CHILD EXPOSED TO BLOOD OR POTENTIALLY BLOOD CONTAMINATED SECRETIONS: MANAGEMENT - CHW

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

- This policy has been developed to prevent or reduce child morbidity following needle stick incidents (i.e. where a child is accidentally stuck by a needle) or exposure to blood or (potentially) blood contaminated secretions. It is based on the NSW Health Policy Directive (PD2005_311) "*HIV, Hepatitis B and Hepatitis C – Management of Health Care Workers Potentially Exposed*" which is for occupational exposure and has been adapted for paediatric needs.
- Children are often accidentally exposed to the risk of acquiring a blood borne virus, HBV, HCV and / or HIV.
- All these infections are chronic and carry a significant risk of long-term morbidity and death.
- The most frequent accident is needle stick injury which often occurs when a child picks up a discarded used needle or accidentally steps on a needle in a public space such as a park or the beach.
- This document provides details on the management of a child exposed (or potentially exposed) to blood or blood contaminated secretions.

Approved by:	SCHN Policy,Procedure and Guideline Committee	
Date Effective:	1st September 2014	**Review Period:** 3 years
Team Leader:	Clinical Nurse Consultant	**Area/Dept:** Infection Control

Date of Publishing: 11 September 2014 7:23 AM Date of Printing: 11 September 2014

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CHANGE SUMMARY

- Appendix 2 amended.
- Appendix 4 added
- References updated

READ ACKNOWLEDGEMENT

- Discretionary – local manager to determine which staff, if any, are to read the document.

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Glossary

Abbreviation or Term	Definition
Anti – HBs	antibody to hepatitis B surface antigen
Anti - HBc	antibody to hepatitis B core antigen
Anti - HCV	antibody to Hepatitis C virus
Anti - HIV	antibody to Human immunodeficiency virus
HBIG	Hepatitis B immunoglobulin
HBsAg	Hepatitis B surface antigen
HBcAb	Hepatitis B core antibody
HBeAg	Hepatitis B e antigen
HBV	Hepatitis B virus
HBV DNA	Hepatitis B virus deoxyribonucleic acid
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
PCR	polymerase chain reaction
window period	The time from exposure to seroconversion when the source may be asymptomatic or experiencing seroconversion illness.

Introduction

- This policy has been developed to prevent or reduce child morbidity following needle stick incidents or exposure to blood or potentially blood contaminated secretions. It is based on the NSW Health Policy Directive (PD2005_311) which is for occupational exposure and has been adapted for accidental paediatric exposure.
- The risk is infection with a blood-borne virus, hepatitis B virus (HBV), hepatitis C virus (HCV) or Human Immunodeficiency virus (HIV).
- The situation should be assessed and any prophylaxis, if indicated, given as soon as possible.
- Confidentiality should always be maintained.

Children are often accidentally exposed to the risk of acquiring a blood borne virus, HBV, HCV and / or HIV. All these infections are chronic and carry a significant risk of long-term morbidity and death. The most frequent accident is needle stick injury which often occurs when a child picks up a discarded used needle or accidentally steps on a needle in a public space such as a park or the beach.

These injuries are usually very minor in themselves but engender a very high degree of anxiety in the parents or care giver and therefore need careful, sensitive and thoughtful evaluation and management.

Hepatitis B

Hepatitis B is a liver disease that results from infection with the Hepatitis B virus. It can range in severity from a mild illness lasting a few weeks to a serious, lifelong illness. Hepatitis B is usually spread when blood, semen, or another body fluid from a person infected with the Hepatitis B virus enters the body of someone who is not infected. This can happen through sexual contact with an infected person or sharing needles, syringes, or other drug-injection equipment. Hepatitis B can also be passed from an infected mother to her baby at birth.

Hepatitis B can be either acute or chronic. Acute Hepatitis B virus infection is a short-term illness that occurs within the first 6 months after someone is exposed to the Hepatitis B virus. Around 30% of infected patients develop acute symptoms with jaundice, signs and symptoms of liver involvement and raised liver enzymes. Diagnosis is by demonstrating HBsAg in the child's blood, which is usually cleared in 3 - 6 months. Acute infection can — but does not always — lead to chronic infection. Chronic Hepatitis B virus infection is a long-term illness that occurs when the Hepatitis B virus remains in a person's body. Chronic Hepatitis B is a serious disease that can result in long-term health problems, and even death.

Hepatitis C

Hepatitis C is a liver disease that results from infection with the Hepatitis C virus. It can range in severity from a mild illness lasting a few weeks to a serious, lifelong illness. Hepatitis C is usually spread when blood from a person infected with the Hepatitis C virus enters the body of someone who is not infected. Today, most people become infected with the Hepatitis C virus by sharing needles or other equipment to inject drugs. Hepatitis C can be either "acute" or "chronic." Acute Hepatitis C virus infection (5-10% of infections) is a short-term illness that occurs within the first 6 months after someone is exposed to the Hepatitis C virus. For most people (65-80% of infections), acute infection leads to chronic infection. Chronic Hepatitis C is a serious disease than can result in long-term health problems, with some progressing to liver failure and/or liver cancer or even death. There is no vaccine for Hepatitis C.

HIV (AIDS)

AIDS (acquired immunodeficiency syndrome) is a chronic, potentially life-threatening condition caused by the human immunodeficiency virus (HIV). By damaging your immune system, HIV interferes with your body's ability to fight the organisms that cause disease. HIV is a sexually transmitted infection. It can also be spread by contact with infected blood or from mother to child during pregnancy, childbirth or breast-feeding. It can take years before HIV weakens your immune system to the point that you have AIDS. The majority of people infected by HIV develop a flu-like illness within a month or two after the virus enters the body. This illness, known as primary or acute HIV infection, may last for a few weeks. In some people, persistent swelling of lymph nodes occurs during clinical latent HIV. Otherwise, there are no specific signs and symptoms. If you receive no treatment for your HIV infection, the disease typically progresses to AIDS in about 10 years. By the time AIDS develops, your immune system has been severely damaged, making you susceptible to opportunistic infections.

Further Information

- NSW Health Policy Directive (PD2006_005) Human Immunodeficiency Virus (HIV) - Management of Non-Occupational Exposure

Initial Management

The treating doctor should:

1. Offer immediate care if required.
2. Assess level of exposure and risk of transmission.
3. Assess source if identified and available for consent to perform HBV, HCV and HIV testing.
4. Obtain consent for baseline testing of the child for HBV, HCV and HIV.
5. Arrange for appropriate vaccination and prophylactic treatment for the child.
6. Arrange follow up for the source and child. Refer to NSW Health PD2005_184: Contact Tracing Guidelines for the Sexually Transmissible Diseases and Blood Borne Viruses

1. Immediate care

After exposure and if appropriate the 'recipient" should;

- encourage bleeding if the exposure involves a cut or puncture, then wash with soap and water;
- wash with soap and water where the exposure does not involve a cut or puncture;
- if eyes are contaminated, rinse them while they are open, gently but thoroughly with water or normal saline;
- if blood or other body substances get into the mouth, spit them out and rinse mouth with water several times;
- if clothing is contaminated remove clothing and shower if necessary

2. Risk Assessment

Risk assessment includes assessment of the significance of the injury and the status of the source if known. This information is to be carefully documented appropriately. Assessment of risk is given in Table 1, Classification of exposures.

At risk situations

(Determine nature of exposure)

Those incidents whereby blood or blood contaminated secretions involve:

- skin puncture
- ingestion
- splashing of mucous membranes
- contact with broken skin

The injury

Factors which should be considered are:

- the nature of the injury;
- the nature of the item that caused the injury (e.g., gauge of the needle);
- the nature of the body substance involved;
- the volume of blood and body substances to which the child was exposed

In the case of other exposures then no further testing or examination is required, apart from the possibility of further counselling. This should be determined according to individual circumstances.

In the case of percutaneous, significant percutaneous, significant mucous membrane, or significant skin exposures the child should be assessed further as set out below.

3. Testing the source

Every effort should be made to ascertain the HBV, HCV and HIV status of the source, particularly in the case of percutaneous, significant percutaneous, significant mucous membrane, or significant skin exposures. If the status of the source individual is unknown at the time of the accident, then baseline testing should be undertaken to determine the source's infectious status for HBV, HCV and HIV, by testing for HBsAg, HBsAb, HBcAb, anti – HCV and anti – HIV respectively. The relative risk of of the source being positive based on local prevalence and risk behaviours should be considered when giving recommendations concerning prophylactic measures.

Testing of the source child must follow accepted guidelines. Pre and post test counselling must be given and informed consent obtained before testing can proceed. Refer to the "Consent for Blood Testing" form: http://intranet.kids/o/forms/ohs/consent_forms/testing_a_child_following_blood_exposure.pdf

N.B. Testing of the source material (needle or syringe) is not recommended - results on discarded injecting material are unreliable

4. Baseline testing of the child

In the case of percutaneous, significant percutaneous, significant mucous membrane, or significant skin exposures the child should have baseline testing for HBV, HCV and HIV. The tests include HBsAg, HBsAb, HBcAb, anti – HCV and anti – HIV.

- Testing of the child **must** follow accepted guidelines.
- Pre – and post – test counselling **must** be given and
- Informed consent **must** be obtained *before* testing can proceed.
  - Refer to the "Consent for Blood Testing" form: http://chw.schn.health.nsw.gov.au/ou/ohs/resources/forms/staff_health/testing_a_child_following_blood_exposure.pdf

5. Treatment of the Child

If source negative for HBV, HCV and HIV

- Apart from counselling no further action is required.

If source HBsAg Positive OR anti-HBc Positive and anti-HBs Negative

- If the source was found to be HBsAg positive or anti - HBc positive and anti – HBs negative, the child should be offered prophylaxis and vaccination. See Table 2.
- Follow-up testing of the recipient for HBsAg and anti – HBs after completion of vaccinations should be offered.

If source anti-HCV Positive

- If the source is positive for anti – HCV there is around 65% to 80% chance that they are infectious. If the source's blood tests are positive for anti – HCV, a polymerase chain reaction (PCR) test should be performed if possible.
- PCR test positivity is currently the best marker of the potential to transmit HCV infection. As PCR positivity can be intermittent, a PCR negative result in a HCV antibody positive source *does not preclude* infectivity, but it may be reassuring to the child or parents to know that the risk of transmission of HCV is lower if the source blood is HCV PCR negative.
- If the source was found to be anti – HCV positive, the child should be followed up specifically for liver function tests and anti–HCV testing at 6 weeks and again at 6 months to determine if they have developed HCV antibodies. If an abnormality is detected in either test, the child should be referred to a Hepatologist for further management.

If Source anti HIV Positive

- If the source was found to be anti – HIV positive, consider degree of risk as determined previously (Table 1) and offer HIV prophylaxis as indicated. Refer to:
  - HIV Management of Non – Occupational Exposure policy and
  - CDC Recommendations for (Occupational) HIV Postexposure Prophylaxis (PEP) (Appendix 3)

Tetanus

- Tetanus prophylaxis should be considered and instituted if the injury circumstances warrant it.

6. Follow-up

- All patients and source should be offered follow-up testing if required.

Follow-up			
Baseline	6 weeks	3 months	6 months
HBsAb	HIV Ab	HBV serology	HBV serology if received hep B vaccine
HCV serology		HCV serology	
HIV Ab		HIV Ab	

Bibliography

1. NSW Health PD2006_005: Human Immunodeficiency Virus (HIV) - Management of Non-Occupational Exposure
2. NSW Health PD2005_184: Contact Tracing Guidelines for the Sexually Transmissible Diseases and Blood Borne Viruses
3. NSW Health PD2005_311: HIV, Hepatitis B and Hepatitis C: Management of Health Care Workers Potentially Exposed.
4. The Red Book (2006) Report of the Committee on Infectious Disease. 27th Edition.
5. E.R Feigin, J. Cherry, G. Demmler and S. Kaplan. Textbook of Pediatric Infectious Diseases (2004) 5th Edition.

Appendix 1: Classification of Exposures

Exposure	Classification
Percutaneous exposures to blood	**Highest risk** BOTH exposure to a large volume of blood (eg deep injury with a large diameter hollow needle previously in the source patient's vein or artery, and especially involving injection of patient's blood) AND exposure to blood containing high titre of HIV, HCV, HBV (eg in the case of HIV, blood from a source with acute seroconversion illness or a terminally ill AIDS patient) **Increased risk** EITHER exposure to a large volume of blood OR exposure to blood with a high titre of HIV, HCV, HBV (eg percutaneous injury with a soiled solid needle). **No increased risk** NEITHER exposure to a large volume of blood NOR exposure to blood with a high titre of HIV, HCV, HBV
Other significant percutaneous exposures	Percutaneous exposures involving fluids containing visible blood, or other potentially infectious fluids (includes semen, vaginal secretions, cerebrospinal, synovial, pleural, peritoneal, pericardial and amniotic fluids) or tissue.
Significant mucous membrane exposures	Exposures (usually splashes) to eye or mouth involving blood, fluid containing visible blood or other potentially infectious body fluids.
Significant skin exposures	Exposures of non-intact skin, or extensive or prolonged skin contact involving blood, blood-stained fluid or other potentially infectious body fluids
Other exposures	Percutaneous, mucous membrane or cutaneous exposures to (non-blood stained) urine or saliva.

Appendix 2: Recommendations for Hepatitis B Prophylaxis following Percutaneous or Per-mucosal Exposure

N.B. Take blood for testing BEFORE administering HBIG and/or HB vaccine.

Exposed Person	Source is HBsAg positive, unknown, untested or epidemiologically high risk	Source is HBsAg negative[1]
Previously fully immunised and immunity confirmed ('known responder') or immunity from past resolved infection	Test exposed person for anti-HBs Result available within 24 hours: - if ≥ 10 IU/mL no treatment - if < 10 IU/mL hepatitis B vaccine booster dose.	No treatment
Previously fully immunised and response unknown	Test exposed person for anti-HBs Result available within 24 hours[3]. - if adequate (≥10 IU/mL) no treatment. - if inadequate (< 10 IU/mL) HBIG[4] and HB vaccine booster dose. Check immunity after 3 months. Result not available within 24 hours: HBIG within 24 hours[4] + HB vaccine booster dose later if indicated by anti-HBs <10 IU/mL. Check immunity after 3 months.	No urgent action. Test for anti-HBs within 7 days. If result shows antibody level (<10 U/mL) offer vaccine booster and check immunity after 3 months. (An antibody level <10 IU/mL is non protective).
Partially immunised	Test exposed person for anti-HBs Result available within 24 hours. - if adequate (≥ 10 IU/mL) no treatment - if inadequate (<10 IU/mL) HBIG + HB vaccine dose. Result not available within 24 hours: HBIG[4] + continue HB vaccine doses. Check immunity 3 months after completion of immunisation course.	Continue hepatitis B immunisation course. Check immunity 3 months after completion of course
Previously immunised but non- responder	HBIG within 24 hours[3]. Repeat dose at 4 weeks.	No treatment.
Unimmunised	HBIG within 24 hours[3] + commence HB immunisation (HBIG and first HB vaccine at separate sites - one in L deltoid, one in R deltoid). Check immunity 3 months after completion of course.	Commence hepatitis B immunisation. Check immunity 3 months after completion of course.

Footnotes:

1. Where source is HBsAg negative and has been interviewed and clinician is satisfied that the source in unlikely to be in the window period of infection for HBV, that is: no risk behaviour or potential exposure in last 6 months.
2. Hepatitis B vaccine dose 1.0 mL, by IM injection in deltoid.
3. HBIG (hepatitis B immunoglobulin) 100 IU for infants (<12 months of age) or 400 IU for all other patients, by deep IM injection HBIG available from Red Cross Blood Bank-Phone: City-: 9229 4444 or Parramatta-: 9840 5815. HBIG is most effective at preventing HBV infection if administered immediately after exposure. Effectiveness falls rapidly with delay in commencement & is of doubtful value after 3 days. Effective for approximately 3 months.

Appendix 3: CDC Recommendations for (Occupational) HIV Postexposure Prophylaxis (PEP)[1]

Note: When considering PEP, please liaise with the Child Protection Unit or the Virology Head of Department (whichever is appropriate)

Reference

1. Updated US Public Health Service Guidelines for the Management of Occupational Exposures to HIV and Recommendations for Post-exposure Prophylaxis. MMWR Sept 30, 2005. Vol 54/RR-9 pp3. (accessed July 2014)

TABLE 1. Recommended HIV postexposure prophylaxis (PEP) for percutaneous injuries

	Infection status of source				
Exposure type	HIV-positive, class 1*	HIV-positive, class 2*	Source of unknown HIV status†	Unknown source§	HIV-negative
Less severe¶	Recommend basic 2-drug PEP	Recommend expanded ≥3-drug PEP	Generally, no PEP warranted; however, consider basic 2-drug PEP** for source with HIV risk factors††	Generally, no PEP warranted; however, consider basic 2-drug PEP** in settings in which exposure to HIV-infected persons is likely	No PEP warranted
More severe§§	Recommend expanded 3-drug PEP	Recommend expanded ≥3-drug PEP	Generally, no PEP warranted; however, consider basic 2-drug PEP** for source with HIV risk factors††	Generally, no PEP warranted; however, consider basic 2-drug PEP** in settings in which exposure to HIV-infected persons is likely	No PEP warranted

* HIV-positive, class 1 — asymptomatic HIV infection or known low viral load (e.g., <1,500 ribonucleic acid copies/mL). HIV-positive, class 2 — symptomatic HIV infection, acquired immunodeficiency syndrome, acute seroconversion, or known high viral load. If drug resistance is a concern, obtain expert consultation. Initiation of PEP should not be delayed pending expert consultation, and, because expert consultation alone cannot substitute for face-to-face counseling, resources should be available to provide immediate evaluation and follow-up care for all exposures.

† For example, deceased source person with no samples available for HIV testing.

§ For example, a needle from a sharps disposal container.

¶ For example, solid needle or superficial injury.

** The recommendation "consider PEP" indicates that PEP is optional; a decision to initiate PEP should be based on a discussion between the exposed person and the treating clinician regarding the risks versus benefits of PEP.

†† If PEP is offered and administered and the source is later determined to be HIV-negative, PEP should be discontinued.

§§ For example, large-bore hollow needle, deep puncture, visible blood on device, or needle used in patient's artery or vein.

TABLE 2. Recommended HIV postexposure prophylaxis (PEP) for mucous membrane exposures and nonintact skin* exposures

	Infection status of source				
Exposure type	**HIV-positive, class 1†**	**HIV-positive, class 2†**	**Source of unknown HIV status§**	**Unknown source¶**	**HIV-negative**
Small volume**	Consider basic 2-drug PEP††	Recommend basic 2-drug PEP	Generally, no PEP warranted§§	Generally, no PEP warranted	No PEP warranted
Large volume¶¶	Recommend basic 2-drug PEP	Recommend expanded ≥3-drug PEP	Generally, no PEP warranted; however, consider basic 2-drug PEP†† for source with HIV risk factors§§	Generally, no PEP warranted; however, consider basic 2-drug PEP†† in settings in which exposure to HIV-infected persons is likely	No PEP warranted

* For skin exposures, follow-up is indicated only if evidence exists of compromised skin integrity (e.g., dermatitis, abrasion, or open wound).

† HIV-positive, class 1 — asymptomatic HIV infection or known low viral load (e.g., <1,500 ribonucleic acid copies/mL). HIV-positive, class 2 — symptomatic HIV infection, AIDS, acute seroconversion, or known high viral load. If drug resistance is a concern, obtain expert consultation. Initiation of PEP should not be delayed pending expert consultation, and, because expert consultation alone cannot substitute for face-to-face counseling, resources should be available to provide immediate evaluation and follow-up care for all exposures.

§ For example, deceased source person with no samples available for HIV testing.

¶ For example, splash from inappropriately disposed blood.

** For example, a few drops.

†† The recommendation "consider PEP" indicates that PEP is optional; a decision to initiate PEP should be based on a discussion between the exposed person and the treating clinician regarding the risks versus benefits of PEP.

§§ If PEP is offered and administered and the source is later determined to be HIV-negative, PEP should be discontinued.

¶¶ For example, a major blood splash.

Appendix 4: HIV Prophylaxis dosing

Prescribing PEP

Ultimately, the decision to prescribe PEP needs to be made on a case-by-case basis considering all the variables. These guidelines are not prescriptive, but put forward cases where PEP is recommended and the benefit of treatment is likely to exceed harm. Situations where there is greater uncertainty or complexity should be discussed with a physician experienced in this area.
PEP should be prescribed as soon as possible after the exposure and within 72 hours.
Adverse effects caused by antiretrovirals and their impact on adherence are well recognised, Individuals receiving PEP should be informed of the potential adverse effects of treatment and possible drug interactions; particularly if protease inhibitors are prescribed. Drug choice is determined by considering antiretroviral treatment history, viral load and resistance patterns of the source case and the medical history of the exposed individual.
As for the number of drugs recommended for treatment, there is no direct evidence to support the greater or lesser efficacy of 3 over 2 drug preventative regimens. It is an extrapolation of any possible benefit conferred by increased numbers/classes of drugs for HIV treatment whilst also taking into account potential side effects, toxicity, adherence and cost effectiveness of adding a third drug.

Table 5. PEP recommendations after occupational exposure to a known HIV positive source

Type of exposure with known HIV positive source	Estimated risk of HIV transmission per exposure	PEP recommendation	
		Source viral load undetectable	Source not on treatment or on treatment with detectable viral load
Needlestick injury (NSI) or other sharps exposure	1/440*	2 drugs	3 drugs
Mucous membrane and non-intact skin exposure	< 1/1000	Consider 2 drugs	3 drugs

* PEP may be recommended if needle and syringe contained fresh blood and sufficiently penetrated the skin

Reference

2. *Post-Exposure Prophylaxis after Non-Occupational and Occupational Exposure to HIV: National Guidelines*. ASHM Sydney December 2013. (accessed July 2014)

PEP recommendations after occupational exposure to a source with unknown HIV status

In the occupational setting, the source is usually able to be identified and tested for HIV, and PEP is usually only prescribed for those who have definitely been exposed to HIV. If the source is unable to be identified or tested, then the risk of the source being HIV positive must be assessed from any epidemiological or other information available. When the source is unknown, the use of PEP should be decided on a case-by-case basis, and it isrecommended that an expert always be consulted in this situation. Currently there are no known cases on HIV seroconversion after a community needle stick injury form a publicly discarded needle, therefore PEP is not usually recommended.

Two drug regimen use either tenofovir-emtricitabine (Truvada) **OR** zidovudine-lamivudine (Combivir).

Drug	Dose	Dose and presentation	Main toxicity
Tenofovir-emtricitabine (Truvada)	300-200mg daily	1 tab daily Max dose 300-200mg	Nephrotoxicity
Zidovudine-lamivudine (Combivir)	300-150mg twice daily	Adolescents greater than or equal to 30 kg: 1 tab twice daily. Children. 21-30 kg: 1/2 tab in morning, 1 tab in evening; Children 14-21 kg: 1/2 tab twice daily.	
Zidovudine capsules	10mg/kg/dose twice daily	100mg and 250 mg Max dose 500mg	Haematological toxicity, renal/ hepatic impairment. Severe headache; GI upset; insomnia; myalgia.
Zidovudine syrup	10mg/kg/dose twice daily	Pack: 10mg /1mL Max dose 500mg	
Lamivudine (3TC) tablets		Children greater than or equal to 12 yrs: 150 mg twice daily or 300 mg once daily. Children 3 months-12 yrs: 4 mg/kg twice daily. Max 300 mg daily	Pancreatitis; musculoskeletal symptoms; GI upset; fatigue; dizziness; dreams; headaches, red cell aplasia.
Lamivudine (3TC) syrup	4mg/Kg/dose twice daily	Pack: 10 mg /1 mL 240 mL	

Three drug regimen use either tenofovir-emtricitabine (Truvada) **OR** zidovudine-lamivudine (Combivir) **PLUS** one of the following combinations of protease inhibitors.

Drug	Dose	Dose and presentation	Main toxicity
Lopinavir-ritonivir (Kaletra)	Children greater than or equal to 2 yrs and < 40 kg 230-57.5mg /m^2/ dose twice daily or 7-15 kg: 12-3mg /kg/dose; 15-40 kg 10-2.5mg/kg/ dose twice daily >40kg 400-100mg twice daily.	Should be taken with food. Oral solution 400/100mg in 5mL 100-25mg tablets 200-50mg tablets Max 400-100mg twice daily.	Diarrhoea, hepatitis, pancreatitis, headache
Atazanavir-ritonivir	300-100 mg once daily	Discuss with virologist or ID physician	Jaundice, renal stones hepatitis
Darunavir-ritonivir	800-100 mg once daily	Discuss with virologist or ID physician	Hepatitis

NB: If the patient is HBsAg positive discuss anti-retroviral therapy with the virologist or ID physician.