

# Testing for HIV infection in pregnancy



## BACKGROUND

The present statement replaces the 2001 Canadian Paediatric Society statement (1). Changes include information on new rapid HIV tests and updated incidence figures for HIV infection in pregnancy in Canada.

Implementation of a strategy to reduce perinatal HIV transmission requires two steps. The first step is the identification of women who are infected with HIV. The second step involves collaborative efforts on the part of health care providers (HCPs) to allow women and children to have access to coordinated HIV care.

- Obstetric care providers should identify HIV-positive pregnant women and provide access for them to receive HIV care;
- HCPs who care for HIV-positive women should help with HIV management during pregnancy, including the selection of antiretroviral therapy and give advice on prevention of transmission to sexual partners;
- HCPs who provide intrapartum care should provide intrapartum antiretroviral therapy and counselling on the risks of HIV transmission when selecting the mode of delivery; and
- HCPs who care for newborns should provide appropriate antiretroviral therapy, timely diagnostic HIV testing and should monitor both the short- and long-term outcomes of these HIV-exposed children.

Five factors are of critical importance in a screening program.

- Sensitivity and specificity of the diagnostic test;
- Acceptability and feasibility of the diagnostic test;
- Benefit of early detection;
- Disadvantages of testing; and
- Prevalence of disease.

In the present statement, the above factors are reviewed with regard to HIV screening during pregnancy.

## REVIEW OF FACTORS CRITICAL IN A SCREENING PROGRAM AS APPLIED TO HIV TESTING IN PREGNANCY

### Sensitivity and specificity of the test

The standard approach to diagnosing HIV infection in North America is by multistep serology testing. The first step is a screening test for HIV antibodies using an enzyme immunoassay (EIA). The third-generation screening EIAs currently in use across Canada have excellent sensitivity and specificity. The 'window period' between infection and detectable antibodies (seroconversion) by the third-generation EIAs is approximately four to six weeks. The fourth-generation EIA in development is a combined antibodies-antigen detection assay which will further shorten the window period. If the EIA is reactive, the sample is tested with a confirmatory test for HIV antibodies by Western blot (WB) or less commonly by another confirmatory test, such as line immunoassay. The WB confirmation test used in Canada is licensed for the detection of antibodies to HIV-1 only. An indeterminate WB can be indicative of early infection, infection with HIV-2 (which occur primarily in west Africa), waning maternal antibodies in an infant or a false-positive result. Tests that measure HIV viral load are used primarily for follow-up rather than diagnosis of HIV and can give falsely low readings for non-B clades (subtypes of HIV), which are primarily acquired outside North America and Europe.

Rapid HIV testing can be defined as an assay that can provide a preliminary HIV antibody result in less than 30 min. The availability of rapid HIV testing is variable across the country. These tests appear to have acceptable sensitivity and specificity for screening, but any positive test result using this technology must be confirmed with standard serology tests. It is advantageous to screen women with no prenatal care or high-risk women in late pregnancy or during labour using a rapid HIV test if a standard serology test is not readily accessible. The MedMira Rapid HIV Screen Test (MedMira Laboratories Inc, Canada) is licensed for use in a laboratory setting only. The INSTI HIV-1 Rapid Antibody Test (bioLytical Laboratories Inc, Canada) was approved in 2005 for both laboratory-based

rapid HIV testing as well as point-of-care (clinic or other health care facility) whole blood testing, with a Health Canada application pending for approval for HIV-2 testing. Protocols and quality assurance should be in place to ensure appropriate and consistent use in the perinatal setting.

#### Acceptability and feasibility of the test

HIV testing includes not only the procedure of collecting the blood sample, but also pre- and post-test counselling with the provision of results (2,3). Many women living with HIV do not report any of the traditional risk factors associated with acquisition of HIV infection to their physician or midwife. Therefore, routine prenatal testing is recommended in all provinces and territories, but compliance varies (4). The most successful programs include automatic HIV screening during routine prenatal bloodwork, unless the woman actively opts out. Very few women refuse screening if the counsellor recommends the test (5). Many women incorrectly assume that they have been tested for HIV even if there is no specific discussion of HIV testing.

#### Benefits of early detection

Perinatal HIV transmission rates of approximately 25% occur when no interventions are undertaken during pregnancy, delivery or the neonatal period. Some transmissions occur in utero, but the majority occur at the time of delivery, with an additional risk if the newborn is breastfed. The earlier a woman becomes aware of her HIV status, the better the chance of optimizing her own health, diminishing the risk of horizontal spread to sexual partners and preventing vertical transmission. It is estimated that the incidence of vertical transmission of HIV could be reduced by 65% in Canada if 90% of pregnant women were tested for HIV (6).

The benefits of zidovudine (AZT) monotherapy for the prevention of mother-to-child transmission of HIV were shown in a randomized, placebo controlled trial (7). In that study, the transmission rate was reduced by two-thirds (from 25% to 8%) with a three-phase intervention. Since then, a number of studies (8,9) have shown that maternal viral load is a critical determinant of the risk of perinatal transmission and that women with undetectable viral loads rarely transmit HIV. The use of highly active antiretroviral therapy during pregnancy combined with intrapartum and newborn AZT has been associated with a further reduction (to less than 2%) in perinatal transmission (10), with the rate in Canada being only 1.2% in the 168 infants born in 2006 where HIV exposure was recognized before birth (11). The choice of antiretroviral therapy for a pregnant woman must be individualized, taking into consideration factors such as current HIV status, side effects (especially those of greater importance in pregnancy), information on the effects of specific drugs on pregnancy outcome, previous antiretroviral therapies, the expected interval from start of therapy to delivery and, if known, antiretroviral susceptibility of the viral strain (6,10). While most newborns exposed to HIV infection perinatally are still given AZT alone in the neonatal period, high-risk situations or perinatal events may require combination infant

therapy. These decisions should be made in consultation with experts in paediatric HIV infection.

International studies (12,13) and observational studies in the United States (14) have shown that shorter courses of maternal AZT provide some reduction in perinatal HIV transmission, although to a lesser extent than longer three-phase regimens. Nevirapine and various combinations of antiretrovirals started during the peripartum period (10,15,16), or neonatal AZT started within 48 h of delivery (14), confer some benefit. These strategies are of particular benefit in resource-poor settings, but are also of potential benefit for HIV-positive women whose HIV status is not recognized until late in pregnancy or at delivery.

Transmission of HIV is known to occur at a rate of approximately 9% per year of breastfeeding (17), with the risk probably being highest in the first six months. Therefore, in Canada, where formula feeding is a safe and available alternative to breastfeeding, avoidance of HIV exposure from breast milk is recommended for all babies born to women living with HIV, regardless of maternal viral load or antiretroviral therapy.

Elective caesarian delivery performed before the onset of labour and rupture of membranes has been shown to reduce perinatal transmission for HIV-infected women who are not receiving antiretroviral drugs, or who are receiving AZT alone (18,19). There are less data on the efficacy in women with incompletely suppressed viral loads despite combination antiretrovirals, and there are insufficient data to determine the point at which the maternal viral load is low enough that the risks of caesarian delivery outweigh the benefits. By consensus, the American College of Obstetricians and Gynecologists have adopted a 'cut-off' of a viral load measured by HIV ribonucleic acid of 1000 copies/mL, below which the risks of a caesarian delivery are considered to outweigh the benefits of prevention of HIV transmission (20). In contrast, the Canadian consensus guidelines (6) state that either elective caesarian section or vaginal delivery may be appropriate for women whose viral load is incompletely suppressed, yet less than 1000 copies/mL.

#### Disadvantages of testing

There are many personal, familial and societal stresses for a woman when she learns that she is HIV-positive (21). To facilitate informed decision-making, access to experts in the management of HIV infection in women and children is essential.

Toxicity due to in utero exposure to any of the antiretroviral agents is a potential complication. In the short term, significant toxicity is rare and information on the long-term toxicity of intrauterine exposure to antiretroviral agents is minimal (6,22-24). However, the benefits of prophylaxis appear to far outweigh the potential for drug toxicity.

#### Prevalence of disease

Of Canadians who are HIV-positive, the proportion of women increased from 12% in 1985 to 1997, to 25% in

2005 (4). Almost all of these women were of childbearing age. Antenatal surveys in Alberta in 2000 and in British Columbia in 2003 found incidences of HIV of 3.3 per 10,000 (25) and 9.0 per 10,000 (4), respectively, with markedly higher rates of 31.3 per 10,000 being described in Aboriginal women in BC between 2000 and 2002 (4). There are approximately 185 children per year in Canada born to women with recognized HIV infection (26), and an unknown number born to infected women who are not yet diagnosed or have hidden the diagnosis from HCPs.

### CONCLUSIONS

The available information confirms the previous recommendation for routine offering of HIV testing to all pregnant women. There is incontrovertible evidence that transmission of HIV from mother to child can be reduced and almost eliminated by HIV testing during pregnancy, the use of appropriate perinatal antiretroviral therapy, reduction of HIV exposure during delivery and avoidance of breastfeeding.

### RECOMMENDATIONS

- HIV testing should be offered routinely to all women as early as possible during pregnancy, with testing repeated later in the pregnancy stage if there is suspected ongoing exposure to HIV infection.
- All HIV testing of women and children should be accompanied by appropriate confidentiality and counselling.
- Testing in the perinatal period must be part of a program that includes pre- and post-test counselling, follow-up testing of the HIV-exposed child, medical and supportive care for the mother and child, and where applicable, for the father and siblings.
- Physicians caring for pregnant women must ensure that the HIV status of the mother is available to the team caring for her at the moment of delivery. Failure to ensure availability of this information dramatically increases the risk of neonatal HIV acquisition and sometimes results in unnecessary exposure of the newborn to antiretrovirals (empirical infant therapy is sometimes started in very high-risk situations pending test results).
- If the mother has not been tested during pregnancy or has risk factors for acquiring HIV (drug use, multiple sexual partners and sexual partner with HIV), and was not retested late in pregnancy, then every effort should be made to perform expedited HIV serology on the mother with informed consent during labour or even after delivery. If the mother is not available, expedited HIV serology should be performed on the newborn with appropriate consent.
- If the mother refuses testing, this should be documented, and testing offered again, with consideration of a referral to a counsellor experienced in HIV counselling. The newborn should be followed as a child of unknown HIV status, in consultation with experts who may recommend antiretroviral therapy for the newborn if the mother is in a high-risk situation.
- HIV-positive pregnant women should be given information on factors that reduce perinatal HIV transmission, which includes antiretroviral therapy, obstetrical options and resources for formula feeding.
- Management of the HIV-positive pregnant woman and her child should be done in consultation with an HIV expert.
- All provinces and territories must ensure that they have comprehensive, accessible programs for HIV testing in pregnancy that result in informed testing of women and provide appropriate follow-up and care for HIV-infected women and their children. These programs must be evaluated for their effectiveness, including the prevention of perinatally acquired HIV infection.

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**Principal author:** *Dr Joan Louise Robinson, University of Alberta, Edmonton, Alberta*

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The recommendations in this statement do not indicate an exclusive course of treatment or procedure to be followed. Variations, taking into account individual circumstances, may be appropriate. *Internet addresses are current at time of publication*