

Management of non-occupational exposures to blood borne viruses

THE EDUCATION PACKAGE

This package has been developed with a New South Wales Health Department HIV Health Promotion Grant. The package is designed to assist staff in Accident and Emergency Departments and General Practitioners to appropriately assess, treat, advise and refer patients who present after possible exposure to a blood-borne virus.

Staff members of the Albion St Centre and St Vincent's Hospital in Sydney have prepared the information in this package.

The package consists of the following:

FLOW CHARTS FOR PATIENT ASSESSMENT AND MANAGEMENT

The flow charts in the pocket in the back cover give a simplified step by step management guide for different types of identified risk. The flow charts can be easily copied and laminated for easy reference.

REFERENCE DOCUMENT WITH EPIDEMIOLOGY AND DISCUSSION

This document gives a more detailed explanation of the responsibilities of the Health Care Worker, the risk assessment process and rationale for management strategies.

BIBLIOGRAPHY

This gives text and Internet references for relevant government guidelines, peer reviewed journal articles and other sources of information on community needlestick injuries and other non-occupational exposures.

SELF ASSESSMENT TOOL

This gives case studies and questions which can be used to assess your level of knowledge about the topic.

ABBREVIATIONS

BBV	<i>Blood borne viruses</i>
CNSI	<i>Community needlestick injury (ies)</i>
HBV	<i>Hepatitis B virus</i>
HCV	<i>Hepatitis C virus</i>
HIV	<i>Human immunodeficiency virus</i>
PEP	<i>Post exposure prophylaxis</i>
STI	<i>Sexually transmissible infection(s)</i>

REFERENCE DOCUMENT

Transmission of blood-borne viruses

There are many pathogens that can be transmitted by the blood-borne route¹, but the most common and of most concern are the Human Immunodeficiency Virus (HIV), Hepatitis B virus (HBV) and Hepatitis C virus (HCV).

While most health facilities and general practices have protocols for managing occupational exposures to blood-borne viruses (BBV) in the health care workplace, there are few guidelines for the management of exposures in other settings. Such exposures are often managed inappropriately either by over or under estimating the risk from an exposure, or by making assumptions about the likely status of the source.

Assessing risk involves considering the nature of the exposure, the amount of blood or body fluid, the contact time, the pathogen involved, the viral load of the source and the prevalence of the BBV in the population.

Responsibility of health care workers

NSW Health Department Circulars^{2,3} set out the responsibilities of Area Health Services in regard to managing health care worker and non-occupational exposures. For individual health care workers this means:

- ◆ knowing the protocol if someone presents after an exposure or is identified as having been exposed;
- ◆ treating all cases of potential exposures as medical emergencies;
- ◆ initiating a risk assessment immediately the exposure is identified;
- ◆ maintaining confidentiality in relation to exposures and testing for BBV.

These responsibilities relate to all exposures whether they are occupational, sexual or from sharps injuries. After a risk assessment, the majority will be classified as low risk and need not then be treated as emergencies.

Post-exposure prophylaxis

The availability of post-exposure prophylaxis (PEP) is the reason that an exposure should be treated as an emergency.

PEP is available after significant exposures to help prevent HIV, HBV, or tetanus. HIV PEP should be given within hours of an exposure. PEP is not available to prevent infection with HCV. Risk assessment is the most important step in managing PEP. This ensures that PEP is given as soon as possible after a significant exposure (those likely to cause transmission) and also not given when the risk is too low for it to be clinically indicated.

Occupational exposure

Risk assessment

Factors that have been demonstrated to be associated with transmission of HIV in the health workplace are:

- ◆ deep injury;
- ◆ visible blood on the device;
- ◆ injury from a device placed in a vein or artery;
- ◆ terminal illness in the source¹⁶.

Other factors that may increase risk are:

- ◆ larger bore needles;
- ◆ if gloves are not worn;
- ◆ high viral load in the source;
- ◆ extended contact time with blood or other bodily fluids to non-intact skin or mucous membranes.

Management of non-occupational exposures to blood borne viruses

Management

PEP has been available in NSW after occupational exposure since 1990. NSW Health Circular 2003/39² gives guidelines for the management of health care workers exposed to BBV.

Exposures to other occupational groups outside the health setting are usually similar to community needlestick injuries in terms of level of risk.

Community needlestick injury

Community needlestick injuries (CNSI) are those that occur from needles which have been discarded after use in public places such as parks, beaches or gardens. Many occupational needlestick injuries in the non-health setting are also from discarded needles and should be considered here.

Risk assessment

There is a popular perception – encouraged by some sections of the media – that CNSI pose a significant risk of BBV. While CNSI cause distress to the exposed person and their family and should be taken seriously, there is an extremely low risk of disease transmission.

A documented transmission is one where the exposed person is negative for the BBV at the time or shortly after the exposure and is positive within 3 – 6 months of the exposure in the absence of any other risk event for the BBV. There have been no documented transmissions of a BBV by CNSI in adults in the international scientific literature. There has been one report of a probable case of transmission of HBV to a child⁴.

Management

If the exposure was from a sharp object that may have had contact with dirt or soil, tetanus vaccination status should be confirmed and tetanus prophylaxis offered as per standard guidelines⁵.

HIV and HBV prophylaxis are not recommended for CNSI³. If there are additional circumstances that increase the risk of CNSI (such as a deep injury from a device that is visibly blood stained that was known to have just been used) the risk may be comparable to needle sharing and PEP may be appropriate. This is however an unusual scenario.

If the exposed person is not immune to HBV it may be appropriate to consider vaccination.

For risk assessment and general management guidelines for CNSI see: General Management Guidelines (page 5) and Flow chart - CSNI

Sexual exposure

Risk assessment

When assessing risk from a sexual exposure it is important to ask questions about exact behaviour, as there is a continuum of risk.

Both partners are at risk for the transmission of HIV or HBV from unprotected intercourse (ie no condom use or a condom break or slippage). The receptive partner in unprotected anal or vaginal intercourse with ejaculation is at higher risk. It should be remembered that in Australia the incidence of HIV transmission through heterosexual contact is low⁷. Risk of transmission through unprotected intercourse increases in the presence of reproductive tract infections, genital ulcer disease or trauma⁷.

Management of non-occupational exposures to blood borne viruses

Receiving oral sex is not considered a risk for transmission of BBV. The risk to the person giving is minimal but increases if there is ejaculation or menstrual blood and if there are oral lesions.

HCV is rarely transmissible sexually but coinfection with HIV or other sexually transmissible infections (STI), sexual practices that traumatise mucosa, or sex during menstruation may increase the risk of HCV transmission⁸.

Management

Any case of sexual assault should be referred to a Sexual Assault Service or Accident and Emergency Department for appropriate management.

PEP is recommended after unprotected insertive or receptive, anal or vaginal intercourse when the source is known to be HIV positive or belongs to a risk group for HIV³.

PEP may be considered after unprotected receptive fellatio with ejaculation if the exposed person has mucosal disease or significant lesions in the mouth⁹.

It must be remembered that sexual exposures that pose little or no risk for the transmission of BBV may still be a risk for the transmission of other STI. A full STI screen is recommended. PEP is not generally recommended for exposure to bacterial STI. There should be consideration of post-coital contraception for women³.

For risk assessment and general management guidelines for a sexual exposure see: General Management Guidelines (page 5) and Flowchart - sexual exposure.

Sharing injection equipment

Risk assessment

Sharing used or inappropriately cleaned needles and syringes for injection can transmit HIV. The risk is greater if there is visible blood in the syringe or on the needle and it has been recently used. The rate of HIV infection in injection drug users in Australia is lower than often assumed. In NSW the prevalence of HIV in (non-homosexual or bisexual male) injection drug users attending needle and syringe programs was 1% or less in 2000 and 2004¹⁰.

The rate of HBV and HCV in injection drug users is higher. HCV prevalence has remained around 50% over the period 1996 – 2000¹¹. HCV can be transmitted by drug preparation equipment even if needles are not shared¹².

Management

PEP is indicated after a needle-sharing event.

For risk assessment and general management guidelines for a sexual exposure see: General Management Guidelines (page 5) and Flowchart - needle sharing event.

Skin Exposure

Risk assessment

Exposures to intact skin do not pose a risk for BBV transmission.

In a review of documented HIV transmissions in the health care setting, exposures of blood or concentrated virus to non-intact skin or mucous membrane accounted for only 8 of 94 cases recorded¹³.

HBV is more transmissible than HIV, but transmission from exposure to non-intact skin is still rarely reported.

Management of non-occupational exposures to blood borne viruses

Management

PEP may be offered for skin exposure in the unusual scenario of an exposure of non-intact skin to blood or concentrated virus over an extended period of time.

For risk assessment and general management guidelines for a skin or mucous membrane exposure see: General Management Guidelines (page 5) and Flow chart - skin and mucous membrane.

Bites and clenched fist injuries

Risk assessment

There is no risk of HIV, HBV or HCV transmission from an animal bite.

The risk of HIV infection following a human bite is minimal as the saliva in HIV infected people has insufficient quantities of virus for transmission to occur. While there is the potential that other infectious diseases such as HBV and, to a lesser extent, HCV may be spread following a human bite, instances of this happening have rarely been documented.

There is a potential, though it has rarely been documented, for transmission of HIV to occur from a fight in which both parties are injured and bleeding¹⁴.

Management

Human bites, clenched fist injuries (which microbiologically are equivalent to human bites) and animal bites often become infected.

The recommended management for bites and clenched fist injuries is thorough cleaning, debridement, elevation, immobilisation and prophylactic antibiotics. If obviously infected,

a wound swab should be taken. In all cases, a patient's tetanus immunisation status must be assessed. For recommended antibiotics refer to the current edition of the Therapeutic Guidelines: Antibiotic (Australia)¹⁵.

GENERAL MANAGEMENT GUIDELINES

Step by step guidelines for risk assessment and management after different exposure events are outlined in the flow charts that form a part of this resource. These have been provided in one-page formats that can be laminated and displayed for easy reference. Also provided is a table (page 6) which describes the probability of HIV infection from an exposure where the source is known to be HIV infected or where the source HIV status is unknown.

Risk assessment

The first step in risk assessment should be to determine the possible risk of transmission from the specific exposure (see Table 1: The Probability of HIV Infection from an Exposure, page 6). This is always the most important step. If the exposure is low risk, an assessment of the source of the exposure is not indicated. When assessing risk, not all relevant information may be available and some risks may not be identified by the exposed person.

If the exposure is significant (could cause transmission of a BBV), the next step is to determine whether the source is, or is likely to be, HIV or HBV positive. This is determined by known information about the source, what the source reports, their activity and local prevalence (see Table 1: The Probability of HIV Infection from an Exposure, page 6).

If the exposure is significant and the source is or is likely to be positive and the exposure occurred within the previous 72 hours, PEP is indicated for the exposed person.

Management of non-occupational exposures to blood borne viruses

The Estimated Probability of Acquiring HIV from Various Exposure Scenarios

TABLE 1			
SOURCE			
Type of exposure	Estimated risk that the source is HIV positive (Australian HIV Seroprevalance)	Estimated risk of HIV infection HIV POSITIVE SOURCE	Estimated risk of HIV transmission if SOURCE HIV STATUS UNKNOWN
<u>HOMOSEXUAL MAN</u>			
Receptive anal intercourse	≈15%	≈3.0% (1:33)	≈0.45% (1:250)
Insertive anal intercourse	≈15%	≈0.1% (1:1000)	≈0.015% (1:10,000)
Sharing injecting equipment	≈17%	≈0.6% (1:167)	≈0.1% (1:1000)
Body fluids to non-intact skin	≈15%	≈0.6% (1:167)	≈0.09% (1:1000)
Mucous membrane exposure	≈15%	≈0.1% (1:1000)	≈0.015% (1:10,000)
<u>OTHER</u>			
Receptive vaginal intercourse	≈0.1%	≈0.1% (1:1000)	≈0.0001% (1:1,000,000)
Insertive vaginal intercourse	≈0.1%	≈0.1% (1:1000)	≈0.0001% (1:1,000,000)
Sharing injecting equipment	≈1.0%	≈0.6% (1:167)	≈0.018 % (1:6250)
Body fluids to non-intact skin	≈0.1%	≈0.6% (1:167)	≈0.0006% (1:250,000)
Mucous membrane exposure	≈0.1%	≈0.1% (1:1000)	≈0.0001% (1:1,000,000)

Adapted from:
 ANCHARD Guidelines for the management and post exposure prophylaxis of individuals who sustain nonoccupational exposure to HIV
 ANCHARD Bulletin No 29 September 2001

Notes: These are estimates of infection from a given HIV exposure and are derived from the higher end of the range of probability.

Prophylaxis for HIV

There is some evidence that taking zidovudine reduces the risk of transmission of HIV after an occupational exposure¹⁶. There are also documented cases of seroconversion, despite early use of zidovudine¹⁷. Since combination therapy is now the standard of treatment for established HIV infection, two or three antiretroviral medications should always be prescribed. This is called PEP.

In general, HIV antiretroviral medications can only be prescribed by S100 prescribers, accident and emergency departments, or specialised services.

If the exposed person elects to take PEP, it should be commenced as soon as possible. PEP may be commenced within 72 hours of exposure. While there is no research evidence for the optimal time, it is recommended that it should be commenced within a few hours if possible. If the exposure warrants PEP, commencement should not be delayed whilst waiting for source serology results. PEP is likely to be less effective if commenced more than 24 hours after the exposure.

If the source is known to be HIV positive it is important whenever possible to ascertain the HIV viral load of the source and an account of their current and past antiretroviral therapy (and reasons for stopping previous regimens). This important information may lead to modification of the exposed person's PEP regimen.

The following should be discussed with the exposed person before commencing PEP:

- ◆ that HIV PEP is an experimental, not a proven, therapy;
- ◆ that efficacy is estimated to be around 80%;
- ◆ that PEP consists of a 4 week course of oral therapy;
- ◆ that there can be difficulties taking PEP (especially if working);

- ◆ that there is a high probability of regimen associated, mild side effects which may include nausea, diarrhoea and fatigue;
- ◆ that there is a possibility of moderate to severe regimen associated side effects;
- ◆ the signs and symptoms of HIV seroconversion;
- ◆ that adherence to the regimen needs to be > 95%¹⁸;
- ◆ that the individual can stop PEP at any time but may lose efficacy;
- ◆ that, although unlikely, taking PEP may prolong the HIV antibody testing 'window period' and so testing for HIV continues up to 6 months after the exposure;
- ◆ that where protected sex is not usually practiced (eg within a monogamous relationship) condoms should be used until a clearance is given, usually at 6 months;
- ◆ the possibility of pregnancy for female patients.
- ◆ that taking PEP is inappropriate if the exposed person is already infected with HIV

Patient consent to PEP after discussing the factors above should be documented in the medical record.

If the exposed person is pregnant and the exposure is significant, the use of PEP would be strongly encouraged. If a woman acquires HIV during pregnancy there is an increased risk of the child becoming infected. There is a large body of evidence demonstrating reduction in transmission from mother to child with the use of HIV prophylaxis¹⁷. Many antiretroviral medications can be safely used in pregnancy. An experienced HIV physician should always be consulted about the appropriate regimen, however zidovudine can always be given while waiting for further advice.

Prophylaxis for HBV

If the exposed person has ever had a blood test that demonstrates HBV immunity – whether from infection or vaccination – there is no necessity for further boosters or hepatitis B immunoglobulin after a potential exposure to hepatitis B⁵.

If the exposure is significant and the exposed person has not demonstrated immunity to HBV, hepatitis B immunoglobulin can be given within 72 hours of exposure.

After any exposure (whether significant or not) to a non-immune person who has not been vaccinated, it is advisable to commence a course of HBV vaccination. For a full discussion on the use and doses of HBV immunoglobulin and vaccination, refer to the Australian Immunisation Handbook⁵.

Prophylaxis for tetanus

If the exposure involves an injury from an object which may be contaminated with soil or dust, tetanus prophylaxis should also be considered. For a full discussion on the use, types and doses of tetanus prophylaxis refer to the Australian Immunisation Handbook⁵.

Prevention of transmission

If the exposure is considered significant, the exposed person should be advised on ways to prevent transmission of BBVs to others. This will include advice about safer sex, safer needle use, breastfeeding, blood donation and safe work practices. As this may be a stressful time for the exposed person, it is recommended that information is also provided in writing and revisited at the next appointment - for instance with baseline test results.

Reporting

If the exposure occurs in the workplace, it should be reported to the employer's insurer within seven days.

Serology

Blood testing for the exposed person provides a baseline result against which to measure future test results. If PEP is commenced baseline HIV testing should be performed to differentiate between a previous undiagnosed HIV infection and a PEP failure. If baseline testing is to include a test for HIV, standard pre-test counselling must be provided as per local guidelines before blood is drawn¹⁹. If it was a non-occupational exposure and PEP is not commenced, baseline testing may not be relevant – apart from epidemiological information – unless there is a basis for litigation associated with the exposure.

The baseline test is measuring any past exposures. Because any infection resulting from the current exposure will not be evident by routine blood testing for some time, this testing may be performed up to 3 days after the exposure. Therefore urgency is not a reason to do baseline testing without pre test counselling.

Results of baseline testing must be given in person with standard post test counselling.

The minimum requirement for follow up is to test for HIV serology at three months and hepatitis B and C antibodies at six months. If HIV PEP has been commenced, HIV antibodies should also be tested for at six months, because of the potential for delayed seroconversion.

If appropriate, consent should be sought to contact primary care provider to organise follow up. If granted, written communication with care provider is recommended.

Education/counselling

Anyone who has had or considers they have had a potential exposure to a BBV, should be offered patient education. This should always address the principles and actual risks of transmission of BBV and STI and include signs and symptoms of primary HIV infection (seroconversion illness). Counselling and strategies for behaviour change to avoid risk situations in future may also be indicated.

References

Any of these references may be obtained from the Albion St Centre Library
Phone: 02 9332 9680/1/2.
Email: alblibrary@sesahs.nsw.gov.au

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Management of non-occupational exposures to blood borne viruses

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Management of non-occupational exposures to blood borne viruses

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http://www.ancahrd.org/media_releases/bulletins/01/28_hiv_guidelines.pdf

National Health and Medical Research Council (2003) The Australian Immunisation Handbook: 8th Edition Commonwealth of Australia, Canberra
<http://www1.health.gov.au/immhandbook>
For information on prophylaxis for tetanus and hepatitis B

NSW Health Policy Directive 2005_311
Management of health care workers potentially exposed to HIV, hepatitis B and hepatitis C
http://www.health.nsw.gov.au/policies/PD/2005/pdf/PD2005_311.pdf

NSW Health Policy Directive 2006_005 Human Immunodeficiency Virus (HIV) - Management of non-occupational exposure
http://203.5.110.172/policies/PD/2006/pdf/PD2006_005.pdf

NSW Health Policy Directive 2005_048 HIV Antibody testing - Counselling - Guidelines
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Lurei P, Miller S, Hecht F, Chesney M, Lo B (1998) Postexposure prophylaxis after nonoccupational HIV exposure *JAMA* 280 (20), Nov 25: 1769-73

Websites

Centers for Disease Control, US
<http://www.cdc.gov/hiv/pubs/faq/faq5a.htm>

This page discusses hoax internet reports of public needlestick injury and states that no cases of HIV transmission after public needlestick injury are known to the CDC.

National Centre for HIV Epidemiology and Clinical Research
<http://www.med.unsw.edu.au/nchecr/>
Annual surveillance reports detailing the epidemiology of HIV and hepatitis B and C in Australia.

Australian National Council on AIDS, Hepatitis and Related Diseases
<http://www.ancahrd.org/pubs/pdfs/needlereview.pdf>

Needle and syringe programs: A review of the evidence

SELF ASSESSMENT TOOL

The following case histories and questions illustrate some of the concepts in the assessment and management of a patient who presents for PEP following an exposure to a BBV.

CASE HISTORY 1

Don is a 24-year-old man. He identifies as gay but because of strong cultural pressures he is engaged to be married. Don presents to an emergency department distressed after a condom break some 24 hours previously during sex with another man. After the event Don doused vigorously.

How would you proceed with Don's risk assessment?

What advice would you give him about douching?

Don discloses that he was the receptive partner in anal intercourse and that after the condom broke, the source patient disclosed that he was HIV positive.

What would you estimate Don's risk of HIV acquisition from this event to be?

What information would be important to know about the source?

This sexual encounter was essentially anonymous and no further source information is available. The decision is made to offer Don PEP with 28-days of antiretroviral drugs.

What information is important to provide Don with regarding PEP?

Don wants and consents to PEP. He isn't sure whether he has ever been vaccinated for or had hepatitis A or B. His last test for HIV was 6 months ago, which was negative.

What base line blood tests does Don require?

What counselling does he require before his blood tests?

After further discussion Don discloses that he has regular sex with his fiancée as well as other men. Sex with his fiancée is always unprotected.

What counselling does Don require with regard to sex with his fiancée?

What follow-up does Don require?

CASE HISTORY 2

Arthur was enjoying some early afternoon gardening. Whilst weeding he felt a sharp prick in his left hand. He looked down and saw a syringe with needle attached lying in the soil and noticed that he had a small puncture mark in his thumb that was bleeding. He carefully placed the syringe and needle into a brown paper bag and left immediately for your surgery.

How would you proceed with Arthur's risk assessment?

What first aid would be appropriate for Arthur's injury?

Arthur produces the syringe and you notice that it looks old and there is no visible blood. Arthur is very anxious and 'wants everything done' to prevent any infection.

What would you estimate Arthur's risk of HIV acquisition from this event to be?

What factors increase the risk of BBV transmission from a needle-stick injury?

Does Arthur require HIV PEP?

Arthur is unsure about his vaccination history

What vaccination would be appropriate for him?

Arthur accepts that his risk of HIV and or HCV acquisition from this injury is very low and that HIV PEP is not indicated. He remains anxious and expresses worry about 'passing anything on' to his wife or grand children.

What advice would you give him?

What follow up does Arthur require?

For answers and discussion, email: michael.nelson@sesiahs.health.nsw.gov.au or jmcallister@stvincents.com.au

CASE HISTORIES – ANSWER GUIDELINES

CASE HISTORY 1

The risk assessment should include: date, time and nature of exposure, active sexually transmissible infections (STI) or trauma, whether he was the insertive or receptive partner, whether there was ejaculation.

Douching is not recommended following receptive anal (or vaginal) sex.

The risk is high, but would vary depending on the prevalence in the local area.

Important information, if available, about the source includes: his viral load, any anti-HIV treatment he is taking or has taken in the past, the reasons for stopping any previous therapies.

Information required before prescribing PEP includes: common side effects and how to manage them, rare but potentially serious side effects, the duration of the regimen, how and when to dose, the importance of 100% adherence, the testing and examination process during and after PEP.

Baseline blood tests are: HIV antibody, hepatitis B core antibody/surface antibody, hepatitis A total antibody, hepatitis C antibody, syphilis serology, routine biochemistry and liver functions, full blood count and differential. Don requires pre-test counselling for HIV and hepatitis B and C.

Protected sex with his fiancée is necessary until the final HIV results. (Some patients choose to tell their regular sexual partner that they are on PEP because of an 'accidental needlestick injury', to explain the need for using condoms to protect the partner.) He also needs information about transmission of other STI.

Follow up includes: review and STI screen at 1 week; review with a routine biochemistry, liver function, serum lactate, and full blood count at week; HIV testing at weeks 6, 12 and 24; repeat syphilis test at week 12; vaccination as indicated against HBV and HAV.

CASE HISTORY 2

The risk assessment should include: date, time, place and nature of exposure; whether the injury was deep, penetrating, or superficial; whether the needle penetrated clothing or gloves, whether there was visible blood in the syringe.

First aid would be to encourage bleeding and wash well with soap and water.

The risk of HIV acquisition is close to zero. There are no documented cases of transmission in these circumstances. PEP is not indicated. Tetanus toxoid would be the only appropriate vaccination.

Appropriate advice would be: reinforcement of the minimal risk for HIV transmission, information about how HIV is (and is not) transmitted.

Follow up: none required but could do testing for HIV antibodies (with pre-test counselling) at baseline and 3 months post exposure; discuss HBV vaccination.