A Substantial Minority of New Mothers Lack Basic Facts About the Transmission of HIV from Mother to Child

Nearly all new mothers appear to know that a pregnant women can transmit HIV to her unborn child, and nine in 10 say they were given information about HIV and AIDS as part of their prenatal care. However, according to information collected postpartum from nearly 1,400 U.S. women, much smaller proportions are aware that HIV can be passed to a child via breast milk (60%) and that medical treatment can prevent mother-to-child transmission (51%). Moreover, many new mothers are reluctant to endorse legal requirements that pregnant women and newborns be tested for HIV: Eighty-four percent believe that all pregnant women should be tested for HIV infection, but only 60% favor a legal requirement that such a test should take place. Finally, a small but sizable proportion believe either that the government is keeping the existence of a cure for AIDS from the general public or that HIV was developed in a laboratory expressly to hurt people.[1]

Since 1995, the U.S. Public Health Service has recommended that all pregnant women be counseled about HIV infection and be offered voluntary HIV testing. In 1997, to determine the extent of counseling and testing and how women's attitudes affect their willingness to be tested, researchers conducted a cross-sectional survey at seven hospitals—four in North Carolina; one in New Haven, Connecticut; one in Miami, Florida; and one in New York City.

The study participants were selected in slightly different ways. At the four North Carolina facilities, researchers approached all women who had had vaginal deliveries in the previous 24 hours or cesarean deliveries in the preceding 48 hours; a total of 753 women were interviewed. Similarly, at the New Haven hospital, all women who delivered were invited to participate, and 208 completed the survey. Researchers at the New York City hospital approached every other woman who gave birth, and surveyed 201. In Miami, every third new mother was approached, with 200 surveyed. Overall, 43% of women who gave birth were surveyed, and only 10% refused to participate; in no case did the refusal rate surpass 13%.

Respondents provided basic demographic data and indicated whether they received prenatal care and how they paid for it. The women were asked if they had been given information about HIV and AIDS during their prenatal care, whether they had been offered an HIV test and whether they had accepted the offer. Interviewers also sought information about what the women knew or believed about HIV testing, about perinatal transmission of HIV, about the government's involvement in a cure for HIV and about the origins of the virus.

Of the 1,362 women interviewed, 44% were black, 43% were white and 13% were of other races; 12% were Hispanic. Their mean age was 27; 58% were married, 43% had no more than a high school education, 48% had an annual household income of $20,000 or less, and 47% relied on a public source for payment of their prenatal care. Fewer than 1% received no prenatal care. For all but the latter characteristic, there were large differences across study locations. For example, the proportion married ranged from 73% in New Haven to 41% in New York. The researchers used multivariate regression analysis to control for the effects of differences in these variables.

Eighty-nine percent of the women said they received information about HIV and AIDS during prenatal care. This proportion differed significantly by site, ranging from 98% in New York to 83% in Miami. Likewise, most women (88%) said they were offered HIV tests during prenatal care; this proportion ranged from 90–92% in North Carolina and New York to 82% in New Haven. Three-quarters of those who were offered a test chose to have one—95% in Miami, 88% in New York, 72% in North Carolina but just 54% in New Haven.

A large majority of participants (84%) believed that all pregnant women should be tested for HIV infection, ranging from nearly all of those surveyed in Miami to about two-thirds of those in New Haven. Yet only 60% believed there should be a law requiring pregnant women to be tested. (This proportion varied from 45% in New Haven to 84% in Miami.) Similarly, 70% of women felt newborns should be tested for HIV, but just 51% thought there should be a law requiring infants to be tested. Nearly all respondents (95%) said that if the law required newborn testing, they would return for a postnatal visit at which they would learn their infant's test outcome.

Interviewers asked the women five questions to assess their knowledge of perinatal HIV infection. Most participants (95%) knew that an HIV-positive pregnant woman can transmit the virus to her unborn baby, and about three in four (74%) knew that if a newborn tests positive for HIV, that means the mother is infected as well. Seventy percent were aware that not all infants born to HIV-positive women become infected, 60% knew that HIV can be transmitted to an infant through breast milk and 51% understood that a medical treatment can prevent transmission of HIV from mother to infant.

On average, the participants answered 3.5 questions correctly. Twenty percent gave five correct answers, 31% four, 30% three, 15% two and 3% one. A multivariate analysis indicated that women with no more than a high school education were significantly less likely to give four or five correct answers than were more educated women (odds ratio, 0.8).

Small proportions of women reported beliefs that suggested distrust of government and scientists. Seventeen percent said they believe a cure for AIDS exists but is being kept secret by the government, and another 18% reported being unsure whether this is the case. Nine percent agreed that HIV was "invented in a laboratory to hurt people," while another 12% were unsure whether this is true.

Several factors appear related to women's distrust of government and scientists. White women were significantly less likely than nonwhite women to agree

with either or both of these statements (odds ratio, 0.4). In addition, less-educated women and those relying on public funds to pay for their prenatal care were significantly more likely to agree with one or both statements (1.8 and 1.7, respectively) than were more educated women and those who used private funds for their prenatal care. Finally, women in Miami, New Haven and New York were significantly more likely than North Carolina women to express distrust (odds ratios, 1.7–2.0).

Additionally, the investigators assessed which factors affected whether the women had been tested for HIV infection during pregnancy. While knowledge was not related to having received an HIV test, testing was somewhat more frequent among those who distrusted the government or scientists than among others (77% vs. 65%). However, a multivariate analysis revealed that the association between distrust and receipt of an HIV test was not statistically significant. Two other factors were significantly related to having had an HIV test: having no more than a high school education (1.4) and relying on public financing for prenatal care (1.8).

While most study participants found routine HIV testing to be acceptable, the investigators observe that "a substantial proportion of new mothers lack rudimentary knowledge about perinatal transmission of HIV." They also note that clinicians should be aware that some patients distrust government and scientists regarding HIV. They conclude that while their study found no evidence that lack of knowledge or the presence of distrust reduces pregnant women's willingness to be tested for HIV infection, such factors "might hamper other important prevention components, such as care-seeking behavior for women who are HIV infected." —*M. Klitsch*

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Levels of HIV Risk Behaviors Are Significantly Elevated Among Women Who Have Ever Had Sex with Women

Bacterial vaginosis appears to be more common, and genital warts less common, among women who have ever had sex with women than among women without same-sex experience. The gender of a woman's recent sexual partners, however, does not seem to affect her likelihood of having an abnormal Pap smear result. According to a case-control study that examined data from a sexually transmitted infections (STI) clinic in Sydney, Australia,[1] the prevalence of both sexual and nonsexual behaviors that increase the risk of HIV is significantly higher among women who have had sex with women than among other women.

The records of new female clients who sought care at the inner-city, public clinic from March 1991 through December 1998 were used in this cross-sectional study. Overall, 1,423 clients (10% of the clinic's total registration over the period) reported any female-female sexual activity. The researchers excluded transsexual women and clients whose same-sex relations occurred only in the context of sex work, and compared the remaining 1,408 women who reported ever having had sex with a woman with 1,423 clients without such experience.

The median age among both groups of clients of the STI clinic was essentially the same (27 years for cases and 26 years for controls). Although women who have had sex with women were significantly less likely than other women to cite having genital symptoms as the reason for their visit (19% vs. 23%), cases were more likely than controls to have come to the clinic to request a Pap smear (7% vs. 5%). Moreover, clients who had had sex with women were twice as likely as other women to currently be sex workers (22% vs. 11%).

For each group of women, the investigators assessed the incidence (taken retrospectively from clinic records) of an abnormal Pap smear result and of diagnosis with an STI (bacterial vaginosis, genital herpes and warts, gonorrhea, chlamydia, candida, hepatitis B and C, and HIV). They also considered whether women in each group had engaged in several sexual and nonsexual risk behaviors.

According to results of a univariate analysis, women who had had sex with women were significantly more likely than controls to test positive for bacterial vaginosis (8% vs. 5%), but were significantly less likely to have newly diagnosed genital warts (8% vs. 11%). There was no difference between the two groups in the proportion whose cervical cytology (Pap smear) was abnormal or who tested positive for genital herpes, chlamydia or candida. And while cases were significantly more likely than controls to have a self-reported history of STIs (44% vs. 32%), there was virtually no difference between the two groups in their rate of HIV infection (less than 1% in both groups). Women who had ever had female- female sex were far more likely than controls ever to have injected drugs (23% vs. 4%) and to have had sexual contact with an injection-drug user (21% vs. 6%); consistent with these findings, they were significantly more likely to have ever had hepatitis C (5% vs. less than 1%) or hepatitis B (5% vs. 3%).

Clinic clients who had ever had sex with women were also significantly more likely than controls to have had an induced abortion (38% vs. 27%). The vast majority (93%) of women with same-sex experience had also had a male sexual partner, and their median number of male partners was significantly higher than that among other women (12 partners vs. six). In fact, women who had had sex with women were significantly more likely than other women to have had more than 50 lifetime male partners (9% vs. 2%). Moreover, sexual contact with a homosexual or bisexual man was significantly more likely among women who had had sex with women than among clients with no such experience (15% vs. 5%).

Among the cases, the researchers identified a subgroup of 283 women whose sexual partners had been exclusively female for the past year. The STI and risk profile of these women (of whom 25% had never had sexual contact with a man) was similar to that of the overall group of cases. They were even more likely than all cases, however, to have bacterial vaginosis (10% vs. 8%). This subgroup of cases did not differ from cases overall in their prevalence of hepatitis C infection; by extension, this means that they too were significantly more likely than controls to test positive for this blood-borne virus. The rate of infection with hepatitis B was higher among women whose sex partners in the past year were exclusively female than among controls. This subgroup of cases was similar to controls, however, in their likelihood of having an abnormal Pap smear.

The researchers used unconditional logistic regression analysis to determine which risks and behaviors were independently associated with ever having had female-female sexual contact, controlling for factors that were significant at

the univariate level or that are considered to be potential confounding factors in the literature. Net of all variables, two STI diagnoses were independently associated with female-female sexual contact—bacterial vaginosis (odds ratio, 1.5) and genital warts (0.7). Five risk behaviors were independently and positively associated with female-female sexual contact—having had sex with a homosexual or bisexual man (odds ratio, 2.5) or with an injection-drug user (2.1), having had more than 50 lifetime male partners (3.4), having had an abortion (1.4) and current or previous injection-drug use (5.0).

The investigators comment that their study is limited by its reliance on a nonrepresentative population of STI clinic patients and by its lack of data on specific sexual practices (which might shed light on why odds ratios for a diagnosis of bacterial vaginosis were significantly elevated for women who had had sex with women). Nonetheless, they conclude that their data "argue strongly for increased measures to improve our understanding of the sexual health" of women who have had sex with women.

A related editorial mentions that the study is noteworthy in demonstrating an "alarming prevalence" of HIV-related risk behaviors in women who have had sex with women.[2] The author warns that such women, although traditionally considered "low-risk," may, in fact, act as a bridge population for transmission of the virus because of their sexual links to men who may themselves be at high risk. This "provocative evidence" is important, the editorial argues, because traditional assumptions that female-female sex confers little risk and that the area is not worthy of study have meant that data on the epidemiology of STIs in women who have had sex with women are seriously lacking. *—L. Remez*

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Cesarean Section Poses Fewer Risks Than Vaginal Delivery for Term Infants in Breech Presentation

Planned vaginal delivery holds significantly higher risks than planned cesarean section for term infants in breech presentation.[1] According to data from a multinational randomized trial, infants scheduled to be delivered by cesarean section are 77% less likely to die and 64% less likely to experience serious neonatal health problems than are those scheduled to be delivered vaginally. The type of delivery planned, however, does not affect the occurrence of serious maternal complications or death.

The analysis included 2,083 women with a term pregnancy who were enrolled at 121 centers in 26 countries around the world between January 1997 and April 2000. Women were eligible to participate in the study if their fetus was in a frank or complete breech presentation.* They were excluded if there was evidence that the fetus was too large to pass through the mother's pelvis, if the fetus was clinically large or weighed 4,000 g or more, if the fetal head was hyperextended, if there was evidence of a fetal anomaly or condition that could cause difficulties in delivery, if there was a contraindication to labor or vaginal delivery, or if the fetus had a lethal congenital anomaly. Participating women were randomly assigned to either planned cesarean section or planned vaginal birth.

The 1,041 women allocated to planned cesarean section were scheduled for delivery at 38 weeks of gestation or later. For a variety of reasons, however, 100 women in this group delivered vaginally. Among the 1,042 women allocated to planned vaginal birth, 451 were delivered by cesarean section; these switches occurred primarily because of problems during labor, because of contraindications to vaginal delivery or because of patient or physician preference.

Both groups were monitored for perinatal or neonatal mortality within 28 days after birth, for serious neonatal morbidity and for maternal mortality or serious morbidity within six weeks after delivery.

A total of 21 infants died, five of whom were excluded from all analyses because death was caused by congenital defects. Of the other 16 deaths, six were linked to difficult vaginal delivery, four to fetal heart-rate abnormalities during labor and six to a variety of other problems; these 16 infants were excluded from analyses of neonatal morbidity.

Overall, the risk of perinatal or neonatal mortality or serious neonatal morbidity was 67% lower in the planned cesarean section group than in the planned vaginal birth group. When these outcomes were examined in separate analyses, the risk of death during the perinatal or neonatal period was 77% lower among infants whose mothers had been randomized to the planned cesarean section group, and the risk of serious morbidity was 64% lower. No significant differences were found between the two groups in serious maternal morbidity or maternal mortality.

Thirteen of 14 subgroup analyses designed to assess the generalizability of the findings found no interactions between the women's characteristics and the planned method of delivery. However, the reduction in the risk of any perinatal or neonatal problem was much greater in countries that had a national perinatal mortality rate of no more than 20 deaths per 1,000 births than in those that had a perinatal mortality rate of more than 20 deaths per 1,000 (93% vs. 34%), as was the reduction in the risk of serious neonatal morbidity (92% vs. 8%).

The investigators point out that although this clinical trial was restricted to facilities with physicians skilled in vaginal breech delivery, the infants of women randomized to planned cesarean section were less likely to die or to experience poor neonatal outcomes than were those of women assigned to planned vaginal birth. A policy of planned cesarean section, they estimate, will save one baby from death or serious morbidity for every 14 additional cesarean sections performed; the number of additional cesareans needed to prevent one infant from having an adverse outcome could be as low as seven in countries with low perinatal mortality or as high as 39 in countries with high perinatal mortality. The researchers conclude that "a policy of planned vaginal birth is no longer to be encouraged for singleton fetuses in the breech presentation." *—F. Althaus*

*A fetus in breech presentation is positioned buttocks down rather than head down. In complete breech presentation, its hips and knees are flexed, but the feet are not below the fetal buttocks. In frank breech presentation, the hips are flexed and the knees extended.

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Providers Who See Sexually Active Teenagers Often Fail To Test Them for Chlamydia

Although nearly three-quarters of primary care providers regularly take a sexual history from female adolescents during annual and new visits, only about half routinely screen those who are sexually active for chlamydia.[1] Women practitioners are far more likely than their male counterparts both to take a sexual history and to routinely test sexually active young women for chlamydia. Providers who are comfortable talking about sex have a greater likelihood than those who are not of taking a sexual history. Additionally, practitioners who regularly discuss with adolescents strategies for preventing sexually transmitted diseases (STDs) are more likely than those who do not to test sexually active females for chlamydia.

From July to November 1998, a total of 576 physicians (including family practitioners, internists, obstetrician-gynecologists and pediatricians), nurse practitioners and physician assistants who provide any gynecologic care to adolescents aged 13–19 and who practice in Colorado responded to an anonymous, self-administered mail survey. The questionnaire requested demographic data and information on sexual history–taking, prevention activities and screening practices during annual and new visits. The survey also asked about knowledge of chlamydia. The majority of respondents were physicians (66%) and were women (58%). Sixty-one percent of physician assistants, 59% of nurse practitioners and 44% of physicians said that they see six or more adolescent females per week.

Using a five-point Likert scale, respondents indicated how frequently they take a sexual history from a female patient and how often they test sexually active teenagers for chlamydia. While 72% of respondents reported that they regularly (i.e., always or often) take a sexual history, only 54% said that they regularly test sexually active female adolescents for chlamydia. Providers most likely to test for chlamydia were those who reported that they routinely take a sexual history.

In univariate analyses, women providers were more likely than men to report both regularly taking a sexual history (85% vs. 53%) and regularly testing sexually active teenagers for chlamydia (64% vs. 39%). Other variables associated with these outcomes were the provider's profession; whether the practitioner is knowledgeable about adolescent females' risk of chlamydia, initiates discussion of STDs, is comfortable discussing sex and regularly talks about STD prevention; and whether 5% or more of the provider's patients are on Medicaid.

Because the provider's gender was strongly associated with both outcomes, the researchers stratified responses regarding sexual history–taking, risk assessment and chlamydia testing by gender. The results show that larger proportions of women than men are comfortable discussing sex with their patients (93% vs. 73%) and initiate discussions about STDs (80% vs. 69%). Women also are more likely than men to regularly discuss a range of preventive behaviors and to regularly test for chlamydia on the basis of a variety of findings from their discussion with the patient and their examination of her.

The researchers used variables that were significant in the univariate analyses to construct multiple logistic regression models assessing factors in providers' sexual history–taking and testing practices. In these analyses, women were more likely than men to routinely take a sexual history from adolescent females (odds ratio, 5.5). Compared with physicians, physician assistants were less likely to take a sexual history (0.4). Obstetrician-gynecologists were more likely than physicians in family practice to routinely take a sexual history (4.0), while internists were less likely to do so (0.4). Furthermore, providers who reported being comfortable talking about sex were more likely than those who did not to take a sexual history (4.9), as were those who said they initiate conversations about STDs (2.7). Finally, providers with a Medicaid population of 5% or more were more likely than those with a lower proportion of Medicaid clients to report taking a sexual history (2.0).

Women were also more likely than men to regularly screen those who are sexually active for chlamydia (2.8). Providers who reported routinely discussing prevention strategies with female adolescents were more likely than those who did not to test sexually active patients for chlamydia (2.1). Similarly, practitioners who said that they regularly discuss limiting the number of sex partners as a part of their prevention message were more likely than those who did not to test for chlamydia (2.4). Although providers' age was not a significant factor in the univariate analyses, the investigators considered it an important variable and included it in the regression analyses. Interestingly, they found that the older providers were, the more likely they became to report testing sexually active females for chlamydia (1.1).

Although the Centers for Disease Control and Prevention (CDC) recommends that all sexually active adolescents be regularly screened for chlamydia, only about half of Colorado's primary care providers are doing so. Furthermore, the researchers suggest that their findings may reflect a nationwide pattern, because comparable studies conducted elsewhere have achieved similar results and because many respondents are likely to have received their training outside Colorado. In conclusion, they advocate for both wider dissemination of the CDC recommendation of routine screening and improved provider training in sexual history–taking, risk assessment and STD testing practices.—*L. Schreck*

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Contraceptive Use Elevates The Odds of Barrier Method Use for Disease Prevention

Low-income women with a high risk of acquiring a sexually transmitted disease (STD) are more likely to use condoms or spermicides for STD prevention if they have been using contraceptives, particularly barrier methods, than if they have not been practicing birth control, according to results of a study conducted in an urban Alabama STD clinic.[1] However, all women—including those originally using no contraceptive—increased their use of barrier methods after participating in an intensive program promoting the use of such methods for STD prevention. The proportion reporting consistent use of a barrier method rose from 46% to 48% among those who had been using barrier contraceptives, from roughly 20% to 40% among users of other contraceptive methods and from 7% to 33% among women who had been using no birth control.

Study participation was open to women attending the clinic between 1992 and 1995 who were aged 18–34, were not pregnant or planning to become pregnant in the next six months and had not had a hysterectomy. The women were interviewed extensively and instructed in how to use a sexual diary; in addition, a nurse pro-

vided detailed information about the importance of consistent, correct use of barrier methods to prevent STDs. Participants were encouraged to use a condom and vaginal spermicide together or, if that was not possible, a condom alone. They were given free supplies and were asked to return to the clinic for six monthly follow-up appointments.

In all, the researchers analyzed data on 991 women, nine in 10 of whom were black. At the beginning of the study, 37% of participants relied on a birth control method that was independent of user behavior (tubal ligation or an IUD, implant or injectable), 28% used oral contraceptives, 23% used barrier methods (condom, spermicides, diaphragm or sponge) and 11% used no birth control. Results of multinomial regression analyses revealed that these groups had significantly different backgrounds. Women relying on user-independent methods tended to be older and to have lower levels of education and income than women in the other groups; they also were more likely than others to be married or living with a partner. Women using oral contraceptives tended to have higher education and income than other women. Those using barrier methods or no method generally fell in the intermediate range on these measures; however, women using barrier methods were younger, had higher incomes and were more likely to be single than those using no method.

Participants' sexual and medical history also varied according to their contraceptive use. Women who reported at the baseline interview that they relied on user-independent methods had become pregnant at younger ages and had more children than women in the other groups. Pill users had been oldest at first intercourse, had had the fewest lifetime sexual partners and were the least likely to have had an STD. Compared with women in other groups, users of barrier methods had fewer children and had had more sexual partners during the previous month. Women using no method had the youngest age at first intercourse and the highest number of lifetime partners; however, they were the least likely to have had intercourse during the previous month.

Some 891 women said that they had had intercourse in the 30 days prior to entering the study. In this group, 46% of women who reported that they used barrier methods of birth control said that they had used such methods every time they had sex in the previous month; 12% reported not having used a barrier method within the last month. By contrast, 26% of pill users, 20% of other contraceptive users and 7% of women who used no birth control had used barrier methods consistently during the previous month, while 41–49% of contraceptive users and 66% of nonusers had not used a barrier method. Levels and patterns of condom use in the last 30 days were similar to those for overall barrier method use; no more than 10% of women in any contraceptive category had used spermicides.

Analyses based on the 747 women who made at least one follow-up visit and reported having had intercourse both in the month before they entered the study and at some time since show improvements in barrier method use for all groups. Women who had used barrier contraceptives remained the most likely to use barrier methods consistently (48%). Levels of consistent barrier method use rose to 41% among pill users, 36% among users of other contraceptive methods and 33% among women who had initially reported using no birth control. The proportions reporting no use of barrier methods during the follow-up period were low—5% of women who had not used a contraceptive before entering the study and 1% of all other groups.

Cumulative logit regression analyses indicated that the odds of consistent use of barrier methods were elevated among women who were older than 25, had 12 or fewer years of education or were single (odds ratios, 1.2–1.5). The odds were reduced as a woman's number of children grew (0.7) and among those who had had an STD (0.6). Women who had used a contraceptive method at baseline were more likely than those who had not to use a barrier method consistently at follow-up; odds ratios ranged from 1.3 among users of oral contraceptives to 1.7 among users of barrier methods.

According to the investigators, the high level of use of barrier methods for STD prevention among women who had relied on barrier contraceptives before the intervention may indicate that these women were already consistent users. However, they point out, the program improved barrier method use among all women; notably, the findings indicate that even women who do not practice birth control can be reached and motivated to adopt barrier methods for STD prevention. The researchers conclude that "the potential synergism between the intention to prevent pregnancy and the intention to prevent STD should be considered in the design of interventions promoting condom use."—*M.L. O'Connor*

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Factors at Birth May Affect Women's Risk of Developing Breast Cancer at Young Age

A woman's own characteristics at birth, such as her birth weight, and her mother's age at delivery may be related to her risk of early-onset breast cancer, according to a study of young women in the state of New York.[1] Women whose birth weight was 4,500 g or more have triple the odds of developing breast cancer by age 38 compared with women whose birth weight was 2,500–3,499 g. In addition, women born to mothers aged 35 or older have twice the odds of developing breast cancer early in life of women whose mothers were aged 20–24 when they gave birth. By contrast, women who were born before 33 weeks of gestation or whose mothers had abruptio placentae have sharply decreased odds of developing breast cancer as a young person.

Using computerized vital record and cancer registry data, the researchers identified 2,391 women who were born after 1957 and who received a diagnosis of breast cancer between 1978 and 1995. Of these women, the investigators were able to match 484 to their birth records; they then matched this group with controls who had not received a diagnosis of breast or endometrial cancer and whose mothers had lived in the same county at the time of delivery. The women with cancer were predominantly white (87%); their age at diagnosis ranged from 14 to 37 years old.

The researchers examined the association between breast cancer risk and prenatal and perinatal characteristics that are either known or suspected to be related to maternal-fetal hormone levels or germ-cell mutations (which may affect the risk of breast cancer), including birth weight, gestational age, multiple birth, birth order, maternal and paternal age, and maternal race. They also evaluated possible assocations between breast cancer risk and maternal abruptio placentae (or premature detachment of the placenta), preeclampsia and eclampsia.

In conditional logistic regression analyses controlling for potentially confounding factors, the risk of early-onset breast cancer was elevated for women who had a high birth weight: Compared with women who were born weighing

2,500–3,499 g, those women who weighed 4,500 g at birth had a risk of breast cancer three times as high (odds ratio, 3.1).

In addition, the risk of early-onset breast cancer increased as maternal age increased: Compared with women who were born to mothers aged 20–24, women born to mothers 25–29 years old had 1.4 times the risk, those born to mothers in their early 30s had 1.5 times the risk, and those whose mothers were 35 or older had 1.9 times the risk. When all factors except maternal age were controlled for, there also was a linear increase in women's risk of early-onset breast cancer in relation to their father's age; women whose father was aged 40 or older had increased odds, compared with women whose father was aged 25–29 (odds ratio, 1.5). However, when paternal age was adjusted for maternal age, the association was not as strong.

Two factors were associated with a reduced risk of breast cancer: Women whose mothers had abruptio placentae and women who were born at a gestational age of less than 33 weeks had decreased odds of developing breast cancer at a young age (odds ratios, 0.2 and 0.1, respectively).

Black women had higher odds of breast cancer than white women (odds ratio, 1.9). Additional analyses showed that relative to young white women, young black women also had elevated odds of having advanced-stage disease (odds ratio, 2.1). First- or second-born black women had a particularly high breast cancer risk (odds ratio, 3.6).

The researchers acknowledge some limitations of their study—namely, that the state vital record and tumor registry data did not allow them to adjust for women's reproductive history, family history of breast cancer or body mass index. In addition, they were able to match only 38% of women who had breast cancer with their birth records. However, according to the researchers, these potential biases were not likely to have confounded their data.

Furthermore, the investigators note that the associations they found between high birth weight, older maternal age and the risk of early-onset breast cancer are consistent with findings indicating that intrauterine hormonal factors or germ-cell mutations may influence a woman's risk of developing breast cancer. Therefore, they conclude that their findings "offer further evidence that early life factors may be important determinants of early-onset breast cancer."—*B. Brown*

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