Procedure for the management of occupational blood and body fluid exposures

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Blood and Body Fluid Exposure Phoneline

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Disclaimer: This procedure has been developed by the Blood and Body Fluid Exposure Phoneline, operated by The Albion Centre. It represents the advice and information given by the Phoneline staff to callers. The information is informed by published research and extensive practice experience. The document is intended as a comprehensive guideline of best practice for managing exposures; however it has not been endorsed by any state health department, so there is no requirement for health workers to comply with any aspect of this procedure.

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Definitions

Exposed	The person exposed to blood or body fluid
Occupational exposure	"Occupational exposure is defined as an incident which occurs during the course of a person's employment and involves contact with blood or other body substances. Such exposures may put the person at risk of acquiring a blood borne infection."[1] Types of occupational exposures are: • Sharps injury **-** needlestick, suture needle, cut with a sharp object or device eg scalpel, glass slide, burr, dental equipment, tooth, bone • Mucous membrane exposure **-** mouth, eye, nose • Contact with non intact skin **-** dermatitis, eczema, acne, cuts Occupational exposure does **not** include contact of blood or body substance with intact skin
Source	The person whose blood or body fluid was inoculated or splashed onto the exposed person. The source individual may not always be identifiable

Management steps

Table 1 sets out the key steps in managing an occupational exposure and the order in which they should be taken. Each step is described in more detail in the document.

Table 1: The key steps to be taken after an occupational exposure

When	What	Who
Immediately after exposure	**First Aid** **Report** - report incident to be relieved from duty **Relieve from duty**	Exposed person Supervisor
As soon as possible (within hours)	**Risk Assessment** **HIV prophylaxis** - offer HIV prophylaxis if significant	Designated person (for example: infection control staff, staff health clinic, emergency department, sexual health staff, nurse supervisor)
As soon as possible (same day)	*If significant:* **Other prophylaxis** - HBV, tetanus. Assess HBV immunity **Prevention advice** - information to prevent transmission **Source assessment** - HBV, HCV, HIV *If non-significant/low risk:* Information, check HBV vaccination *All exposures* **Crisis counselling** - address anxieties **Document** - complete incident report	
When practicable (within 1 week)	**Referral** - for continuation of course if PEP commenced	S100 prescriber or specialist service

	Referral - offer choice of follow up agencies **Informed consent** - before HIV, HBV, HCV serology **Baseline serology** - HIV, HBV, HCV **Support** - to exposed and partner/family if required **Prevention** - advice on safe practices, workplace safety	Expert/elected service provider (for example: infection control staff, staff health
1-3 weeks	**Post-test discussion** - with results of baseline serology	
	Documentation - confidential recording of results **Workplace health and safety review** – if needed	clinic, sexual health staff, General Practitioner)
3 months	**Informed consent**- before HIV, HBV, HCV serology **Follow up serology** - HIV	
6 months	**Informed consent** – before HBV, HCV and ? HIV serology **Follow up serology** – HBV, HCV and ? HIV (if PEP taken)	

First aid

The aim of first aid is to decrease contact time with possible pathogens. The best solutions to use are mild soap and water for skin or saline for mucous membranes. If water is not available alcohol hand rub can be used. Stronger solutions may decrease skin integrity and assist passage of microorganisms.

The exposed person should be advised to complete the following:

- Clean the wound/site with soap and water.
- Flush mucous membranes/conjunctiva with normal saline or water.
- Further management of wound dependant on nature of injury (for example, suturing, application of dressing)

Reporting

Low levels of reporting exposures are common in most retrospective studies everywhere in the world. In a study of Australian nurses in 2008, 11.2% of those surveyed had had an exposure in the previous 12 months of which only 61% were reported. “In terms of the main reasons for not reporting, the injury being considered too minor was the main reason for 25 (50%) unreported incidents, the needle being considered sterile was the main reason for 15 (30%) incidents, and concern about blame was the main reason in four (8%) unreported incidents.”[2]

Reporting of exposures can be encouraged by:

- An easy to follow management plan
- Relief from duty without question
- Rapid assessment (often not possible in an Emergency Department)
- Confidential reporting and documentation
- Assessment by a few trained staff
- A supportive – rather than punitive - process
- Availability of options for assessment and testing

Reporting at this stage is about getting relieved from duty so the exposed person can be assessed for risk. The incident reporting process is initiated at a later stage.

Risk assessment

The risk assessment is the most important part of managing exposures because it tells you if the person is eligible to take post exposure prophylaxis (PEP) which is potentially life-saving.

Questions to ask in a risk assessment	Rationale
Was first aid performed immediately?	Immediate first aid decreases potential contact time with viruses
How long ago was the exposure?	Within 72 hours means the exposed person may be eligible for prophylaxis if indicated
What type of exposure occurred?	To determine whether it is a sharps injury or a splash exposure
What level of injury was sustained?	A deep injury or one that bled spontaneously is a higher risk.
What type of body fluid was involved?	Blood, semen, vaginal secretions, cerebrospinal, synovial, pleural, peritoneal, pericardial and amniotic fluids or tissue are considered infectious
Is the exposed person immune to Hepatitis B?	If successfully vaccinated they will be protected from being infected with Hepatitis B. If not, the need for Hepatitis B prophylaxis needs to be assessed
Is the source known to have Hepatitis B, Hepatitis C, or HIV?	If known, this may determine strategies for the management of the exposure
If the source is HBsAg+ve, are they known to be HbeAg +ve?	HbeAg poses a higher risk of transmission
If source is HCV+ve, are they known to be PCR positive?	PCR [polymerase chain reaction] +ve poses a higher risk of transmission
If source is HIV+ve, do they have a positive antigen or high viral load?	Positive antigen or high viral load indicates viral activity and increased risk of transmission
If source is HIV+ve, have they ever taken HIV medications and if so which ones?	May affect which medications are prescribed if HIV prophylaxis is required
If source is HIV+ve, are they on treatment with an undetectable viral load?	If so they will be much less infectious
Questions to ask – sharps injury	Rationale
What type of instrument caused the injury?	Hollow-bore needles are more likely to cause transmission than solid sharps
Had the sharp been in a vein or artery?	Higher risk of transmission if the sharp has been in a vein or artery
Was blood aspirated into the needle and/or syringe?	The greater the amount of blood, the greater the risk of transmission

Was the sharp visibly blood stained?	The greater the amount of blood, the greater the risk of transmission
(If a needle,) what gauge [size] was the needle?	Larger bore needles pose a greater risk of transmission (16g – large, 30g – small)
Did the sharp object pass through gloves or clothing?	Material will have a cleaning effect on the sharp reducing the amount of blood on the object; also can reduce contact time
Could the sharp have been contaminated with soil or dirt?	Tetanus status needs to be assessed and prophylaxis considered
Questions to ask – splash injury	Rationale
Was the exposure to mucous membranes, conjunctiva, or non-intact skin?	Not considered an exposure if to intact skin
Was the fluid visibly blood stained?	If blood stained, the risk of transmission increases
How much fluid was the person exposed	The greater the volume, the greater the risk of
to?	transmission
For how long was the exposure to the fluid?	The longer the contact time, the increased risk of transmission

The risk assessment tables in Appendix 1 provide an outline of which exposures are significant and require PEP to be considered.

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, 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 been demonstrated to contain insufficient quantities 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, the 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.

Antibiotics may not be necessary for mild wounds not involving tendons or joints that can be adequately debrided and irrigated and that are seen within 8 hours.

Wounds having a high risk of infection (which require antibiotics) include:

- Wounds with delayed presentation (>8 hours)
- Puncture wounds unable to be debrided adequately
- Wounds on hands, feet or face
- Wounds with underlying structures involved, eg bones, joints, tendons

- Wounds in the immunocompromised patient

Antibiotics should be prescribed as per *Therapeutic Guidelines: Antibiotic, Version 15, 2014.*

Non-health exposures

Community needlestick injuries and non-health occupational exposures are usually to small needles and syringes which have been used to inject drugs and subsequently discarded. No cases of HIV have ever been recorded from such exposures. One possible and one definite case of HBV have been documented (one in Spain and one in Australia)[3,,4] and three cases of HCV (one in Spain and two in Australia)[5,6].

Post exposure prophylaxis

Initial management is dependent on the degree of exposure, the severity of the injury and the hepatitis B immune status of the exposed person.

Post exposure prophylaxis can be given for HIV, tetanus, or HBV.

Disease	Prevention	Post exposure prophylaxis
Tetanus	Vaccination	Tetanus toxoid; immunoglobulin
HBV	Vaccination	Immunoglobulin
HCV	No	No – early treatment if seroconversion detected
HIV	No	Antiretroviral drugs

Human immunodeficiency virus post exposure prophylaxis

If HIV PEP is indicated it should be given as soon as possible. While most guidelines say it can be given up to 72 hours after exposure, no clinical trial has indicated an optimum time. It is generally accepted that it should be given as soon as practicably possible.[10]

Recommendations for the use of PEP should be based primarily on the significance of the exposure. **The decision to start prophylaxis should not be delayed while waiting for test results from the source of the exposure.**

A study published in 1995 suggested use of Zidovudine by health workers reduced the risk of HIV seroconversion after a needlestick injury by 80%[11]. There have been few studies of the effectiveness of the use of combination therapy for prophylaxis, despite combination therapy being used since 1996.

However, a summary of published reports to 2002,[12] identified 24 published cases of HIV seroconversion despite the initiation of PEP.

Informed consent

The decision to accept or refuse prophylaxis is that of the exposed person. They must not be coerced into accepting or refusing treatment.

Before deciding whether to start therapy, the exposed person should be informed about:

- Current data on efficacy of antiretroviral agents as prophylaxis
- Possible side effects and their prevention or timely management. As many side effects are general (nausea, diarrhoea, anorexia, fatigue) they may think they are experiencing seroconversion illness if not forewarned
- Length of course (4 weeks of oral therapy)
- The need for monitoring by serological testing
- The importance of adherence to the prescribed regimen
- Use in pregnancy and lactation (if relevant) – see comments below
- When to start - as soon as possible (preferably within an hour or two)
- Cessation of therapy - it can be stopped at any time. If unsure, it is best to start and then stop if they decide to after consideration, rather than not start
- The recommended medications

Persons deciding to commence prophylaxis should be aware that it may be ceased once the source has been confirmed to be HIV-negative. The exposed person must be advised of the possibility of the source being in the window period and thus returning a negative HIV test for up to three months after the period in which the source person may have been exposed to HIV.

PEP prescription

If PEP is indicated after risk assessment the injured worker should be referred to the nearest centre/hospital and HIV PEP should be commenced as soon as possible as per the facility's in-house protocol. In general, a starter pack with enough medication for 3-5 days will be prescribed. Any medical officer can prescribe a starter pack.

For continuation of the course of therapy, the exposed person will be referred to a community S100 prescriber or a specialist service (such as infectious diseases, or sexual health) which can prescribe HIV antiretroviral medications.

Medications should also be given for anticipated side effects (depending on regimen prescribed). Such as immodium for potential diarrhoea and an oral anti-emetic (e.g. metaroclopramide) for nausea.

If the source is known to be HIV positive, it should be determined what treatment they are taking or have taken. The regimen prescribed should have at least one drug that the source has not taken to reduce likelihood of resistance.

PEP must be discontinued immediately if the exposed person is found to be HIV positive on baseline testing. This is to minimise the possibility of resistance developing (to drugs they might need later in the course of their HIV infection).

It is important to provide written information to reinforce the information given. This is in case the person was too anxious on the day of the exposure to take in all the information, and also in case they were too nervous to ask clarifying questions. The information should also contain numbers for referral for medication prescription and ongoing support.

"There is no direct evidence to support the greater or lesser efficacy of 3 over 2 drug preventive regimes."[13] The NSW Health policy directive recommends the use of two drugs for PEP unless"

- "The source is known to be HIV positive; AND
- If a high risk exposure has occurred (see Table One for classification of risk);AND
    1. If all that is known about the source individual is that s/he has advanced HIV Disease; OR
    2. If the source individual is known to have recently had an HIV plasma load greater than 10,000 copies/mI bDNA (>20,000 copies/mI RT-PCR); OR
    3. If it is known, as a result of HIV anteretroviral drug resistance testing, that the source individual has evidence of drug resistance involving primary mutations to nucleosides drugs"[1]

Which drugs are prescribed will in the first instance be determine by the drugs available in the starter pack at the prescribing facility and subsequently by the specialist prescriber. "Apart from zidovudine (AZT), there is no evidence to support the use of one drug or class of drug over another. Factors to consider include the presence of co-morbidities, simplicity of the dosing regimen, minimisation of side effects and drug interactions. PEP starter packs encourage follow-up, support adherence and minimise drug waste if the course is not finished. Co-formulated preparations reduce pill burden and improve adherence."[13]

Pregnancy and breastfeeding

In the event of the exposed person being pregnant or lactating, additional consultation with a specialist is necessary.
When considering the use of antiretroviral therapy in pregnant women the following should be taken into account:

- to date, studies of the use of zidovudine by pregnant women with HIV, including in the first trimester, show no evidence that zidovudine is teratogenic
- seroconversion in a pregnant woman carries a significant risk to the foetus
- the use of zidovudine by women with HIV has been shown to be associated with a significantly reduced risk of maternal-infant transmission

Pregnant women should therefore be recommended to take prophylaxis in the event of significant exposure, having been fully informed of current knowledge. Prophylaxis should be discouraged for pregnant women if there is not a definite parenteral exposure.

If the exposed person is pregnant and has had a significant exposure, it is recommended to commence the mediations in the starter pack and then to seek specialist advice, as evolving safety aspects of anti-retroviral therapies in pregnancy must be taken into account, especially in the first trimester.

Women who have a significant exposure should be warned of the risk of transmission of HIV through breastfeeding. They should be advised not to breastfeed for three months whether or not they choose to take prophylaxis.

Prophylaxis for non-health exposures

Unless assessment reveals an increased risk of transmission of blood-borne viruses, only tetanus prophylaxis is recommended for needlestick injuries to the public, including children. Increased risk of transmission would be visible blood on the device, deep penetrating injury, and the device known

to be recently used. In this case the exposed person should be referred for non-occupational postexposure prophylaxis.

Tetanus prophylaxis

Tetanus prophylaxis should be recommended depending on the nature of the exposure and the exposed person's past history of tetanus immunisation. Always consider for wounds which may be contaminated with soil or dust (for instance, discarded needles in parks).

Give in conjunction with current *Australian Immunisation Handbook*[7] – table reproduced below.

Table 4.19.1: Guide to tetanus prophylaxis in wound management

History of tetanus vaccination	Time since last dose	Type of wound	DTPa, DTPa-combinations, dT, dTpa, as appropriate	Tetanus immunoglobulin (TIG)
≥3 doses	<5 years	Clean minor wounds	NO	NO
		All other wounds†	NO	NO‡
≥3 doses	5–10 years	Clean minor wounds	NO	NO
		All other wounds†	YES	NO‡
≥3 doses	>10 years	Clean minor wounds	YES	NO
		All other wounds†	YES	NO‡
<3 doses or uncertain§		Clean minor wounds	YES	NO
		All other wounds†	YES	YES

† All wounds, other than clean minor wounds, should be considered 'tetanus-prone'. For more detail, see 4.19.9 *Tetanus-prone wounds* above.

‡ Individuals with a humoral immune deficiency (including HIV-infected persons who have immunodeficiency) should be given TIG if they have received a tetanus-prone injury, regardless of the time since their last dose of tetanus-containing vaccine.

§ Persons who have no documented history of a primary vaccination course (3 doses) with a tetanus toxoid-containing vaccine should receive all missing doses and must receive TIG.

Hepatitis B prophylaxis

The hepatitis B status of the exposed person should be established. If they have natural immunity (past infection) or have ever demonstrated immunity after vaccination, they are not considered to be at risk of infection regardless of the nature of the exposure. A seroprotective anti-HBs antibody level is considered to be ≥10 mIU/mL.[7]

If the exposed person does not have natural immunity, has not been vaccinated, or does not know if they have ever been immune from vaccination, the benefits of vaccination and knowing their immune status should be explained – whether or not the current exposure is significant.

The advice in the rest of this section is from the *Australian Immunisation Handbook: 10th Edition.* [7]

"Completion of a full course of hepatitis B vaccination is strongly recommended for any non-immune healthcare worker who has sustained a needle-stick injury or other potential hepatitis B exposure." [7]

Unknown immunity

"If persons who are at significant risk of hepatitis B (such as healthcare workers) were not tested for anti-HBs within 4 to 8 weeks after completion of the documented primary course, they should still undergo serological testing to ensure immunity. If, on testing, they have an anti-HBs level of <10 mIU/mL, they should be given a single booster dose (4th dose) of vaccine. Persons with immune memory established from effective prior vaccination should respond to this booster dose. Anti-HBs should be checked 4 weeks later, and if the anti-HBs level remains <10 mIU/mL, the possibility of HBV infection should be investigated (and, if excluded, the person should be managed as a nonresponder to vaccination, see below). If the anti-HBs level is ≥10 mIU/mL, the person can be regarded as immune."[7]

Non-responders to primary vaccination

"Persons who are non-responders after being given the booster/4th dose (and in whom HBV infection has been excluded) should have 2 further doses of hepatitis B vaccine at monthly intervals, and be re-tested for anti-HBs levels at least 4 weeks after the last dose. The booster/4th dose that was received could be counted as the 1st of the 3 repeat doses, as recommended for nonresponders." …" Persistent non-responders should be informed that they should be considered not protected against hepatitis B and should minimise exposures. They should also be informed about the need for HBIG within 72 hours of parenteral or mucosal exposure to HBV" [7]

Hepatitis B Immunoglobulin (HBIG).

"Following significant exposure (percutaneous, ocular or mucous membrane) to blood or to potentially blood-contaminated secretions where feasible, the source individual should be tested for HBsAg as soon as possible.

If the person exposed has not been previously vaccinated against hepatitis B, their anti-HBs level, and anti-HBc and HBsAg status, should be determined immediately. If the person exposed is antiHBs and anti-HBc negative (non-immune) and the source is either HBsAg-positive or cannot be identified and tested rapidly, a single dose of HBIG should be administered according to the recommendations in Table 4.5.3. Hepatitis B vaccine must also be given as soon as possible, with further doses as recommended in Table 4.5.3."

"If the response to previous vaccination is unknown, the anti-HBs level should be determined as quickly as possible. If the anti-HBs level is <10 mIU/mL and there is no evidence of HBV infection, HBIG and HBV vaccine should be administered as per Table 4.5.3."

Table 4.5.3: Post-exposure prophylaxis for non-immune persons exposed to HBsAg-positive source

Exposure	Hepatitis B immunoglobulin		Vaccine	
Percutaneous, ocular or mucous membrane	400 IU, by IM injection	Single dose within 72 hours of exposure	1 mL by IM injection	Within 7 days† of exposure and at 1 and 6 months after 1st dose

† The 1st dose can be given at the same time as HBIG, but should be administered at a separate site. Administration as soon as possible after exposure is preferred.

"Hepatitis B immunoglobulin (HBIG) is prepared from plasma donated through routine blood bank collection. Samples are selected on the basis that they contain high levels of anti-HBs antibodies. As stocks of HBIG are very limited, use should be strictly reserved for those who are at high risk, such as babies born to mothers with chronic HBV infection and non-immune persons who are exposed through occupational exposure to the blood of unidentified persons or to persons who are chronically infected with hepatitis B or whose hepatitis status cannot be ascertained in time. Requests should be directed to the Australian Red Cross Blood Service in your state/territory." [7]

Hepatitis C post exposure management

There is currently no recommended HCV prophylaxis.

If a person sustains a significant injury to a source that is determined to have HCV infection (by positive-antibody and polymerase chain reaction (PCR) testing) they should be monitored for HCV seroconversion by regular liver function or HCV PCR testing). If seroconversion is evident they should be referred to a clinician experienced in the management of hepatitis C. There is some evidence that early treatment, after viraemia or seroconversion are noted, may clear the virus. [8]

Between 2004 and 2013, nine HCV seroconversions following occupational exposure were reported in the United Kingdom; "eight of the nine healthcare workers received antiviral therapy of whom seven are known to have achieved viral clearance." [9]

Prevention advice

If the exposure is considered significant, then the exposed person could be infected with, and therefore able to transmit, a blood borne virus. Therefore before sending then home or back to work, they need information about how to prevent transmission to others.

The exposed person should be advised to prevent possible transmission by:

- not donating plasma, blood, tissue, breast milk, or sperm
- protecting sexual partners by practising safe sex
- not sharing needles, syringes or other injection equipment, such as spoons or tourniquets, to inject drugs
- complying with infection control guidelines
- not breastfeeding
- not performing exposure-prone procedures[14,15]
- not sharing razors or toothbrushes in the event of significant exposure to HBV or HCV

Source assessment

Note: The initiation of PEP after a significant exposure should not be delayed while the sero-status of the source is being determined – unless the source status is known prior to the exposure or unless rapid testing is available and can be done immediately after the exposure.

If the source of the body substance involved in the exposure is unknown, procedures applicable to the source being HIV, HBV, or HCV positive should be followed.

Significant exposures (PEP recommended or available)

If the exposure is significant and the source of the body substance is known but has no record of current serology status for hepatitis B, C and/or HIV, a third party (not the exposed person) should seek source consent to test for HIV, HBV surface antigen and HCV.

Informed consent must be gained as required by the national testing policies for HIV, HBV, or HCV.[16] (See section on *Informed consent for testing* below). Steps must also be in place to ensure confidentiality with regard to source testing, including where results are documented. If consent is denied, or the source is unable to give consent, they should be treated as being HIV, HBV, and HCV positive and decisions undertaken based on risk assessment.

If the results of source testing for HIV, HBV or HCV are negative, the possibility of the source being in the window period should be considered and a detailed risk assessment undertaken. It must also be remembered that if the source is in the window period (negative but seroconverting), this is a period of increased infectivity of any of the viruses.

If the source is known to be HIV-positive a history of antiretroviral use should be obtained in the event of a significant exposure for which PEP is recommended.

Low risk exposures

The NSW Health policy directive recommends "In the case of percutaneous, significant percutaneous, significant mucous membrane, or significant skin exposures every effort should be made to ascertain the HIV, HBV and HCV status of the source."[1]

For low risk exposures when PEP is not indicated, the management of the exposed person will not change regardless of the source status. If the source is tested and found to be positive for HIV, HBV antigen or HCV, it may make the exposed person anxious even though the risk from the exposure remains low.

It is often preferable to document the identity of the source, but not to test them unless the health worker subsequently demonstrates signs of infection (unlikely for low risk exposures.) This reduces costs to the health facility and anxiety for both the source and the exposed person.

Crisis counselling

This is not the same as "pre-test counselling". This is what people need before they go home – or go back to work - and continue with their lives.

It is important to assess exposed person's level of anxiety. Everyone reacts differently to an exposure and the level of anxiety is unrelated to the level of risk. People can be very anxious over a no-risk exposure and completely blasé over a significant exposure.

This initial counselling should include crisis intervention, involving discussion of the exposed person's fears, feelings and thoughts regarding the incident.

It may be necessary to address anxiety by explaining risks, offering support, or referring to another agency, employee assistance program, or mental health professional.

It may also be necessary to consider their partner or significant others – does the exposed person need support to inform them or does the family need information?

Baseline and follow-up testing

Baseline testing does not need to be done immediately after the exposure. The initiation of PEP after a significant exposure should never be delayed until after baseline testing is completed.

It is important to encourage the exposed person to have baseline testing, but it can be done within a few days of the exposure.

Baseline testing is done to ascertain that the exposed person is not already infected from a previous exposure at the time of the incident. The reasons for recommending this are:

- If the exposed person is positive at baseline, PEP should be ceased immediately (if it has been commenced)
- If the exposed person is negative at baseline and subsequently seroconverts to HIV (within three months) or to HBV or HCV (within six months), it is proof of likely occupational transmission and provides documentation to establish eligibility for Workers' Compensation
- If the exposed person is negative at baseline and follow up testing, this will help to relieve any subsequent anxiety about the exposure
- De-identified data from baseline and follow-up testing provide valuable information about the risks from and management of occupational exposures

Informed consent

Baseline testing should occur at a time and in a place that is appropriate for the exposed person. The exposed person cannot be required to have testing; it can only be strongly recommended.

While pre-test counselling before testing for blood borne viruses is no longer required, informed consent in accordance with the national testing policies[16] must still be gained before any blood is taken for HIV, HBV, or HCV testing. Written consent is not essential, but the pre-test discussion should be documented. Confidentiality must be maintained – which can be difficult in the workplace.

Because the baseline test is to see if the person was negative before the exposure, lifestyle risks must be discussed as for any person presenting for testing, so that they may be adequately prepared for their result. For this reason it is best if it is not done by a close work colleague.

Informed consent for testing does not need to take place at the workplace and in some cases may be best accessed off-site with someone experienced in this discussion for blood borne viruses. The exposed person should be given options for testing so they don't feel pressured to have testing at the workplace. If the exposed person elects to be tested elsewhere, they should be advised to ensure that it is documented that the person is testing because of an occupational exposure.

"Informed consent for testing means that the person being tested agrees to be tested on the basis of understanding the testing procedures, the reasons for testing and is able to assess the personal implications. Informed consent is required for HIV testing, except for rare occasions when a legal order is made for compulsory testing or in emergency settings. The person performing the test

should use their clinical judgement in securing informed consent. This should be based on their understanding of the context in which the test is being performed:

- the features which precipitate testing such as clinical presentation, risk exposure, epidemiology and prevalence and patient initiation; and
- an assessment of the person being tested with respect to their understanding of the HIV testing process and consequences of the result. "[16]

"People involved in HIV testing should use whatever additional supports are necessary to assist the person who is considering testing to become adequately informed. The discussion should be appropriate to the gender, culture, behaviour and literacy level of the person being tested and to their intellectual capacity." [16]

The above two paragraphs are also in the testing policies for HBV and HCV.[16]

It is also important to ensure people know when and where to get their results and ensure post-test discussion is available.

Serology

Baseline and follow up testing is usually done for HIV, HBV and HCV, depending on the nature of the exposure, what is known about the source, and the HBV vaccination status of the exposed person.

Standard baseline testing includes

- HIV antibody
- HCV antibody
- HBsAg and HBsAb or HBcAb – depending on whether the person has been vaccinated. If the exposed person has documented immunity to HBV, there is no need to test for HBV.

Follow up testing

If PEP has been commenced, a full blood count and biochemistry profile, appropriate to the therapy used, should be obtained and assessed at the end of the four-week course of therapy.

The length of time taken to return a definitive HIV result varies with the type of test used.[16] Although the tests used in Australia will return results much sooner, the window period is still taken to be three months. Therefore a definitive negative diagnosis cannot be given until a test has been done three months after the exposure. Despite this, some protocols recommend testing at six weeks and this will give a good indication of the final result.

The window period for HBV and HCV is taken to be six months.

Follow up testing at three months post exposure should include:

- HIV antibody
- Liver function tests after a significant exposure to a HCV positive source
- HB surface antigen
- HCV antibody

Follow up testing at three months post exposure should include:

- Liver function tests after a significant exposure to a HCV positive source

- HB surface antigen
- HCV antibody
- HIV antibody - The NSW Health policy directive recommends testing for HIV antibody at six months if PEP has been taken as PEP has been shown to delay seroconversion. However, the policy has not been updated since 2003. The current national PEP guidelines[13], do not recommend HIV testing beyond 3 months, nor do the Centers for Disease Control (US) if using a fourth generation assay as we do in Australia.

No testing should be done beyond 6 months.

It is also important to consider if and where serology results are recorded. This must be somewhere very confidential which only a limited number of people can access – so a personnel file is not usually acceptable. The person must always give consent to have their results recorded – the organisation does not have to right to know or record them. They must also be told where and how they will be stored.

Hepatitis B requests and results

Many health care workers are confused about the meaning of hepatitis B related tests and results. The following is a brief summary.

Positive		Means
HbsAg	surface antigen	Current infection/infectivity or carrier Detected in acute and chronic infection
HbcAb (= anti HBc)	core antibody	Natural immunity (past infection)
HbsAb (= anti HBs)	surface antibody	Acquired immunity (past vaccination)
HbeAg	"e" antigen	Viral replication, carrier, more infectious

Antigen = a foreign substance in the body, such as a virus
Antibody = a protein that the immune system makes in responses to a foreign substance. Antibodies can be produced in response to vaccination or infection

More detailed summaries of HBV testing issues (written for Australian General Practitioners) are listed in the references.[17,18,19]

Documentation

All exposures should be documented – even if not significant in terms of risk.

It needs to be considered who has access to documentation and which versions of the documentation need identifying details and which should be coded. Some Local Health Districts require entry of data about exposures into the local online incident management system.

Workplace health and safety review

At some stage in the process, it is necessary to build in a review of the work practices at the time of the incident to see if there is a need for change. This will mean a review of the individual's practice – which could be done when giving results (if negative), or at another pre-determined time. Also there will need to be a regular review of all incidents resulting in exposures. De-identified individual forms may be considered by a facility infection control or safety committee. Also de-identified aggregated data should be collected and regularly reviewed to identify any trends or clusters of exposures.

Abbreviations

Albion	The Albion Centre
HBIG	Hepatitis B immunoglobulin
HBV	Hepatitis B virus HCV
	Hepatitis C virus
HIV	Human immunodeficiency virus
NSW	New South Wales
PCR	Polymerase chain reaction
PEP	Post exposure prophylaxis

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Appendix 1: Risk assessment tables for occupational exposures to blood or other body fluids

HIV risk

Level of risk	Exposure	Body substance	Source	Post exposure prophylaxis
Massive	Injection or transfusion of fluid	Potentially infectious fluid*	• HIV positive, or • not recently tested, or • unknown	Strongly recommended

Very high	Deep needlestick from needle used for venepuncture, blood gasses, or other blood withdrawal Deep injury from instrument contaminated with concentrated virus	Blood Concentrated virus	HIV positive and: • acute seroconversion illness, or • terminal HIVrelated illness, or • symptomatic HIV disease, or • AIDS diagnosis, or • high viral load, or • low CD4 count	
	Extensive and/or prolonged contact to significant area of non-intact skin or mucous membrane	Potentially infectious fluid or tissue		
High	Deep needlestick from needle used for venepuncture, blood gasses, or other blood withdrawal Deep injury from contaminated instrument	Blood Concentrated virus	• HIV positive, or • not recently tested, or • unknown	
	Extensive and/or prolonged contact to significant area of non-intact skin or mucous membrane	Potentially infectious fluid or tissue		
Increased	Needlestick through gloves or less deep needlestick from needle used for venepuncture, blood gasses, or other blood withdrawal	Blood	• HIV positive, or • not recently tested for HIV, or • unknown	Recommended
Moderate	Sharps injury from: • sharp contaminated with visible blood • cut from scalpel with significant blood exposure	Potentially infectious fluid or tissue	• HIV positive, or • not recently tested, or • unknown	Available
	Contact to significant area of non-intact skin			
Low	Sharps injury from: • intramuscular injection • scalpel cut through double gloves Needlestick injury which did not bleed spontaneously	Potentially infectious fluid or tissue	• HIV positive, or • not recently tested, or • unknown	Not advised
	Contact to cut or small area of non-intact skin Contact of small amount of fluid to mucous membrane			
	Any	Any	HIV positive and on treatment and with undetectable viral	
			load	

Very low/theoretical	Sharps injury from: • solid sharp –eg suture needle, lancet, probe • subcutaneous injection • small dental needle used for local anaesthetic • discarded needle in public place Needlestick injury which did not pierce the skin – eg scratch Human bite	Potentially infectious fluid or tissue	• HIV positive, or • not recently tested, or • unknown	Do not give
No risk	There is no risk from: • Contact of fluid or tissue with intact skin • Exposure to saliva, urine, faeces, vomit, sweat, tears which are not bloodstained • Injury from clean sharp (which has not had contact with body fluid prior to injury) • Any exposure from a source who is HIV negative and has not been at risk within previous 3 months			

*Potentially infectious fluids include: blood, visibly blood stained fluid, semen, vaginal secretions, wound drainage, or cerebrospinal, pleural, synovial, peritoneal, pericardial, or amniotic fluids; concentrated virus (in laboratory)

HBV risk to non-immune person

Level of risk	Exposure	Body substance	Source	Post exposure prophylaxis
Massive	Injection or transfusion of fluid	Potentially infectious fluid*	• HBsAg or HBeAg positive, or • not recently tested for HBV, or • unknown	HBIG strongly recommended if exposed not immune
Very high	Deep needlestick from needle used for venepuncture, blood gasses, or other blood withdrawal	Blood		
	Extensive and/or prolonged contact of fluid or tissue to significant area of non-intact skin or mucous membrane	Potentially infectious fluid or tissue		
High	Needlestick through gloves or less deep needlestick from needle used for venepuncture, blood gasses, or other blood withdrawal	Blood	• HBsAg or HBeAg positive, or • not recently tested for HBV, or • unknown	HBIG recommended if exposed not immune
	Sharps injury from: • sharp contaminated with visible blood • cut from scalpel with significant blood exposure	Potentially infectious fluid or tissue		
	Contact of fluid or tissue to significant area of non-intact skin			

Moderate	Sharps injury from: • intramuscular injection • scalpel cut through double gloves	Potentially infectious fluid or tissue	• HBsAg or HBeAg positive, or • not recently tested for HBV, or	HBIG available if exposed not immune
	Needlestick injury which did not: bleed spontaneously Contact of fluid or tissue to cut or small area of non-intact skin Contact of small amount of fluid to mucous membrane		□ unknown	
Low	Sharps injury from: • solid sharp –eg suture needle, lancet, probe • subcutaneous injection • small dental needle used for local anaesthetic • discarded needle in public place Needlestick injury which did not: pierce the skin – eg scratch Human bite	Potentially infectious fluid or tissue	• HBsAg or HBeAg positive, or • not recently tested for HBV, or • unknown	Do not give HBIG
No risk	There is no risk from: • Contact of fluid or tissue with intact skin • Exposure to saliva, urine, faeces, vomit, sweat, tears which are not bloodstained • Injury from a clean sharp (which has not had contact with body fluid prior to injury) • Any exposure to a person who has previously demonstrated HBV immunity through vaccination or natural infection • Any exposure from a source who is HB antigen negative and has not been at risk within previous 6 months			Do not give HBIG

*Potentially infectious fluids include: blood, visibly blood stained fluid, semen, vaginal secretions, wound drainage, or cerebrospinal, pleural, synovial, peritoneal, pericardial, or amniotic fluids; concentrated virus (in laboratory)

HCV risk

Level of risk	Exposure	Body substance	Source	Post exposure prophylaxis
Massive	Injection or transfusion of fluid	Blood	• HCV PCR positive, or • not recently tested, or • unknown	Not available Monitor for seroconversion
High	Deep needlestick from needle used for venepuncture, blood gasses, or other blood withdrawal			
	Extensive and/or prolonged contact of fluid or tissue to significant area of non-intact skin or mucous membrane			

Increased	Needlestick through gloves or less deep needlestick from needle used for venepuncture, blood gasses, or other blood withdrawal	Blood	• HCV PCR positive, or • not recently tested for HCV, or • unknown	Not available Monitor for seroconversion
	Sharps injury from: • sharp contaminated with visible blood • cut from scalpel with significant blood exposure			
	Contact of fluid or tissue to significant area of non-intact skin or mucous membrane			
Moderate	Sharps injury from: • intramuscular injection • scalpel cut through double gloves Needlestick injury which did not: bleed spontaneously	Blood or visibly blood stained fluids	• HCV PCR positive, or • not recently tested for HCV, or • unknown	Not available Monitor for seroconversion
	Contact of fluid or tissue to cut or small area of non-intact skin Contact of small amount of fluid to mucous membrane			
Low	Any of the above exposures	Body fluids other than blood, but which could potentially contain blood	• HCV PCR positive, or • not recently tested for HCV, or • unknown	Not available
		Blood	□ HCV PCR negative	
	Sharps injury from: • solid sharp –eg suture needle, lancet, probe • subcutaneous injection • small dental needle used for local anaesthetic • discarded needle in public place Needlestick injury which did not: pierce the skin – eg scratch Human bite	Blood or body fluids which could potentially contain blood	• HCV antibody positive, or • not recently tested for HCV, or • unknown	
No risk	There is no risk from: • Contact of fluid or tissue with intact skin • Exposure to body fluids which do not contain blood • Injury from clean sharp (which has not had contact with body fluid prior to injury)	Any	Any	Not available

	Any	Any	HCV antibody negative and not at risk within previous 6 months	

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The evidence for the information in the risk assessment tables can be found in the following references.

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