

## Cesarean Section Is Safer Than Vaginal Delivery For Breech Births but Not Normal Presentations

Compared with vaginal deliveries, nonemergency cesarean deliveries are associated with a reduced risk of neonatal complications in cases of breech (buttocks-first) presentation, according to a prospective study conducted in Latin America.<sup>1</sup> The odds of fetal death among cases of breech presentation are reduced by 70–80% with an elective or intrapartum cesarean birth compared with a vaginal birth. However, newborns with a cephalic (headfirst) presentation are more likely to have a prolonged stay in the intensive care unit or to die before hospital discharge if delivered by cesarean rather than vaginally, and women delivering this way are twice as likely to experience severe complications (including death) as women with vaginal deliveries.

Researchers analyzed data from the 2005 World Health Organization global survey on maternal and perinatal health, which was conducted at health care facilities in Argentina, Brazil, Cuba, Ecuador, Mexico, Nicaragua, Paraguay and Peru. Demographic, health and obstetric information was obtained from medical records for all women admitted for singleton deliveries at 123 health facilities during a 2–3 month period in 2004–2005. Cesarean deliveries were classified as elective if the decision to perform surgery was made before the start of labor, and as intrapartum if the decision was made during labor; emergency cesarean deliveries performed before the onset of labor were excluded. A total of 94,307 deliveries were included in the analyses, of which 66% were vaginal deliveries, 14% elective cesarean deliveries and 20% intrapartum cesarean deliveries. Multivariate analyses were used to determine the odds of various maternal and neonatal outcomes (e.g., maternal death, fetal death or neonatal mortality) according to the type of delivery; these analyses adjusted for institutional factors, maternal characteristics and (for neonatal outcomes) gestational age. Because breech deliveries pose greater risk than cephalic deliveries, the two types were analyzed separately.

Only 2% of women with vaginal deliveries experienced severe maternal complications

(admission to the intensive care unit, blood transfusion, hysterectomy, a hospital stay longer than seven days or death), compared with 6% of women with elective cesarean deliveries and 4% of those with intrapartum cesarean births. In adjusted analyses, the odds of such complications among women with an elective or intrapartum cesarean delivery were twice those of women with a vaginal delivery (odds ratios, 2.3 and 2.0, respectively). In addition, women who had an elective or intrapartum cesarean delivery had substantially greater odds of receiving antibiotics after delivery, an indicator of infection (4.2 and 5.5). However, women delivering by elective or intrapartum cesarean were much less likely than women with vaginal deliveries to develop severe perineal lacerations, postpartum fistulas or both (0.1 and 0.1).

Fetal death occurred in 0.5% of pregnancies; in addition, about 1% of newborns died before hospital discharge, and 3% had intensive care unit stays lasting at least seven days. In cases of cephalic presentation, newborns delivered by elective or intrapartum cesarean were more likely than those delivered vaginally to have a prolonged intensive care unit stay (odds ratios, 2.1 and 1.9, respectively) and to die before hospital discharge (1.7 and 2.0). The odds of fetal death did not differ by delivery type.

In contrast, among cases of breech or other noncephalic presentation, elective and intrapartum cesarean deliveries were associated with a 70–80% reduction in the odds of fetal death compared with vaginal deliveries (odds ratios, 0.3 and 0.2, respectively). However, the odds of a prolonged intensive care unit stay or death before discharge did not differ among newborns delivered by elective or intrapartum cesarean and those delivered vaginally.

Because the poorer outcomes seen with cesarean deliveries (particularly intrapartum ones) might be due in part to medical problems that prompted the decision not to deliver vaginally, the researchers repeated the analyses for cephalic presentations, this time excluding cesarean deliveries that were per-

formed because of fetal distress or other relevant conditions. In these analyses, newborns delivered by elective or intrapartum cesarean were still more likely than those delivered vaginally to have a prolonged intensive care unit stay (odds ratios, 2.1 and 1.8, respectively). The association between cesarean delivery and death before hospital discharge remained significant for elective procedures (1.8), but not for intrapartum ones.

Finally, to assess whether the lack of labor was contributing to the negative outcomes seen following elective cesarean delivery, the researchers stratified births according to whether labor occurred spontaneously. For cephalic presentations, the odds of a prolonged intensive care stay were higher among newborns delivered by elective cesarean following spontaneous labor than among newborns delivered vaginally following spontaneous labor (odds ratio, 1.4)—and higher still among newborns delivered by elective cesarean without spontaneous labor (2.2). The odds that a newborn would die before discharge were also elevated for elective cesarean births without spontaneous labor (1.8), but among women who did have spontaneous labor, the odds of neonatal mortality did not differ between elective caesarian deliveries and vaginal deliveries.

While acknowledging that the study's findings may not apply to settings with higher rates of perinatal death or lower rates of cesarean delivery, the researchers conclude that “any net benefit from the liberal use of cesarean delivery on maternal and neonatal outcomes, at the institutional or individual level, remains to be demonstrated, with the exception of fewer severe vaginal complications and better fetal outcomes among breech presentations.” They recommend cesarean births for all breech presentations, as well as consideration of strategies that might convert breech presentations to cephalic ones. In addition, the researchers call for improved technologies for fetal monitoring during labor, which may help to reduce the use of cesarean delivery in cases of cephalic presentation.—S. London

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## Intimate Partner Violence's Effects on Women's Health May Be Long-Lasting

Physical and sexual intimate partner violence may have lasting effects on a woman's health, according to a recent multicountry study by the World Health Organization.<sup>1</sup> Compared with women who had never been abused, those who had suffered intimate partner violence had 60% greater odds of being in poor or very poor health, and about twice the odds of having had various health problems, such as memory loss and difficulty walking, in the past four weeks.

Unlike previous research on the health effects of intimate partner violence, which has mostly focused on small clinical samples of women in developed countries, the new analysis used a population-based sample of 19,568 ever-partnered women aged 15–49 at 15 sites in 10 countries. In most of the countries, the study was conducted in a rural province (Ethiopia), a large city (Japan, Namibia, Serbia and Montenegro) or both (Bangladesh, Brazil, Peru, Thailand and Tanzania); in Samoa, the whole country was sampled. Between 2000 and 2003, the researchers interviewed women about their health and their experience with physical and sexual intimate partner violence. Women were asked to rate their health as either excellent, good, fair, poor or very poor, and to note whether in the past month they had had various physical symptoms, such as memory loss or difficulties with daily activities, and symptoms of emotional distress, such as crying and inability to enjoy life. In addition, women were asked if they had ever attempted suicide or had suicidal thoughts. The researchers assessed women's experiences of physical and sexual violence in the past 12 months and in their lifetime; they used a composite variable that encompassed both physical and sexual abuse because a previous analysis had shown that 20–50% of women had suffered both kinds of abuse, making it difficult for the investigators to determine the effects of either type alone. The investigators conducted regression analyses to examine

the relationship between abuse and health outcomes, adjusting for women's location, age, marital status and level of education.

Across sites, 15–71% of women reported that a current or former partner had abused them physically, sexually, or both during their lifetime. In every country but Samoa, women who had been abused were more likely than those who had not to report being in poor or very poor health (odds ratio, 1.6). Moreover, the odds of having had pain (1.6), difficulty walking (1.6), memory loss (1.8), dizziness (1.7), vaginal discharge (1.8) or difficulties with daily activities (1.6) in the past month were elevated among abused women.

In addition to suffering recent physical problems, significant proportions of abused women (ranging from 19% in Ethiopia to 55% in Peru's provincial site) said that they had been injured at some point in their lives during a partner's assault. The majority of these women reported having been injured once or twice, but at seven study sites at least 20% had been injured six or more times. Although most of the injuries had been minor, such as bruises or bites, some women reported more serious consequences; for example, one-half of injured women in Bangladesh and the Peruvian province, and 8–34% of injured women elsewhere, had lost consciousness. Between 23% and 80% of injured women indicated that they had needed medical treatment as a result of a partner's assault.

Symptoms of emotional ill health were also associated with intimate partner violence: Abused women were more likely than other women to have ever had suicidal thoughts (odds ratio, 2.9) or to have ever attempted suicide (3.8). Suicidal thoughts were associated with intimate partner violence in every country but Ethiopia. More generally, abused women in all sites had higher levels of emotional distress than did women who had not been abused.

The researchers note that because the study was cross-sectional, they could not determine if abuse had caused the physical and mental health problems that women reported; it is possible, the investigators acknowledge, that women in ill health might have an elevated risk of experiencing intimate partner violence. However, they noted in a previous report on this sample that in every study country except Ethiopia, one-third of abused women had not been assaulted in the previous year, which suggests that abuse frequently preceded and may have caused the health

problems. Moreover, the consistent association between poor health and lifetime experience of abuse among women of such varied backgrounds and circumstances is "striking," according to the researchers. Given that intimate partner violence not only violates the rights of the abused partner but results in increased "health expenditures and human suffering," they recommend greater policy and programmatic attention to partner violence. —S. Ramashwar

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## Inequities Remain in Use Of Maternal Health Care Services in Bangladesh

Despite the implementation of programs that provide home-based skilled birth attendants, Bangladeshi women who are poor or uneducated are still far less likely than wealthier, highly educated women to use maternal health care services.<sup>1</sup> For example, women whose household assets place them in the wealthiest quintile are more likely than those in the poorest quintile to have used skilled birth attendants (odds ratio 2.9), had a cesarean delivery (2.6) or received postnatal care (1.5) for their most recent birth. Use of these maternal services also differed by women's educational level, religion, proximity to a hospital and receipt of prenatal care.

In the past decade, the Bangladeshi government has made emergency obstetric care and, more recently, the provision of home-based skilled birth attendants the focal points of its efforts to reduce maternal mortality. Although these programs (and related programs offered by nongovernmental organizations) have often provided services at little or no cost, it has not been clear whether the women who most need such services, such as those of low socioeconomic status, have been receiving them.

To find out, researchers examined utilization of skilled birth attendants in regions served by two maternal health care programs, both run by nongovernmental organizations in areas where government services were also available. In the first program, implemented

between 1992 and 1997, women in a rural region south of Dhaka were trained to be midwives, enabling them to perform safe deliveries and provide antenatal and postnatal care. The second program, conducted in rural and periurban areas throughout the country, provided refresher training to midwives and nurses in 2005. The following year, researchers at the International Centre for Diarrhoeal Disease Research, Bangladesh, used self-weighted cluster sampling to survey a representative cohort of 2,164 women who lived in areas served by these two programs and who had given birth in the previous 12 months. Women were asked about their use of antenatal care, skilled birth attendants, cesarean delivery and postnatal care. In addition, the researchers assessed various measures potentially associated with receipt of services, including wealth (determined by household assets), distance to the nearest government hospital, religion, and women's and husbands' education. Associations between use of services and background characteristics were assessed using multivariate logistic regression models that controlled for age and parity.

Most participants were Muslim (95%) and had completed at least one year of schooling (80%). More than four-fifths (81%) were aged 20–35, and one-third (35%) had been pregnant only once.

About two-thirds (65%) of deliveries had been performed at the woman's home, without the presence of a skilled birth attendant; another 12% had taken place at home, but with a skilled attendant supervising. The remaining 23% of deliveries had occurred in health facilities. The vast majority of women (93%) had had at least one prenatal care visit, and half of these women had had at least four visits. Postnatal visits, however, were far less common (28%). Eleven percent of respondents had had a cesarean delivery.

Use of maternal health care services differed according to women's education level, wealth, distance from hospital, religion and antenatal visits. For example, women from the wealthiest quintile of households were more likely than those from the poorest quintile to have had a skilled birth attendant (63% vs. 16%), a cesarean delivery (28% vs. 3%) or a postnatal care visit (39% vs. 22%).

In multivariate analyses, women were more likely to have used a skilled birth attendant if they had had at least 10 years of education (odds ratio, 2.7) or their husbands had

had this level of education (2.3) than if they or their husbands had had no education, respectively. Similarly, the odds of birth attendant use were greater among women in the wealthiest quintile (2.9), those who were not Muslim (2.1) and those who had had two (2.4), three (2.9), or four or more (3.8) prenatal care visits, compared with women in the poorest quintile, Muslim women, and those who had had no prenatal visits, respectively. Women who lived more than five kilometers from a hospital were less likely than women who lived closer to a facility to have used a skilled birth attendant (0.7).

Use of cesarean deliveries and postnatal care also differed by subgroup. Women had elevated odds of having had a cesarean delivery if their husband had had at least 10 years of education (odds ratio, 2.0), if they were in the wealthiest quintile (2.6) or if they were not Muslim (2.1). Postnatal care usage was elevated among women who had had at least four prenatal care visits (2.7) and among those in the wealthiest quintile (1.5).

Overall, the findings suggest that inequality in the use of maternal health care services remains "substantial" and that costlier, facility-based services, such as cesarean delivery, are "more inequitably distributed...than frontline, less-expensive, preventive services," such as prenatal care, the authors note. Improving women's educational opportunities and reducing socioeconomic inequality "should be viewed as a central policy and programme goal" if maternal mortality is to be reduced, they contend. In addition, there is a need for "implementation and evaluation of interventions that are efficient and that benefit the poor," such as voucher programs for maternal health services.—*P. Doskoč*

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## Poverty Linked to Early Sexual Debut and Low Condom Use in Africa

In Burkina Faso, Ghana and Malawi, female adolescents from poor households are more likely than their wealthiest counterparts to have had sex, according to an analysis of nationally representative data from four coun-

tries in Sub-Saharan Africa.<sup>1</sup> Moreover, in Ghana, Malawi and Uganda, sexually active adolescents of both genders who come from poorer families are only about half as likely as their wealthiest peers to have used a condom the last time they had sex (odds ratio, 0.4–0.6).

The analysis was designed to help sort out the associations between wealth and some of the risky behaviors that contribute to HIV transmission among adolescents. Researchers analyzed data from interviews with 19,500 adolescents aged 12–19 in Burkina Faso, Ghana, Malawi and Uganda. The countries were chosen to reflect a variety of HIV prevalence rates and contexts; in 2003, the prevalence of HIV among adults ranged from 2% in Burkina Faso and Ghana to 7% in Uganda and 14% in Malawi. Multistage cluster sampling was used to obtain nationally representative samples of adolescents in each country. Respondents were asked about their sexual experiences, socioeconomic status, education, childbearing, contraceptive use and HIV knowledge. Household wealth was categorized into quintiles based on ownership of selected assets and was determined separately for urban and rural respondents. For each country, discrete-time hazard models were used to determine the likelihood of first sex by a given age; separate models were created for males and females. For sexually experienced respondents, logistic regression analysis was used to examine the associations between selected characteristics and condom use at last sex and number of sex partners in the past year; in these analyses, the male and female data for each country were pooled.

Overall, more than half of respondents were aged 15–19, and the majority were unmarried. Among those who were unmarried, 24% of males and 16% of females had had sexual intercourse; the proportions ranged from 9% (Ghana) to 40% (Malawi) among males and from 13% (Uganda and Malawi) to 21% (Burkina Faso) among females. In Malawi and Uganda, males were more likely than females to have had sexual intercourse; the opposite was true in Burkina Faso and Ghana.

Household wealth was associated with having had sex among females in Burkina Faso and Ghana and among members of both genders in Malawi. Young women in the poorest and second poorest quintiles were more likely than those in the wealthiest quintile to have had sex in Ghana (odds ratios, 2.7 and

1.9, respectively) and Malawi (1.9 and 2.6, respectively); the odds of having had sex were also elevated among young women in the second wealthiest quintiles in Ghana (1.8) and Malawi (2.0). In Burkina Faso, only females in the second poorest quintile had elevated odds of having had sex (2.0). Among males in Malawi, those in the second poorest (1.3) and middle (1.6) quintiles had increased odds of having had sex. Young men in all four countries and young women in three of the countries were more likely to have had their sexual debut while attending school than while not attending school (1.7–3.3); the exception was Burkina Faso, where 63% of female respondents had never attended school.

Among respondents who had been sexually active in the year prior to the survey, 43% reported that they had used a condom the last time they had sex. In Malawi and Uganda, adolescents aged 15–19 were more likely than those aged 12–14 to report having used a condom at last sex (odds ratios, 3.3 and 3.8, respectively). However, adolescents in the poorest and second poorest quintiles were less likely than those in the wealthiest quintile to have used a condom, in both Malawi (0.4 and 0.5, respectively) and Uganda (0.4 and 0.5). In addition, in Burkina Faso, Malawi and Uganda, rural residence was associated with decreased odds of condom use at last sex compared with urban residence (0.2–0.5).

Twelve percent of sexually experienced males and 5% of sexually experienced females reported having had two or more sex partners in the year before the survey; 20% of sexually experienced females and 34% of sexually experienced males reported having had no sex partners in the preceding year. Wealth was not associated with number of partners in any of the four countries; however, there were interactions between wealth and gender in Ghana and Uganda, such that males in the middle wealth quintile had the highest risk of having had multiple partners in the preceding year. Although no socioeconomic or demographic characteristic was associated with multiple partnerships in every one of the four countries, in at least one of the countries the odds of having had more than one partner were reduced among females, married respondents, Muslims and those who had had sex for the first time between the ages of 15 and 19.

Overall, the findings indicate that in parts of Sub-Saharan Africa, poverty is associated

with early sexual debut (particularly among females) and that the poor are less likely than their wealthier peers to use condoms. Thus, the researchers note, it seems likely that “poverty, by influencing sexual behavior and access to services, can influence the transmission of HIV infection.” They conclude that “HIV prevention programmes must identify ways of making the poor less vulnerable to risky sexual behavior and devise strategies for improving condom usage among the poorest.”—L. Melhado

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## Truckers Who Perceive Having Greater Freedom Tend to Have More Partners

Truck drivers who perceive having moderate or high levels of freedom while on the road are more likely than those who perceive having no more freedom than they do at home to report having had a commercial sex partner in the past six months, according to a Brazilian study.<sup>1</sup> Moreover, drivers whose trips average a week or longer are more likely than those whose trips are shorter to have commercial partners. For every additional week spent at home each month, a driver's odds of having had a commercial sex partner in the past six months are reduced by 23%.

In general, mobile individuals have higher rates of STIs, including HIV, than less mobile individuals, in part because being away from home affords mobile workers more opportunities to engage in casual sex. Moreover, without family and social networks to reinforce behavioral norms, mobile workers may feel a greater sense of freedom while on the road. Few studies, however, have attempted to measure the social experience of mobility or to assess the relationship between this experience and sexual risk-taking.

In 2003, researchers interviewed 1,775 male truck drivers who had been systematically recruited at two Brazilian customs stations: one bordering Argentina, the other both Argentina and Paraguay. The participants were asked about demographic characteristics, sexual health and behavior, and exposure to sexual health education. Addi-

tionally, participants reported the types of sex partners (principal, commercial and occasional) they had had in the past six months and their total number of partners in the preceding month. Mobility was measured in two ways: by the number of nights spent at home in the previous month and the number of months spent at home in the previous year, and by the typical length of participants' trips (less than a week, 1–2 weeks, 2–4 weeks, more than four weeks or variable length). To measure the truckers' sense of freedom and of being outside of the norms and obligations of conventional social networks, the researchers developed a 10-item scale. Participants were asked to state whether they agreed, partially agreed or disagreed with such statements as “Being a truck driver means I have more freedom to do what I'd like” and “When I am on the road I can do things that I don't do at home”; responses were used to group the truckers into clusters. The researchers conducted logistic and negative binomial regression analyses to assess whether mobility and sense of freedom were associated with having commercial or concurrent partners and with the number of these partners.

Most of the drivers were from Brazil (73%) and were married or cohabiting (87%). Their median age was 40, and they had a median of eight years of education and 15 years' experience as a truck driver. In general, the drivers were on the road more often than they were home: They had spent a median of two months at home in the past year and five nights at home in the past month. Almost half of their trips lasted 1–2 weeks. About one-third of the truckers had had at least one commercial partner in the past six months, and one-quarter had had an occasional partner. Ninety-three percent of truckers who had had commercial partners reported using condoms consistently with those partners; rates of consistent use were lower with occasional (68%) and principal (9%) partners.

The cluster analysis yielded three groups with differing attitudes about behavior while on the road. According to these classifications, 31% of the truckers can and do behave differently while on the road, 42% could but do not behave differently, and 27% cannot and will not behave differently. Truckers in the “can and do” cluster reported the greatest perceived freedom, while those in the “cannot and will not” group felt that being on the road was the same as being home. Truckers in the “could but do

not” cluster reported feeling less supervision while on the road than at home, but the levels of freedom they felt during trips fell between those of the other two groups.

These differences in perceived freedom were embodied by participants’ sexual behavior. Compared with truckers in the “cannot and will not” cluster, those in the “can and do” and “could but do not” clusters were more likely to report having had a commercial partner (odds ratios, 3.9 and 1.4, respectively) or an occasional partner (2.1 and 1.5, respectively) in the past six months. Similarly, truckers in the “can and do” and “could but do not” clusters were more likely than those in the “cannot and will not” cluster to have had concurrent partners in the past month (3.5 and 2.2, respectively).

The odds of having had a commercial or concurrent partner in the past six months were reduced by 23% and 29%, respectively, for every additional week the drivers spent at home per month. Those whose trips averaged 1–2 weeks, 2–4 weeks or more than four weeks were more likely to report having had a commercial sex partner than were men whose trips averaged less than a week (odds ratios, 1.5, 1.8 and 2.3, respectively). In addition, drivers whose average trip lasted 2–4 weeks or more than four weeks were more likely than those whose trips averaged less than a week to have had concurrent partners (1.6 and 1.8, respectively).

Similar patterns emerged for drivers’ number of partners. Among men who had had at least one commercial partner, the average number of these partners declined by 24% for every additional week that the men slept at home per month. Put another way, given that participants averaged eight commercial partners per year, a driver who spent an additional week at home per month would have two fewer commercial partners annually. Unmarried men tended to have a greater number of commercial partners if their average trip lasted more than a week; among married men, only trips longer than four weeks were associated with an increase in commercial partners.

Overall, the findings indicate that both physical travel and the psychosocial aspects of being mobile are associated with increases in commercial and occasional sexual partnerships. Thus, to be effective, preventive programs must “integrate issues surrounding mobility and conditions of travel,” the researchers note. They suggest that interven-

tions “encouraging family travel and family context” may “provide a more stable travel environment for truckers and thus reinforce home-based social norms and reduce the liminal effect of travel.”—*L. Melhado*

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## Many Countries May Not Meet Maternal and Child Health Goals by 2015

At the midpoint of the 15-year timetable for achieving the Millennium Development Goals, the majority of countries with high levels of maternal and child mortality are not on track to meet the targets for reductions in these outcomes by 2015, according to a recent analysis.<sup>1</sup> Among the 68 countries that account for the vast majority of maternal and child deaths, only 16 are on track to reduce mortality among children younger than five to one-third of its 1990 level (Goal 4). Progress toward reducing maternal mortality by three-quarters (Goal 5) has been slow as well: In all 41 Sub-Saharan African countries included in the analysis, at least 300 maternal deaths occur per 100,000 live births.

The research was conducted by Countdown to 2015, a collaboration of researchers, policymakers and other stakeholders that has been tracking progress toward the Millennium Development Goals in the 68 countries in which 97% of deaths among women of child-bearing age and children younger than five occur. Researchers focused on determining coverage rates (the proportion of individuals in each country who need a service and are able to obtain it) for interventions that have been proven to avert maternal, newborn and child deaths, that can be widely implemented in resource-poor countries, and whose levels can be reliably estimated across countries and over time; these interventions include provision of contraceptive and STI services, skilled care during childbirth, and pre- and postnatal care. Most of the data were obtained through nationally representative household surveys.

When possible, the investigators examined trends in coverage since 2000. Because data on maternal mortality were often too imprecise

to allow trends to be tracked, the investigators simply classified each country’s 2005 rate as very high ( $\geq 550$  deaths per 100,000 live births), high (300–549 per 100,000), moderate (100–299 per 100,000) or low ( $< 100$  per 100,000). In no country were data available for every measure and intervention type.

Analyses revealed that most of the 68 Countdown countries have not made adequate progress in reducing child and maternal mortality. Only 16 countries have reduced the rate of death among children younger than five sufficiently to be considered on track for meeting Millennium Development Goal 4. Three of these countries, including China, have reached the necessary rate of reduction since the last Countdown report in 2005. Sub-Saharan African countries accounted for more than half of child deaths worldwide and, with the exception of Eritrea, are not on track to achieve Goal 4.

The maternal mortality statistics in Sub-Saharan Africa were similarly grim: Ratios were high or very high in all 41 countries, and the region accounted for 50% of maternal deaths worldwide (most of the remaining deaths occurred in south Asia). Of the 10 countries with the highest maternal mortality ratios, nine were in Sub-Saharan Africa, including Sierra Leone, which—with a maternal mortality ratio of 2,100 per 100,000 live births—ranked last among the 68 countries.

Progress toward increasing the coverage of maternal, newborn and child health interventions and approaches was uneven across and within the Countdown countries. In countries where intervention coverage had been assessed at least twice between 2000 and 2006, the proportion of women aged 15–49 who had received contraceptive services or skilled delivery care increased by an average of two percentage points per three years; the proportion of pregnant women who had had at least one prenatal visit with a skilled provider increased by four percentage points per three years. Coverage was higher for interventions that could be scheduled in advance, such as prenatal care services (which were available, on average, to more than 80% of the population in the 68 countries), than for services requiring 24-hour access to trained personnel, such as care for the mother and child immediately after delivery and management of childhood illness. Average coverage levels for the latter services were less than 60%; levels were only about 30% for promotion of exclu-

sive breastfeeding and for contraceptive prevalence. Moreover, services that ideally would have been integrated—for example, routine prenatal care, prevention of mother-to-child transmission of HIV and malaria treatment during pregnancy—were not combined; some of these interventions had very limited coverage or were not offered at all.

Although such gaps in coverage constitute a major challenge for the 68 Countdown countries and for donor organizations, the researchers acknowledge that their analysis presents only a partial picture of progress (or lack thereof) toward Goals 4 and 5. Many data were not available, were outdated or involved measures that did not allow comparisons. Moreover, stillbirths are often not counted in infant mortality rates. Better systems are needed to collect the data required to support sound decisions at national and local levels, the researchers emphasize.

Despite the low levels of coverage for ma-

ternal and child health interventions in most Countdown countries, the investigators believe that “many of the necessary ingredients are in place to accelerate progress towards achievement of the health-related [Millennium Development Goals].” These include consensus on which interventions should be prioritized and the presence of programs to carry them out. Improving the survival rates for women, newborns and children will depend in large part on strengthening those programs by increasing 24-hour access to services and establishing “a functional continuum of care that encompasses women before pregnancy, pregnancy, childbirth, the postnatal period, and the first 24 months of a child’s life.”—*H. Ball*

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## Pill Use Is Associated with Reductions in Overall Risk of Cancer and in Risk of Main Gynecologic Cancers

Ever-use of the pill had no adverse effect on the overall risk of cancer in the large cohort of British women participating in the Royal College of General Practitioners’ oral contraception study. Rather, analyses of data reflecting as much as 36 years of observation indicate that ever-users of oral contraceptives had a 12% reduction in the risk of developing any cancer and a 29% reduction in the risk of developing cervical, uterine or ovarian cancer. (Analyses of data from a subset of the cohort, however, revealed no association between ever-use and the risk of any cancer.) Long-term pill use was associated with elevated risks of some cancers and with reduced risks of others.<sup>1</sup> Analyses of data from the U.S. Nurses’ Health Study, another long-term cohort study, confirm the inverse association between pill use and ovarian cancer risk; they also show that the risk of this disease is reduced among sterilized women and elevated among women who have used an IUD or are infertile.<sup>2</sup>

### The British Study

The original British cohort comprised about 23,000 current pill users and a similar number of never-users recruited by general practitioners throughout the United Kingdom in

1968–1969. Participants were 29 years of age, on average, and were married or cohabiting at recruitment; most were white. They were followed up by their physicians, who collected information every six months about their pregnancies, illnesses, surgeries and use of hormonal contraceptives or hormone replacement therapy. One-quarter of women remained in the study until 1996. In addition, central registry data on cancer and mortality after the mid-1970s were available for three-quarters of the original cohort, regardless of whether the women were still being followed up by their physicians; these sources covered the period up to a woman’s first cancer diagnosis or 2004, whichever came first.

Two data sets were used for the analysis of cancer risk. The main one was based on all women for whom central registry data were available and included about 744,000 woman-years of observation for ever-users of oral contraceptives and 339,000 woman-years of observation for never-users. The second one contained only information collected by general practitioners through 1996 and contained about 224,000 and 331,000 woman-years of observation for ever- and never-users, respectively. Researchers calculated the rates of first diagnoses of a variety of

cancers among ever- and never-users; rates were standardized for women’s age and parity at diagnosis, and for cigarette smoking and social class (as defined by husband’s occupation) at recruitment. Relative risks were calculated to compare rates by use status and selected characteristics of women.

Participants included in the main data set were predominantly younger than 40 when they entered the study (94% of ever-users and 90% of never-users); most had had at least one birth (83% and 80%, respectively) and had husbands who were employed in manual occupations (64% and 61%). Close to half of ever-users and four in 10 never-users in this data set smoked. Some 13% of ever-users and 10% of never-users in the general practitioner data set had used hormone therapy.

Compared with never-users of oral contraceptives, ever-users in the main data set had a 12% lower risk of developing any cancer during follow-up and a 29% lower risk of developing one of the main gynecologic cancers (cervical, uterine or ovarian cancer). They had significantly reduced risks of cancer of the large bowel or rectum (relative risk, 0.7), uterus (0.6) and ovaries (0.5), and of cancers for which the site was unknown (0.6) or that were classified as “other” (0.9). The reduction in overall risk translates into an estimated 45 cancers prevented per 100,000 woman-years. Relative risks calculated from the general practitioner data set were significant only for uterine and ovarian cancer (0.5 for each). In the main data set, the overall risk of cancer was significantly reduced for ever-users of the pill who were in their 30s or 50s, among both smokers and nonsmokers, among women of most parities and regardless of social class.

Data from the general practitioners’ observations were used to explore the relationship between cancer risk and characteristics of women’s oral contraceptive use. These analyses showed no relationship between pill use for less than four years and cancer risk (median duration of use was 44 months), and a modest decrease in overall risk associated with use for 4–8 years (relative risk, 0.9). However, use for more than eight years, which accounted for less than a quarter of use in the cohort, was associated with an elevated risk of any cancer (1.2) and of cancers of the cervix (2.7) and the central nervous system or pituitary (5.5). Furthermore, the trend toward increased risks of these specific cancers with increasing dura-

tion of use was statistically significant, as was a trend toward decreased risks of uterine and ovarian cancer.

Ovarian cancer risk was reduced for up to 15 years after women had last used the pill, and uterine cancer risk was reduced for up to five years since last use; for both of these cancers, the data suggest continued reductions in risk at longer durations since last use. Although trends for individual cancers were not statistically significant, ever-users' risk of developing any main gynecologic cancer declined as the time elapsed since last use of the pill increased.

The researchers comment that "many women, especially those who used the first generation of oral contraceptives many years ago, are likely to be reassured by [these] results." Nevertheless, they acknowledge that their findings may not reflect current pill users' experiences, given changes in preparations and in use protocols. Moreover, they emphasize that "the likely balance of cancer risks and benefits" may vary in different parts of the world, and that this is an important area for further study.

#### **The U.S. Study**

The initial cohort of the Nurses' Health Study consisted of almost 122,000 married, female registered nurses who were 30–55 years old

at recruitment, in 1976. Baseline data, including information on oral contraceptive use and risk factors for cancer, were collected in a mailed questionnaire. In follow-up questionnaires sent to participants twice a year, women were asked about their cancer risk factors and newly diagnosed diseases; follow-up continued through May 2004. Until the mid-1980s, follow-up questionnaires assessed contraceptive use among premenopausal women; 1994 questionnaires asked again about sterilization. In 1980 and 1992, women were asked about infertility.

The 28 years of follow-up yielded information on 2.5 million woman-years of experience, including data on 612 women who developed ovarian cancer and for whom duration of pill use was known. Researchers examined ovarian cancer risk in relation to duration of pill use and time since last use in analyses controlling for age, body mass index, parity, age at menopause, duration of postmenopausal hormone use, and history of sterilization and smoking. They found that risk declined significantly with increasing duration of pill use; women who had taken oral contraceptives for more than 10 years were less likely than never-users to develop the disease (relative risk, 0.6). The relationship between risk and time elapsed since last use did not demonstrate a significant trend, but

women who had last used the pill 5–10 years earlier had a reduced risk of ovarian cancer (0.5). Risk also was reduced for those who had used oral contraceptives for more than five years and had last taken the pill within the past 20 years (0.6); no protective effect was seen for women who had discontinued use longer ago. The researchers speculate that the "waning" of the protective effect of taking the pill could be problematic, since the incidence of ovarian cancer is highest after menopause.

Use of two other contraceptive methods also was associated with the risk of ovarian cancer. Women who had undergone tubal ligation had a reduced risk of this disease (relative risk, 0.7), and ever-users of an IUD had an elevated risk (1.8). Women reporting a history of infertility also had a somewhat elevated risk (1.4). The mechanisms underlying these associations are not well understood, as the researchers note, and require further investigation.—*D. Hollander*

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