagar) (Table 2). Women in Mirsarai reported the highest rates of chronic disease (82%).

*Table 2: Percentage of people over 60 years of age by gender who reported a diagnosis of any chronic disease in Mirsarai and Abhoynagar in 2005*

| Selected chronic diseases<br>(Multiple responses possible) | Mirsarai        |                   |                 | Abhoynagar      |                   |                 |
|------------------------------------------------------------|-----------------|-------------------|-----------------|-----------------|-------------------|-----------------|
|                                                            | Male<br>(n=398) | Female<br>(n=370) | Both<br>(N=768) | Male<br>(n=374) | Female<br>(n=373) | Both<br>(N=747) |
| Any chronic condition                                      | 65              | 82                | 73              | 40              | 47                | 44              |
| Arthritis                                                  | 42              | 68                | 54              | 18              | 17                | 17              |
| Hypertension                                               | 27              | 36                | 32              | 12              | 28                | 20              |
| Heart problems                                             | 16              | 9                 | 13              | 6               | 3                 | 5               |
| Lung problems                                              | 11              | 8                 | 10              | 5               | 5                 | 5               |
| Stroke                                                     | 10              | 5                 | 8               | 8               | 7                 | 7               |
| Diabetes                                                   | 8               | 4                 | 6               | 8               | 4                 | 6               |
| Mental problems                                            | 3               | 2                 | 2               | 0.5             | 0.8               | 0.6             |
| Cancer                                                     | 2               | 5                 | 4               | 1               | 0.5               | 0.8             |

From 2002 to 2005, 988 persons aged over 60 years were admitted to the Upazila Health Complex in Mirsarai, representing 5% of total hospitalizations for that time period. The majority were males (57%) and 21% of hospitalizations were due to chronic disease complaints, including hypertension and lung and heart problems. During the same time period, 1,554 people aged over 60 were admitted in Abhoynagar, representing 7% of all hospitalizations at that facility. The majority (66%) were also males and 38% of those hospitalizations were due to chronic disease complaints.

Verbal autopsy data from the Mirsarai and Abhoynagar surveillance sites showed that at least 42% of all deaths in persons aged over 60 from 2000-2003 were due to chronic conditions. Cardiovascular diseases (26%), senility (22%), respiratory diseases (15%), malignancy (7%) and neurological conditions (6%) were the most common causes of death in people aged over 60 years during this time period (Table 3). It is quite likely that many deaths categorized here as respiratory disease and senility were also caused by chronic conditions.

*Table 3: Causes of death among people over 60 years of age from verbal autopsies conducted in Mirsarai and Abhoynagar from 2000 to 2003*

| Causes of death         | Mirsarai<br>n (%) | Abhoynagar<br>n (%) | Both Sites<br>n (%) |
|-------------------------|-------------------|---------------------|---------------------|
| Chronic causes          | 231 (40)          | 166 (46)            | 397 (42)            |
| Cardiovascular diseases | 143 (24)          | 101 (27)            | 244 (26)            |
| Malignancy              | 41 (7)            | 26 (7)              | 67 (7)              |
| Neurological conditions | 34 (6)            | 22 (6)              | 56 (6)              |
| Diabetes                | 13 (2)            | 17 (5)              | 30 (3)              |
| Respiratory disease     | 95 (17)           | 44 (12)             | 139 (15)            |
| Senility                | 128 (22)          | 79 (22)             | 207 (22)            |
| Other infections        | 13 (2)            | 6 (2)               | 19 (2)              |
| Undiagnosed             | 13 (2)            | 17 (5)              | 30 (3)              |
| All others              | 94 (16)           | 49 (13)             | 143 (15)            |
| Total deaths            | 574               | 361                 | 935                 |

There were 67 deaths among people over age 60 years at the upazila health complexes in Mirsarai and Abhoynager combined from 2000-2005. Cardiovascular diseases (33), bronchial asthma (19), and cerebrovascular accidents (10) accounted for almost all deaths.

Reported by: Health Systems and Infectious Disease Division, ICDDR,B

Supported by: International Network for the continuous Demographic Evaluation of Populations and Their Health (INDEPTH)

## Comments

Evidence from Mirsarai and Abhoynagar suggests that chronic illness is common in persons aged over 60 in Bangladesh. This population-based survey found that 73% of persons aged over 60 were living with at least one chronic disease complaint in Mirsarai and 44% were doing so in Abhoynagar. It is unclear why differences in disease prevalence existed between the two sites surveyed and between males and females; however, other studies have also observed higher proportions of females with chronic illness than men (5,6,7). Estimated prevalences reported here and in other studies from Bangladesh based on reported illness (7) are likely to be underestimates given that they are based on participant reports and that this population traditionally has poor access to regular medical care necessary to diagnose chronic illnesses. Studies conducted with similar populations in neighbouring India, which included a physician diagnosis, report that nearly all persons aged over 60 surveyed were living with some morbidity (5). Further studies, including physician exams, are required to accurately document the prevalence of chronic disease in Bangladesh.

Causes of death from verbal autopsies showed that at least 42% of all deaths in ICDDR,B's surveillance sites in Mirsarai and Abhoynagar are due to chronic conditions. Deaths reported as respiratory illness and senility were also likely caused by chronic disease. Future reports might be better able to categorize deaths due to chronic disease because the definition used for senility was revised in 2004, based on the 10th version of the International Statistical Classification of Diseases and Related Health Problems (ICD-10). Almost all deaths recorded at the health complexes in these two upazilas were attributed to chronic disease. Our ability to compare causes of death between verbal autopsy data and data from the health complexes is limited due to differences in definitions of cause of death and the extremely small numbers of deaths that occurred in the health complexes.

Hospitalizations of persons over the age of 60 accounted for only 5% of all hospitalizations in Mirsarai and 7% in Abhoynagar. Despite the fact that most deaths at these facilities in people over 60 are attributed to chronic illness, hospitalizations for this age group for chronic illness were rare. Another study from Bangladesh found similarly low proportions of hospital admissions from this age group (8). This could be explained in a number of ways. It is possible that these people are receiving treatment elsewhere since upazila health complexes usually do not have the resources to treat chronic conditions. Another possibility is that these people simply are not seeking care for their illnesses, either because they do not have the resources to do so or because they are unaware of their condition and the

need to seek treatment. Anecdotal evidence suggests that community members are reticent to seek care for older members of the family. While conducting the survey for this study, interviewers were often requested by younger adults in the household to collect information on the health of younger family members instead. They said, "What is the use of collecting such data for older people, as no intervention is likely to bring them back to a normal life. It is better to keep him/her with the family and leave them alone to perform rituals as long as they survive".

As Bangladesh's population ages, increasing numbers of people will be living with chronic conditions. The Government of Bangladesh is committed to sustainable improvements in health, nutrition and family welfare especially for vulnerable groups such as the elderly. These commitments are outlined in the Health, Nutrition and Population Sector Programme (2003-2010) (9) and the national Strategy for Accelerated Poverty Reduction (10). Given evidence of the current burden of chronic disease and the predictions for growing numbers of people with chronic illness, the government should work to increase resources for diagnosis and treatment of these conditions and initiate strategies, such as lifestyle change, for preventing them. One step could be to discourage smoking, a common habit among men found in this study and others in Bangladesh (11,12). The future holds many challenges for Bangladesh's health care system, which will have to cope with high rates of infectious disease and increasing rates of chronic disease. Further studies to generate more accurate estimates of the chronic disease burden and track trends will assist the government in facing this challenge.

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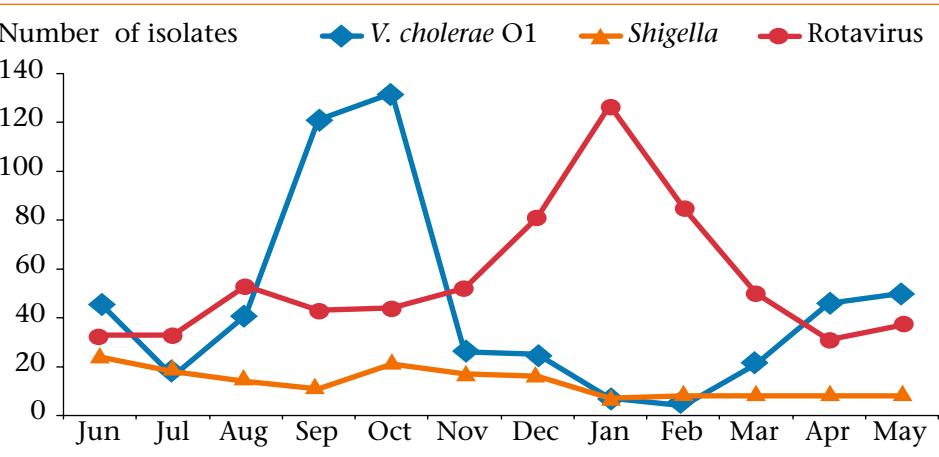
# Surveillance update

With each issue of the HSB, updates of surveillance data described in earlier issues are provided. These updated tables and figures represent the most recent observation period available at the time of publication. We hope these updates will be helpful to health professionals who are interested in current patterns of disease and drug resistance.

*Proportion of diarrhoeal pathogens susceptible to antimicrobial drugs: June 2006-May 2007*

| Antimicrobial agents | <i>Shigella</i><br>(n=161) | <i>V. Cholerae</i> O1<br>(n=535) |
|----------------------|----------------------------|----------------------------------|
| Nalidixic acid       | 27.3                       | Not tested                       |
| Mecillinam           | 92.5                       | Not tested                       |
| Ampicillin           | 58.4                       | Not tested                       |
| TMP-SMX              | 30.1                       | 1.7                              |
| Ciprofloxacin        | 98.1                       | 100.0                            |
| Tetracycline         | Not tested                 | 72.5                             |
| Erythromycin         | Not tested                 | 7.1                              |
| Furazolidine         | Not tested                 | 0.2                              |

*Monthly isolation of V. cholerae O1, Shigella and Rotavirus: June 2006-May 2007*



*Antimicrobial resistance patterns of 185 M. tuberculosis isolates: March 2006-February 2007*

| Drugs                | Resistance type    |                     | Total<br>(n=185) |
|----------------------|--------------------|---------------------|------------------|
|                      | Primary<br>(n=167) | Acquired*<br>(n=18) |                  |
| Streptomycin         | 41 (24.6)          | 9 (50.0)            | 50 (27.0)        |
| Isoniazid (INH)      | 14 (8.4)           | 7 (38.9)            | 21 (11.4)        |
| Ethambutal           | 7 (4.2)            | 3 (16.7)            | 10 (5.4)         |
| Rifampicin           | 17 (10.2)          | 6 (33.3)            | 23 (12.4)        |
| MDR (INH+Rifampicin) | 6 (3.6)            | 4 (22.2)            | 10 (5.4)         |
| Any drugs            | 52 (31.1)          | 10 (55.6)           | 62 (33.5)        |

() column percentage      \* Antituberculous drugs received for one month or more

*Antimicrobial susceptibility of N. gonorrhoeae isolated during January-March 2007 (n=9)*

| Antimicrobial agents | Susceptible (%) | Reduced susceptibility (%) | Resistant (%) |
|----------------------|-----------------|----------------------------|---------------|
| Azithromycin         | 100.0           | 0.0                        | 0.0           |
| Ceftriaxone          | 100.0           | 0.0                        | 0.0           |
| Ciprofloxacin        | 0.0             | 11.1                       | 88.9          |
| Penicillin           | 0.0             | 0.0                        | 100.0         |
| Spectinomycin        | 88.9            | 11.1                       | 0.0           |
| Tetracycline         | 0.0             | 0.0                        | 100.0         |
| Cefixime             | 100.0           | 0.0                        | 0.0           |

*Antimicrobial susceptibility pattern of S. pneumoniae among children <5 years during January-March 2007*

| Antimicrobial agents | Total tested (n) | Susceptible n (%) | Reduced susceptibility n (%) | Resistant n (%) |
|----------------------|------------------|-------------------|------------------------------|-----------------|
| Ampicillin           | 20               | 20 (100.0)        | 0 (0.0)                      | 0 (0.0)         |
| Cotrimoxazole        | 20               | 5 (25.0)          | 0 (0.0)                      | 15 (75.0)       |
| Chloramphenicol      | 20               | 20 (100.0)        | 0 (0.0)                      | 0 (0.0)         |
| Ceftriaxone          | 20               | 20 (100.0)        | 0 (0.0)                      | 0 (0.0)         |
| Ciprofloxacin        | 20               | 18 (90.0)         | 2 (10.0)                     | 0 (0.0)         |
| Gentamicin           | 20               | 0 (0.0)           | 0 (0.0)                      | 20 (100.0)      |
| Oxacillin            | 20               | 18 (90.0)         | 2 (10.0)                     | 0 (0.0)         |

Source: Children participating in PneumoADIP surveillance in Dhaka Medical College Hospital, Chittagong Medical College Hospital, Sir Salimullah Medical College and Mitfort Hospital, ICH-Shishu Sasthya Foundation, Chittagong Maa Shishu O General Hospital, Dhaka Shishu Hospital, Kumudini Hospital-Mirzapur, and ICDDR,B's urban surveillance in Kamalapur (Dhaka) and rural surveillance in Mirzapur (Tangail).

*Antimicrobial susceptibility pattern of S. typhi among children <5 years during January-March 2007*

| Antimicrobial agents | Total tested (n) | Susceptible n (%) | Reduced susceptibility n (%) | Resistant n (%) |
|----------------------|------------------|-------------------|------------------------------|-----------------|
| Ampicillin           | 24               | 11 (45.8)         | 0 (0.0)                      | 13 (54.2)       |
| Cotrimoxazole        | 24               | 11 (45.8)         | 0 (0.0)                      | 13 (54.2)       |
| Chloramphenicol      | 24               | 11 (45.8)         | 0 (0.0)                      | 13 (54.2)       |
| Ceftriaxone          | 24               | 24 (100.0)        | 0 (0.0)                      | 0 (0.0)         |
| Ciprofloxacin        | 24               | 24 (100.0)        | 0 (0.0)                      | 0 (0.0)         |

Source: Children participating in PneumoADIP surveillance in Dhaka Medical College Hospital, Sir Salimullah Medical College and Mitfort Hospital. ICH- Shishu Sasthya Foundation, Chittagong Maa Shishu O General Hospital, Dhaka Shishu Hospital and Kumudini Hospital, Mirzapur



*A Bangladeshi woman aged over 60 years. (Courtesy: Rabiul Hasan)*

This publication of HSB is funded by Government of Bangladesh through IHP-HNPRP.

**Editors:**  
Stephen P Luby  
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M Sirajul Islam Molla

**Editorial Board:**  
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**Copy editing and overall management:**  
M Sirajul Islam Molla

**Translation:**  
M Sirajul Islam Molla

**Design and pre-press:**  
Mahbub-ul-Alam

**ICDDR,B**  
GPO Box 128, Dhaka 1000, Bangladesh  
[www.icddrb.org/hsb](http://www.icddrb.org/hsb)