

*M*aterniKit

English ~ 4th Edition ~ 2013

Table of Contents



1	Introduction
2	Preconception: Planning Pregnancy
4	Antepartum: Care During Pregnancy
9	Intrapartum: Care During Labour and Delivery
18	Postpartum: Care After Delivery
	Appendices
24	A. Intravenous Zidovudine (AZT/Retrovir®) Preparation and Administration Protocol
27	B. Antiretroviral Dosing and Protocols for the Newborn
29	C. Summary of HIV-exposed Infant Paediatric Care
31	D. Useful Links and Suggested Resources
33	E. Clinical Resources
36	F. References

MaterniKit, fourth edition

Cover illustration: © Tracy Walker/i2iart

For copies, contact CATIE at www.catie.ca or 1-800-263-1638.

CATIE Ordering Centre No: ATI-26452 (*aussi disponible en français, ATI-26453*)

Introduction



The use of combination antiretroviral therapy has improved the lives of people living with HIV. Consequently, many people living with HIV have reconsidered their reproductive options. With drastic declines in the rates of perinatal transmission of HIV (i.e., vertical transmission) in the past decade, we know that the use of combination antiretroviral therapy along with specialized obstetrical care is the key to maintaining this outcome. In order to keep members of the healthcare team who provide care to people living with HIV abreast of the developments in this area, the MaterniKit has been created. This comprehensive guide will review and summarize the important aspects of the management of HIV and pregnancy as well as pregnancy and family planning. It will also provide a comprehensive list of resources and links for further information in this area. Although management of HIV in pregnancy is best done by an interdisciplinary team with the appropriate knowledge, this is not always immediately available. Hence, this guide was created and supported by CATIE to be used as a national reference for members of healthcare teams providing care and support for people living with or affected by HIV who are or wish to become pregnant to ensure optimal outcomes.

Preconception: Planning Pregnancy

.....

Introduction

Reproductive health counseling should be offered to all people living with HIV of reproductive age soon after HIV diagnosis and on an ongoing basis. Pregnancy planning and preconception care must take into account: (a) the high rates of unintended pregnancy among women with HIV, (b) general principles of preconception health that are universal to all women of reproductive age, (c) the options for ways to achieve a pregnancy, and (d) unique considerations regarding preconception health for women living with HIV.

Pregnancy Planning and Reducing Unintended Pregnancies

Pregnancy planning for women living with HIV involves several aspects, including the prevention of unintended pregnancies. The incidence of unintended pregnancies among women living with HIV appears to be higher than in the general population (56% versus 30%), according to a recent Ontario study (Loutfy et al., 2012). Healthcare providers should counsel women living with HIV on contraceptive options that are suitable to prevent pregnancy until such a time that a pregnancy is intended. Counseling and clinical assessment related to contraception should be carried out in a manner that supports a woman's right to choose how and when to have a child and should be free of judgment.

General Recommendations for Preconception Health

Like all women, those living with HIV should be counseled on relevant aspects of preconception health. This counseling should include: 1) the importance of a healthy diet and lifestyle, 2) the initiation of 1 mg of folic acid per day three months prior to pregnancy, 3) the cessation of smoking, drinking alcohol and use of recreational drugs, 4) screening for and treating any additional infections such as syphilis or latent TB infection, 5) updating any needed immunizations, and 6) a review of all medications prior to conception, including antiretroviral therapy for the mother's health and to prevent perinatal transmission. For comprehensive guidelines on healthy preconception, including psychosocial issues,

please refer to the Canadian HIV Pregnancy Planning Guidelines (Loutfy et al., 2012b).

Methods of Conception

Couples and individuals affected by HIV must consider the risk of horizontal HIV transmission (i.e., between partners). Several variables including the HIV status of both partners, current use of antiretroviral therapy, and the viral load of the HIV-infected partner(s) must be assessed. As outlined in the Canadian HIV Pregnancy Planning Guidelines, all couples should be provided with comprehensive counseling on the risk of horizontal transmission of various conception methods. Examples of methods of conception used by couples and individuals affected by HIV include:

- Timed Natural Conception (unprotected intercourse)
- Home Insemination
- Sperm Washing
- Intrauterine insemination (IUI), In Vitro Fertilization (IVF), Intracytoplasmic Insemination (ICSI)

At publication, Canadian practice recommends that the HIV-positive partner be on antiretroviral therapy with a fully suppressed viral load prior to considering any of the above conception methods. Pre-exposure prophylaxis can be considered for an HIV-negative female partner of an HIV-positive male partner; the details are beyond the scope of this work.

In addition to these conception methods, counseling should include a discussion of adoption as an option to create a family.

Antiretroviral Therapy Consideration

Women living with HIV who require combination antiretroviral therapy for their own health during the preconception period should be advised to continue their current regimens, but women should avoid drugs that are potentially teratogenic or considered toxic in pregnancy. The most efficacious regimen that is safe in pregnancy should be selected. Women living with HIV who do not require combination antiretroviral treatment for their own health need to consider starting treatment before becoming pregnant or need to start by the end of the first trimester of pregnancy at the latest (i.e., week 12) (see Antepartum: Antiretroviral Considerations in Pregnancy).

Antepartum: Care during Pregnancy



Introduction

The management of pregnancy in women living with HIV should be seen as a routine part of the continuum of care. It requires collaboration between medical disciplines and community service agencies including a prenatal care provider (an Obstetrician or family doctor or midwife), Infectious Diseases or HIV specialist, Paediatrician/Paediatric Infectious Diseases or HIV specialist, nurse, pharmacist, social worker and community-based service provider in order to optimize all elements of health in a holistic manner. The medical care of women living with HIV during pregnancy should be tailored to the individual needs of the woman. Caregivers must consider and address the fact that many women living with HIV come from vulnerable social situations that may involve substance use, poverty, homelessness, trauma, past/current incarceration, single parenting of one or more children, psychiatric co-morbidities and abuse. In addition, cultural and language differences may present challenges to accessing care.

Summary of Antepartum Outpatient Management

- The first antenatal visit for a woman living with HIV should be extensive and include a detailed history, physical examination and routine laboratory investigations.
 - Verify the CD4 cell count and viral load at the time of pregnancy diagnosis.
 - HIV resistance testing (genotyping) should be done for all pregnant women who are not suppressed on antiretroviral therapy at the time of pregnancy diagnosis.
- Pregnant women should receive all routine antenatal care, screening, vaccinations, follow-up visits and counseling as per provincial and territorial guidelines.
- Routine antenatal ultrasonography should be performed with additional follow-up ultrasound to assess fetal growth and well-being (as clinically indicated).
- For women who are immunosuppressed, offer prophylaxis against *Pneumocystis jiroveci* pneumonia (PJP), *Mycobacterium avium* complex (MAC) and other prophylactic therapies

according to usual adult guidelines. Manage any complications, including opportunistic infections, with assistance from Infectious Diseases or HIV specialists.

- Close monitoring of potential toxicity from antiretroviral drugs is required and laboratory investigations to monitor for drug toxicity should be carried out.
- During pregnancy, the CD4 cell count should be repeated approximately every three months and the viral load should be done at 4–6 week intervals. This will allow for timely changes in antiretroviral therapy if warranted. The schedule may vary from patient to patient depending on the scenario.
- To assist the patient in making informed decisions, antepartum care should include discussion and counseling regarding the factors that impact the likelihood of perinatal transmission of HIV, including viral load, CD4 count, nutritional status as well as the approach to infant feeding.
- Where possible, antepartum referral to a Paediatrician with experience in the care of infants born to women living with HIV is recommended for discussion regarding the care and management of infants exposed to HIV *in utero*.
- When appropriate, women should be linked with other providers such as Paediatric teams, social workers and community organizations during pregnancy.

Antiretroviral Considerations in Pregnancy



All clinicians are advised to refer to the Department of Health and Human Services (DHHS) HIV/AIDS Treatment Guidelines for the most current information and dosing recommendations on antiretroviral use in pregnancy (see <http://aidsinfo.nih.gov/guidelines/>).

① If mother is on combination antiretroviral therapy and has a suppressed viral load at time of pregnancy diagnosis:

- Continue current regimen if woman is optimally suppressed. Changes in early pregnancy can lead to medication errors, adverse side effects leading to adherence issues and subsequent increases in viral loads, all of which should be avoided in pregnancy.
- If the patient becomes pregnant while on efavirenz (Sustiva®, Atripla®), she should be made aware of the small additional risk of adverse fetal outcome. At publication, most guidelines now suggest that if a woman conceives while on efavirenz, it may be continued in pregnancy. However, some experts would still recommend avoiding the use of efavirenz in women of reproductive potential.

② If mother is not on combination antiretroviral treatment or has a detectable viral load while on treatment at time of pregnancy diagnosis:

- Perform resistance testing (HIV genotyping) at the first visit. In general, genotyping can be reliably performed if the viral load is greater than 250 copies/mL.
- Decisions regarding combination antiretroviral treatment should be made by a physician expert in HIV care, and preferably in conjunction with an HIV pharmacist, taking into account past treatment history, results of resistance testing, hepatitis B co-infection status, potential teratogenicity of antiretroviral drugs and history of adherence problems.
- Use suppressive combination antiretroviral treatment, which usually consists of three active drugs (two nucleoside analogues + a boosted protease inhibitor or non-nucleoside reverse transcriptase inhibitor (NNRTI)). The goal of therapy is to suppress the plasma viral load (HIV RNA) to undetectable levels during the pregnancy and especially at the time of delivery.

Nucleoside analogues:

- Preferred: zidovudine/lamivudine (Combivir®). Unless there is a specific contraindication or history of resistance, one of the drugs should be zidovudine.
- Alternatives: abacavir/lamivudine (Kivexa®), tenofovir/emtricitabine (Truvada®). HLA-B*5701 screening should be ordered if abacavir is being considered.

Protease inhibitors:

- Preferred: lopinavir/ritonavir (Kaletra®) or atazanavir (Reyataz®)/ritonavir (Norvir®).
- Alternative: darunavir (Prezista®)/ritonavir (Norvir®) or saquinavir (Invirase®)/ritonavir (Norvir®).
- Unboosted nelfinavir (Viracept®) and indinavir (Crixivan®)/ritonavir (Norvir®) should only be considered in special circumstances when other antiretrovirals are not suitable.

Non-nucleoside reverse transcriptase inhibitors:

- Preferred: nevirapine (Viramune®, Viramune XR®). Avoid use in women with nadir CD4 counts above 250 cells/ μ L. However, at publication guidelines recommend continuation of nevirapine if the patient becomes pregnant while on nevirapine, is virologically suppressed and is tolerating the regimen.

Consult current resources for more information about individual antiretrovirals used in pregnancy and dosing (<http://aidsinfo.nih.gov/guidelines/>).

Antepartum Obstetrical Care

Most frequently, women living with HIV are asymptomatic and have no major obstetrical problems associated with their HIV infection. However, women with poorly controlled HIV infections are at increased risk for postpartum infections, intrauterine growth restriction and perinatal transmission of HIV.

While the obstetrical care of women living with HIV is generally routine, obstetricians who specialize in HIV consider these to be high-risk pregnancies. For women living with HIV, pregnancies are regarded as high risk for the following reasons:

- Women often have a vulnerable social history that may negatively impact the pregnancy.
- Women are taking combination antiretroviral therapy, which has potential side effects for both the woman and the fetus.
- Antiretroviral adherence support is a critical aspect of antepartum care to ensure optimal neonatal outcomes. This support requires a skilled clinician who can explore issues associated with adherence at each visit.
- Women may require delivery by Cesarean section, which requires specialized training both surgically as well as in determining the need for operative delivery based on viral suppression.
- Higher incidences of adverse obstetrical outcomes (preterm delivery and small for gestational age) have recently been reported, and this is still an evolving area of research with the precise etiology unknown.

For these reasons, intensive and careful monitoring by a multidisciplinary team is recommended to optimize both maternal and fetal health outcomes. Follow-up obstetrical visits should adhere to the standard routine, with additional visits scheduled as needed. Additional monitoring and clinical assessments, including laboratory tests and ultrasounds, may be required during routine follow-up visits.

Patient Support with Treatment

Adherence to treatment is key to the success of therapy.

Every effort should be made to assist pregnant patients with medication adherence.

- Make arrangements for daily observed therapy if necessary.
- Provide tools and necessary supports to assist with adherence (beepers, bubble-packing, dosettes, family supports, frequent phone calls, home visits).
- Manage side effects (e.g., nausea) aggressively and early, especially if the woman is feeling unwell due to pregnancy.
- Discuss any confidentiality issues and the impact this may have on adherence.

Intrapartum: Care during Labour and Delivery

.....

Introduction

It is well accepted that most of the cases of perinatal transmission of HIV occur at the time of labour and delivery. This risk can be minimized, first and foremost, by achieving an undetectable maternal plasma viral load prior to delivery with the use of antiretroviral agents in pregnancy. With the addition of maternal intravenous zidovudine during labour and administration of post-partum zidovudine prophylaxis to the infant, the risk is further minimized. However, it is important to realize that not all women, confirmed or suspected to be HIV positive, will present for delivery having achieved this ideal condition. Some of the possible scenarios to be considered are explained on the following pages.

Scenario 1 (Very low risk)

HIV positive, history of antenatal antiretroviral use
 Viral load **undetectable** near estimated delivery date
 Presenting in labour

Mother


Continue on antepartum oral antiretrovirals during labour.


Review indication for postpartum antiretrovirals.

IV Zidovudine Maternal Protocol*.

See Appendix A for dosing.

Proceed with vaginal delivery, reserving Cesarean section for obstetrical indications.

 At publication, Canadian practice deviates from the DHHS guidelines regarding the administration of maternal IV zidovudine intrapartum. DHHS only recommends IV zidovudine for patients with a viral load above 400 copies/mL; however, most Canadian protocols still include IV zidovudine for all patients intrapartum.

 Some protocols in other guidelines use maternal single-dose nevirapine with tail nucleoside therapy for one week in high-risk patients. However, the DHHS guidelines no longer recommend this approach.

Baby

Initiate PO/IV** zidovudine alone \times 6 weeks as soon as possible and no later than 6 hours after birth if maternal viral load is suppressed.

See Appendix B for dosing.

** IV medication only reserved for infants who cannot tolerate PO.

Scenario 2 (Low risk)

HIV positive, history of antenatal antiretroviral use

Viral load **detectable but below 1,000 copies/mL** near estimated delivery date

Presenting in labour


Mother


Continue on antepartum oral antiretrovirals during labour.

Review indication for postpartum antiretrovirals.

IV Zidovudine Maternal Protocol*.

See Appendix A for dosing.

 Recommendations for mode of delivery remain unclear in women with detectable viral loads below 1,000 copies/mL. Recent studies suggest that while there is still a chance of perinatal transmission at low maternal viral loads, the low rates of transmission in this group make it difficult to confirm if Cesarean section provides any additional benefit in reducing transmission. Decisions about mode of delivery for women with detectable viral loads that are below 1,000 copies/mL should be individualized based on discussions between the clinician and the woman, in addition to clinical factors present at the time of delivery. Women should be informed that there is no evidence of benefit for scheduled Cesarean section for prevention of perinatal transmission in women with viral loads below 1,000 copies/mL. She should also be informed that many Canadian experts in the field would recommend a Cesarean section in this scenario. **Consultation with an expert in this area is advised.**


 At publication, Canadian practice deviates from the DHHS guidelines regarding the administration of maternal IV zidovudine intrapartum. DHHS only recommends IV zidovudine for patients with a viral load above 400 copies/mL; however, most Canadian protocols still include IV zidovudine for all patients intrapartum.

Baby

Initiate PO/IV** zidovudine \times 6 weeks as soon as possible and no later than 6 hours after birth. *See Appendix B for dosing.*

At the discretion of expert opinion, babies may receive additional drugs such as:

- PO lamivudine (3TC®)
- PO nevirapine

 In rare circumstances when the mother has NNRTI resistance, the protease inhibitor nelfinavir could be used instead of nevirapine. **Consultation with a Paediatric HIV specialist and/or HIV pharmacist is advised.**

** IV medication only reserved for infants who cannot tolerate PO.

Scenario 3 (Higher risk)

HIV positive, history of antenatal antiretroviral use

Viral load **greater than or equal to 1,000 copies/mL** near estimated delivery date

Presenting in labour

Mother


A scheduled **Cesarean section** at 38 weeks gestation is recommended.

- IV zidovudine should be administered 3 hours prior to surgery.
- Use of routine prophylaxis antibiotics at time of delivery is recommended.

If patient presents with ruptured membranes or is in labour, the decision to proceed with an emergency Cesarean section versus allowing for a vaginal delivery should take into account duration of ruptured membranes, progress in labour, HIV viral load and current antiretroviral therapy.

All women (Cesarean section or vaginal) who are delivering should receive the following therapies:

- **IV Zidovudine Maternal Protocol**
See Appendix A for dosing
- **Continue on oral antepartum antiretrovirals during labour**
- Review indication for postpartum antiretrovirals.

 Some protocols also use maternal single-dose nevirapine with tail nucleoside therapy for a week in high-risk patients; however, the DHHS guidelines no longer recommend this approach.

Baby

Consult with a Paediatric HIV specialist and/or HIV pharmacist for guidance.

Combination antiretrovirals should be considered.

Immediately (as soon as possible and no later than 6 hours after birth) start antiretroviral prophylaxis.


All babies are to receive:

PO/IV* zidovudine × 6 weeks


See Appendix B for dosing

At the discretion of expert opinion, babies will usually receive additional drugs, such as:

- PO lamivudine (3TC®)
- PO nevirapine

 In rare circumstances when the mother has NNRTI resistance, the protease inhibitor nelfinavir could be used instead of nevirapine.

*IV medication only reserved for infants who cannot tolerate PO.

Scenario 4 (Higher risk)	
HIV positive, <i>NO history of antenatal antiretrovirals</i> and <i>NO IV zidovudine</i> given intrapartum Presenting after vaginal delivery	
Mother	Baby
Consult adult Infectious Diseases about indication for postpartum antiretrovirals, follow-up appointment, etc.	<p>Consult with a Paediatric HIV specialist and/or HIV pharmacist for guidance.</p> <p>Combination antiretrovirals should be considered.</p> <p><i>IMMEDIATELY</i> (as soon as possible and no later than 6 hours after birth) start antiretroviral drug prophylaxis.</p> <p>All babies are to receive:</p> <ul style="list-style-type: none"> • PO/IV* zidovudine × 6 weeks <i>See Appendix B for dosing</i> <p>Babies will usually receive additional drugs such as:</p> <ul style="list-style-type: none"> • PO lamivudine (3TC®) • PO nevirapine <div>  In rare circumstances when the mother has NNRTI resistance, the protease inhibitor nelfinavir could be used instead of nevirapine. </div>
	<p>* IV medication only reserved for infants who cannot tolerate PO.</p>

Scenario 5 (Maternal Antiretroviral Resistance)

HIV positive, known or suspected history of antiretroviral drug resistance

(includes zidovudine resistance)

Presenting in labour

Mother

Continue on antepartum oral antiretrovirals during labour.

Review indication for postpartum antiretrovirals.

IV Zidovudine Maternal Protocol (even if mother has a history of zidovudine resistance, IV zidovudine should be administered).

See Appendix A for dosing

Scheduled Cesarean section delivery if viral load is greater than 1,000 copies/mL.*

* See Scenarios 1–3 for more detail on mode of delivery according to viral load near estimated delivery date.

Baby

Consult with a Paediatric HIV specialist and/or HIV pharmacist for guidance.

IMMEDIATELY (as soon as possible and no later than 6 hours after birth) start antiretroviral drug prophylaxis.

All babies are to receive:

- **PO/IV** zidovudine × 6 weeks**

See Appendix B for dosing

Other antiretroviral drugs will usually be required depending on mother's drug resistance patterns and viral load close to the time of delivery.

** IV medication only reserved for infants who cannot tolerate PO.

Scenario 6 (Unknown HIV status, but at high risk)

Unknown HIV status or HIV negative in early pregnancy:

With recent *high-risk activities* or possible HIV seroconversion and/or in “window period” (1–6 months after acute infection before antibodies have developed). Examples of high-risk activities include: active injection drug use, HIV-positive sexual partner, multiple sexual partners, sex worker and recent history of sexually transmitted infection, OR,

Belongs to a community that is *disproportionately affected by HIV* with additional clinical factors associated with HIV seroconversion and/or in “window period” (1–6 months after acute infection before antibodies have developed). Examples of disproportionately affected communities include: people with a history of incarceration, inner-city/homeless people, Aboriginal people, people from a region of high HIV prevalence (e.g., sub-Saharan Africa, Caribbean) and people with a sexual partner with known risk factors for HIV.

Presenting in labour

Mother	Baby
<p>STAT HIV antibodies test or use Rapid HIV Test if available at site.</p> <p>HIV RNA PCR (Quantitative) – to be done only if HIV antibodies tested is positive.</p> <p>HCV Antibody (if unknown)</p> <p>HBsAg</p> <p>Syphilis serology</p> <p>If STAT HIV test is pending, consider immediate administration of IV zidovudine as per the IV Zidovudine Maternal Protocol following a discussion and consent from the patient. <i>See Appendix A for dosing</i></p> <p>If STAT HIV antibodies test or Rapid HIV Test is positive, consult adult Infectious Diseases immediately.</p> <p>If mother is HIV positive and still in labour, immediately initiate IV Zidovudine Maternal Protocol if not yet commenced. <i>See Appendix A for dosing</i></p> <p>If patient is newly diagnosed with HIV and presents with ruptured membranes or is in labour, the decision to proceed with an emergency Cesarean section versus allowing for a vaginal delivery should take into account duration of ruptured membranes, progress in labour and HIV viral load if available.</p>	<p>If maternal HIV test is negative at delivery (HIV negative), then no therapy is required.</p> <p>If maternal HIV test is pending, consider immediate administration of PO/IV* zidovudine +/- combination therapy in the interim.</p> <p>If maternal HIV test is positive (HIV positive), IMMEDIATELY (as soon as possible; no later than 6 hours after birth) start antiretroviral drug prophylaxis with PO/IV* zidovudine × 6 weeks +/- combination therapy.</p> <p>Consult with a Paediatric HIV specialist or HIV pharmacist for guidance. They will determine infant treatment as in Scenario 2 or 3.</p> <p>Consider ordering baseline <i>HIV PCR</i> to determine possible perinatal transmission (collect in EDTA tube; consult with local policies regarding specimen transfer to the National HIV and Retrovirology Laboratories in Ottawa).</p> <p>If maternal syphilis serology is positive, also perform testing on the infant.</p> <p>If there is concern regarding maternal Hepatitis B status, then Hep B immune globulin and vaccination should be initiated in the infant.</p>

* IV medication only reserved for infants who cannot tolerate PO.



Drug Interaction

Precautions: Potential significant drug interactions between protease inhibitors and ergot derivatives (e.g., ergonovine maleate) or midazolam (Versed®):

Protease inhibitors are potent inhibitors of the liver cytochrome P450 3A4 isoenzymes, which are also the major route of metabolism for midazolam and ergot alkaloids. Serious and occasionally fatal interactions between protease inhibitors (PIs) and these agents have been reported in the literature, and **co-administration is contraindicated**.

Suggested alternatives include:

- **Ergot derivatives:**
Consider other options for management of postpartum hemorrhage, such as oxytocin (pitocin) or carboprost (Hemabate®).
- **Midazolam (Versed®):**
Other options for short-term sedation include parenteral lorazepam (Ativan®) or propofol (Diprivan®).

Obstetrical Care During Delivery

- Women living with HIV should be counselled regarding the risks and benefits of elective Cesarean section before the onset of labour or rupture of membranes, with consideration of the following:
 - Higher plasma viral loads are associated with a higher risk of perinatal transmission.
 - At publication, it is unknown if elective Cesarean section will offer any additional benefit in decreasing transmission in women on antiretroviral therapy with low or undetectable viral loads.
- Elective Cesarean section should be scheduled at 38 weeks to ensure the Cesarean section occurs before the likelihood of onset of labour or rupture of membranes before delivery.
- Women should continue their oral antenatal antiretrovirals during labour. Intrapartum IV zidovudine (**see Appendix A**) should be started when labour begins or membranes rupture. If membranes rupture before the onset of labour, induction may be considered to minimize the interval between rupture and delivery.
- If spontaneous rupture of membranes occurs before or early during the course of labour, interventions to decrease the interval to delivery, such as administration of oxytocin, can be considered if a vaginal delivery is planned. At publication, Canadian clinical practice advises against artificial rupture of membranes unless indicated for a clear obstetric indication in women who present in labour with undetectable viral loads. Data are limited on artificial rupture of membranes in women with undetectable viral loads.
- Epidurals are not contraindicated.
- Interventional or invasive procedures may increase the risk of transmission. Avoid the following unless obstetrically indicated: rupture of the membranes, internal fetal monitoring, fetal scalp gases, intrauterine pressure catheters, episiotomy and vacuum extraction/forceps.

Labour & Delivery Checklist

Labour & Delivery

Initials

Ensure that maximal confidentiality of maternal HIV status is maintained.

Determine if HIV-positive woman is taking antiretroviral therapy during the current pregnancy and obtain the most recent viral load measurement.

Initiate intrapartum IV zidovudine during labour and delivery to the mother regardless of antepartum antiretroviral regimen or mode of delivery.

If applicable, continue HIV-positive woman's antepartum antiretroviral regimen wherever possible throughout labour/delivery and following delivery.

Routine Precautions: Ensure that the routine blood and body fluid precautions are observed. No additional precautions are required.

Breastfeeding is not recommended in Canada.

Postpartum: Maternal Care after Delivery

.....

Introduction

There are many important facets to the care required in the postpartum period to optimize the health of the infant and mother. While medical care remains critical, social determinants greatly impact on the health and well-being of women living with HIV and their infants following delivery. Healthcare providers and social service professionals working with new mothers need to consider aspects beyond newborn care and infant feeding to fully understand the unique issues that women living with HIV experience in the postpartum period.

Postpartum Depression and Other Mental Health Concerns

The period following the birth of a child is stressful for all women. The postpartum period for women living with HIV, while fulfilling and rewarding, heightens concerns related to disclosure, perinatal transmission and their own HIV infection. Expert clinicians have observed high rates of postpartum depression and poor mental health outcomes in the postpartum period among new mothers living with HIV. Poor functioning on medical outcomes related to stigma, stress and mental health have also been observed. Women living with HIV, especially mothers, reveal high rates of psychiatric disorders, including depression and post-traumatic stress disorder (50%–89%), significant level of psychological distress and histories of trauma (Mellins, Ehrhardt & Grant, 1997; Morrison, et al., 2002). Given the high prevalence of depression and trauma in the lives of women living with HIV, close monitoring of mental health is of particular consequence during the postpartum period.

New mothers living with HIV must have adequate and timely access to health and social services in the event that any psychological concerns should emerge or be observed by care providers. Clinicians are encouraged to routinely screen for postpartum

depression using a valid tool, such as the Edinburgh Postnatal Depression Scale (<http://www.testandcalc.com/etc/tests/edin.asp>).

- It is recommended to see new mothers living with HIV 4–6 weeks or sooner following delivery to assess for postpartum depression and medication adherence.

Antiretroviral Therapy

- If mother was on antiretrovirals during pregnancy, continue as specified for the mother's own health.
- If mother was determined HIV positive but not on antiretroviral therapy, arrange for follow-up with an HIV Care Program.

Patient Support with Treatment

Adherence to treatment is key to the success of therapy. Every effort should be made to assist the new mother with medication adherence.

- Make arrangements for daily observed therapy if necessary.
- Provide tools and necessary supports to assist with adherence (beepers, bubble-packing, dosettes, family supports, frequent phone calls, home visits).
- Discuss any confidentiality issues and the impact this may have on adherence.

Management of side effects (e.g., nausea, sleep or mood disturbances) is especially important, as the postpartum period may present unique challenges to maintaining adherence to treatment.

Contraception

As with all pregnant and postpartum women, contraception considerations should be discussed. Contraceptive planning should be customized based on individual needs of the woman and her family and clinical factors present at the time of delivery. Appropriate forms of birth control include oral or injectable hormonal contraceptives, intrauterine devices (IUD), tubal ligation and condoms. For women undergoing a Cesarean section who do not intend any future pregnancies, routine counseling related to elective tubal ligation during the Cesarean section is an appropriate form of birth control.

Many types of antiretrovirals may interact with oral hormonal contraceptives and make them less effective. Therefore, two methods of birth control (including at least one non-hormonal method)



Note: An IUD should not be inserted immediately postpartum; a minimum of 2 weeks is required prior to postpartum insertion

should be used. A summary of interactions between antiretrovirals and hormonal contraceptives should be consulted:

http://www.hivclinic.ca/main/drugs_interact_files/Oral%20Contraceptive-int.pdf.

For women who may be at higher risk of repeat unplanned pregnancy, a dose of injectable hormonal contraception (e.g., Depo-Provera®) prior to discharge from hospital postpartum should be considered.

Postpartum Checklist

Postpartum – Mother

Ensure that maximal confidentiality of maternal HIV status is maintained.

Ensure that arrangements for follow-up of the mother and baby are made with Adult and Paediatric HIV specialists.

Ensure that the prescription for 6 weeks of discharge infant antiretroviral medication has been explained to the caregiver and dosing and administration of medication has been observed for accuracy/technique.

Supportive management of breast engorgement and breast care to be provided. Breastfeeding is not recommended in Canada.

Contraceptive counseling and planning should be provided to mother prior to discharge; if not possible, arrangements should be made for follow-up of this as soon as possible after discharge.

Postpartum depression symptoms are discussed.

Infant Care After Delivery

Infant Laboratory Orders

The following steps apply to

Infants born to mothers with known HIV infection *and/or*

Infants born to mothers with potential or suspected HIV infection

- Universal precautions: Ensure that standard universal precautions are undertaken for blood and body fluid protection.
- Wash infant with soap and water prior to intramuscular injections or blood sampling.
- Breastfeeding is not recommended irrespective of maternal antiretroviral therapy received.

- Initiate antiretroviral treatment for prevention of perinatal transmission to the infant within 6 hours of birth (see **Appendix B**).
- **Labs to be ordered within 48 hours after birth (all infants):**
 - CBC, differential, AST, ALT, + / – lactate. Other laboratory investigations (e.g., urea, creatinine) may be required depending on maternal antiretroviral regimen during pregnancy.
 - Consult with a Paediatric HIV specialist and/or HIV pharmacist for guidance.
- **Infants born to mothers with known HIV infection**
 - Infant diagnostic HIV PCR – send blood (minimum 2 mL in EDTA tube).
- **Infants born to mothers with unknown HIV status (where rapid HIV antibody testing is not available):**
 - HIV EIA (antibody) – This is a priority test over HIV PCR if it is difficult to obtain a blood sample from the infant – send blood (minimum 2 mL in gold top tube).
 - Infant diagnostic HIV PCR within 48 hours.
- Check maternal hepatitis B status. If mother is Hepatitis B surface antigen positive (HBsAg +) or has unknown status, administer first dose of Hepatitis B vaccine and Hepatitis B Immune Globulin within 12 hours after birth.
- Provide discharge prescriptions for prophylaxis with zidovudine for 6 weeks + / – other antiretrovirals as indicated.
- Refer to a Paediatrician and provide information for follow-up care and laboratory investigations (see Appendix C).

Medication Teaching for Infants

It is very important for the infant caregiver to completely understand the dosing instructions and scheduling for the antiretroviral prophylaxis for the infant. Ensure that all required prescriptions and dosing tools, such as oral syringes, dosing cups, dosing schedule/calendars and dosing reminders (e.g., beepers), are provided. Health teaching should be provided regarding drawing up the medication, administering the medication, the schedule, medication storage and trouble-shooting for confidentiality issues (e.g., how to explain why the baby is receiving this medication) prior to discharge from the birthing unit. The caregiver's ability to adhere to the medication schedule is crucial. If there is any question of

this ability, please arrange for home care or postpartum community nursing support to ensure that the baby receives the proper regimen according to protocol. See Appendix B for dosing guide.

Infant Feeding

The presence of HIV DNA in breast milk has been documented in many studies. Transmission can occur through breastfeeding. All women who are living with HIV and who have given birth should be counseled regarding the risks and benefits of breastfeeding. An open and comprehensive discussion is recommended in the clinical setting regardless of additional support services available in your community. Breastfeeding is a highly personal and emotional experience. Depending on the culture and history of each woman, additional individualized support may be required to address the psychosocial impact of infant feeding in the context of maternal HIV infection and should be offered to all women at each follow-up visit. These issues may include:

- A plan to explain why she is not breastfeeding to friends and families
- Fears related to disclosure
- Concerns related to bonding associated with breastfeeding
- The expectation of breastfeeding as a “motherly duty”
- Stigma associated with not breastfeeding
- Managing milk production and supporting the cessation of mammary glands (including pain, infection and prolonged milk production)
- Managing cost associated with formula feeding (when formula programs are unavailable)

The World Health Organization (2010) continues to advise against breastfeeding in the context of maternal HIV infection when the non-HIV-related infant morbidity and mortality does not outweigh the risk of HIV transmission through breastfeeding. **At publication, Canadian clinical practice advises against breastfeeding and supports the use of formula as a safe alternative for infant feeding.** Several provinces across Canada have implemented programs to provide formula free of charge to mothers living with HIV (e.g., Ministry of Health and Long-term Care via Teresa Group in Ontario, Provincial Health Services Authority in British Columbia and Northern Alberta Program in northern Alberta). Please inquire with the local AIDS Service Organizations or HIV specialists for details.

Infant Checklist

Postpartum – Infant

Provide HIV antiretroviral prophylaxis to the infant *immediately*, no later than 6 hours post-delivery _____

Ensure that maximal confidentiality of maternal HIV and infant exposure status is maintained _____

Routine Precautions: Ensure that routine blood and body fluid precautions are observed. Do admission bath as soon as possible after delivery once infant's temperature has stabilized. **Bathe infant with soap and water to remove maternal blood or amniotic fluid prior to intramuscular injections or blood sampling.** _____

Breastfeeding is not recommended in Canada. _____

Obtain verbal consent for HIV screening of baby and document on record. _____

Ensure that laboratory tests are done. _____

Ensure that teaching regarding administration of infant antiretrovirals is done and that mother/caregiver can administer it comfortably prior to discharge. _____

Ensure that the prescription for 6 weeks of discharge infant antiretroviral medication is filled and that the mother/caregiver has the ordered drug supply prior to discharge. _____

Ensure that the baby will have an adequate supply of formula and arrangements are made for compassionate access to formula in the community. _____

Ensure that the follow-up appointment has been made for the baby with the Paediatric HIV specialist or Paediatrician at 2 weeks of age and a summary of infant follow-up care is provided. **See Appendix C.** _____

Ensure that the mother or caregiver has been given a list of contact phone numbers as needed. _____

Appendix A:

Intravenous Zidovudine (AZT/Retrovir®)

Preparation and Administration Protocol

.....

Recommended Supplies:

- 5 – vials zidovudine 200 mg/20 mL from prevention of perinatal transmission kit (concentration 10 mg/mL)
- 1 – IV bag 500 mL (D5W, D5NS, LR, D5LR)

To make a Standard Zidovudine Concentration: 2 mg/mL



Note: This solution is stable for 24 hours at room temperature (or 48 hours if refrigerated).

- ❶ Withdraw contents of 5 zidovudine vials (100 mL).
[5 × 20 mL per vial = 100 mL (=1000 mg)].
- ❷ Remove 100 mL from 500 mL IV bag.
- ❸ Add the 100 mL zidovudine to it.

For fluid-restricted patients the maximum concentration of zidovudine is 4 mg/mL.

Dosage of Zidovudine during Labour:

- Loading dose: 2 mg/kg* infused over 1 hour followed by...
- Continuous infusion: 1 mg/kg/hour* continuous infusion until cord clamped.

Zidovudine Dosing Table:

* Only to be used for standard 2 mg/mL solution

Wt (Kg)	Loading Dose	Continuous Infusion
Round woman's weight to the nearest 2 kg	Set pump at this rate FOR FIRST HOUR ONLY (mL/hour)	Set pump at this rate (<i>after loading dose</i>) (mL/hour)
50	50	25
52	52	26
54	54	27
56	56	28
58	58	29
60	60	30
62	62	31
64	64	32

Zidovudine Dosing Table:

*** Only to be used for standard 2 mg/mL solution**

Wt (Kg)	Loading Dose	Continuous Infusion
Round woman's weight to the nearest 2 kg	Set pump at this rate FOR FIRST HOUR ONLY (mL/hour)	Set pump at this rate (<i>after loading dose</i>) (mL/hour)
66	66	33
68	68	34
70	70	35
72	72	36
74	74	37
76	76	38
78	78	39
80	80	40
82	82	41
84	84	42
86	86	43
88	88	44
90	90	45
92	92	46
94	94	47
96	96	48
98	98	49
100	100	50
102	102	51
104	104	52
106	106	53
108	108	54
110	110	55
112	112	56
114	114	57
116	116	58
118	118	59
120	120	60
122	122	61
124	124	62
126	126	63
128	128	64

Zidovudine Compatibility:

The following list includes some of the drugs that are compatible at Y-site with zidovudine (ZDV):

acyclovir, amikacin, amphotericin, ampicillin, ceftazidime, ceftriaxone, cimetidine, clindamycin, cloxacillin, co-trimoxazole, dexamethasone, erythromycin, fluconazole, gentamicin, heparin, imipenem-cilastatin, insulin, magnesium sulfate, meropenem, metoclopramide, metronidazole, meperidine, morphine, oxytocin, potassium chloride, ranitidine, vancomycin.

Appendix B

Antiretroviral Dosing and Protocols for the Newborn

.....

All Infants: Give oral (PO) or intravenous (IV) zidovudine beginning as soon as possible and within 6 hours of birth.

- Oral therapy is preferred but IV route may be used if infant is unable to tolerate oral feeds.

Zidovudine (AZT, Retrovir®) dosage:

≥ 35 weeks gestation:

zidovudine syrup 4 mg/kg/dose PO every 12 hours for 6 weeks.

OR

zidovudine 3 mg/kg/dose IV every 12 hours for 6 weeks if infant unable to tolerate oral feeds.

30–34 weeks gestation:

zidovudine dose reduced to 2 mg/kg/dose PO every 12 hours for 2 weeks then 3 mg/kg/dose PO every 12 hours until 6 weeks.

OR

zidovudine 1.5 mg/kg/dose IV every 12 hours for 2 weeks then 2.3 mg/kg/dose IV every 12 hours until 6 weeks if infant unable to tolerate oral feeds.

< 30 weeks gestation:

zidovudine dose reduced to 2 mg/kg/dose PO every 12 hours for 4 weeks then 3 mg/kg/dose PO every 12 hours until 6 weeks.

OR

zidovudine 1.5 mg/kg/dose IV every 12 hours for 4 weeks then 2.3 mg/kg/dose IV every 12 hours until 6 weeks if infant unable to tolerate oral feeds.

**IMPORTANT NOTE:**

Combination antiretroviral therapy with nevirapine *and* lamivudine (in addition to zidovudine) may be given to infants born to mothers who:

- Were not on optimal antiretroviral therapy (e.g., received no antenatal antiretroviral therapy).
- Have a recent detectable HIV viral load (measured within last 4 weeks). Consult with a Paediatric HIV specialist or HIV pharmacist for guidance if the mother has a history of drug resistance to any of these antiretroviral medications.

Dosing for combination antiretroviral therapy is complex. At publication, Canadian clinical practice regarding dosing and regimen may vary by region and changes as new data become available. In situations where there is a higher risk of infant HIV infection, consultation with a Paediatric HIV specialist is recommended to determine the benefits and dosing of combination antiretroviral prophylaxis.

Appendix C

Summary of HIV-exposed Infant Paediatric Care

.....

At Birth

- Counsel about the Canadian clinical practice that advises against breastfeeding and supports the use of formula as a safe alternative for infant feeding.
- Zidovudine initiated within 6 hours of birth as per dosing guidelines in Appendix B for six weeks.
- Addition of other antiretrovirals at the discretion of the Paediatric HIV or Infectious Diseases specialists in special instances.
- Be sure that the mother's Hepatitis B status has been determined and that she and the infant have been appropriately managed.

Tests that should have been done while still in hospital

- Blood test for HIV PCR; if positive then repeat immediately to confirm.
- CBC, differential, AST, ALT, + / – lactate. Other laboratory investigations (e.g., urea, creatinine) may be required depending on maternal antiretroviral regimen during pregnancy.
- Serology for CMV, syphilis, toxoplasmosis, hepatitis C (if maternal seropositivity or unknown).

2–4 Weeks

- Blood test for HIV PCR; if positive then repeat immediately to confirm.
- Hemoglobin, liver enzymes and other laboratory investigations (e.g., urea, creatinine) as required depending on maternal antiretroviral regimen during pregnancy.
- Counsel about continued adherence to zidovudine for the entire course.
- Counsel about the Canadian clinical practice that advises against breastfeeding and supports the use of formula as a safe alternative for infant feeding.
- Zidovudine/antiretrovirals to be discontinued at 6 weeks unless HIV PCR is positive.

8 Weeks

- Routine infant immunizations according to provincial protocols.



Note: Some guidelines recommend *Pneumocystis jiroveci* pneumonia (PJP) prophylaxis for all HIV exposed infants. **At publication, Canadian clinical practice usually does not include routine PJP prophylaxis unless the risk of HIV transmission is considered high.** Please consult with a local expert on clinical practice on a case-by-case basis.

- Counsel about the Canadian clinical practice that advises against breastfeeding and supports the use of formula as a safe alternative for infant feeding.

8–16 Weeks

- Blood test for HIV PCR*.
- Hemoglobin. Some experts consider a CD4 lymphocyte count.
- Routine immunizations according to provincial protocols.
- Counsel about the Canadian clinical practice that advises against breastfeeding and supports the use of formula as a safe alternative for infant feeding.

* Following the Third HIV PCR Test

- Review all HIV tests

If there are two negative tests after one month of age, the infant is **not considered HIV infected**. Maternally derived HIV antibodies should be undetectable by 18 months of age. At publication, Canadian clinical practice recommends that this be documented at 18 months to confirm the negative HIV status of the child. Newer HIV tests provide a higher level of sensitivity that may result in residual maternal antibody detection at 18 months. If this occurs, the test should be repeated for several months until confirmed negative.

If any HIV PCR tests are positive, the test should be repeated immediately. If the repeat test is positive, the infant is confirmed to be HIV positive and should be referred immediately to a Paediatric HIV program.

Appendix D

Useful Links and Suggested Resources

.....

Guidelines

Panel on Treatment of HIV-Infected Pregnant Women and Prevention of Perinatal Transmission. Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1 Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV-1 Transmission in the United States. July 31, 2012: pp i–J3.

Accessed at: <http://aidsinfo.nih.gov>

Reducing the Rate of Perinatal HIV Transmission for Mothers and Babies. Women's Health program Guidelines and Protocols. Alberta Health Services and Covenant Health, Edmonton Zone. Revision 10, October 2012.

Access at: <http://www.bugsanddrugs.ca/>

Guidelines for the Management of HIV Infection in Pregnant Women 2012. British HIV Association.

<http://www.bhiva.org/PregnantWomen2012.aspx>

Society of Obstetricians and Gynaecologists of Canada; Clinical Practice Guidelines.

www.sogc.org/guidelines/index_e.asp

Pregnancy Planning

Canadian HIV Pregnancy Planning Guidelines

<http://www.sogc.org/guidelines/documents/gui278CPG1206E.pdf>

Pregnancy Planning Information for HIV + Women and Their Partners

<http://library.catie.ca/PDF/ATI-20000s/26314.pdf>

Pregnancy Planning Information for HIV + Men and Their Partners

<http://library.catie.ca/PDF/ATI-20000s/26320.pdf>

Antepartum and Intrapartum

Information for Women who are Diagnosed with HIV during Pregnancy

<http://library.catie.ca/PDF/ATI-20000s/26316.pdf>

Post Partum

Information for HIV + New Moms

<http://library.catie.ca/PDF/ATI-20000s/26318.pdf>

Post Partum Depression Scale Assessment Tool

<http://www.testandcalc.com/etc/tests/edin.asp>

Antiretroviral Information

Table 5. Antiretroviral Drug Use in Pregnant HIV-Infected Women: Pharmacokinetic and Toxicity Data in Human Pregnancy and Recommendations for Use in Pregnancy

http://aidsinfo.nih.gov/contentfiles/lvguidelines/peri_tables.pdf

Antiretroviral Drug Interaction Tables and Medication Fact Sheets

http://www.hivclinic.ca/main/drugs_home.html

Algorithms, Tools and Order Sets

Oak Tree Clinic; BC Women's Hospital and Health Centre

<http://www.bcwomens.ca/Services/HealthServices/OakTreeClinic/ClinicalGuidelines.htm>

Alberta Health Services and Covenant Health, Edmonton Zone

<http://www.bugsanddrugs.ca/>

Edinburgh Postnatal Depression Scale

<http://www.testandcalc.com/etc/tests/edin.asp>

Appendix E

Clinical Resources



MaterniKit would like to acknowledge all of the clinicians and community service providers supporting women and infants living with and affected by HIV across Canada. While there are additional resources across Canada, the following list provides a quick link to primary Paediatric HIV resources in each province for urgent questions and referrals.

Primary Provincial Resources for Support and Referral Services

British Columbia

Oak Tree Clinic

BC Women's Hospital and Health Centre
4500 Oak Street
Vancouver, BC V6H 3N1
Tel: 604-875-2212 or 1-888-711-3030
www.oaktreeclinic.bc.ca

Alberta

Northern Alberta Program

University of Alberta Hospital Site
Kaye Edmonton Clinic
11400 University Avenue,
Edmonton, AB T6G 1Z1
Adult HIV Clinic: Tel: 780-407-8372 or 780-407-8439 or
1-866-407-8371
Paediatric HIV Clinic: Tel: 780-248-5540 (ask for paediatric
ID physician)
[http://www.albertahealthservices.ca/
services.asp?pid=service&rid=5741](http://www.albertahealthservices.ca/services.asp?pid=service&rid=5741)

Southern Alberta Clinic (SAC)

Southern Alberta HIV Clinic
 Sheldon M. Chumir Health Centre
 #3223, 1213 – 4th St. SW
 Calgary, AB T2R 0X7
 Tel: 403-955-6399
<http://www.albertahealthservices.ca/services.asp?pid=service&rid=1001306>

Saskatchewan**Pediatric HIV Clinic**

Infectious Diseases, Dept of Pediatrics
 Royal University Hospital
 103 Hospital Drive
 Saskatoon, SK S7N 0W8
 Tel: 306-966-7927

Manitoba**Health Sciences Centre Winnipeg**

820 Sherbrook Street
 Winnipeg, Manitoba R3A 1R9
 The Pediatric Infectious Disease service can be contacted via central paging at the Health Sciences Centre (204-787-2071) for any concerns related to HIV perinatal transmission.

Ontario**Children's Hospital of Eastern Ontario, HIV program**

401 Smyth Road
 Ottawa, ON K1H 8L1
 Tel: 613-737-7600 x 2651 or x 2543
 If urgent call 613-737-7600 x 0 and ask to have the infectious diseases physician on call paged
www.cheo.on.ca/en/referringhivprogram

Hospital for Sick Children, HIV Clinic

555 University Ave
 Toronto, ON M5G 1X8
 Tel: 416-813-7444
 To have the infectious diseases physician on call paged dial 416-813-7500

Quebec

Ste Justine's Children's Hospital, HIV Clinic

3175 CH Cote Sainte Catherine

Montreal, QC H3H 1P3

Tel: 514-345-2136

www.chu-sainte-justine.org/hiv

Immunocompromised Clinic

c/o Complex Care Service of the Montreal Children's Hospital

Montreal Children's Hospital

2300 Tupper, A-216

Montreal, Quebec H3H 1P3

Tel: 514-412-4420

Atlantic Canada

Grace Health Science Centre for Children, Women and Families

8th Floor Labs

5850 University Ave.

Halifax, NS B3J 3G9

Tel: 902-428-8498

Northern Canada

Please contact any of the resources in the other provinces listed above.

National Resources

CATIE

Canada's source for HIV and hepatitis C information

www.catie.ca

Motherisk

Online and telephone support for expectant mothers and their care providers

www.motherisk.org

Appendix F

References

• • • • •

Loutfy, M.R., et al. (2012). High prevalence of unintended pregnancies in HIV-positive women of reproductive age in Ontario, Canada: a retrospective study. *HIV Medicine*, 13(2), 107–117.

Loutfy, M.R., et al. (2012b). Canadian HIV pregnancy planning guidelines. *Journal of Obstetrics and Gynecology of Canada*, 34(6), 575–590.

Mellins, C. A., Ehrhardt, A. A., & Grant, W. F. (1997). Psychiatric symptomatology and psychological functioning in HIV-infected mothers. *AIDS and Behavior*, 1(4), 233–245.

Morrison, M. F., et al. (2002). Depressive and anxiety disorders in women with HIV infection. *American Journal of Psychiatry*, 159(5), 789–796.

Acknowledgements – 2013 MaterniKit Revision

The 2013 revision of the MaterniKit was made possible through unrestricted educational grants and support from:



Funding also provided by the Public Health Agency of Canada. The views expressed herein do not necessarily represent those of funders and supporters.

Major revisions done by:

Alice Tseng, PharmD, FCSHP, AAHIVP
Immunodeficiency Clinic,
Toronto General Hospital
Assistant Professor, Faculty of Pharmacy,
University of Toronto

Linda Robinson, BScPhm, AAHIVE
Co-Chair, Ontario HIV Pharmacists,
Professional Specialty Group
HIV Clinical Pharmacist Specialist,
Windsor, Ontario

Michelle Foisy, PharmD, FCSHP, AAHIVP
Clinical Pharmacist,
Northern Alberta Program,
Edmonton, Alberta

V. Logan Kennedy, MN, RN
Research Associate,
Women and HIV Research Program,
Women's College Research Institute,
Women's College Hospital

Mona R. Loutfy, MD, FRCP(C), MPH
Associate Professor,
Department of Medicine,
University of Toronto
Infectious Diseases Specialist and
Research Director,
Maple Leaf Medical Clinic
Director, Women and HIV
Research Program,
Women's College Research Institute,
Women's College Hospital

Reviewers and Editors:

Mark H. Yudin, MD, MSc, FRCSC
Associate Professor,
Department of Obstetrics
and Gynecology,
University of Toronto

Lindy Samson, MD, FRCP(C)
Associate Professor,
Department of Paediatrics,
University of Ottawa

Anita Benoit, BSc, MSc, PhD
James Kreppner CTN Postdoctoral Fellow,
Women and HIV Research Program,
Women's College Research Institute,
Women's College Hospital

