Childbirth Education for the HIV-Positive Woman

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Abstract

Pregnant HIV-positive women have unique education needs during the perinatal period. HIV-positive women need information regarding the differences in recommended care they can expect to experience both for themselves and their newborn. Differences in recommended care are related to minimizing transmission of the HIV virus. This article discusses the unique educational content needs of HIV-positive pregnant women. Providing women with appropriate information about what their labor and delivery experiences will entail can help them make decisions and promote a positive birth experience.

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HIV-positive women have unique needs during the perinatal period. These women include those who were aware of their HIV status prior to pregnancy (almost 60%) (Centers for Disease Control and Prevention [CDC], 2002b) and those who discovered their HIV status during pregnancy (40%) (CDC, 2002b). While HIV testing during pregnancy is not mandatory at a federal level, the standard of care is to routinely offer women HIV testing during the prenatal period. For the purpose of this paper, “education” refers to both teaching by the prenatal care provider (e.g., the physician, nurse midwife, or other health care providers) and childbirth education that is part of a formal series of classes for expectant couples to prepare for birth. The purpose of this paper is to provide an educational update on the content that needs to be covered in clinics or childbirth education classes related to HIV infection. At present,

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Pregnancy does not seem to contribute to the progression of HIV disease, and HIV-positive pregnant women do not experience more complications of pregnancy when compared to uninfected women (Ahdieh, 2001). Additionally, recent advances in therapies to promote life and health for HIV-positive individuals have resulted in a longer lifespan for many. However, living longer and remaining symptom-free may contribute to more women with HIV becoming pregnant in the future (Katz, 2003).

Because care provided for the HIV-positive pregnant woman and her neonate will differ from care for uninfected women, it is important that the woman and her family are well informed and understand these differences and the limitations of their choices in order to promote a safe, positive birth experience. For the scope of this paper, it is assumed that the woman has received or is receiving adequate counseling, especially if she just learned she has HIV and has decided to continue her pregnancy.

Expected differences in care are related to the prevention of maternal-to-child-transmission of HIV and treatment of maternal HIV. Women may have preconceived ideas about their ideal childbirth experience and may have a specific birth plan in mind; thus, being aware of potential differences in care will allow the family to plan their birth experience appropriately and realistically. In addition, pregnant women are often given advice from well-meaning family and friends. Were it not for their HIV diagnosis, women may have wished to incorporate some of the suggestions from these individuals into their ideal birth experience. Thus, it is important that women know upfront which options may be appropriate and which options may result in an increased risk of HIV transmission to their newborn and further risks to themselves. Of course, when it is the woman's (and family's)

decision, care options should be discussed with the woman and her family so that she may make an informed decision. (For additional information on perinatal transmission of HIV, see Box 1.)

At present, many uncertainties exist in the care for HIV-positive pregnant women. Recommendations may

Box 1 Transmission of HIV during the Perinatal Period

HIV can be transmitted from the mother to her offspring via several mechanisms. Transmission may occur in utero before birth, during labor and delivery, or postpartum through breastfeeding. Early transmission is generally defined as viral detection anytime during gestation or during the first 48 hours of life (Sherman, D., & Sherman, N., 2001). Early transmission is thought to occur by passage of HIV through the placenta (Katz, 2003). Breaks or leaks in the placenta may increase the risk of viral passage to the fetus (Bryson, 1996). Early transmission may also occur from ascending virus from the reproductive tract. Late transmission is defined as the detection of HIV antibodies after 7 days of life following initial negative findings (Sherman, D., & Sherman, N., 2001). The exact mechanism and timing of intrauterine transmission is not known. However, some evidence suggests that transmission occurs during late gestation (Sherman, D., & Sherman, N., 2001).

Transmission of the virus to offspring is more likely to occur when the woman has a larger amount of virus (high viral load) present in her system. A high viral load represents early infection prior to the body developing adequate defense mechanisms to fight the infection or late in the course of illness when the body is depleted to the extent that an adequate response cannot be manifested. Pregnancies are more likely to occur during the earlier phase of infection before overall health (and fertility) is compromised. In addition, HIV infection may also occur after pregnancy through breastfeeding or other contact with maternal fluids. Use of antiviral medications during pregnancy and prior to conception can drastically reduce the woman's viral load and, thus, the risk of HIV transmission (Sherman, D., & Sherman, N., 2001).

be offered in which only a small amount of evidence exists related to long-term outcomes (e.g., antiviral medications). However, most women who intend to parent their newborn are concerned about their baby's health and safety and, thus, they are receptive to the information that health care professionals can provide. In addition, health care providers have a moral, ethical, and legal responsibility to ensure that pregnant women and their families understand care options.

Differences in Care

This section addresses care differences that are typically recommended for HIV-positive pregnant women and

their newborns (see summary in Table 1). It is less important who provides the related education than that the woman receives the educational content. Ideally, this content should be presented in conjunction with regular prenatal care, which can then be reinforced by the childbirth educator.

Antepartum

Use of antiretroviral agents during pregnancy and labor can significantly reduce the risk of maternal-to-child transmission of HIV. Current recommendations for prevention of transmission include oral zidovudine (ZDV) beginning at 14 weeks gestation and continued until

Table 1 Summary of Differences in Care for HIV-Positive Pregnant Women

Time	Change in Recommended Care
Pregnancy	<ul style="list-style-type: none">• Antiretroviral medication (oral); no abrupt cessation and zidovudine by 14 weeks• CD 4 cell count and percentage• HIV RNA levels• Viral load count• Prophylaxis against opportunistic infections• Monitoring for liver or hematologic changes/toxicity• Level II ultrasound• Pneumococcal, influenza, and hepatitis B vaccinations• Amniocentesis, chronic villi sampling (CVS), external version, and stripping the membranes should be avoided.
Labor & Delivery	<ul style="list-style-type: none">• Antiretroviral medication (oral and IV)• Avoidance of fetal scalp electrodes and scalp blood sampling for fetal pH• Avoidance of forceps and vacuum extraction, except in the case of emergencies• Delaying or omitting amniotomy• Scheduled cesarean delivery for women with viral loads greater than 1,000 copies per ml• Possible use of prophylactic antibiotics to prevent infection
Postpartum	<ul style="list-style-type: none">• Antiretroviral medication• Breastfeeding discouraged• Careful monitoring for signs and symptoms of infection• More frequent pap smears needed• Avoid intrauterine devices for contraception• Hormonal contraceptives might not be appropriate because of drug-to-drug interactions with antiretroviral medications
Newborn	<ul style="list-style-type: none">• Antiretroviral medication (oral)• Bathed immediately after delivery• Wall suction pressures under 140 mm Hg• No blood draws or invasive procedures until bath is complete• Possible cardiac consultation and follow-up• Infectious disease consultation and follow-up• Multiple forms of testing for HIV• Close monitoring for signs and symptoms of infection• Prophylaxis to prevent infection for up to one year or confirmation of HIV negative status
Infancy	<ul style="list-style-type: none">• Close follow-up for altered growth patterns and failure to thrive• Supplemental nutrition• Monitoring for central nervous system involvement• Use of inactivated poliovirus vaccine instead of live oral vaccine

labor and delivery (Katz, 2003). The oral dose schedule is followed by intravenous zidovudine during labor and delivery. Oral doses are administered to the newborn beginning at 8–12 hours of age and continuing for 6 weeks. See Box 2 for pharmacological treatment of HIV-positive pregnant women.

Women who are already taking antiretroviral medications should be cautioned against abruptly stopping them once pregnancy is discovered for fear of the effects on the fetus and newborn. While inadequate data exist about the safety of most antiretroviral medications for the fetus, abruptly discontinuing antiretroviral medications can result in a significant increase in viral load and increased risk of transmission (CDC, 2002b). In addition, sudden discontinuation of antiretroviral medications may lead to a progression of maternal HIV disease and viral resistance to the drugs, when resumed (CDC, 2002b).

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As more drugs are developed and tested, combination therapies are becoming increasingly popular in treating HIV disease. Women who are taking combination therapy prior to pregnancy should continue to do so; however, any combination therapies must include ZDV, as it is the only drug treatment shown to reduce perinatal transmission (CDC, 2002b). Women who are newly diagnosed may wish to wait until 14 weeks gestation to begin combination therapy because the risks to the fetus are unknown (Katz, 2003). One study found an increased risk of prematurity (Lorenzi et al., 1998). Women may benefit from understanding that the advantages of beginning therapy early include maximum viral suppression and decreased risk of transmission, decreased risk of developing resistant strains of HIV, prevention of progressive immune failure, and prevention of opportunistic infections (Katz, 2003). However, they should also know that negative considerations include

Box 2 Pharmacological Treatment of HIV-Positive Pregnant Women to Reduce the Risk of Maternal-to-Child Transmission

While zidovudine (ZDV) is considered the standard of care for prevention of maternal-to-child transmission of HIV and is the only drug that has had success in lowering the rates of transmission, it alone is no longer considered the standard of care for treatment of HIV in women (Centers for Disease Control and Prevention [CDC], 2002b). Women who also wish to be treated for HIV disease during pregnancy should be prescribed combination drug therapy that includes, but is not limited to, ZDV (CDC, 2002b). Optimal antiretroviral therapy is tailored to the pregnant woman's virologic and immunological status and is not typically withheld due to pregnancy at any gestational age (Sherman, D., & Sherman, N., 2001). During pregnancy, alterations in dosing requirements for antiretroviral medications may be needed due to the physiologic changes of pregnancy, including drug absorption, distribution, biotransformation, and elimination (CDC, 2002b). In some instances, for the woman who has not been previously taking antiretroviral medications and who is also in good health, antiretroviral medication may be delayed until 14 weeks gestation when embryogenesis is complete (Sherman, D., & Sherman, N., 2001). Additionally, for women with severe nausea and vomiting early in pregnancy who may not be able to tolerate oral antiretroviral medications, delay may also be necessary (Sherman, D., & Sherman, N., 2001). However, viral replication and turnover are rather rapid; thus, frequent doses are necessary to maximally suppress viral replication, protect immune function, and reduce the development of resistance (CDC, 2002b). Viral load can be quantified through assays that measure HIV-1 RNA copy number, which is useful to assess disease stage, likelihood of progression, and therapeutic effects of the current treatment regime (CDC, 2002b).

side effects and the potential to develop resistance to one or more classes of drugs, which might limit future treatment options (Watts, 2001). In addition, some clini-

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cal trials include a criterion that the individual must be "treatment naïve"; thus, treatment with certain antiretroviral drugs during pregnancy may limit the woman's ability to participate in future clinical trials (Katz, 2003).

In addition to routine prenatal labs and screening, HIV-positive pregnant women should understand why they need an assessment of the severity of their HIV status with a CD 4 cell count, CD 4 percentages, HIV RNA levels, and viral load. Because of physiological changes associated with pregnancy, normal variations in the CD 4 count may make it difficult to determine risk for opportunistic infection and disease progression. Thus, during pregnancy, it is wise to additionally monitor CD 4 percentages because they are more accurate and reliable during pregnancy (CDC, 2002b). CD 4 cell counts, CD 4 percentages, and HIV RNA levels should be monitored every 3–4 months during pregnancy (or once a trimester) to determine if alteration of antiviral medications is needed. When CD 4 counts become low (less than 200 cells/mm³), prophylaxis against opportunistic infectious organisms will likely be considered (Sherman, D., & Sherman, N., 2001). Prophylaxis is usually given for signs of thrush or unexplained fever of greater than two weeks duration regardless of CD 4 counts (Sherman, D., & Sherman, N., 2001). In some women, HIV RNA levels may be higher in the genital tract than in the plasma, increasing the risk of exposure to the fetus during vaginal delivery (CDC, 2002b). In such a case, the option of a cesarean birth may be presented to the woman. Women who receive ZDV should be monitored at least monthly for hematologic and liver chemistry changes (Sherman, D., & Sherman, N., 2001). If toxicity develops, discontinuation for a short period may be necessary. Thus, pregnant women with HIV need to understand why frequent, faithful prenatal care attendance is important.

The American College of Obstetricians and Gynecologists (ACOG) recommends that all pregnant women receive a routine Level I ultrasound at 8–18 weeks and

32–36 weeks (ACOG, 2000). However, women who are HIV positive need more intensive monitoring and, thus, a Level II ultrasound is recommended (CDC, 2002b). HIV-positive pregnant women are also advised to receive pneumococcal, influenza, and hepatitis B vaccinations (ACOG, 1997). Women should be encouraged to refrain from cigarette smoking, illicit drug use, and unprotected sexual intercourse with multiple partners because these behaviors have been associated with increased risk of viral transmission during pregnancy (CDC, 2002b).

Another change in prenatal care of HIV-positive pregnant women is that common procedures such as amniocentesis, chorionic villi sampling, external version, and stripping the membranes are avoided to reduce the risk of maternal-to-child transmission of HIV. These procedures all carry the risk of bleeding and additional fetal exposure to maternal body fluids that contain HIV (Sherman, D., & Sherman, N., 2001).

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In addition to the changes in medical and nursing care outlined above, perinatal education should emphasize the topics of nutrition, stress management, and exercise (Sherman, D., & Sherman, N., 2001). Pregnancy and HIV include similar, cumulative symptoms such as increased stress, fatigue, and an increased metabolic rate. Mild to moderate exercise can help to alleviate these symptoms and promote a sense of well-being through the release of natural endorphins (Sherman, D., & Sherman, N., 2001). In addition, exercise has been correlated with a slight rise in CD 4 counts and a reduction of opportunistic infections in all stages of HIV infection (Laperriere et al., 1994).

Nutrition is important both to support the pregnancy and provide enough nutrients for the body to maintain normal function and combat the HIV infection. Deficiencies in iron, zinc, selenium, and vitamin A have been associated with the progression of HIV (Friis, 2002). Low plasma levels of vitamins B₆, B₁₂, and A have also

been correlated with altered immune response and cognitive function in HIV-infected individuals (Baum et al., 1994).

Infants born to HIV-positive mothers who do not receive treatment during the prenatal period are more likely to be born prematurely and/or with low birth weight (Katz, 2003). However, women who receive ZDV during pregnancy do not show these negative birth outcomes. Thus, it is believed that other factors—such as malnutrition, coexisting infection, and illicit drug, alcohol, and tobacco use—contribute to these complications and that prenatal care and close monitoring during pregnancy result in improved outcomes.

Intrapartum

The main goal of nursing care during the intrapartum period is safe delivery of the fetus with the least risk of viral transmission. Precautions can be taken, and women may benefit from knowing the unnecessary interventions that can often be avoided to accomplish this goal. For example, fetal scalp electrodes and scalp blood sampling for fetal pH should be avoided because lacerations to fetal skin can increase the risk of HIV transmission (Katz, 2003). Forceps and vacuum extraction are also risky (Sherman, D., & Sherman, N., 2001). Delaying amniotomy can reduce the risk of transmission by about 50% if the woman gives birth within four hours (Mandelbrot et al., 1996). Episiotomy has not been shown to influence the rate of transmission to the newborn (Mandelbrot et al., 1996), even though it is generally an unnecessary procedure. However, unless delivery is significantly delayed by an intact perineum (and is thereby increasing fetal exposure to maternal fluids), episiotomy should be avoided to prevent the risk of infection to the mother or additional bleeding that could theoretically result in an increased risk of maternal-to-child transmission.

Current data suggest that elective scheduled cesarean section prior to rupture of the membranes significantly reduces perinatal transmission of HIV (CDC, 2002b; Minkoff, 2001). This option should be offered to selected pregnant women with HIV to further decrease the risk of transmission beyond that provided by administration of ZDV (ACOG, 2000). ACOG notes that insufficient data exist to support the use of elective cesarean delivery in women with viral loads of less than 1,000 copies per milliliter (and thus at the lowest risk for maternal-to-child transmission).

When cesarean delivery is the method of choice, delivery should be scheduled for 38 weeks gestation. Fetal age should be estimated using clinical signs and first or second trimester ultrasounds (ACOG, 2000). Intravenous ZDV should begin 3 hours prior to surgery, and the regular regime of antiretroviral medications should continue uninterrupted (CDC, 2002b).

Benefits to the fetus must be weighed against the woman's increased risk of infection related to a decision for cesarean delivery and compromised immune status. When compared to vaginal births, postpartum infections are approximately 5–7 times more likely after cesarean delivery following labor or rupture of the membranes (Hebert et al., 1999). Complications during scheduled cesarean delivery are fewer than those found with urgent cesarean delivery, but more than is found with vaginal delivery (Gregory, Henry, Ramicone, Chan, & Platt, 1998). Prophylactic antibiotics can help to prevent infection.

Method of delivery is much more complicated when the woman spontaneously begins labor or her membranes rupture. When membranes are ruptured longer than 4 hours prior to delivery, the rate of HIV transmission to the infant increases. Thus, to protect the infant, women who present to the labor-and-delivery room in labor or with ruptured membranes can expect to receive pitocin to augment labor or for labor induction when progress is slow. Nonelective cesarean delivery performed after rupture of membranes and the onset of labor has not been associated with a significant decrease in transmission risk (CDC, 2002b).

Postpartum and Ongoing General Gynecological Concerns

The postpartum period is a stressful one for most new mothers. The complexity of caring for another individual and returning to a prepregnant state can be time consuming and overwhelming. New mothers who are HIV posi-

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tive face additional challenges of complex medication regimes for themselves and their newborn. During the postpartum period, women should be encouraged to remain diligent in continuing to take their medications as scheduled. Medications that are missed or only taken haphazardly can contribute to the development of resistant strains of HIV. Women also need to be taught to recognize the signs and symptoms of infection during the postpartum period. Women who are HIV positive are at greater risk for infection and poor wound healing because of compromised immunity and poor health status. Women with HIV are also at greater risk of postpartum hemorrhage due to HIV-related thrombocytopenia (Bastin et al., 1992).

Antiretroviral therapy should continue in the postpartum period. Women who only received ZDV during pregnancy should consider combination therapy as appropriate because it is now the standard of care in treating HIV infection. Because HIV is present in breast milk and approximately 25% of breastfed infants become infected through breastfeeding, the Centers for Disease Control recommends that HIV-positive women in the United States should not breastfeed (CDC, 2002b).

As a group, women infected with HIV have a high incidence of other gynecologic disease, including sexually transmitted infections (Williams, 2003). It is unclear if these gynecological problems are related to decreased immunity, HIV co-infection, or behavior (Williams, 2003). Gynecological infections have implications for neonatal and maternal health. Women with HIV have high rates of infection with the human papillomavirus (HPV), which can contribute to the development of cervical cancer (Williams, 2003). Cervical dysplasia has been associated with immune suppression in individuals receiving chemotherapy and in women with HIV. Thus, HIV-positive women should be made aware of the need for careful screening following their postpartum recovery. Women who have had a previous birth before becoming infected with HIV need to know that the postpartum course for an HIV-positive woman is likely to differ from that of an uninfected woman.

When the diagnosis of HIV is made, women should receive a cervical pap smear as soon as feasible (CDC, 2002a). If the pap is normal, a repeat examination should occur in 6 months. In the case of an abnormal screen, treatment should be provided and the woman evaluated in 3 months. Menstrual abnormalities are also common

(Williams, 2003). While currently there are only anecdotal reports of menstrual abnormalities, explanations for these occurrences may be related to HIV-associated conditions including wasting, malnutrition, chronic disease, anemia, emotional stress, drug-related side effects, and/or endocrine abnormalities (Williams, 2003). Women should also be aware that hormonal contraceptives have significant drug-to-drug interactions with many drugs that are used in the treatment of HIV and opportunistic infections (Williams, 2003). Intrauterine devices may contribute to increased risk of infection and are not recommended for HIV-positive women. Women should be made aware of these gynecological considerations early in prenatal care so that they have adequate opportunity to consider these issues prior to delivery.

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Newborn

The newborn should be bathed immediately after delivery to reduce the risk of viral transmission. If wall suction is used during delivery or immediately afterward, pressures should be kept under 140 mm Hg to prevent trauma to delicate newborn tissues and to prevent an increased risk of acquiring HIV. While definitive studies are yet to be done, it seems likely that prolonged exposure to HIV-infected fluids could increase the risk of transmission to the newborn. Thus, the woman should understand that, to prevent the risk of infection, the newborn will not remain on her abdomen following delivery; rather, the baby will be bathed immediately. Except in the event of an emergency, no blood drawing or other invasive procedures should be done until the infant is thoroughly bathed. The skin should be cleaned with alcohol prior to needle sticks of any kind (e.g., vitamin K injection, PKU screening).

Ventricular wall thickness in the heart of infants born to women who are HIV positive appear to be thickened irrespective of fetal HIV status (Hornberger et al., 2000). Thus, consultation and follow-up with a pediatric cardiologist may be recommended.

Following birth, infants born to HIV-positive mothers

will have antibodies to HIV present in their blood. Both ELISA (for screening) and the Western Blot (for further testing) test for the presence of HIV antibodies, not HIV itself. Thus, using these testing mechanisms, all infants born to HIV-positive mothers will test positive after birth. However, a measure of the amount of antibody in the infant's blood may be useful for later comparison. Maternal antibodies are generally present in the infant's blood until 15 months of age. Only infants who continue to have antibodies to HIV in their blood at 18 months are considered to be positive for HIV (Lindberg, 1995). See Box 3 for infant testing for HIV.

The newborn will be closely monitored at birth and may be subjected to testing above and beyond that which

Box 3 Infant Testing for HIV

A newer test, the p24 antigen, tests directly for the HIV antigen (O'Neill, Thureen, & Hobbins, 1999). However, the antigen is generally only detectable during the initial infection for up to one month after exposure and then again after the period of latency when the viral disease progresses (Chernecky & Berger, 2001). The period of latency ranges from 6–23 months in infants (Chernecky & Berger, 2001).

Polymerase chain reaction (PCR) testing is another option. With PCR, either viral RNA or DNA is detected (Burchett, 1998). Testing is advised at birth, 2–4 weeks of age, and 3–6 months of age. Diagnosis is confirmed if the infant tests positive on two or more occasions (McGowan, Crane, Wiznia, & Blum, 1999). Multiple testing is recommended because PCR is less sensitive during the first 6 months of life (Simonds et al., 1998). If these initial tests remain negative, a follow-up ELISA is recommended at 15 months to determine if any antibodies are present (Meleski & Damato, 2003). In the untreated woman, there is about a 30% chance of transmission to the newborn, and approximately 65% of infected infants will develop AIDS within the first few months after birth without treatment (O'Neill et al., 1999). Advanced maternal disease, high maternal viral burden, and prematurity may predispose the infant to acquiring HIV infection.

is normally done with newborns. Symptoms of infants with HIV infection are rare during the newborn period, but may manifest early in infancy or childhood. Symptoms include the following: failure to thrive; generalized lymphadenopathy, hepatomegaly, and splenomegaly; recurrent mucosal infections (especially ear and sinus infections); systemic bacterial infections (bacteremia, pneumonia, meningitis, urinary tract infections); recurrent oral candidiasis; lymphoid interstitial pneumonitis; dysfunction in major organs; recurrent diarrhea; opportunistic infections (see Table 2); neurodevelopmental delay; and malignancies (Thureen & Abzug, 1999). Experts in pediatric infectious disease may also be utilized to help manage the newborn's care.

Because pneumocystis carinii pneumonia is common in infants born to HIV-infected women, prophylaxis with trimethoprim-sulfamethoxazole is recommended (Thureen & Abzug, 1999). Treatment begins at 4–6 weeks of age and continues until 1 year or confirmation of HIV-negative status. These possibilities need to be explained to the HIV-positive pregnant woman so that she may realistically appraise the first days of her newborn's life and know what to expect during her hospitalization at the time of delivery.

Infancy for HIV-Infected Children

Infants who are HIV positive are at risk for altered growth patterns and failure to thrive (Meleski & Damato, 2003). Mothers will need to be extra careful in providing appropriate nutrition for these infants and maintaining regular follow-up visits with the child's health care provider. Problems with growth occur for several reasons. First, disease process is likely to consume much of the infant's energy, both in terms of viral replication and the body's response to the infection. This com-

Table 2 Opportunistic Infections That May Develop in HIV-Positive Infants

- Pneumocystis Carinii Pneumonia*
- Cytomegalovirus
- Candidiasis
- Atypical Mycobacteria
- Cryptosporidium
- Herpes Simplex Virus

* Most common type of opportunistic infection in infants. Carries a high mortality rate.

promises the amount of energy available for growth (Miller et al., 2001). Also, many infants have additional morbidities and infections related to their HIV disease that consume extra calories. Calories that are taken in by the infant may not be adequately absorbed due to gastrointestinal problems related to the disease itself and the frequent diarrhea that results from medications used in treatment (Miller et al., 2001). Decreased sensitivity to growth hormones, decreased levels of growth factor, and release of cytokines that may decrease the effectiveness of growth hormones are other possible mechanisms for altered growth in HIV-positive infants (Pollack et al., 1996).

Central nervous system involvement occurs early in the course of HIV disease among infants and children and has been associated with encephalopathy that results in either slowing or cessation of developmental progress or the loss of previously acquired developmental milestones (Gay et al., 1995). Microcephaly and altered nervous system myelination may also occur. About 20%–30% of infected infants are considered rapid progressors who display viral loads at birth 2–3 times higher than other infants infected at birth (Bailey & Toltzis, 2002). Thus, it would be helpful to those caring for an HIV-infected infant to know whether or not the infant was considered to have a high viral load. See Box 4 regarding causes of death in an HIV-infected infant.

Because of the high rate of infection seen in HIV-positive infants and the serious nature of any additional illness, caregivers need to be instructed on the signs and symptoms of infection and when to seek appropriate medical care. Caregivers should be encouraged to find a provider with HIV expertise—especially one they are happy with—and then maintain consistency of appointments with that provider. To maintain a consistency of care for the child, emergency-room visits, if necessary, should occur in a facility where the primary provider has admitting privileges. Obtaining services at a regional medical center that has a children's hospital is recommended.

Infants should receive regular immunizations, as scheduled. However, the infant should not receive the live oral poliovirus vaccine but should receive the inactivated poliovirus vaccine instead (Thureen & Abzug, 1999). Use of the live measles, mumps, and rubella vaccine has not been problematic for infants who are HIV positive (Meleski & Damato, 2003). Mothers should be made

Box 4 Causes of Death in HIV-Infected Infants

In HIV-infected infants who are rapid progressors, disease advances quickly and death generally results during infancy. Other infants and children progress more slowly and live into the preschool years or beyond. About an equal number of infected children die at each year of life, through causes of death vary (Langston et al., 2001).

Infection is the most frequent cause of death for children less than 6 years old, most often pulmonary infection with pneumocystis carinii pneumonia. Other reasons for death include other types of infection and disseminated cytomegalovirus infection. As the child ages, death from respiratory problems is less likely. Death is more likely to occur from chronic cardiac disease such as congestive heart failure or cardiomyopathy, wasting syndrome, encephalopathy, and Mycobacterium avium complex (Langston et al., 2001).

aware, however, that as the child's disease worsens, immunity gained through immunization might be lost.

Recommendations for Childbirth Educators

Because of the increased educational needs of HIV-positive pregnant women, childbirth educators who are working in high prevalence areas might consider offering a special course to women who are HIV positive. The course would need to be handled carefully so as not to compromise patient confidentiality and to gain the trust of women. However, women might benefit by knowing other families who share their circumstances. It would also be important not to make the women feel as if they

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are being excluded from regular prenatal classes because of their HIV status, but that a special course was created for them to better meet their educational needs. Of course, any of the expectant couples that are concerned about segregation should be invited to attend the regular prenatal classes as well. To date, published research has not addressed whether one type of course or time is better than another for HIV-positive pregnant women; childbirth educators who work in high prevalence areas are encouraged to discover what works best for their particular community.

This literature review should clearly show that care for the HIV-positive pregnant woman and for her infant is complex, even when working with women who have a strong desire to receive the best care available. Because HIV occurs disproportionately in populations that have engaged in high-risk behaviors, a number will have difficulty following their recommended care or understanding their choices. For this group, individual "bench" education at the time of an appointment may work better than urging class attendance. In either case, the perinatal educator will need to carefully assess the level of information each woman can comprehend. Some HIV-infected mothers may need support for their grief and fear as pregnancy brings to them a new set of concerns for their battle with HIV.

Summary

Pregnant women who are HIV positive need special care during pregnancy, labor and delivery, postpartum, and as their child grows. Anticipatory education during the prenatal period can be beneficial to women and their families. Knowledge of the differences in needed care allows the pregnant woman and her family to make informed decisions regarding their care. It also allows them to appropriately develop a birth plan for the best possible outcomes.

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What we do for ourselves dies with us. What we do for others remains alive and is immortal.

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