

Most Heterosexual HIV Transmission in Urban Rwanda And Zambia Occurs in Married or Cohabiting Couples

In urban areas of Rwanda and Zambia, most heterosexually transmitted HIV infections occur within marital or cohabiting relationships, according to a probability model that combined clinical data on couples' HIV status with population-based data on sexual behavior.¹ The estimated proportion is particularly high in Rwanda, where more than 90% of such infections, among both women and men, may occur between cohabiting or married partners. The researchers estimate that voluntary testing and counseling interventions, which have been shown to reduce the rate of HIV transmission within couples, would prevent more than one-third, and perhaps as many as four-fifths, of heterosexually transmitted infections.

The new analyses incorporate data from several sources. Information on the types and durations of heterosexual relationships and on condom use at last sex were obtained from Demographic and Health Surveys conducted in Zambia in 2001–2002 and in Rwanda in 2005. The probability that one partner in a relationship, but not both, was infected with HIV (i.e., that the relationship was serodiscordant) was estimated using data collected in 2003–2005 by voluntary counseling and testing services in Kigali, Rwanda, and Lusaka, Zambia. The annual risk of transmission among serodiscordant couples was assumed to be 20%, reflecting older, preintervention data from Zambia and Rwanda. For each urban survey respondent who reported having had at least one sexual partner in the past 12 months, the researchers estimated the probability that he or she had acquired HIV during that time from a married or cohabiting partner and from a noncohabiting partner. From these values, the researchers created probability models to estimate the proportion of heterosexually transmitted infections that occur within marriage or cohabitation. In addition, because prior research has shown that joint voluntary testing and counseling interventions reduce the annual rate of HIV transmission within couples to just 3–7%, they estimated the proportion of heterosexually

transmitted infections that could be prevented by such programs.

Analyses were based on data from 1,739 Zambian women, 540 Zambian men, 1,176 Rwandan women and 606 Rwandan men. In the year prior to being surveyed, 64–85% of respondents had had sex with a married or cohabiting partner, 16–51% had had sex with a noncohabiting partner and 1–15% had had sex with both types of partners. Levels of condom use at last sex were greater with noncohabiting partners (35–64%) than with cohabiting ones or spouses (5–11%).

In an estimated 9% of married or cohabiting couples and 16% of noncohabiting ones in Zambia, the female partner was HIV positive, but the male partner was not; in Rwanda, the corresponding values were 7% and 8%, respectively. Conversely, Zambian males were HIV positive, but their female partners were not, in an estimated 8% of married or cohabiting couples and 11% of noncohabiting ones; the corresponding values were 6% and 4%, respectively, in Rwanda.

An initial model that did not consider condom use predicted that more than half of heterosexually transmitted HIV infections occur in serodiscordant couples who are married or living together. The proportions varied by country and sex, ranging from 55% among Zambian males to 93% of both males and females in Rwanda. In analyses that took condom use (including the higher level of use by noncohabiting partners) into account and that assumed that condom use reduced the risk of HIV transmission by 50%, the proportion of heterosexually transmitted infections that occurred within marriage or cohabitation was slightly higher (60–94%).

Voluntary testing and counseling interventions that reduce the annual rate of HIV transmission within serodiscordant couples to 7% would prevent 36–50% of heterosexually transmitted HIV infections in Zambia and 60% of those in Rwanda. An intervention that reduced the annual transmission rate to 3% would prevent 51–80% of heterosexually transmitted infections.

In sensitivity analyses that tested a range of alternate assumptions about the annual rate of HIV transmission within married or cohabiting couples (10–30%), the annual probability of HIV transmission within noncohabiting couples (10–40%), the reduction in transmission risk resulting from condom use (25–85%) and the prevalence of serodiscordance (50–200% of the observed value), findings were largely similar to those described above. The results were also generally similar in analyses that varied the level of serodiscordance among couples and the number of partners a person had, with one exception: The proportion of new heterosexually transmitted infections occurring in marriage or cohabitation fell to 25–29% among Zambian men when extremely high or low levels of serodiscordance or numbers of noncohabiting partners were assumed.

The study's findings suggest that marital and cohabiting relationships pose a risk of HIV infection for men and women alike, the researchers note. They advocate collection of further data for couples of all types, and replication of the study in other populations to better define the proportion of new infections that occur within various relationship types. Although interventions that provide joint counseling to couples can reduce the risk of transmission, such programs are not the norm, the researchers observe. Moreover, services that focus on abstinence and fidelity without providing HIV testing will not be adequate for reducing transmission of the virus. Given the large potential reduction in new heterosexual infections that could be achieved by offering appropriate services, the researchers "call for increased promotion of voluntary counselling and testing for couples and for development and assessment of other interventions for couples that are both culturally and gender sensitive."—S. London

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Lifetime Abortion Rate In Iran Is Estimated to Be One Per Four Women

In Iran, where abortion is severely restricted by law, married women aged 15–49 have an estimated 73,000 abortions per year, according to a recent analysis of nationally representative data.¹ This translates to 0.26 lifetime abortions per woman. However, the abortion rate varies widely among Iran's provinces, depending largely on regional levels of religiosity and modern contraceptive use.

The data used to estimate abortion rates and levels come mainly from a subsample of 87,248 married women aged 15–49 who completed the 2000 Iran Demographic and Health Survey. The women provided information on social and demographic characteristics (including fertility), as well as on factors affecting their reproductive health. Because abortions are difficult to obtain in Iran and are often performed illegally, accurate data on the procedure's incidence were unavailable; thus, the researchers used the so-called residual method to estimate the abortion rate. In this approach, the abortion rate is calculated from a formula that incorporates women's theoretical maximum fertility rate (15.3 children per woman), the total fertility rate for Iran (2.0 children per woman), contraceptive use, postpartum infecundability, and seasonal and absolute spousal separation (due primarily to work-related migration). This rate was then applied to 1996 census data to generate an estimate of the incidence of abortion.

To examine the relationship between abortion and religiosity, the researchers merged data on the estimated abortion rates for Iran's provinces with information from the 1999–2000 World Values Survey, a 60-country survey of religious attitudes and behavior. The Iranian sample consisted of 2,532 men and women aged 15 or older and represented 26 of the country's 28 provinces. Data on the importance of religion in respondents' lives and the frequency with which respondents attended religious services were used to construct a religiosity scale that ranged from –3 (weak religiosity) to 2 (strong religiosity).

The researchers estimated that among the measured factors that limit fertility, contraceptive use had the greatest effect in Iran, far outweighing the impact of postpartum infe-

cundability and spousal separation. Abortion accounted for 4% of fertility inhibition. Extrapolating from the data, the researchers estimated the total abortion rate to be 0.26 lifetime abortions per woman, which corresponds to a national annual abortion rate of 7.5 per 1,000 married women aged 15–49. Overall, Iranian women have an estimated 73,000 abortions per year. The national rate, the researchers point out, obscures large regional differences: The estimated rate was essentially zero in 10 provinces, while it was more than 40 per 1,000 in Hormozgan (40.6) and Sistan-Baluchestan (46.3). In the remaining 16 provinces, estimated abortion rates ranged between 0.8 and 22.8.

A bivariate analysis of data from the 18 Iranian provinces with estimated abortion rates higher than zero revealed an inverse relationship between rates of abortion and contraceptive use, underscoring contraception's role in preventing the need for abortion. In an analysis that included all 28 provinces, the association between religiosity and abortion was generally negative: Highly religious provinces tended to have lower abortion rates than did areas that scored lower on the religiosity scale. Nonetheless, provinces with similar abortion rates often varied widely in religiosity. For instance, among provinces with an abortion rate of zero, religiosity scores ranged from around –1 (in Ardebil, which had the fourth lowest religiosity score) to 2 (in Semnan, the province with the highest score). In most cases, provinces that had low levels of both abortion and religiosity, such as Ardebil, had relatively high rates of modern contraceptive use.

In a multivariate analysis, the investigators found that together, contraceptive use and level of religiosity accounted for 87% of the variance in abortion rates among provinces. The analysis also confirmed that contraceptive use is negatively associated with abortion, even when the influence of religiosity is taken into account. Overall, the effect of contraceptive use on abortion rates was 51% greater than that of religiosity.

The researchers point out that the level of abortion in Iran, while relatively low—less than half that of neighboring Turkey—is nonetheless cause for concern, as “most [abortions] are performed in unsafe and hazardous circumstances because legal restrictions on the practice of abortion, although partially relaxed in recent years, remain strict.” Given the strong negative association

between contraceptive use and abortion rates, the authors advocate greater promotion of modern contraceptive use through Iran's family planning policies and programs. Their recommendations include increasing the availability of modern contraceptives in areas with high abortion rates, expanding contraceptive education efforts to reach couples, and increasing information about and access to emergency contraception.—*H. Ball*

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Pregnancy and Miscarriage Are Not the Main Reasons For Leaving School in Africa

Although “schoolgirl pregnancy” is commonly thought to be a key reason why many young women in developing countries do not complete their education, an analysis of Demographic and Health Survey data indicate that early pregnancy and marriage generally account for only about 20% of school dropouts among female adolescents in Sub-Saharan Africa.¹ Of the two causes, it is union formation, rather than pregnancy, that is most likely to precipitate dropping out. Moreover, as rates of early marriage and childbearing have declined in the region, so too has the risk of leaving school for either reason.

While policymakers and the media often cite pregnancy and marriage as the primary drivers for female adolescents' leaving school prematurely (i.e., before completion of secondary school) in Sub-Saharan Africa, the circumstances that predispose young women to have premarital sex or to marry early, such as poverty and poor school performance, may themselves lead students to drop out. To determine the relative importance of these various factors, researchers analyzed data on reproductive and educational outcomes from Demographic and Health Surveys conducted in 1994–1999 in 20 Sub-Saharan African countries. In the surveys, women of reproductive age who were no longer in school were asked to give the primary reason they left school and, in five of the countries, the age at which they left. The researchers examined how frequently women said that pregnancy or marriage was the main reason that they left school, and whether these reasons were more commonly

cited in countries with high rates of early marriage and childbearing. These analyses were restricted to women aged 20–24.

In addition, for the five countries (Burkina Faso, Cameroon, Côte d'Ivoire, Guinea and Togo) for which data were available on the age at which women left school, the researchers calculated three estimates of the probability that a young woman would leave school by age 20 as a result of pregnancy or marriage. The first estimate was simply the probability that a woman would report that she left school prematurely and that she did so because of pregnancy or early marriage. The second estimate consisted of the proportion of women who left school prematurely and who gave birth or married around the same time (i.e., their age at childbirth or marriage was within a year of their age when they left school); although these women did not necessarily attribute their leaving school to marriage or pregnancy, the analysis assumed that these events were directly related. The third estimate included women who fit either of the first two categories and served as the upper-limit estimate. These analyses were conducted for two cohorts: women who were aged 15–24 at the time of the survey and those who were aged 35–44.

The proportion of women aged 20–24 who had ever attended school ranged from 18% in Burkina Faso to 96–98% in Kenya, Zimbabwe and South Africa. In 14 of the 20 countries, more than 80% of those who had attended school reported leaving school early. Among those who left school prematurely, the proportion who reported that pregnancy was the primary reason ranged from 1% in Niger to 31% in South Africa; however, the proportion was no more than 10% in 15 countries and no more than 5% in nine. Similarly, the proportion of those who cited marriage as their primary reason for leaving school ranged from 3% in Côte d'Ivoire and Togo to 28% in Chad; again, in most countries, the proportion was no more than 10%. The countries with higher rates of dropout due to marriage were generally not the same as those with higher rates due to pregnancy.

Moreover, countries with high levels of early marriage (i.e., by age 18) did not necessarily have high proportions of women who cited marriage as their reason for leaving school. For example, in eight of the 20 countries, more than half of women marry by age 18; these countries include not only Chad and Nigeria, where relatively high propor-

tions (26–28%) of women who left school did so primarily because of marriage, but also Burkina Faso and Niger, where only 3–5% of women who left school did so primarily because of marriage. Similarly, there was little correlation between the rate of early childbearing in a country and the likelihood that women in that country would cite pregnancy as their reason for leaving school.

In the five countries with detailed data on the age at which young women left school, the probability that a respondent in the younger cohort would leave school prematurely and attribute the decision to pregnancy ranged from 3% in Burkina Faso to 10% in Cameroon. The upper-limit estimates, though higher, were lower than 10% in every country but Cameroon (17%). For marriage, the first estimates ranged from 1% in Togo and Côte d'Ivoire to 7% in Guinea, and the upper-limit estimates ranged from 12% in Togo to 22% in Cameroon. The upper-limit estimates suggest that young women were more likely to leave school because of early marriage than because of pregnancy. In addition, the upper-limit estimates indicate that in four of the five countries, childbirth and marriage together accounted for only about 20% of dropouts among young women.

Comparisons between the estimates for women aged 15–24 and those for the 35–44-year-old cohort indicate that the risk of leaving school because of pregnancy or marriage has declined. In Côte d'Ivoire, for example, the upper-limit estimate of the probability that a woman in the older cohort had left school because of marriage or childbirth was double that of a woman in the younger cohort (49% vs. 22%).

Given the study's findings, the authors conclude that for young women in francophone Africa, "the risks of leaving school during adolescence for reasons other than childbirth or marriage far exceed the risks associated with these demographic events." They add that schooling may be a protective factor against pregnancy and early marriage, because despite recent declines in the age at puberty and increases in the proportion of females attending school after puberty, the risk of school-leaving because of pregnancy has diminished. The researchers recommend that more complete retrospective data be gathered to facilitate "an exploration of the conditions that contribute simultaneously to greater schooling success and better reproductive health in adolescence."—*L. Melhado*

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Risk Factors for Recent HIV Infection in Uganda Include Marital Status and Herpes

In Uganda, risk factors for recent HIV infection include being female, having had multiple sex partners in the past year, being widowed or divorced, having a herpes simplex virus type-2 (HSV-2) infection and (among men) being uncircumcised, according to findings from a nationally representative survey.¹ In addition, among married individuals who have sex with outside partners, condom use is associated with a substantially reduced risk of recent infection. Although the researchers did not track changes in individuals' HIV status over time, they were able to identify probable recent (as opposed to long-term) infections on the basis of respondents' antibody levels, and their findings suggest that as many as 15% of HIV-positive individuals had been infected only recently (a median of six months prior to the survey).

The findings come from the 2005 Uganda HIV/AIDS Sero-Behavioral Study, in which a nationally representative sample of individuals aged 15–59 were interviewed about their health and sexual behavior. All residents of selected households, as well as persons who had visited the night before the survey, were eligible to participate. The interview included questions about respondents' age at first sex, number of recent and lifetime partners, STI history and demographic variables. In addition, respondents provided a blood sample, which was tested for HIV, syphilis and HSV-2. Because the study was primarily concerned with recent HIV infections, rather than with all HIV infections, the researchers used a test that measures the proportion of an individual's immunoglobulin G antibodies that react against HIV; this proportion increases in a predictable manner following infection, providing a means to estimate the recency of infection. The researchers used multivariate logistic regression to assess associations between interview variables and respondents' HIV status.

Researchers visited 9,529 households and completed interviews with 95% of eligible

women and 89% of eligible men; 94% of those who completed the interviews provided blood samples. The final sample consisted of 10,227 women and 8,298 men. Tests revealed that 6% of these individuals were infected with HIV, and 15% of the infections were classified as recent (within a median of six months prior to the survey), yielding an incidence of 1.8 infections per 100 person-years. The incidence was 2.1 infections per 100 person-years among female respondents and 1.5 per 100 person-years among males, and it was higher among persons who were widowed (4.8) or divorced (3.0) than among those who were married (2.0) or had never been married (0.7). The incidence among individuals aged 15–24 (1.1) was about half that among those aged 25–59 (2.3).

Multivariate analyses revealed that the odds of recent HIV infection were greater among women than among men (odds ratio, 2.4), among widowed (6.1) or divorced (3.0) individuals than among those who had never married, and among persons with one (1.7) or two or more (2.9) sex partners in the past year than among those who had not had any partners. Risks were also elevated among individuals who tested positive for HSV-2 (3.9), had had an STI in the past year (1.7) or were not circumcised (2.5; the odds for women were similar to those of circumcised men). Risk varied by region as well: Compared with those who lived in the central/Kampala region, those who lived in the north central area had a higher risk (2.6), while those who lived in the west Nile area had a lower risk (0.3). The findings were generally similar when the researchers used a more stringent definition of recency (i.e., a lower proportion of antibodies against HIV). Age, education and lifetime number of partners, among other characteristics, were not associated with the risk of recent infection.

In multivariate analyses restricted to sexually active, married respondents, the odds of a recent HIV infection among individuals who did not use a condom the last time they had sex with a nonmarital partner were three times those of respondents who had no nonmarital partners (odds ratio, 3.3). In contrast, respondents who had had one or more nonmarital partners, but had used a condom with at least one of them, did not have increased odds of a recent infection. As they were for the sample as a whole, the odds of recent infection among sexually active, married respondents were elevated among those who tested

positive for HSV-2 (4.1), had had an STI in the past year (1.6) or were not circumcised (4.1). For 74 married respondents with recent HIV infections, test results were also available for their spouses; 38% of the spouses had longstanding infections, 14% had recent infections and 49% were not infected.

The authors note that the incidence of recent infections in the total sample was higher than expected given the 6% prevalence of HIV in Uganda. This could reflect a recent increase in transmission rates, though it might be an artifact of the screening method. The elevated incidence of recent infections among females, divorcees and widows may be attributable to social factors—such as power differentials between the sexes and women’s limited access to education and financial resources—that restrict women’s ability to protect themselves from HIV, and highlights “the potential benefit of focusing specific interventions on changing social norms.” The findings also point to the continued need for HIV prevention efforts that focus on reducing individuals’ number of sexual partners, promoting condom use, HIV testing and circumcision, and delaying sexual debut. Finally, the elevated risk observed among individuals with HSV-2 suggests that drugs that suppress the virus, such as acyclovir, might help reduce HIV risk.—*P. Doskoch*

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Fertility Declines Have Stalled in Many Countries In Sub-Saharan Africa

During the past four decades, the total fertility rate (TFR) in the developing world has fallen by about half, from around six births per woman to about three. However, a new analysis suggests that in much of Sub-Saharan Africa, the transition from high to low fertility has stalled.¹ In two-thirds of countries in the region, there was no meaningful change in the TFR during the interval between the two most recent Demographic and Health Surveys. In contrast, fertility has continued to decline in Latin America, Asia and North Africa.

The study used data from 40 developing countries for which multiple Demographic and Health Surveys have been conducted since 1991. The key measures of interest were the

TFR in the three years before a given survey, and the absolute rate of fertility decline per year between surveys. On average, the most recent survey for the 40 countries (22 in Sub-Saharan Africa, 11 in Asia and North Africa and seven in Latin America) was conducted in 2003, and the previous survey in 1997. For 29 of the countries, data from three surveys were available; on average, these surveys were conducted in 1992, 1998 and 2004. The former Soviet republics were omitted from the study because of their “unique demographic and political history,” and Eritrea because the results of its 1999 survey were affected by the country’s war with Ethiopia. In addition, surveys conducted in 1999 in the Dominican Republic and Nigeria were omitted because of a small sample size and underreporting of events, respectively; however, surveys conducted in other years were used for those countries.

In countries with three surveys, the TFR in Sub-Saharan Africa was 2.0–2.5 births per woman higher throughout the study period than it was in Latin America or in Asia/North Africa. Fertility declined in all three regions, both between the first and second surveys and between the second and third surveys. However, the rate of decrease slowed considerably in Sub-Saharan Africa, from 0.07 births per woman per year during the first intersurvey interval to 0.02 during the second interval. In six of the 16 countries in Sub-Saharan Africa, fertility actually increased during the second interval. In contrast, the rate of decline in the TFR was fairly steady in Latin America (0.08 during the first interval and 0.07 during the second) and in Asia and North Africa (0.08 and 0.010, respectively), and no individual country in these regions showed an increase in fertility during the second interval. Overall, in 17 of the 29 countries, the decline in the TFR achieved during the first interval either slowed or reversed during the second interval.

Another analysis, which used the entire sample of 40 countries, examined whether there had been a statistically significant decline in fertility between the most recent two surveys. In Sub-Saharan Africa, only seven of the 22 countries (32%) showed such a decline. In contrast, nearly all of the countries in the other two regions had declines in fertility—10 of 11 in Asia and North Africa, and six of seven in Latin America.

Almost all of the 40 countries could be considered to be in transition from high fertility to low (replacement level) fertility; the excep-

tions were Vietnam—where the fertility rate (1.9) has fallen below replacement level—and Chad, Guinea and Mali, where contraceptive use is so low (<10%) that they have not yet begun the fertility transition. Of the remaining 36 countries, 14 (39%) did not show a statistically significant decline in fertility between the last two surveys, indicating a stall in the fertility transition. Twelve of the countries with stalls were in Sub-Saharan Africa. Although such stalls are uncommon, they need not be permanent: Nine of the countries with three surveys had such stalls during the first intersurvey interval, and all but one had a decline during the subsequent interval.

The researcher posits that several factors may have played a role in the recent fertility stalls in Sub-Saharan Africa. For example, fer-

tility tends to decrease when countries experience economic growth and declining mortality; in Sub-Saharan Africa, however, the economy stopped growing during most of the 1990s, while mortality increased because of the AIDS epidemic. Moreover, in many African countries, funding and promotion of family planning programs have declined in the past decade. “If the recent slow pace of fertility transition persists,” the researcher notes, “this trend will likely have adverse effects on the region’s prospects for social and economic development, food security, and the sustainability of natural resources.”—*P. Doskoch*

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Nevirapine Regimen Reduces Risk of HIV Transmission From Breast-Feeding—at Least in the Short Term

A six-week postpartum regimen of the antiretroviral drug nevirapine reduces HIV transmission from breast-feeding in the short term, but the benefits are no longer apparent after six months, according to findings from three coordinated randomized trials conducted in Ethiopia, India and Uganda.¹ Among infants who were HIV-negative a week after birth, those who received nevirapine for six weeks—an initial dose followed seven days later by five weeks of daily doses—were less likely than those who received a single dose of the drug at birth to have HIV at the end of treatment (odds ratio, 0.5). At the six-month follow-up, the difference in HIV rates was no longer statistically significant; however, infants given the extended regimen did have a reduced risk of death (0.5).

Although breast-feeding can transmit HIV, the World Health Organization recommends that mothers in developing countries who are infected with HIV consider breast-feeding their infants if they do not have access to a safe, affordable alternative, because unsafe sources of nutrition and hydration pose risks of their own, including death from diarrhea and other causes. Providing a single dose of nevirapine to mothers during labor and a dose to infants within a few days of birth helps prevent the immediate transmission of HIV, but does not reduce the risk of transmission through breast-feeding. The new trials were designed to examine whether an ex-

tended regimen of nevirapine could reduce transmission in breast-fed infants.

The three trials were originally meant to be independent entities, but the researchers merged their efforts during study development and implementation. As a result, most of the main features of the three trials were identical. Pregnant women with HIV who intended to breast-feed their children were recruited and randomly assigned to receive a single dose of nevirapine during labor; their infants received a single dose at birth, followed by daily multivitamins on days 8–42. Infants randomized to the extended regimen also received a dose of nevirapine on days 8–42. Blood samples were obtained from infants at birth, and at least four additional collections were scheduled for (although not always obtained during) the ensuing six months. Infants were classified as having HIV if they had two independent positive tests or if one test was positive and no subsequent sample was obtained for testing. The primary outcome for the study was HIV status at six months among infants who were uninfected at birth (those who had a positive HIV test within the first week were considered to have been infected at birth); secondary outcomes included HIV status at six weeks, and death from any cause at six weeks and at six months. The researchers also used a combined outcome measure that included both HIV transmission and death from any cause.

The main differences among the three trials were that the Ugandan trial included a third treatment arm, which was not included in the current analysis, and that women receiving antiretroviral therapy other than nevirapine were eligible for participation in India but not in the other two countries.

After omission of infants who were infected at birth and those for whom adequate specimens were unavailable for testing, the study sample consisted of 986 infants who received a single dose of nevirapine and 901 who received the extended regimen. The characteristics of the two groups—including the proportions of infants who were breast-fed or exclusively breast-fed—were generally similar, although infants in the single-dose group were more likely to receive 28 or more doses of study products (vitamins, in their case) than those in the extended-regimen group (54% vs. 48%).

After six weeks, the proportion of infants in the extended regimen group who had become infected with HIV was significantly lower than the proportion in the single-dose group (3% vs. 5%). However, by six months, the difference between the groups (7% vs. 9%) was no longer statistically significant. Mortality was equally common in the two groups at six weeks, but at six months it was lower in the extended-dose group than in the single-dose group (1% vs. 4%). For the combined outcome category that included both HIV transmission and death, adverse outcomes were less common in the extended-dose group than in the single-dose group, both at six weeks (4% vs 7%) and at six months (8% vs. 12%). Seventy-two percent of the deaths occurred among infants who were not infected with HIV; the most common causes were respiratory conditions, gastrointestinal conditions and infections.

Nearly 40% of the infants experienced at least one serious adverse event. The rate of these events did not differ between groups, however. The most common adverse events were abnormal laboratory findings (45%), gastrointestinal conditions (16%) and respiratory illnesses (14%).

The investigators note that the lack of a statistical difference in HIV transmission rates between the two groups at six months may be related to the low rate of HIV transmission in the single-dose group, which reduced the study’s statistical power to detect such a difference. Nonetheless, the benefits observed at six weeks in this study, and the findings from

another recent study of extended antiretroviral treatment during the postpartum period, suggest that “extended post-partum nevirapine should be considered for HIV-uninfected infants being breastfed by HIV-infected mothers to improve survival and to reduce the risk of HIV transmission,” the researchers contend. They add that “the optimum duration of post-partum infant nevirapine is, however, unclear, and is probably dependent on the duration of breastfeeding and other maternal and infant factors that vary among communities.”—*P. Doskoch*

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Hand Washing May Reduce The Risk of Infant Death In Home Births in Nepal

In rural southern Nepal, where the vast majority of births occur at home, the risk of neonatal mortality is significantly reduced when visiting birth attendants wash their hands before the delivery, mothers wash their hands before handling their infant, or both, according to an observational prospective cohort study.¹ When birth attendants and mothers both cleaned their hands, the risk of infant death was decreased by nearly half (relative risk, 0.6).

Hand washing has long been a recommended method of reducing the risk of infection, but there is little research assessing its effect on neonatal mortality in developing countries, let alone in high-risk rural environments like Nepal’s Sarlahi district. The neonatal mortality rate in Nepal is about 33 deaths per 1,000 births, and infectious diseases like meningitis and pneumonia account for almost 40% of these deaths. To examine the impact of hand washing in this setting, the authors performed a secondary analysis of data from a pair of community-based trials conducted in 2002–2006 that were designed to evaluate fieldworkers’ use of the antiseptic chlorhexidine for cleansing the skin and umbilical cord.

All pregnant women in 30 villages in Sarlahi were invited to participate in the studies. Upon enrollment, women were counseled on

safe birthing practices, including the importance of having birth attendants wash their hands with soap and of washing their own hands before handling their baby. They received, among other items, a clean birthing kit that contained soap. More than three-quarters of the women lived in households that lacked electricity or a latrine, and a similar proportion had never attended school.

Outcomes for 23,662 infants born alive from September 2002 to February 2006 were included in the analysis. More than 90% were born at home or outdoors (sometimes en route to a facility). About three in 10 infants weighed less than 2,500 grams, and two in 10 were preterm.

Visiting fieldworkers checked the newborns for signs of illness up to 11 times during their first 28 days of life. About half of these home visits occurred during the first week. The majority (63%) of the infants were first visited within 24 hours of birth; during the initial visit, all mothers completed a questionnaire that included an item about whether the birth attendant had washed his or her hands before the delivery. In 59% of births, the attendant had done so. On a follow-up questionnaire given two weeks later, about 15% of mothers reported always or sometimes washing their hands before caring for their baby.

The neonatal mortality rate in the study was 32 per 1,000 live births. After the exclusion of very early deaths, which were generally related to conditions like asphyxia or congenital abnormalities rather than to infection, infants delivered by birth attendants who had washed their hands prior to delivery had a 19% lower risk of death than newborns delivered by attendants who had not washed their hands (relative risk, 0.8). The risk of death was 60% lower for infants whose mothers washed their hands before caring for them compared with those whose mothers did not (0.4). Although the combination of attendant and maternal hand washing also reduced neonatal mortality (0.4), it was no more effective than maternal handwashing alone.

When the data were adjusted for possible confounding factors, such as birth weight and gestational age, the risk reductions were slightly smaller. Neonatal mortality declined by 19% when birth attendants washed their hands (relative risk, 0.8), by 44% when mothers washed their hands (0.6) and by 41% when both mothers and birth attendants washed (0.6).

Some high-risk groups particularly benefited from the interventions. The risk of mor-

tality was reduced for low-birth-weight infants (relative risk, 0.6), but not for those of regular weight, when birth attendants washed their hands before delivery. Maternal hand washing reduced the risk of neonatal death by 64% among infants born in homes without a latrine (0.4).

The authors qualify these findings by noting that all reports on hand washing were subjective, and that there may have been differences between women who reported washing their hands and those who did not that were not captured by this study. Moreover, because early neonatal deaths were excluded from most analyses, the findings should be interpreted as showing benefits “among infants who survived the first few days of life,” rather than among all newborns. Nonetheless, the findings indicate that “a substantial proportion” of neonatal deaths in Nepal “may be preventable with routine hand washing practices.” Although considered normal practice in developed countries, “the concept of washing with soap...to protect against infection is not well understood” in developing countries, and the authors suggest that the establishment of hand washing as a routine practice in these settings would have a “tremendous impact” on reducing the four million annual neonatal deaths worldwide.—*S. Ramashwar*

REFERENCE

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