

## MANAGEMENT OF EXPOSURE TO BLOOD/BODY FLUIDS IN A HEALTH CARE SETTING

**Needlestick and Blood Accidents**  
- This bulletin is about the management of exposure to blood or body fluids contaminated with blood, including needlestick or sharps injuries with a potential for BBV infections.

### DEFINITIONS AND ABBREVIATIONS

#### BBV

Blood-borne viruses. In general the management of occupational exposures aims to prevent infection with HIV, HBV or HCV. However, in rare circumstances, other infections may be transmitted by occupational exposure.<sup>1</sup>

#### Exposed person

The person who has been exposed to blood and/or body fluids. This is assumed to be the health care worker in this document, but patients and visitors may also be exposed in health care settings.

#### Exposure

Contact between blood or body fluids (except sweat) from the source and non-intact skin or mucous membranes of the exposed person.

**HBV** Hepatitis B Virus

**HCV** Hepatitis C Virus

**HCV** Health Care Worker(s)

**HIV** Human Immunodeficiency Virus

#### Post-exposure prophylaxis (PEP)

Medication(s) given after an exposure which may reduce the risk of acquiring an infection from the exposure.

#### Source

The person whose blood or body fluids were inoculated or splashed onto the exposed person. The source may not always be identifiable.

### GUIDELINES FOR MANAGING EXPOSURES

The purpose of these guidelines is to inform policy development and clinical management of occupational exposures.

The potential for exposures should be minimised by the adoption of Standard Precautions and safe sharps handling practices. However, even where there is safe practice, some exposures may still occur: for example, through accidents, faulty equipment, or aggression.

For this reason, all health care settings should have policies and protocols in place for the management of exposures. The aim of protocols is to reduce the potential for transmission of BBV by first aid and post exposure prophylaxis (PEP) where indicated. Even where there are comprehensive national or state guidelines, local health settings need to develop implementation protocols to address the local situation and resources.

Policies and protocols should primarily aim to meet the needs of the exposed person, rather than the employer or health facility. Protocols should be non-punitive and simple to implement so as to encourage reporting and compliance. The immediate management including risk assessment and consideration of PEP should be considered a medical emergency in terms of timeliness and resource allocation. Protocols should

ensure that the confidentiality of the exposed person is maintained.

### RECOMMENDED STEPS FOLLOWING EXPOSURE

#### IMMEDIATE

##### First aid

The aim of first aid is to minimise contact with any BBV after an exposure. The exposed person should be advised to complete the following:

1. Clean the wound/site with soap and water.
2. Flush mucous membranes/conjunctiva with normal saline or water. If contact lenses are worn, remove after flushing eye and clean as usual.
3. Further management of wound dependant on nature of injury (for example, suturing, application of dressing).

There is no advantage to the use of a stronger solution than soap and water for cleaning, as some disinfectants may inhibit wound healing.

##### Risk assessment

After first aid, the most important step in the management process is an assessment of the severity of the exposure to determine the risk of BBV transmission. The risk assessment will determine if PEP is warranted. The risk assessment is urgent as initiation of PEP may potentially prevent a life-threatening disease. On the other hand PEP is also expensive and may have significant side effects, so an accurate risk assessment is also important in



ensuring PEP is only recommended when warranted.

Because this step is crucial to the management process, the exposed person must be immediately relieved from duty to be assessed. Supervisors must be aware of how to access a person who is able to assess risk 24 hours a day. (The initial risk assessment may be by telephone.)

In assessing whether an exposure has the potential to transmit a BBV, the following would be considered:

- type of exposure
- type of body substance
- volume of blood or body fluids
- length of time in contact with blood or body fluids
- time elapsed since exposure.

In addition, after a sharps injury:

- presence of visible blood or body substance on the device causing the injury
- type of device involved
- whether a hollow bore needle or solid sharp object
- procedure for which the device was used (for example, into a vein or artery)
- gauge of the needle or device
- time elapsed since use of device
- whether the injury was through a glove or clothing.

#### Risk of HIV transmission

The overall risk from a needlestick injury from a known HIV positive source has been estimated at 0.3%.<sup>2</sup> However, the factors above determine whether the exposed person is at more or less risk.

A six year retrospective study of HCW exposed to known HIV-infected blood identified the following factors as being associated with HIV transmission: deep injury, a device visibly contaminated with blood, procedures involving a needle placed directly in a vein or artery and terminal illness in the source.<sup>3</sup>

Reviews of the literature show that most cases of HIV seroconversion after occupational exposure occur after percutaneous injury from a hollow bore needle (very few are related to mucocutaneous exposures) – often after venepuncture.<sup>4</sup>

There have been five documented cases of occupational transmission of HIV in Australia, of which four have been in health care workers.<sup>5,6</sup>

#### Risk of HBV transmission

It is important to remember that while much of the documentation on risk relates to HIV, the risk of HBV transmission to a non-immune person is much greater than for HIV. While all HCW are encouraged to take up vaccination, not all have done so and some remain non-responders to vaccination.

The risk of HBV transmission to a non-immune person from a single needlestick is more than 30% if the source is hepatitis B 'e' antigen positive, and less than 6% if the source is surface antigen positive, but 'e' antigen negative.<sup>2</sup>

#### Risk of HCV transmission

The risk of HCV transmission from a single needlestick injury from a confirmed HCV positive source is about 1.8%, but this rose to 10% in a study where the source patients had HCV RNA in their blood (tested by PCR).<sup>2</sup>

International studies of occupational transmission of HCV, suggest that the risk factors are similar to HIV – predominantly from needlestick injury with a large bore needle used for drawing blood.

#### Post exposure prophylaxis (PEP)

If the exposure is considered significant (i.e. able to transmit a BBV if the source were infectious) then PEP for HBV, HIV and Tetanus should be considered immediately.

#### HIV PEP

There is some evidence that taking Zidovudine reduces the risk of transmission of HIV after an occupational exposure.<sup>3</sup> There are also documented cases of seroconversion, despite early use of Zidovudine.<sup>2</sup> Since combination therapy is now the standard of treatment for HIV, two or three antiretroviral medications should always be prescribed for PEP.

For significant exposures where the source is positive or at high risk, three antiretroviral medications including one protease inhibitor will usually be prescribed. Which medications are used in combination will depend on current information and local protocols. If the source is known to be on anti HIV medications, the treatment history will influence the medications prescribed.

In general, HIV antiretroviral medications can only be prescribed by S100 prescribers or specialised services. This does not apply to starter packs of medications after occupational exposure. However, anyone who is commenced on HIV PEP should be referred as soon as possible to an S100 prescriber, or a physician specialising in HIV or infectious diseases.

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, but, while there is no research evidence for the optimal time, it is recommended that it should be commenced within a few hours if possible.

In some settings, there may not be immediate access to all antiretroviral drugs. In this case Zidovudine or Combivir should be commenced immediately (as this should be available as a starter pack in all health facilities.) Other antiretrovirals can then be accessed as soon as possible.



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

- a detailed assessment of their risk
- HIV PEP is an experimental, not a proven, therapy
- it is a 4 week course of oral therapy
- there can be difficulties taking PEP (especially if working)
- side effects - 30 - 40% in several studies do not complete the course due to side effects. It is important that the exposed person knows the difference between PEP side effects and seroconversion symptoms.
- it is the exposed individual's choice whether to take PEP and they can stop at any time
- the possibility of pregnancy.

It is advisable to have the exposed person sign a consent form to indicate that these factors have been discussed with them prior to commencing PEP.

If the exposed person is pregnant and the exposure is significant, the use of PEP would be strongly encouraged. If a woman seroconverts to 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 prophylaxis.<sup>2</sup> Many antiretroviral medications can be safely used in pregnancy. An experienced HIV physician should be consulted about the appropriate regime.

### HBV PEP

If the exposed person has ever had a blood test which 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 B.<sup>7</sup>

If the exposure is significant and the exposed person has not had 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 Handbook.<sup>7</sup>

### Tetanus PEP

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 Handbook.<sup>7</sup>

### Bites and clenched fist injuries

Human bites, clenched fist injuries (which microbiologically are equivalent to human bites) and animal bites often become infected. There is no risk of HIV, hepatitis B or hepatitis C transmission from an animal bite.

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

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).<sup>8</sup>

## AS SOON AS POSSIBLE (same day)

### Source assessment

After a significant exposure, if information is readily available about the HIV, HBV, or HCV status of the source, this should be used to inform the decision about whether to commence PEP. However, in practice, this is rarely the case and assessing the source should not delay the commencement of PEP if the exposure warrants it.

If the source is known, but they are not known to have HIV, HBV, or HCV, and they have not had a recent negative test, they may be asked to undergo testing (with the consent of their health care provider if they are a patient.) If the source is tested, they must first give informed consent after receiving pre-test counselling according to accepted guidelines. The source must also give consent as to who may be informed of the test results.

If the source refuses or is reluctant to be tested, it must be remembered that if the exposure is not significant, or if the exposed person has elected not to take PEP, knowing the status of the source – while providing epidemiological data – will not affect the immediate management of the exposed person.

### Source unknown

If the source of the exposure is unidentifiable (for example, an exposure from a discarded needle), what is known about the local prevalence of BBV should be taken into account when considering PEP. This may vary by service, institution, and geographical area.<sup>9</sup>

### Source HIV positive

If the source is known or found to be HIV positive, PEP is still only indicated if there has been a significant exposure. A person who is HIV positive is deemed to be infectious throughout the course of the disease, however, infectivity will be



greater if the source is terminally ill, has a high viral load or positive HIV antigen, or if they are seroconverting (after recent infection with HIV.)

If the source is taking or has previously taken antiretroviral medication, PEP medications for the exposed person will be adjusted so that different medications will be prescribed. This is because the virus exposed to may have some resistance to medications the source has taken.

#### Source HBV antigen positive

If the source is known or found to have a positive HBV antigen, and the exposed person does not have demonstrated immunity to HBV, hepatitis B immunoglobulin should be administered after a significant exposure to blood or blood-contaminated fluids.<sup>7</sup> A source who is hepatitis B 'e' antigen positive is significantly more infectious than someone who is surface antigen positive.<sup>2</sup>

#### Source HCV antibody positive

Although at present there are no specific PEP indicated for HCV, a paper by Jaekel et al (2001) provides evidence that treatment with antiviral agents during the acute phase of the disease may prevent establishment of the carrier state. At the time of writing there are insufficient data on which to base specific recommendations on the place of antivirals in PEP or management of acute hepatitis C. However, if the source is known or likely to be HCV positive, regular liver function tests and the monitoring of clinical signs and symptoms should be undertaken by an infectious diseases physician or gastroenterologist, and specific therapy considered if appropriate.

#### Source with negative serology results

If the source has negative serology results, this does not automatically mean that they do not have a BBV. The possibility that they may be in the window period must be considered. In Australia, the window period is

considered to be three months for HIV and six months for HBV and HCV. If the injury is significant, a detailed risk history should be taken from the source to determine if infection could have been acquired during that time. It must be realised that the source may be reluctant to disclose all lifestyle-related risk factors to a health care provider. It should also be remembered that if the source is in a window period, they may be at a particularly infectious stage of their disease process, even though test results are negative. If no risk can be determined it is for the exposed person to decide whether to discontinue PEP, if it has been commenced.

#### Documentation of incident

The exposure should be documented on a standard incident or accident reporting form and reported to the employer. This documentation ensures a record for the employer and the insurer, should there be a later claim and also provides evidence for Infection Control or Occupational Health and Safety personnel about potentially unsafe practices, environments, or equipment.

#### Prevention of transmission and crisis counselling

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 safe sex, safe 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 test results or occupational health and safety review. Sexual partners of exposed persons should also be offered counselling on the necessity for safe sex practices until the results of follow up tests are known.

Some people find the experience of an occupational exposure very distressing and they should be given the opportunity for immediate counselling to address anxieties.

## AS SOON AS POSSIBLE (within 1 week)

### Baseline blood testing

Blood testing should be offered to the exposed person to provide a baseline result against which to measure future test results. If baseline testing is to include a test for HIV, standard pre-test counselling must be provided as per local guidelines *before* blood is drawn.<sup>11</sup>

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 two weeks after the exposure. Therefore urgency is not a reason to do baseline testing without pre test counselling.

While it is preferable to do baseline testing soon after the exposure, there are reasons why this may not always be appropriate (outlined in the following section.)

### Pre HIV test counselling

Because baseline testing is concerned with risks before the current exposure, questions must be asked in pre test counselling about lifestyle as well as occupational risks. It should not be assumed that HCWs are either well informed about HIV transmission, or that they are without lifestyle risks of infection. The majority of HCW in Australia with HIV did not acquire it through their occupation. There is evidence to show that adequacy of pre-test counselling affects adjustment to being HIV positive.

Therefore it is important that someone who has the appropriate knowledge and skills provides pre test counselling for the exposed person. Testing should always be delayed until such a person is available.

It may also be argued that if the exposed person is anxious about the exposure, they



may not be able to give true informed consent immediately after the exposure. The exposed person should be given options as to where they are tested. In a small institution, it is not appropriate to discuss lifestyle risks (such as sexual and drug taking behaviours) with a colleague and testing off-site may be the preferred option. Health care facilities should explore links with local facilities to provide this service when developing policy.

#### Referral to specialist physician

If the exposed person commenced HIV PEP they should be referred to an HIV specialist physician – this may be a general practitioner who is an S100 prescriber, a doctor in a sexual health centre, or a specialised service in a hospital.

#### Support for significant others

As information about BBV, exposures and transmission risks is complex, it can be difficult for the partner or family members of the exposed person to understand. This may result in pressure on a HCW to change their area of work. It may therefore be necessary to offer support and education for a partner or family member, as well as the exposed person.

## FOLLOW UP

#### Post test counselling

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

#### Occupational health and safety review

The exposure should be assessed and followed up by infection control or occupational health and safety staff. This may lead to specific training for the exposed person, or a general review of workplace practices, staffing levels, environmental safety, training requirements, equipment, etc.

#### Follow up blood tests

Local protocols should be followed for ongoing blood testing. The minimum requirement is to test for HIV antibodies at three months and hepatitis B and C at six months. If HIV PEP has been commenced, HIV antibodies should also be tested at six months.

There have been a few cases where seroconversion has been recorded outside this timeframe<sup>2</sup>, but it is not considered necessary to adopt a more stringent testing regime than is advised for the community as a whole. Nevertheless, the treating doctor should advise the patient of this remote possibility.

Follow up testing for the source is often logistically difficult and is not necessary unless the exposed person is positive at follow up testing, or the source was thought likely to have been in the window period at the time of exposure.

## OTHER PUBLISHED GUIDELINES FOR EXPOSURE MANAGEMENT

#### United States Guidelines

Centers for Disease Control (2001) Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis *Morbidity and Mortality Weekly Report* Vol 50/No.RR-11 June 29

#### Australian State Guidelines

ACT Department of Health; Canberra Sexual Health Centre; AIDS Action Council; ACT Division of General Practice (October 2000) *Post Exposure Management Guidelines*

Health Department of Western Australia (September 2001) *Operational Instruction 1333/00: Sharps Injury and Blood and Body Substance Exposure Protocol*

New South Wales Health Department (1998) *Circular 98/11: Management of Health Care Workers Potentially Exposed to HIV, Hepatitis B and Hepatitis C*

Communicable Disease Unit, Public Health Services, Queensland Health (October 2001) *Guidelines for the Management of Occupational and Non-Occupational Exposures to Blood and Body Fluids*

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11. Australian National Council on AIDS and Related Diseases, Intergovernmental Committee on AIDS and Related Diseases (1998) *HIV Testing Policy* Commonwealth Department of Health and Aged Care, Canberra

## MANAGEMENT OF EXPOSURE TO BLOOD/BODY FLUIDS IN A HEALTH CARE SETTING

WHEN	WHAT
Immediately after exposure	First aid Relief from duty Risk assessment Post exposure prophylaxis (PEP) – if significant injury
As soon as possible (same day)	Source assessment Documentation of exposure Prevention of transmission and crisis counselling
As soon as possible (within 1 week)	Pre HIV test counselling Baseline serology Referral to specialist physician – if PEP commenced Support of significant others
1-3 weeks	Post test counselling with results of baseline serology Occupational health and safety review
3 months	Pre HIV test counselling Follow up serology – HIV, HBV, HCV
6 months	Follow up serology – HBV, HCV – HIV (if PEP taken)