

HIV, Hepatitis B and Hepatitis C – Management of Health Care Workers Potentially Exposed

Summary The purpose of this Policy Directive is to assist health services to appropriately assess and manage a health care worker following an occupational exposure in order to prevent disease transmission.

Document type Policy Directive

Document number PD2017_010

Publication date 04 May 2017

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Replaces PD2017_009

Review date 04 May 2022

Policy manual Not applicable

File number 16/2631

Status Active

Functional group Clinical/Patient Services - Incident Management, Infectious Diseases
Personnel/Workforce - Occupational Health and Safety
Population Health - Communicable Diseases, Infection Control

Applies to Affiliated Health Organisations, Board Governed Statutory Health Corporations, Chief Executive Governed Statutory Health Corporations, Community Health Centres, Dental Schools and Clinics, Environmental Health Officers of Local Councils, Government Medical Officers, Local Health Districts, Ministry of Health, NSW Ambulance Service, NSW Health Pathology, Private Hospitals and day Procedure Centres, Public Health System Support Division, Public Health Units, Public Hospitals, Specialty Network Governed Statutory Health Corporations

Distributed to Divisions of General Practice, Environmental Health Officers of Local Councils, Government Medical Officers, Ministry of Health, NSW Ambulance Service, Private Hospitals and Day Procedure Centres, Public Health System, Tertiary Education Institutes

Audience All clinical staff

Secretary, NSW Health

This Policy Directive may be varied, withdrawn or replaced at any time. Compliance with this directive is mandatory for NSW Health and is a condition of subsidy for public health organisations.

HIV, HEPATITIS B AND HEPATITIS C – MANAGEMENT OF HEALTH CARE WORKERS POTENTIALLY EXPOSED

PURPOSE

Human immunodeficiency virus (HIV), hepatitis B and hepatitis C may be transmitted by significant percutaneous or mucosal exposure to infective blood or other infective body substances. Occupational exposure is defined as an incident that occurs during the course of a person's employment and involves direct contact with blood or other body substances. Such exposures may put the person at risk of acquiring a blood borne virus infection. The purpose of this Policy Directive is to assist Health Services to appropriately assess and manage a health care worker following an occupational exposure in order to prevent disease transmission.

MANDATORY REQUIREMENTS

All health facilities within the NSW public health system are required to implement this Policy Directive. It is also recommended that licensed private health care facilities have regard to this Policy Directive.

Facilities must ensure that:

- An efficient local system is established for reporting and managing potential exposures of HCWs (including non-LHD, non-hospital based health staff or volunteers) to blood borne viruses
- HCWs (including non-LHD, non-hospital based health staff or volunteers) and source patients have access to blood borne virus testing, as appropriate, following an occupational exposure
- Confidentiality is maintained for all testing and reporting relating to occupational exposures
- All staff are aware of whom to contact for advice regarding occupational exposures
- Expert advice is available to all HCWs (including non-LHD, non-hospital based health staff or volunteers) 24 hours a day following a potential BBV occupational exposure to enable rapid assessment and, if needed, timely administration of prophylaxis
- All occupational exposures are reported to SafeWork NSW as required under the *Work Health and Safety Act* (s35 and 36) and *Work Health and Safety Regulation* (cl699) (Refer to SafeWork NSW Factsheet <http://www.safework.nsw.gov.au/media/publications/health-and-safety/when-to-notify-blood,-body-fluid-and-needlestick-exposure-incidents>)
- HCWs are able to obtain the support to which they are entitled, including access to an Employee Assistance Program or workers compensation if appropriate as documented in NSW Policy Directive *Employee Assistance Program* (PD2016_045)

- The local Public Health Unit is notified in the rare event that hepatitis B or hepatitis C is transmitted from a patient to a health care worker.

Health care workers must ensure that:

- All exposures to blood and body substances are reported as per local protocols.

IMPLEMENTATION

Sections 2 to 5 describe the procedures to be followed by health care workers and health facilities in the event that a health care worker is potentially exposed to a blood borne virus following an occupational exposure.

REVISION HISTORY

Version	Approved by	Amendment notes
May 2017 (PD2017_010)	Deputy Secretary, Population and Public Health	Formatting changes.
April 2017 (PD2017_009)	Deputy Secretary, Population and Public Health	HIV testing and post exposure prophylaxis recommendations have been updated. A requirement for health facilities to notify their local public health unit in the rare event of blood borne virus transmission to a health care worker has been added. Evidence relating to occupational transmission of BBV has been updated.
January 2005 (PD2005_311)	Director-General	Minor amendments.
June 2003 Circular 2003/839	Ministerial Advisory Committee on AIDS Strategy	Updates regarding to use of newer antiretroviral therapies.
1998 Circular 1998/11	Ministerial Advisory Committee on AIDS Strategy	New circular.

ATTACHMENTS

1. HIV, Hepatitis B and Hepatitis C – Management of Health Care Workers Potentially Exposed: Procedures.

HIV, Hepatitis B and Hepatitis C – Management of Health Care Workers Potentially Exposed



Issue date: May-2017

PD2017_010

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1 BACKGROUND

1.1 About this document

Human immunodeficiency virus (HIV), hepatitis B and hepatitis C may be transmitted by significant percutaneous or mucosal exposure to infective blood or other infective body substances. Occupational exposure is defined as an incident that occurs during the course of a person's employment and involves direct contact with blood or other body substances. Such exposures may put the person at risk of acquiring a blood borne virus infection.

Adherence to infection prevention and control practices as outlined in the current version of the NSW *Infection Control Policy* remains the first line of protection for health care workers (HCWs) against occupational exposure to HIV, hepatitis B and hepatitis C. The policy and guidelines for the NSW Health Service on prevention of sharps injuries are documented in the NSW Policy Directive *Sharps Injuries – Prevention in the NSW Public Health System* (PD2007_052). The current version of the NSW Policy Directive *Occupational Assessment, Screening and Vaccination Against Specified Infectious Diseases* mandates that health staff directly involved in patient care and/or the handling of human tissue, blood or body fluids complete the full course of hepatitis B vaccination and provide their post vaccination serology result.

This policy directive outlines the procedures that should be followed in the event of an occupational exposure including:

- The immediate care to be taken by the exposed HCW
- An assessment of the risk of blood borne virus transmission
- Management of the exposed HCW including blood borne virus testing and post exposure prophylaxis.

1.2 Key abbreviations and definitions

Appropriately skilled officer – means a medical practitioner or nurse with expertise in the assessment of the risk of blood borne virus transmission and the management of the exposed HCW following an occupational exposure

anti-HBs – antibody to hepatitis B surface antigen

BBV – blood borne virus. Refers to HIV, hepatitis B and hepatitis C viruses.

HBV – hepatitis B virus

HBIG – hepatitis B immunoglobulin

HBsAg – hepatitis B surface antigen

HCW – health care worker. Refers to all persons working in healthcare settings who have the potential for exposure to infectious/potentially infectious body fluids. This also includes non-LHD, non-hospital based health staff and volunteers.

HCV – hepatitis C virus

HIV – human immunodeficiency virus

PCR – polymerase chain reaction

PEP – post exposure prophylaxis

Source - person from whom blood or body fluids originated

Window period – refers to the time after a person has been exposed and is the maximum time it takes for a test to give an accurate result

1.3 Legal and legislative framework

Health Services have obligations under the *Work Health and Safety Act 2011* (NSW) and the *Public Health Act 2010* (NSW) and their associated regulations.

2 IMMEDIATE CARE OF THE EXPOSED HEALTH CARE WORKER

After exposure to blood or other body substances the exposed HCW should as soon as possible do the following:

- Wash the exposure site with soap and water
- Undertake appropriate care of any wound(s)
- If eyes are contaminated then rinse them, while they are open, gently but thoroughly with water or normal saline
- If blood or other body substances get in the mouth, spit them out and rinse the mouth with water several times
- If clothing is contaminated remove clothing and shower if necessary
- Inform their line manager so they can immediately be relieved from duty and notify the appropriately skilled officer who is designated to conduct an urgent risk assessment on potentially exposed staff (as per local reporting procedures) to ensure that necessary further action is undertaken.

Sections 2 to 5 outline the procedures to be followed by health care workers and health facilities following an occupational exposure. Refer to Appendix A for a summary of these procedures and Appendix B for a summary of recommended laboratory testing.

3 RISK ASSESSMENT OF THE EXPOSURE

In the event of an occupational exposure, appropriately skilled officer/s should conduct a risk assessment immediately. The first step in the risk assessment is to establish the type of injury (see Table 1). Following this, consideration should be given to the body fluid involved (see Table 2).

Table 1: Risk of transmission of blood borne viruses from an infectious bodily fluid, by injury type (based on UK guidelines¹)

Level of risk	Injury type
Higher risk injury	<ul style="list-style-type: none"> • Deep percutaneous injury • Visible blood on sharps • Needle used on source's blood vessels
Lower risk injury	<ul style="list-style-type: none"> • Superficial injury, exposure through broken skin, mucosal exposure (usually splashes to eye or mouth) • Old discarded sharps • No visible blood on sharps • Needle not used on blood vessels e.g. suturing, subcutaneous injection needles
Injury with no risk	<ul style="list-style-type: none"> • Skin not breached • Contact of body fluid with intact skin • Needle (or other sharp object) not used on a patient before injury

Table 2: Body fluids and risk for blood borne virus transmission (based on UK guidelines¹)

Level of risk	Body fluid
Infectious (good evidence of BBV transmission following occupational exposure)	<ul style="list-style-type: none"> • Blood • Visibly bloody body fluids
Potentially infectious (risk of BBV transmission following occupational exposure unknown)	<p>(In alphabetical order):</p> <ul style="list-style-type: none"> • Amniotic fluid • Cerebrospinal fluid • Human breast milk • Pericardial fluid • Peritoneal fluid • Pleural fluid • Saliva in association with dentistry (likely to be contaminated with blood even when not visibly so) • Semen • Synovial fluid • Tissue fluid from burns or skin lesions • Vaginal secretions
Not infectious (unless visibly blood stained)	<ul style="list-style-type: none"> • Nasal secretions • Saliva (non-dentistry associated) • Sputum • Stool • Sweat • Tears

	<ul style="list-style-type: none">• Urine• Vomit
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Where the exposed HCW is uncertain about actions to be taken, the Blood and Body Fluid Exposure Phonenumber (formerly the NSW Needlestick Hotline) may assist. The Blood and Body Fluid Exposure Phonenumber is an information, support and referral service for NSW based health care workers who sustain needlestick injuries and other blood/body fluid exposures during the course of their work. The line is answered by an on-call nurse 7 days a week from 7am to 11pm and can be contacted on free call 1800 804 823 within NSW. The Exposure Phonenumber is not a reporting or surveillance service.

4 MANAGEMENT OF EXPOSURES WITH NO RISK OF BLOOD BORNE VIRUS TRANSMISSION

Occupational exposures are not considered to have the potential for blood borne virus transmission if **either** the injury is classified as no risk (Table 1) **or** the body fluid is not infectious (Table 2). For such exposures, no further action with respect to the health worker is required other than an opportunistic assessment of his/her protection against hepatitis B in accordance with the current NSW Policy Directive *Occupational assessment, screening and vaccination against specified infectious diseases*. Post exposure prophylaxis (PEP) is not indicated and testing of the source patient is not required. Such workers should be advised that the potential side effects and toxicity of taking HIV PEP outweigh the negligible risk of transmission posed by this exposure regardless of the HIV status of the source patient. No HCV or HIV testing of the exposed HCW is required.

A risk assessment of the incident should be conducted and local documentation procedures should be followed after each potential exposure.

5 MANAGEMENT OF EXPOSURES WITH POTENTIAL FOR BLOOD BORNE VIRUS TRANSMISSION

An occupational exposure has the potential for blood borne virus (BBV) transmission if the injury carries a risk (see table 1) **and** the body fluid is infectious/potentially infectious (see table 2). Following all such exposures a risk assessment of the incident should be conducted.

5.1 Post exposure prophylaxis

Post exposure prophylaxis (PEP) is available following exposure to HIV and hepatitis B. It is recommended for all higher risk injuries involving an infectious/potentially infectious body fluid. It should be considered for lower risk injuries involving an infectious/potentially infectious body fluid (see Tables 1 and 2).

Greater efficacy is achieved the earlier prophylaxis is administered (ideally within 1-2 hours of exposure). The initiation of PEP should not be delayed while awaiting laboratory testing of either the source patient or the health care worker. The continuation of PEP should be reconsidered once laboratory results become available. Further information on

PEP is found in section 5.2.3 (for HIV) and 5.2.4 (for HBV). Prophylaxis can be commenced up to 72 hours post exposure.

5.2 Risk assessment of the source patient

Following occupational exposures that carry a risk of BBV transmission, officer/s conducting the risk assessment should seek information on the BBV status of the source patient as soon as is practicable.

If the blood borne virus status of the source patient at the time of the incident is unknown, the staff conducting the risk assessment should arrange for the source patient to be tested as soon as practicable for HIV, HBV and HCV infection (refer to Table 3). Results of source testing will better inform the exposed HCW about the risk of transmission and where PEP has been initiated, inform the need for continuation. Informed consent for testing must be obtained from the source patient. The exposed HCW should not approach the source patient for consent. If the patient does not provide consent, testing cannot occur. Consent should also be sought for the results of testing to be provided to the exposed HCW.

Occupational exposures occurring during autopsies should be managed as set out in section 5.2.2.

Note that testing of the source patient for HBV infection is not required if the exposed HCW has previous documented evidence of immunity to hepatitis B (anti-HBs level ≥ 10 mIU/mL at any time or HBcAb positive). Viral load should be measured for source patients who are known, or discovered, to be infected with HIV, HCV or HBV. The source should be offered immediate referral to a specialist service if a previously undiagnosed blood borne virus is detected.

Table 3: Recommended testing of source patient #

- Combined HIV antigen and antibody immunoassay (fourth generation HIV test)
- Hepatitis B surface antigen (not required if HCW has hepatitis B immunity)
- Hepatitis C antibody*

Viral load should be measured for source patients who are known, or discovered, to be infected with HIV, HCV or HBV

*Consider qualitative hepatitis C RNA testing if individual is at risk of hepatitis C infection as may be antibody negative in acute infection and remain negative for up to 12 months if immunocompromised.

Source potentially in the window period

If the source patient tests negative for BBV infection but reports a recent (within previous three months for HIV or six months for HBV and HCV) risk behaviour that places them at high risk for infection, he/she should be advised to seek medical attention if they develop signs and/or symptoms of primary infection. For their own health benefit, they should also be advised to undergo testing for that BBV six weeks and 12 weeks after the exposure. If the source is at risk of a recent hepatitis B or C infection final tests should be done at 24 weeks after exposure.

Follow up and documentation of source testing is not required by staff managing the occupational exposure as it will not influence the care of the exposed HCW (due to timing

of results). Until such time as infection can be excluded in the source, the exposed HCW should be managed as for exposure to a positive source.

The risk assessment of the source patient is outlined in Table 4.

Table 4: Risk assessment of source patient (based on UK guidelines¹)

Level of risk	Source
Higher risk source	<ul style="list-style-type: none"> • Known to be infected with one or more blood borne viruses (viral load and treatment status unknown) • Known to have a detectable viral load for one or more blood viruses • Unknown viral load but known to have advanced or untreated blood borne infection • Blood borne virus status unknown and known risk factors*
Lower risk source	<ul style="list-style-type: none"> • Infected with a blood borne virus but known to have a fully suppressed viral load • Unknown viral load but receiving long term antiviral treatment for blood borne virus with good adherence and known to be stable • Blood tests at/near to the time of the incident were negative for all three blood borne viruses but source reports ongoing risk factors for blood borne viruses • Blood borne virus status unknown but had no known risk factors for such viruses
Source with minimal or no risk	<ul style="list-style-type: none"> • Recent blood test that was negative for all three blood borne viruses and no recent risk behaviours reported

* Example of risk factor may include intravenous drug use, men who have sex with men, origin or unprotected sexual intercourse with a sexual partner from high prevalence area¹ for either HIV infection, or hepatitis B or hepatitis C.

5.2.1 Source negative for HIV, HBV and HCV

In the event that the source undergoes testing and is found to be negative for HIV, HBV and HCV and does not report recent behaviour that may place them at risk of a blood borne virus then no further action is required. PEP, if commenced, should be discontinued. If there is reason to suspect the self-reported risk history of the source may be unreliable or incomplete, the exposed HCW should be managed as per exposure to a positive source (refer to sections 5.2.3 to 5.2.5).

5.2.2 Source with unknown infectious status and source unable to be tested

If the status of the source is not known then the risk of the source being positive for HIV, HBV and HCV must be assessed from the available information relating to risk factors

¹ Countries with population prevalence over 1% are considered to have a high prevalence of HIV. High prevalence areas include the Caribbean, Sub-Saharan Africa, South East Asia and Papua New Guinea. For the HIV seroprevalence for individual countries go to <http://aidsinfo.unaids.org/>. Areas reporting high hepatitis C prevalence are sub-saharan Africa, North Africa and the Middle East, central, south and east Asia and Eastern Europe. Areas of high hepatitis B endemicity include most of East and Southeast Asia (except Japan), Pacific island groups, parts of central Asia and the Middle East, the Amazon Basin, and sub-Saharan Africa. Refer to the Travelers' Health section of the Centers of Disease Control and Prevention website for further detail.

known to be associated with BBVs (e.g. intravenous drug use, male homosexual sex and origin or sexual partner from a high prevalence area). If there is a risk of the source being infected with HIV, HBV or HCV then the exposed HCW should be managed as per exposure to a positive source (refer to sections 5.2.3 to 5.2.5).

5.2.3 Source positive or potentially positive for HIV

Risk of HIV transmission from positive source patient

The overall risk of acquiring HIV infection following occupational exposure to HIV is low. The average risk of HIV transmission (without prophylaxis) after a percutaneous exposure to HIV infected blood has been estimated to be 0.3% (95% confidence interval (CI): 0.2-0.5%).² The risk of seroconversion following mucous membrane exposure is estimated to be 0.09% (95 % CI: 0.006%-0.5%) and the risk following non-intact skin exposure is estimated to be even lower.²

A case control study conducted by the US Centers for Disease Control and Prevention showed that significant risk factors for HIV infection were deep injury (odds ratio (OR) = 15, 95% CI: 6.0-41), injury with a device that was visibly contaminated with the source patient's blood (OR= 6.2, 95% CI: 2.2-21), a procedure involving a needle placed in the source patient's artery or vein (OR =4.3, 95% CI 1.7-12), and exposure to a source patient who died of the acquired immunodeficiency syndrome within two months afterward (OR=5.6; 95 %CI: 2.0-16)³.

There have been no confirmed cases of HIV infection in a HCW following an occupational exposure in NSW since 1994 and nationally since 2002. Only one confirmed case of occupational HIV acquisition (involving a laboratory technician working with a live HIV culture) has been reported in the US since 1999⁴. There has only been one other case report of occupational HIV transmission in the developed world published since 2005. In this instance, a nurse acquired HIV following a needle stick injury from a patient (not previously known to have HIV) with a high viral load⁵. Due to delayed reporting of the incident, PEP was not given. Table 5 shows a summary of the occupational exposure registry reviews published in the international literature since 2005.

Table 5: Evidence of HIV transmission following occupational exposure

Country	Time period	No. of HCW exposures to HIV	No. HIV sero-conversions (rate)	Notes
Australia ⁶	2000-2003	13	0 (0%)	Includes percutaneous and mucous membrane exposures. All given PEP
Brazil ⁷	1997-2009	80	0 (0%)	Includes only percutaneous injuries. No information provided on PEP
Denmark ⁸	1999–2012	276	0 (0%)	Includes percutaneous and mucous membrane exposures. All given PEP
Germany ⁹	2010-2012	51	0 (0%)	Includes only percutaneous injuries. PEP (3 drugs, mean time to start 75 mins > exposure) given to 35/51 and for other 16 cases the source patient was known to have a viral load <20 copies/mL at time of incident.

Netherlands ¹⁰	2003-2010	60	0 (0%)	Includes only percutaneous injuries. No information provided on PEP
Thailand ¹¹	1996–2014	84	0 (0%)	Includes percutaneous, mucous membrane and non-intact skin exposures. All offered PEP, completed in 62/84 instances.
United Kingdom ¹²	2004-2013	1478	0 (0%)	Includes percutaneous, mucous membrane and non-intact skin exposures. 1135 (77%) given PEP.

Post exposure prophylaxis (PEP)

Based on evidence from animal models and what is known about primary HIV infection, there is a window of opportunity following exposure to HIV, during which antiviral medication may prevent infection. However, the evidence for efficacy of PEP in preventing HIV acquisition is limited^{13,14}. A small US case-control study of HIV seroconversion in HCWs after percutaneous exposure published in 1997 provided the first evidence in humans that PEP seemed to be protective against infection³. This study found that zidovudine PEP was associated with an 81% reduction in the odds of infection after adjustment for relevant exposure risk factors. There have been 24 reports of PEP failure following occupational needle stick exposures in the literature¹⁵. In over three quarters of these instances, zidovudine only was used; only six instances of PEP failure in the context of occupational needle stick injury have been reported with multi-drug regimens with three of these occurring after 1999. Factors that may have contributed to the failure of the combination drug PEP include drug resistance (in 3 cases the HCW was found to be infected with a strain resistant to the PEP regimen), exposure to a high HIV viral load and delayed initiation of PEP.^{16,17,18,19}

Multi-drug regimens are now prescribed to prevent HIV infection following exposure. However, there is no definitive evidence to support a two versus a three-drug regimen. Instead, the additional benefit of a third drug must be weighed against the cost and potential harms.

While newer HIV antiretrovirals are less toxic and better tolerated than the older HIV drugs, adverse effects still occur. In addition, serious drug interactions can occur when antiretroviral agents are used with certain other drugs. More commonly reported side effects include nausea, vomiting, diarrhoea and fatigue. Rare, but important side effects of tenofovir include acute renal failure and proximal renal tubulopathy (Fanconi's syndrome). There is a small risk of rhabdomyolysis with raltegravir.

The need for HIV PEP depends on an assessment of the risk of transmission and consideration of the potential adverse effects. Where possible, information concerning the source's stage of HIV infection, viral load, resistance testing and history of therapy and medication adherence should be ascertained so that the most appropriate therapy and counselling can be offered. While the evidence supports a significantly lower risk of HIV transmission following sexual exposure to a source with an undetectable viral load, such evidence does not exist for occupational exposures. While it is assumed there is also an extremely low risk of HIV transmission, it is still reasonable for a healthcare worker who has had a higher risk exposure to a source who is HIV positive but with an undetectable viral load to complete the course of PEP. The recommended PEP regimen

is outlined in Table 6. Refer to Appendix C for the antiretroviral drug regimens recommend by the Australasian Society of HIV Medicine.

Table 6: PEP recommendations following occupational exposure to HIV positive source

Injury type	Source viral load known to be undetectable	Source not on treatment or on treatment with detectable or unknown viral load
Needlestick injury or other sharps exposure	Consider 2 drugs	3 drugs
Mucous membrane or non-intact skin exposure	Consider 2 drugs	Consider 3 drugs

Any medical officer can prescribe a PEP starter pack (lasting 3 to 7 days). The recommended course of PEP is 28 days. A prescription for the remainder of the PEP course must be obtained from a clinician experienced in the administration of drugs for the treatment of HIV.

Where there is a risk that a woman may be pregnant, undertake a serum beta HCG urgently. If possible, contact an HIV experienced Infectious Disease or Sexual Health Physician before starting HIV prophylaxis for a woman who is pregnant or at risk of pregnancy. Where it is not immediately possible and the risk of contracting HIV appears to outweigh any potential risk for the pregnancy commence prophylaxis and advise making an appointment with an HIV experienced physician for the next working day. Truvada® and Combivir® are category B3 drugs which means that there is limited data relating to safety in pregnancy but no human evidence of harm.

Exposed HCW testing recommendations

It is recommended that 4th generation HIV antibody/antigen testing be conducted at 6 weeks. A negative test at 6 weeks is likely to exclude infection but the exposed HCW should be retested at 12 weeks to definitively exclude infection. HIV viral load tests have the capacity to detect early HIV infection before antibody development and should be considered following higher risk exposures to a higher risk source. Longer follow up with additional testing may also be indicated in complex cases (e.g. possibility of coinfection) as directed by an expert clinician.

Advice for the exposed HCW during follow up period

During the follow up period the exposed HCW should be advised:

- Not to donate plasma, blood, body tissue, breast milk or sperm
- To protect sexual partners by adopting safe sexual practices (use of condoms)
- To seek expert medical advice regarding pregnancy and/or breastfeeding
- To seek medical attention about any acute illness (i.e. fever, rash, myalgia, fatigue, malaise, lymphadenopathy, anorexia).

Modification to work practices (including avoidance of exposure prone procedures) is not required on the basis of an occupational HIV exposure.

5.2.4 Source positive or potentially positive for HBV

Susceptibility of the exposed HCW to HBV infection

In accordance with the current NSW Policy Directive *Occupational Assessment, Screening and Vaccination Against Specified Infectious Diseases* all staff who have direct contact with patients, deceased persons, blood, body substances or infectious material or surfaces/equipment that might contain these must complete a full course of hepatitis B vaccination and/or provide serological evidence of protection.

If the exposed HCW has a documented protective response (anti-HBs level ≥ 10 mIU/mL) at any time following completion of the vaccination course, then he/she is considered immune to hepatitis B and no further action (i.e. testing of the source patient or post exposure prophylaxis) is required regardless of the exposure. If the response to previous vaccination is unknown, the anti-HBs level of the exposed HCW should be determined as quickly as possible. If immunity status cannot be determined quickly then the HCW should be managed as a susceptible person until such time that evidence of immunity is available.

The following provisions relate only to those who are presumed susceptible to HBV infection (those with anti-HBs level < 10 mIU/mL and who are hepatitis core antibody negative).

Risk of HBV transmission from positive source patient

The probability of infection following exposure to a susceptible person depends on a number of factors including the volume and infectiousness of the body fluids and the route of the exposure. Occupational HBV transmission primarily occurs via percutaneous and mucosal exposure to blood. Of viral parameters, the risk of infection best correlates with viral load (HBV DNA) rather than hepatitis B serology. The presence of hepatitis B e antigen (HBeAg) is a surrogate marker for high viral load.

In studies of hepatitis B susceptible HCWs who sustained injuries from needles contaminated with blood containing HBV, the risk for developing clinical hepatitis if the blood was both HBsAg-positive and HBeAg-positive was 22%–31%, and the risk for developing serologic evidence of HBV infection was 37%–62%. By comparison, the risk for developing clinical hepatitis from a needle contaminated with HBsAg-positive, HBeAg-negative blood was 1%–6%, and the risk for developing serologic evidence of HBV infection was 23%–37%.¹⁷

Post exposure prophylaxis (PEP)

Where indicated (see Section 5.1) HBV post exposure prophylaxis with hepatitis B immunoglobulin and vaccine should be offered to non-immune and non-infected individuals in accordance with the recommendations in the current edition of the Australian Immunisation Handbook (refer to Appendix D). Requests for hepatitis B immunoglobulin should be directed to the local hospital blood bank.

Source testing recommendations

If a source is known or found to be HBsAg positive, then HBeAg and quantitative HBV DNA testing of the source patient should be performed, with the consent of the source, so that the exposed HCW can be counselled appropriately about the risk of transmission.

Exposed HCW testing recommendations

The exposed susceptible HCW should undergo HBsAg testing at 6 weeks, 12 weeks and 24 weeks. In the rare event that an exposed HCW is newly diagnosed with HBV infection, the local Public Health Unit should be notified. Post-vaccination serological testing is recommended 4 to 8 weeks after completion of the vaccination course.

Advice for the exposed HCW during follow up period

During the follow up period the exposed HCW should be advised:

- Not to donate plasma, blood, body tissue, breast milk or sperm
- To seek medical attention if they develop signs and/or symptoms of acute hepatitis (i.e. anorexia, vague abdominal discomfort, nausea and vomiting, fatigue and/or jaundice)

The exposed HCW is not required to modify sexual practices provided that HBV PEP has been administered on time. Ideally the HCW should refrain from becoming pregnant until completion of the vaccination course. There are no restrictions regarding breastfeeding. Modifications to work practices (including avoidance of exposure prone procedures) are not required on the basis of an occupational HBV exposure.

5.2.5 Source positive or potentially positive for HCV

Risk of HCV transmission from positive source patient

Overall, the risk of HCV transmission following an occupational exposure is low. The probability of infection following exposure depends on a number of factors including the volume and infectiousness of the body fluids and the route of the exposure. The average incidence of anti-HCV seroconversion after accidental percutaneous exposure from a HCV-positive source is estimated at 1.8% (range 0-7%)²⁰. The risk of transmission increases significantly if the source has a high viral load. A review of the recent published evidence of HCV transmission following occupational exposures is summarised in Table 7.

A case control study on the risk factors for HCV transmission in HCW based on UK data collected from 1997 to 2007, found that all HCV seroconversions followed percutaneous injuries²¹. As had been previously shown²², the depth of injury was significantly associated with seroconversion and the majority of exposures involved hollow bore needles from a vein or artery contaminated with blood or blood stained fluid. Transmission rarely occurs from mucous membrane exposures to infective blood and there are only two published reports to date of HCV transmission to a HCW via non-intact skin exposure^{23,24}.

Post exposure prophylaxis (PEP)

Currently, there is no vaccination or post exposure prophylaxis that is effective in the prevention of hepatitis C transmission. However, treatment of acute hepatitis C infection is now highly effective. Early identification of infection is necessary to enable prompt referral and treatment.

Table 7: Evidence of HCV transmission following occupational exposures

Country	Time period	Number of exposures involving HCW and HCV positive source	Number of HCV seroconversions	Rate
Australia ⁶	2000-2003	64 #	0	0%
Austria ²¹	1995-2009	150*	0	0%
Brazil ⁷	1997-2009	38#	2	5%
Denmark ²²	2003-2012	62	0	0%
Germany ⁹	2010-2012	44*	1	2.3%
Italy ²³	2004-2006	26	0	0%
Korea ²⁴	2004 -2008	327	3	0.9%
Netherlands ¹⁰	2003-2010	53	1	1.9%
United Kingdom ¹²	2004-2013	2566	9	0.4%

*All percutaneous injuries with source known to be HCV PCR positive

#All percutaneous injuries involving large bore catheter needles

Source testing recommendations

If the source is known or found to be HCV antibody positive, then quantitative hepatitis C RNA testing of the source patient should be performed with the consent of the source, so that the exposed HCW can be counselled appropriately about the risk of transmission.

Exposed HCW testing recommendations

The exposed HCW should undergo qualitative HCV PCR testing at 6 weeks and HCV antibody testing at 6 weeks and 12 weeks. If results are negative at that time the HCW can be advised that the risk of transmission is negligible but an antibody test at 24 weeks post exposure should still be undertaken to confirm that transmission has not occurred. Given its low specificity, liver function testing is not recommended. In the rare event that an exposed HCW is newly diagnosed with HCV infection, the local PHU should be notified.

Advice for the exposed HCW during follow up period

During the follow up period the exposed HCW should be advised:

- not to donate plasma, blood, body tissue or sperm
- to seek medical attention if they develop signs and/or symptoms of acute hepatitis (i.e. anorexia, vague abdominal discomfort, nausea and vomiting, fatigue and/or jaundice)

The exposed HCW is not required to modify sexual practices. In most circumstances the HCW should refrain from becoming pregnant until HCV infection is excluded. There are no restrictions regarding breastfeeding. Modifications to work practices (including avoidance of exposure prone procedures) are not required on the basis of an occupational HCV exposure.

5.3 Testing of the exposed HCW

The exposed HCW should have baseline testing for HIV, HBV and HCV infections as detailed in Table 8. If the exposed HCW is known to be infected with one or more of these BBVs, then baseline testing for those BBVs is not required. Note that a HCW with previous HCV infection who has been successfully treated or who has cleared the virus spontaneously remains susceptible to HCV re-infection.

Informed consent must be obtained before testing can proceed. The exposed HCW needs to be informed that baseline testing:

- Determines whether they were infected before the exposure and can be done up to a few days after the exposure (there is no need for after-hours testing)
- Does not have to be done at the workplace. The HCW can seek testing at their GP or other offsite service but the reason for the test (i.e. following occupational exposure) should be documented.
- Although not urgent, is important in case of a worker’s compensation claim in the rare event of seroconversion

If the HCW is not immune and not previously vaccinated against HBV, or not currently infected with HBV, then he/she should be vaccinated as outlined in The Australian Immunisation Handbook and in accordance with the current NSW Policy Directive *Occupational assessment, screening and vaccination against specified infectious diseases*.

The HCW should be offered immediate referral to a specialist service if a previously undiagnosed blood borne virus is detected. Refer to current version of the NSW Policy Directive *HIV, Hepatitis B or Hepatitis C – Health Care Workers Infected*. Immediate consultation with a HIV specialist is required in the event that the exposed HCW who had commenced HIV PEP is found to be HIV positive on baseline testing.

All occupational exposure incidents should be documented according to local procedures.

Table 8: Baseline testing of the HCW

HCW hepatitis B status unknown	HCW previously shown to be hepatitis B immune
<ul style="list-style-type: none"> • Hepatitis B surface antigen, hepatitis B surface antibody, hepatitis B core antibody • Combined HIV antigen and antibody immunoassay (fourth generation HIV test) • Hepatitis C antibody 	<ul style="list-style-type: none"> • Combined HIV antigen and antibody immunoassay (fourth generation HIV test) • Hepatitis C antibody

5.4 Special situation: when a patient is exposed to the blood or body fluids of a HCW

In some instances, when a HCW is exposed to potentially infectious fluids from a patient, there is also exposure of the patient to the HCW’s blood. For example, this might occur if the HCW experiences a used sharps injury and blood from the sharps injury comes into contact with the patient’s open wound or mucous membrane. In this situation, in addition

to the risk of BBV transmission to the HCW, there is also a potential risk of BBV transmission from the HCW to the patient. In such circumstances, the HCW should be managed as per Sections 2 to 5 as a potential source for the patient. The patient and their treating medical team must be informed of the incident as soon as possible after the exposure. Injuries to patients must be reported in the Incident Information Management System.

The Australian National Guidelines for the Management of Health Care Workers Known to be infected with Blood Borne Viruses minimize the risk that a patient will be exposed to the blood of an infected health care worker. In the event of an occupational exposure incident involving a HCW known to be infected with a BBV, refer to the NSW Policy Directive, *HIV, Hepatitis B or Hepatitis C – Health Care Workers Infected*.

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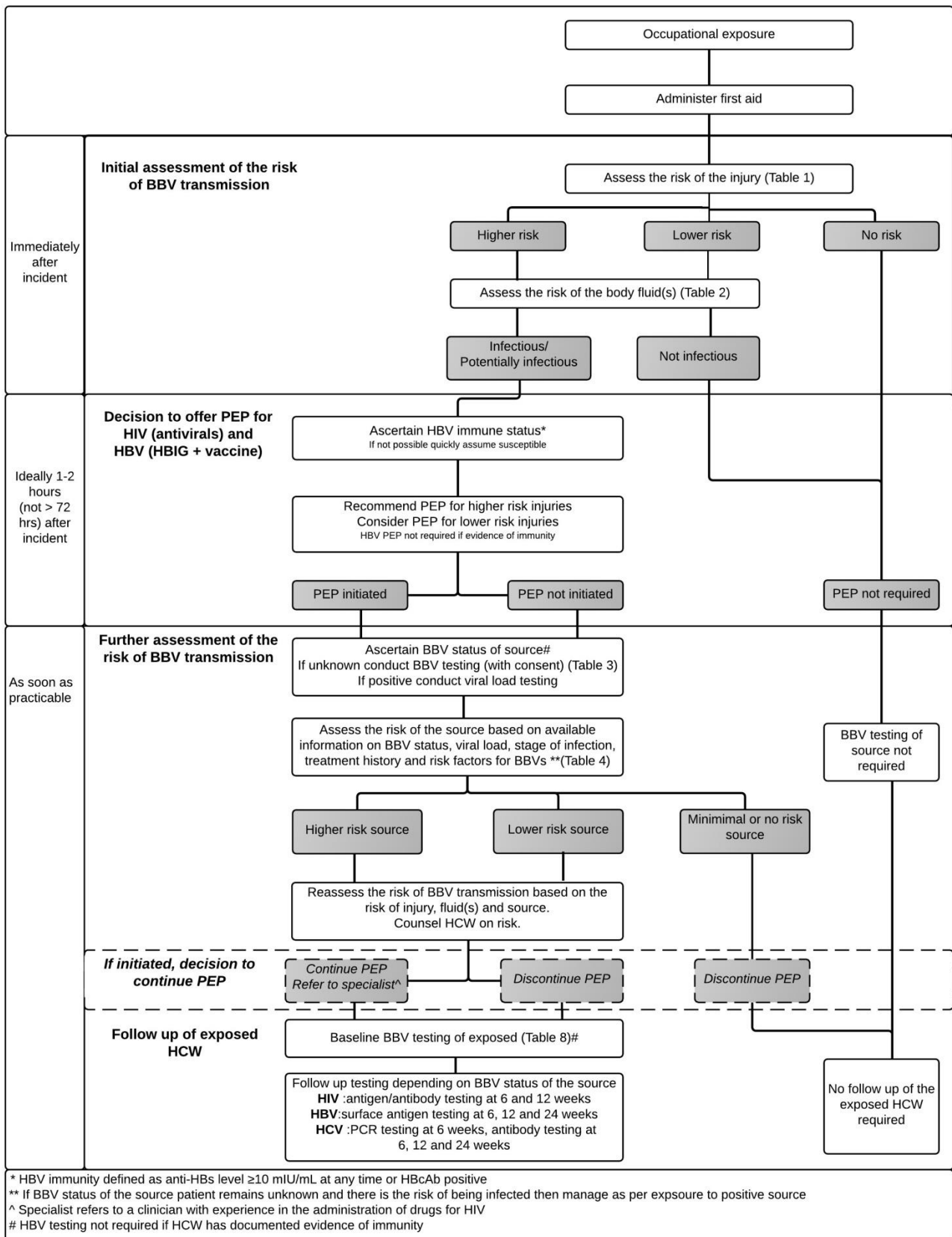
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APPENDIX A: MANAGEMENT OF THE EXPOSED HCW FOLLOWING AN OCCUPATIONAL EXPOSURE



APPENDIX B: RECOMMENDED LABORATORY TESTING FOR THE EXPOSED HCW

BBV status of the source patient [#]	Time (in weeks) following BBV exposure		
	6 weeks	12 weeks	24 weeks
HIV positive	Combined HIV antigen and antibody (fourth generation HIV immunoassay)	Combined HIV antigen and antibody (fourth generation HIV immunoassay)	
HBV positive*	Hepatitis B surface antigen	Hepatitis B surface antigen	Hepatitis B surface antigen
HCV positive	Hepatitis C antibody, qualitative HCV PCR	Hepatitis C antibody	Hepatitis C antibody

[#] If BBV testing of the source patient at the time of the incident is negative but there is the possibility of being in the window period or BBV status of the source is unknown and there is a risk of being infected then follow up as per positive source.

* If the HCW is immune (i.e. anti-HBs level ≥ 10 mIU/mL or HBcAb positive) no further HBV testing is required regardless of the exposure or status of the source patient.

APPENDIX C: HIV PEP RECOMMENDATIONS

HIV PEP starter packs may vary between facilities. The Australasian Society for HIV Medicine (ASHM) recommendations are provided here.

Recommendations for PEP following occupational exposure to HIV²

2-drug regimens*

Tenofovir 300mg with lamivudine 300mg (daily) *(TGA approved generic lamivudine may be used to reduce cost)

OR

Tenofovir disoproxil fumarate/emtricitabine 300mg/200mg (daily)

* Zidovudine, in combination with lamivudine, can be used in two-drug PEP combinations. The benefits of cheaper zidovudine cost are offset by the need for a twice-daily treatment regimen, higher incidences of gastrointestinal side effects, myalgia and headaches in comparison to the recommended regimens.

3-drug regimens

The preferred 2 drug-regimen PLUS

dolutegravir 50mg (daily)

OR

raltegravir 400mg (bd)

OR

rilpivirine 25mg (daily with food)

Note: Refer to *Post Exposure Prophylaxis after Non-Occupational and Occupational Exposures: Australian National Guidelines 2nd Edition* for cautions in relation to specific antiretroviral medications

² Taken from the *Post Exposure Prophylaxis after Non-Occupational and Occupational Exposures: Australian National Guidelines 2nd Edition*

APPENDIX D HEPATITIS B PEP RECOMMENDATIONS

Management of non-immune HCWs following occupational exposure to a positive/likely positive HBsAg source³

Type of exposure	Hepatitis B Immunoglobulin	Vaccine
Percutaneous, ocular or mucous membrane	Single dose of 400IU by IM injection within 72 hours of exposure	1ml recombinant antigen by IM injection within 7 days* of exposure, repeated at 1 month and again 6 months post first 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.

³ Taken from the Australian Immunisation Handbook, 10th Edition