Few Developing Countries Are Expected to Meet Goals for Reducing Maternal and Child Mortality

Although rates and numbers of maternal and child deaths have decreased substantially during the past two decades, few countries are on track to achieve the declines specified in the Millennium Development Goals, a recent analysis indicates.[1] Between 1990 and 2011, the global maternal mortality ratio declined by 1.9% per year and the child mortality rate by 2.2% per year—less than half the rates needed to reach the targets. At present, only 13 developing countries are on track to meet the maternal mortality goal, and just nine are expected to meet both goals.

Reductions in maternal and child mortality were among the eight goals cited in the United Nations Millennium Declaration of 2000. Specifically, the targets were for countries to reduce the mortality rate among children younger than five by two-thirds (goal 4) and the maternal mortality ratio by three-quarters (goal 5) from their 1990 levels by 2015. Two analyses published in 2010 concluded that annual declines in these outcomes were falling far short of the 4–5% needed to achieve the targets. However, the analyses were inconsistent in their classification of HIV-related maternal deaths, and did not have access to data that has since become available.

For the new analyses, investigators added 1,142 site-years of maternal mortality data, including new data from published reports and vital registration and surveillance systems; as a result, 138 of the 187 countries in the analysis have data that were unavailable for previous analyses, and the number of countries without data has been reduced from 21 to 15. In addition, unlike one of the 2010 reports, the researchers used the Millennium Development Goal definition of maternal mortality, which includes not only deaths during pregnancy or within 42 days of termination of pregnancy from direct and indirect causes, but also all HIV-related deaths that occur during pregnancy or within 42 days of termination. Moreover, the analyses on HIV-related maternal mortality used updated data on HIV prevalence, access to antiretroviral drugs and age-specific fertility from the United Nations and the World Health Organization.

Similarly, the researchers obtained new child mortality data for 163 countries. In addition to calculating numbers and rates for all deaths among children younger than five, they calculated estimates for four subcategories: neonatal mortality (within 0–6 days of birth), late neonatal mortality (7–28 days), postneonatal mortality (29–364 days) and childhood mortality (1–4 years).

Because accurate, up-to-date vital event data are unavailable for most countries, the researchers created models to fill gaps and correct for biases in event reporting. To obtain the most accurate estimates, the researchers created a range of regression models using 80% of available data; they then examined how well each model's predictions matched the remaining 20%, and used the most accurate models to make their estimates.

The analyses indicate that the annual number of maternal deaths worldwide declined from 409,000 in 1990 to 273,000 in 2011. Nearly half of the decrease occurred between 2005 and 2011, during which time India accounted for 29% of the decline. In 2011, the estimated maternal mortality ratio was 202 deaths per 100,000 live births; the ratio was highest in Eritrea, Liberia, Burundi and Afghanistan (881–1,081 per 100,000), and lowest in Austria and Iceland (four per 100,000 in both). About 56,000 maternal deaths were related to HIV during pregnancy.

Thirteen countries, representing 19% of births in the developing world, are on track to meet the Millennium Development Goal for reducing maternal mortality; the 13 include China, Egypt and Turkey, but no countries in Sub-Saharan Africa. Fifteen additional countries will meet the goal between 2015 and 2025 if the rate of decline they achieved between 1990 and 2011 continues; however, 96 others will not meet the goal until at least 2035 unless their rate of reduction increases. Twenty countries made no progress in reducing maternal mortality between 1990 and 2011.

The number of deaths among children younger than five declined by more than a third worldwide between 1990 and 2011, from 11.6 million to 7.2 million. The annual rate of decline was 2.2%; it was lowest for early neonatal mortality (1.7%), and higher for late neonatal (2.7%), postneonatal (2.5%) and childhood (2.4%) mortality. Sub-Saharan Africa accounted for 49% of child deaths in 2011 (an increase from 33% in 1990), while South Asia accounted for 33%. The rate of early neonatal mortality was 16.1 per 1,000 live births globally, and ranged from 0.8 per 1,000 in Japan to 36 per 1,000 in Equatorial Guinea; the rate of late neonatal mortality was 5.2 per 1,000 globally, and ranged from 0.4 in seven European countries to 15 in Equatorial Guinea (which also had the highest rates of postneonatal and child mortality).

Between 1990 and 2011, the number of developing countries whose mortality rate among children younger than five was lower than 20 per 1,000 increased from 20 to 41. Eighteen of the 41 were in Latin America; only two were in Sub-Saharan Africa, though 39 of the latter's 48 countries had greater declines in 2000–2011 than in 1990–1999, suggesting that the rate of progress has accelerated.

The investigators estimate that 31 countries (representing 27% of live births in developing countries) will meet the Millennium Development Goal for reducing child mortality. An additional 11 are predicted to meet the target by 2020, and all but three Latin American countries are on track to meet it by 2025. The picture is not as encouraging for Sub-Saharan Africa: Only Madagascar will likely meet the 2015 goal; eight other countries in the region are on track to make it by 2025, but 23 others, if past trends continue, will not meet the goal before 2040.

Countries with large declines in maternal mortality did not necessarily achieve similar declines in child mortality; the coefficient for the correlation between the rates of progress for the two measures was 0.42. Only 11 countries, and nine of 137 developing countries, are expected to make both goals: Albania, China, Egypt, Estonia, Iran, Libya, Maldives,

Mongolia, Peru, Syria and Tunisia. Another 14 are on target to meet both goals by 2020.

The researchers note that their analyses have several limitations. All of the estimates encompass a degree of uncertainty; for example, the 95% uncertainty interval for the number of maternal deaths in 2011 was 256,000–292,000, and the range for the number of child deaths was 6.6–7.8 million. In addition, data were unavailable for 15 countries, and atypical events such as the 2009 H1N1 epidemic may have affected estimates for some years. Still, the findings indicate that progress in reducing maternal and child mortality "is continuing" in much of the world, and seems to be accelerating in Sub-Saharan Africa. Although most countries are unlikely to a-chieve either target, the investigators acknowledge, "it is perhaps more important to keep track of whether the pace of progress for children and mothers has improved. Accelerated progress should be viewed as an important indicator of success of programmes ... even if the pace of the progress is below the [pace needed to reach the Millennium Development Goal] target."*–P. Doskoch*

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Injectable Use Associated With Increased Risk Of HIV Transmission

Use of hormonal contraceptives, especially the injectable, is associated with an increase in a woman's risk of acquiring HIV or of passing it on to her male partner, new research suggests.[1] In a prospective study of HIV-serodiscordant couples in Africa, women who were using hormonal contraceptives had twice the risk of nonusers of contracting HIV from their partner or transmitting the virus to him; the association was driven by the increased risk among injectable users. Moreover, compared with women who were not using hormonal contraceptives, HIV-positive injectable users were more likely to have HIV RNA in their genital tract—a possible mechanism for transmission—and had higher concentrations of the virus.

To examine associations between hormonal contraceptive use and HIV transmission, researchers analyzed data on 3,790 heterosexual, serodiscordant couples who had participated in either of two longitudinal HIV studies conducted in seven African countries from 2004 to 2010. The couples were recruited through community outreach and referrals from HIV testing and treatment centers, antenatal clinics and nongovernmental organizations. Participants had to be 18 or older and sexually active; those with HIV were ineligible if they had an AIDS-related illness, were using antiretroviral therapy or were pregnant.

Participants completed baseline and quarterly evaluations about sexual behaviors for up to 24 months (median, 18 months). Only women completed evaluations about hormonal contraceptive use. At each evaluation, women reported their current contraceptive method; they were assumed to have used the same method throughout the past three months. HIV-negative participants underwent quarterly serological testing, and HIV-positive participants underwent CD4 testing every six months. All participants received HIV counseling, free condoms and contraceptive supplies or referrals.

The researchers used generalized estimating equations to compare participant characteristics during periods of hormonal contraceptive use and nonuse, and Cox proportional hazards regression and marginal structural modeling to identify associations between hormonal contraceptive use and HIV transmission. For each three-month period, a woman was classified as having used a hormonal contraceptive if she had used the injectable or the pill; she was classified as a nonuser if she had used no method or condoms only, or had had a hysterectomy or tubal ligation. The investigators conducted separate analyses for women's acquisition of HIV and their transmission of the virus. Cases of female-to-male transmission were included in analyses only if genetic testing confirmed that both partners had the same strain of HIV, to avoid including transmission to men from outside partners whose use of hormonal contraceptives was unknown. Finally, researchers used logistic and linear regression to compare the prevalence and concentration of HIV RNA in cervical samples from hormonal contraceptive users with those from nonusers.

Among the 3,790 HIV-serodiscordant couples, the female partner was HIV-positive in 2,476 and HIV-negative in 1,314. Most couples were married and had children; the median age was in the mid-30s. HIV-positive participants had median CD4 counts of 455 cells per microliter.

At baseline, 15% of the HIV-negative women and 17% of the HIV-positive women were using a hormonal method; about three-fourths of users were receiving the injectable, and one-fourth were using the pill (4%). Overall, 1,321 women used hormonal contraceptives at some point in the study, although only about half used them during the entire study. During follow-up, men exposed to hormonal contraceptive use by their female partner were more likely than those not exposed to report having had unprotected sex with their partner during the past month (13% vs. 10%), but less likely to report having had sex outside the relationship in the past month (10% vs. 12%). Sexual behavior did not vary by hormonal contraceptive use among HIV-negative women, nor did plasma virus levels and CD4 counts in the infected partner differ by method use in either HIV group.

In multivariate analyses that adjusted for age, pregnancy, unprotected sex and the infected partner's plasma HIV levels, women who were using hormonal methods had twice as great a risk of becoming infected with HIV as women who were not using a hormonal method (adjusted hazard ratio, 2.0). The risk also was elevated among users of the injectable (2.1), but not among pill users, in part because of small sample sizes, according to the researchers. Similarly, the risk of contracting HIV was doubled among men whose partner was using any hormonal method or the injectable (2.0 for each).

Cervical samples taken from 1,691 HIV-positive women indicated that injectable users were more likely than those not using hormonal methods to have detectable levels of viral RNA in their genital tract (adjusted odds ratio, 1.7). In addition, the RNA was present at higher concentrations in injectable users than in nonusers.

The authors note several study limitations. First, they relied on self-reports to assess contraceptive use but did not collect information on contraceptive compliance or brands, whose properties may vary. Additionally, most participants were part of a randomized trial of a therapy to suppress herpes simplex virus type 2, which affects vulnerability to HIV infection (nearly 80% of HIV-infected people in Africa also are infected with herpes simplex virus type 2), and with which nearly all HIV-positive partners were infected.

Although the authors acknowledge that

their findings are cause for concern, they note that "the benefits of effective hormonal contraceptive methods are unequivocal and must be balanced with the risk for HIV-1 infection." They recommend combining HIV and contraceptive counseling to educate women about the potential HIV risk that hormonal methods may pose, and about the importance of dual protection with condoms. In an accompanying editorial, Morrison and Nanda reiterated the study's limitations, but noted that other studies have also found possible evidence of a link.[2] "The question of hormonal contraceptive use and risk of HIV acquisition remains unanswered after more than two decades," they wrote. "The time to provide a more definitive answer to this crucial public health question is now."–*A. Kott*

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Elective Labor Induction Linked to Elevated Risk of Adverse Outcomes

Latin American women with low-risk pregnancies who undergo elective labor induction are at increased risk for adverse maternal and perinatal outcomes, compared with those who experience spontaneous labor, according to an eight-country study.[1] Women who opted for labor induction without any medical indication were more likely than those who delivered spontaneously to require drugs to manage postpartum hemorrhage (relative risk ratio, 1.5), be admitted to the intensive care unit (2.9), need anesthesia or pain-relieving medications and procedures during labor (1.6–3.7) and delay the initiation of breast-feeding (1.1–3.1). Women electing labor induction were also more likely than those delivering spontaneously to undergo hysterectomy (5.2), though the researchers note that caution should be exercised when interpreting this finding, given the small number of cases involved.

To determine the frequency of elective labor induction in Latin America, as well as the associations between elective induction and adverse maternal and perinatal outcomes, researchers performed a secondary analysis of cross-sectional data from the 2004–2005 World Health Organization Global Survey on Maternal and Perinatal Health. The data, collected on every delivery over a 2–3 month period, were obtained from the medical records of 120 randomly selected health facilities located in eight randomly chosen Latin American countries. In all, the researchers analyzed 37,444 deliveries among women with low-risk pregnancies between 37 and 40 weeks of gestation. Multiple logistic regression models were run to determine the maternal and other characteristics associated with elective labor induction and to assess the relative risks for adverse outcomes. Characteristics included in the analyses were maternal age, marital status, education, parity and body mass index; gestational age; and facility type.

Out of the 11,077 cases of induced labor, 1,847 (17%) were elective, representing 5% of deliveries among women with low-risk pregnancies. Administration of oxytocin was the most common method used for elective induction (66%), and led to vaginal delivery in 88% of cases; cesarean section was required in 12% of electively induced deliveries. Women who did not have a partner were less likely than those who did to have an elective induction (odds ratio, 0.8), while women giving birth for the first time were more likely to choose to induce labor than those who had had one or more prior deliveries (1.1). In addition, women delivering at a social security or private health facility were more likely to have an elective induction than those delivering at a public facility (2.9 and 1.9, respectively).

Although the cesarean section rate was higher among women who had had an elective induction than among those delivering spontaneously (12% vs. 9%), the risk of cesarean section was only marginally associated with elective labor induction (relative risk ratio, 1.2). Women who had had elective labor induction had elevated odds of needing drugs to manage postpartum hemorrhage (1.5), undergoing hysterectomy (5.2, although only four hysterectomies were performed among those electively induced), being admitted to the intensive care unit (2.9) and needing epidural anesthesia or other pain-relieving medications or procedures during labor (1.6–3.7). In addition, women who had had an elective induction were more likely than those with spontaneous labor to delay breast-feeding by 1–24 hours (1.1), more than 24 hours (1.6) or more than six days (3.1). Other perinatal outcomes, such as Apgar scores, early neonatal death and admission to the neonatal intensive care unit, were not associated with delivery type, suggesting that elective induction did not offer any advantages to the infant.

The researchers note that the rate of elective labor induction in Latin America is similar to that found in developed countries (around 10%). They add that although the highly elevated risk of hysterectomy among electively induced women should be interpreted cautiously, the finding is nonetheless a concern, especially given that the affected women lost their ability to bear children as the result of a medically unnecessary procedure. "Caution should be exercised when inducing labour without any medical indication," they conclude, "since no clear benefits outweigh the associated risk of an adverse maternal outcome."–*L. Melhado*

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Personal, National Income Positively Linked to Rates Of Voluntary HIV Testing

Wealthier individuals are more likely than poorer ones to be tested for HIV, especially in less affluent countries, according to an analysis of data from a global survey.[1] Within countries, the odds that a person in the wealthiest income quintile has been tested for HIV are twice those of someone in the poorest quintile (odds ratio, 2.1). This disparity is substantially greater in lower-income countries (2.4) than in better-off ones (1.4).

Voluntary counseling and testing is a key component of HIV programs throughout the world, and generally includes not only testing but also risk assessment, emotional support and referral of infected individuals to appropriate providers. Some evidence indicates that testing and counseling reduces the likelihood that clients will engage in HIV risk behaviors, such as unprotected sex. However, cost may be a barrier to testing, particularly in developing countries.

To examine the relationship between voluntary testing and wealth—both within countries and among them—investigators exam-

ined data from the 2002–2003 World Health Survey. The survey, whose questions were carefully constructed and standardized to facilitate cross-cultural comparisons, was administered in 70 low-, middle- and high-income countries. Forty-nine chose to administer the survey's sexual and reproductive health module, which was given only to participants aged 18–49.

Respondents (except those who had given birth in the past two years) were asked whether they had been tested for HIV during the past 12 months. They also provided information on a range of social and demographic measures, including their gender, education, age, residence (urban or rural), marital status and household assets (which the investigators used to classify the respondents into country-specific income quintiles). Three country-level variables were also included in the analysis: gross domestic product per capita, national health expenditures per capita and HIV prevalence. Data for these measures were generally obtained from the World Bank's World Development Indicators database. The researchers conducted multilevel logistic regression analyses that allowed them to simultaneously assess associations between HIV testing and individual and country-level variables. Countries were categorized as higher income or lower income if their gross domestic product per capita was one standard deviation above or below the sample's mean, respectively.

The survey's sexual and reproductive health module was administered to 267,926 men and women, although only 110,638 answered the question about HIV testing. Another 3,933 respondents failed to provide information on one or more covariates, resulting in an analytic sample of 106,705. Globally, 9% of respondents had been tested for HIV in the past year; the proportion ranged from less than 1% (in Bangladesh, Bosnia and Herzegovina, China, Laos and Pakistan) to more than 25% (in Malaysia, Russian Federation, South Africa and United Arab Emirates). In 35 of the 49 countries, the prevalence of testing was less than 10%.

In regression analyses, all of the individual-level variables were associated with HIV testing. The odds of testing increased more than twofold for each increase in wealth quintile (odds ratio, 2.1); they were also greater among females than among males (1.2), and higher among urban residents than among rural dwellers (1.4). Respondents who were currently or formerly married, or who were cohabiting, were more likely than never-married, noncohabiting individuals to have been tested (1.2–1.5). Finally, the odds of testing increased with each year of schooling (1.1) and decreased with each year of age (0.99).

National wealth was also associated with differences in testing rates across countries. Individuals in higher-income countries were more likely than those in lower-income countries to have been tested for HIV; for example, among respondents who were in their country's lowest income quintile, the probability of testing was 1% if they lived in a lower-income country and 5% if they lived in a higher-income one. Moreover, disparities by income within countries were greater in lower-income countries than in higher-income ones; in the former, the odds of a respondent in the wealthiest quintile having been tested were 2.4 times those of a person in the poorest quintile, whereas in higher income countries the odds of testing among the wealthiest respondents were only 1.4 times those among the poorest participants. The probability of testing was unrelated to a country's health expenditures but positively related to its HIV prevalence (odds ratio, 1.1 per 1% increase in prevalence).

The authors note several limitations of the study, including the age of the data, the exclusion of new mothers and persons younger than 18 or older than 49 and the likelihood that some participants did not answer the question about HIV testing truthfully, even though interviewers explicitly stated that they did not want to know the test results. Nonetheless, the findings indicate not only that wealthier individuals are more likely than poorer ones to be tested for HIV, but that the disparity is especially great in poorer countries, suggesting that in the developing world "public spending disproportionately benefits those in the highest income quintiles." The investigators recommend that international programs and policies aimed at addressing the HIV/AIDS pandemic in less-developed countries "better [target] programs to low-income individuals to help reduce social and economic barriers associated with testing."
–P. Doskoch

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In Ethiopia, Community-Based Reproductive Health Agents Effectively Provide Injectable to Rural Women

Rural Ethiopian women who had received injections of depot medroxyprogesterone acetate (DMPA) from community-based reproductive health agents were less likely than those who had received the shots at health posts to discontinue the method after three months (1% vs. 9%) or between the third and sixth months (2% vs. 4%), according to a prospective community intervention trial.[1] Nearly all women in the trial were satisfied with both the injectable and their provider, although those who had used health agents were less likely than women who had gotten their shots at health posts to report side effects at three months. Moreover, at six months they could name more potential side effects than could health post clients.

Community-based distribution of the injectable by trained health agents has been successful in a number of developing countries. In Ethiopia, which has a shortage of skilled health care providers, community-based reproductive health agents (CBRHAs) are allowed to distribute oral contraceptives and condoms, but not the injectable or other methods. The potential benefits of expanding provision by these workers are substantial: Only 11% of rural Ethiopian women use any contraceptive method, even though 36% have an unmet need for family planning. This intervention trial, conducted in 2008–2009, assessed whether CBRHAs could administer the injectable to women in the predominantly rural Tigray region as safely, effectively and acceptably as health extension workers (basic-level providers) at government health posts.

The trial was conducted in four villages in each of the region's two districts. To maximize public support for the trial, community leaders were briefed on the project prior to its initiation. In each village, on average, four CBRHAs and two health extension workers participated in the intervention; all providers attended a 10-day classroom training program on family planning, client screening, injection administration and infection prevention, as well as subsequent clinical training

sessions. Women who approached a participating provider for contraceptives and who wished to use DMPA were invited to participate in the study, and self-selected into one of the study arms according to the type of provider they usually saw for family planning needs. After screening women for eligibility, providers administered the injectable without charge. At enrollment, and after receiving their three- and six-month follow-up injections, women completed questionnaires that assessed demographic characteristics, side effects, quality of service and satisfaction with the method and provider. Chi-square and t tests were used to assess differences between the two arms.

At enrollment, 622 women received the injectable from CBRHAs, and 440 from health extension workers. Compared with clients of health extension workers, CBRHA clients were older (mean, 30 vs. 28 years), had more children (4.0 vs. 3.6) and were less likely to be married (88% vs. 92%); they were more likely to have no education (89% vs. 78%) and to be new users of DMPA (58% vs. 46%). Four in 10 women in each group had never used a modern method.

Eighty-four percent of CBRHA clients received their second injection at three months, as did 82% of clients of health extension workers. By this follow-up, only 1% of women in the CBRHA arm had discontinued the method, whereas 9% of those in the other arm had done so. (The remaining women were lost to follow-up.) By six months, 79% of the original CBRHA clients and 62% of the original health extension worker clients had received their third injection, while an additional 2% and 4% of the original samples, respectively, had discontinued use. All of these differences were statistically significant.

At the first follow-up, women who had obtained their injections from CBRHAs were less likely than those who had used health extension workers to report having had side effects, although this difference disappeared by six months. Overall, nearly all women in both arms of the study were satisfied with DMPA and their provider. CBRHA clients were slightly less likely than clients of health extension workers to have received a written appointment reminder (96% vs. 100%), while they were more likely to have been offered condoms in addition to the injectable (80% vs. 73%). At six months, CBRHA clients could recall more potential side effects than could the health extension worker clients, and they were more likely than the latter to be able to cite irregular bleeding (43% vs. 32%) and amenorrhea (42% vs. 20%) as possible side effects. Finally, at six months, CBRHA clients were far more likely than health extension worker clients to want to receive injections at home (84% vs. 52%) or in the home of a health agent (13% vs. 5%), and less likely to want to get them at a health post (2% vs. 43%). The overall preference for home injections, even among women who had opted to receive care from health extension workers, may reflect that almost half of women in the study reported difficulty in traveling to a health facility for family planning.

The researchers believe this study demonstrates that community health workers can safely and effectively provide access to injectables, as well as reach first-time users of the method. They assert that such a community-based approach can not only increase the contraceptive options available to rural women, but also meet the high demand for the injectable in Ethiopia. These findings suggest that the appropriate "combination of social marketing and community-based distribution methods could help defray ... the costs of training and monitoring, generate income for community health workers and increase women's access to modern contraceptive methods."–*J. Thomas*

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Partner Abuse Uncommon Among HIV-Serodiscordant Couples in Africa

Only a minority of HIV-serodiscordant heterosexual couples who have ongoing access to couples' HIV counseling experience intimate partner abuse, according to a multinational study from Africa.[1] Although most couples did not experience verbal or physical abuse, the odds of being abused were slightly elevated among HIV-positive partners (odds ratios, 1.3 for women and 2.2 for men), and women—regardless of their infection status—were more likely than men to suffer abuse. Overall, 18% of HIV-positive and 14% of HIV-negative women reported experiencing intimate partner abuse during the two-year study, compared with 7% and 5%, respectively, of infected and uninfected men.

The study was a secondary analysis of data from a seven-country clinical trial, conducted in East and Southern Africa in 2004–2008, that examined the potential benefits of using an antiviral drug to prevent HIV transmission within serodiscordant couples co-infected with herpes simplex virus type 2. Participants had to be at least 18 years old, sexually active and planning on staying in their current relationship for the duration of the study. Most couples had learned that they were serodiscordant in the month prior to enrollment. HIV-positive partners attended monthly visits at an HIV clinic, and uninfected partners had quarterly visits; however, partners were encouraged to attend each other's clinic visits so that they could receive ongoing counseling to address the struggles of living as a serodiscordant couple.

At enrollment and every three months thereafter, participants were asked—separately and privately—whether they had been abused verbally (yelled at, called names or threatened) or physically (hit, slapped or forced to have sex) by their partner during the previous three months. The researchers used Kaplan-Meier analysis to determine the cumulative proportion of individuals who had reported intimate partner abuse at any point in the study, and univariate and multivariate generalized estimating equations to assess potential correlates of intimate partner abuse, including a wide range of social, demographic and behavioral factors assessed at initial and follow-up visits.

In 67% of the 3,408 serodiscordant couples, the woman was the partner with HIV. Two-thirds of couples were from East Africa; more than half were married and cohabiting. At enrollment, couples in which the woman was infected had been together for an average of five years, while those in which the man was infected had been together for seven. Most respondents had at least one biological child, eight or more years of education, and little or no income. The median number of times couples had had sex in the month before enrollment was four; one-quarter of respondents had had unprotected sex during that time.

At enrollment, 3% of infected women and an identical proportion of uninfected women reported having been a victim of intimate partner abuse in the previous three months, compared with 2% of infected and 1% of uninfected men. About 36–37% of the incidents

in which HIV-positive partners experienced abuse were probably or definitely related to the couples' learning that they were serodiscordant, in the view of study staff, compared with 13–15% of incidents involving abuse of uninfected partners.

Participants attended more than 39,000 follow-up visits. Intimate partner abuse was reported at 3% of infected women's visits, 2% of uninfected women's visits, and 1% each of infected and uninfected men's visits. After two years, the proportions of infected and uninfected women who had ever reported intimate partner abuse (18% and 14%, respectively) were more than twice those among men (7% and 5%). For both sexes, having reported abuse at enrollment was associated with reporting it at follow-up (odds ratios, 5.8 for women and 7.9 for men). However, the incidence of violence declined over the course of the study.

Overall, one or both partners reported intimate partner abuse in 16% of couples. Reports of such abuse came from the woman in 69% of these couples, from the man in 13% and from both in 18%. In 67% of the couples in which the man and the woman each reported intimate partner abuse at some point in the study, both partners reported abuse during the same visit at least once, indicating that the abuse was mutual.

The majority of reports involved verbal abuse, either alone or in tandem with physical violence. A larger proportion of women than men reported physical violence (11% vs. 3%), or a combination of verbal abuse and physical violence (48% vs. 20%). Abuse was not associated with seroconversion during the trial.

In multivariate analyses, a woman's odds of intimate partner abuse were elevated if she was HIV-positive (adjusted odds ratio, 1.3), unmarried (1.4) or living with her partner (2.6), or had had unprotected sex with her partner in the past month (1.9). Odds were elevated for a man who was HIV-positive (2.2) or had had sex with other partners in the past month (2.6); in addition, they were higher among men from East Africa than among those from Southern Africa (2.2), and greater among men aged 35–44 than among those aged 45 or older (1.9). For both sexes, the odds of having experienced abuse in the past three months were lower during the second year of study (0.3–0.7) than at enrollment.

The authors acknowledge several study limitations. The sample may not fully represent HIV-serodiscordant couples, especially those who are unaware of their serodiscordant status or are not in couples' counseling. Investigators did not collect data on alcohol use, which has been associated with intimate partner violence in other settings. Because of cultural norms about masculinity, men may have underreported being a victim of intimate partner abuse.

Although couples' awareness of serodiscordance may help them avoid transmitting HIV to the uninfected partner, the authors note that "becoming aware of being in a serodiscordant relationship itself could lead to intimate partner violence." However, the decrease in partner abuse observed during the trial could be "an indicator of the effectiveness of ongoing counseling in addressing couples' need for support." The authors suggest that future studies examine the extent to which HIV counseling can minimize the occurrence of intimate partner abuse.–*A. Kott*

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