AUSTRALIAN NATIONAL GUIDELINES FOR THE MANAGEMENT OF HEALTH CARE WORKERS KNOWN TO BE INFECTED WITH BLOOD-BORNE VIRUSES.
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Acronyms

BBV Blood-borne virus
CDNA Communicable Diseases Network Australia
DNA Deoxyribonucleic acid
EAC Expert Advisory Committee
EPP Exposure-prone procedure
HBeAg Hepatitis B e Antigen
HBsAg Hepatitis B surface Antigen
HBV Hepatitis B virus
HCV Hepatitis C virus
HCF Health care facility
HCW Health care worker: persons, including students, trainees and voluntary workers who undertake procedures in public and/or private health care settings, that normally involve patient care and/or contact with blood or other body fluids
HIV Human immunodeficiency virus
PCR Polymerase chain reaction
RNA Ribonucleic acid
Executive Summary

Guiding principles

Health care workers (HCWs) are expected to protect the health and safety of their patients. This obligation includes preventing transmission of blood-borne viruses (BBVs) from themselves to their patients. All HCWs should have access to regular confidential testing and appropriate treatment and management for BBVs, and HCWs who perform exposure-prone procedures (EPPs) should be encouraged and supported to undergo regular testing for BBVs. While the protection of the public’s health is paramount, employers of HCWs must also consider, and comply with, relevant anti-discrimination, privacy, industrial relations and equal employment opportunity legislation.

Prevention and detection

All HCWs should be vaccinated against hepatitis B virus (HBV) if they have no documented evidence of pre-existing immunity (from natural infection or prior vaccination) and ensure they are assessed for immunity post-vaccination. HCWs should be encouraged to undergo testing for BBVs, knowing that they will be given support if they have a positive test. New trainees, who embark on training in a discipline which includes EPPs, should be tested for BBVs at entry, and counselled about career options if they have a positive test. HCWs who perform EPPs should know their BBV status and be encouraged and supported to undergo regular testing. Annual testing is considered to be appropriate in most cases, with immediate retesting and follow-up care after a potential occupational or non-occupational exposure. The health care system should have an effective infection control strategy and provide a safe working environment that minimizes the risk of a sharps injury or exposure to body fluids, secretions and excretions and prevents the transmission of infections from person to person within the health care setting. All HCWs should be tested for all BBVs following such an event, and managed appropriately.

Management

- All HCWs infected with a BBV should remain under regular medical supervision.
- HCWs must not perform EPPs if they are human immunodeficiency virus (HIV) antibody positive.
- HCWs must not perform EPPs while they are hepatitis C virus (HCV) RNA positive, but may be permitted to return to EPPs after successful treatment or following spontaneous clearing of HCV RNA.
- HCWs must not perform EPPs while they are HBV DNA positive, but may be permitted to return to EPPs following spontaneous clearing of HBV DNA or clearing of HBV DNA in response to treatment.

The scope of restrictions on practice of HCWs infected with a BBV will depend on the likelihood that an EPP will form part of the duties of the field of work undertaken.
At the time of diagnosis of a BBV, a HCW has a professional obligation to seek advice about personal care and work practices. Employers must ensure that the rights of infected HCWs are safeguarded.

All jurisdictions should have policies for managing HCWs infected with a BBV. The Director of the Communicable Disease Control Directorate, or equivalent delegated authority, should be consulted for information on current policies. If there is an incident, or a dispute between the HCW and health care facility (HCF), an Expert Advisory Committee (EAC) or equivalent should be formed to review the HCW’s practice and advise on lookbacks. Lookback investigation will depend on the results of a full risk investigation following disclosure of a diagnosis of a BBV in a HCW who has undertaken EPPs. The duration of the lookback should be decided on a case-by-case basis. Disclosure of the infection status of an individual HCW to a patient should not be necessary, and confidentiality should be maintained as far as possible, even when the HCW has died.
Introduction

The existing national guidelines for the management of Health Care Workers (HCWs) known to be infected with BBVs were endorsed by the Communicable Diseases Network of Australia (CDNA) in 2005\(^1\). In July 2008, the decision was made by CDNA to review the national guidelines focusing on both the management of the worker and the need for, and extent of, any lookback investigation. Western Australia (WA) undertook to lead the revision, and a technical steering group (see Appendix 4) was created to provide expert technical and scientific assistance. The document was circulated to a wider audience for feedback during its preparation.

The majority of procedures in the health care setting pose minimal risk of transmission of BBVs from an infected HCW to a patient, provided that appropriate prevention and infection control precautions are practised. However, there are certain procedures during which BBVs are significantly more likely to be transmitted. These are referred to as exposure prone procedures (EPPs). During EPPs, it is possible that injury to the HCW could result in the worker’s blood contaminating the patient’s open tissues. Under these circumstances, transmission of BBVs is possible. For this reason, HCWs known to be infected with a BBV, who are considered to present a significant risk of virus transmission, must not perform EPPs.

These guidelines provide advice on best practice. It should be noted that the current evidence-base is limited and the guidelines are based upon the best available evidence at the time of completion, placing scientific knowledge about transmission into a risk management approach. In particular, there is a dearth of evidence on transmission risks through occupational exposures since the introduction of effective antiviral treatment regimens for the BBVs. This area will be monitored closely, and changes made if indicated as evidence becomes available.

Evidence for human immunodeficiency virus (HIV) transmission risk

In 1992, a dental practitioner in Florida was found to have infected 5 of his patients. In total, approximately 1,100 patients were tested, and 8 were found to be HIV positive. Five of these patients had HIV viral nucleotide sequencing very similar to those of the dentist’s virus and were considered to have acquired their infection from him\(^2\). Since then, there have been three further reports of probable transmissions of HIV to patients from infected HCWs performing EPPs in the 1990s\(^2\)\(^-\)\(^5\). In the latter three lookback exercises, a total of 3,527 patients were tested and three were found to be HIV positive, with infection from the HCW thought to be likely. This gives an average infection risk of 0.09\(^%\)\(^6\). In the United Kingdom between 1988 and 2003, 28 patient notification exercises were conducted in which more than 7,000 patients were tested and in Israel in 2007, 545 patients operated on by an HIV-infected cardiothoracic surgeon were tested. There was no detectable transmission in any of these exercises\(^7\)\(^,\)\(^8\).
These data support the conclusion that the overall risk of transmission of HIV from infected HCWs is very low, in the order of 2.4 to 24 per million procedures\textsuperscript{9}. Plasma HIV RNA or viral load is known to be the critical risk factor in HIV transmission risk and treatment-associated reduction reduces this risk to a very substantial extent in sexual and mother to child transmission\textsuperscript{10,11}. In the era of effective antiretroviral therapy, almost all individuals are able to achieve undetectable plasma HIV RNA on treatment which is both recommended and widely available in Australia.

The risk of transmission of HIV after sharps injury to a HCW from a HIV positive source patient has been calculated to be 0.3\%\textsuperscript{12-21,46-48}.

**Evidence for hepatitis C virus (HCV) transmission risk**

There are no published reports of HCW to patient transmission of HCV prior to 1995. Since then, lookback exercises have been reported in the literature in connection with 13 HCWs\textsuperscript{22-32}. All of these studies undertook genetic sequencing of virus in HCW and infected patients. The risk of transmission varied from 0 to 2.25\%, suggesting that transmission is highly variable and heterogeneous. Risk factors for transmission include likelihood of a percutaneous injury, active liver disease and high levels of viraemia in the surgeon\textsuperscript{24}, the number and complexity of surgical procedures performed and the surgeon’s technique and experience\textsuperscript{33}.

The risk of transmission of HCV after sharps injury to a HCW from a HCV positive source patient has been calculated to be 1.8\% (range 0-7\%)\textsuperscript{34}.

**Evidence for hepatitis B virus (HBV) transmission risk**

Worldwide there have been 12 published reports of lookback exercises since 1991\textsuperscript{35-41} in which there was evidence of transmission of HBV from an infected HCW to patients. A total of 3,079 patients were tested, and 91 HBV positives were considered to be confirmed, probable or possible results of acquisition of disease from the HCW. This gives an average risk of 2.96\%\textsuperscript{6}. To date, all reported cases of transmission have occurred at levels >10\textsuperscript{5} geq/ml (>2x10\textsuperscript{4} IU/ml)\textsuperscript{42}, except for one questionable case at a level of 4x10\textsuperscript{4} geq/ml (8x10\textsuperscript{3} IU/ml)\textsuperscript{43}. Transmission of HBV from HCWs with low levels of HBV DNA has yet to be documented but may occur\textsuperscript{42}.

The risk of transmission of HBV after sharps injury to a HCW from a HBV positive source patient has been calculated to be at least 6-30\% in non-immune recipients, with higher rates if the source patient is HBeAg positive\textsuperscript{35-41}.

The current UK Guidelines allow HCW to perform EPP if the HBV DNA levels are below 10\textsuperscript{3} geq/ml (200 IU/ml), provided there is close monitoring of the situation\textsuperscript{7,44}. Because of the known fluctuation in HBV DNA levels and the consequent potential for transmission, the working group developing these Australian National Guidelines agreed that HCWs must not perform EPP while HBV DNA is detectable.
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<th>Recommendation</th>
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<tr>
<td><strong>Guiding principles</strong></td>
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<tr>
<td><strong>1.</strong> HCWs have the same right to access confidential testing, counselling and treatment as the general population and a confidential advisory service on BBVs should be available to all HCWs.</td>
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<td><strong>2.</strong> A HCW known to be infected with a BBV may require supervision of, and support for, their professional activity in relation to: EPP; any physical or psychological impairment; and opportunities for re-training.</td>
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<tr>
<td><strong>3.</strong> All patients and HCWs have the right to protection from health care acquired infections, including exposure to risk of BBV transmission via nosocomial sharps injury and/or exposure to body fluids, secretions and excretions. All HCWs should have access to timely testing, counselling and treatment if such an event occurs.</td>
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<td><strong>4.</strong> All HCWs, including trainee and student HCWs, involved in EPPs have a professional and ethical responsibility to be voluntarily tested annually for BBVs, and immediately after potential acute exposure associated with a risk of disease acquisition.</td>
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<td><strong>5.</strong> While the protection of public health is paramount, employers of HCWs must also consider relevant anti-discrimination, privacy, industrial relations and equal employment opportunity legislation in discharging their duty of care to both clients and staff. Employers must ensure that the status and rights of infected HCWs as employees are safeguarded.</td>
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<tr>
<td><strong>Prevention and detection</strong></td>
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<tr>
<td><strong>6.</strong> All HCWs and student HCWs should be vaccinated against HBV at the commencement of employment or studies if they have no documented evidence of pre-existing immunity (from natural infection or prior vaccination).</td>
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<td><strong>7.</strong> Dental trainees, on entry to undergraduate dentistry, are required to undergo testing for BBVs. If found to be positive for one or more BBVs, they must not proceed with their dental studies.</td>
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<td><strong>8.</strong> New trainees, including those trained elsewhere, who embark on training in a health care discipline where they may be required to undertake EPPs, should be required by the educational facility/employer to be tested for BBVs at or before entry. The follow up of test results is the responsibility of the medical practitioner who conducts the test. HCWs should be medically assessed and counselled on career options where they are found to be potentially infectious.</td>
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<tr>
<td><strong>9.</strong> HCWs who perform EPPs should be encouraged to be tested for BBVs in the knowledge that appropriate support is available to those who test positive for a BBV, through registered health professional training organisations or employers, where applicable.</td>
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| **10.** HCWs performing EPPs should be encouraged to be tested for BBVs at least annually, with more frequent testing to be performed if the HCW has been exposed to an increased risk of infection, whether
occupational or non-occupational. HCWs have the option of arranging
testing with a practitioner of their choice.

11. All HCWs should be tested for BBVs following a sharps injury and/or
exposure to body fluids, secretions and excretions, and managed
appropriately.

12. HCWs who perform EPPs, and any HCW considered to be at risk for
whatever reason, should have easily accessible and confidential testing
for BBVs, and counseling.

13. The health care system should support the HCW who is known to be
infected by a BBV by providing a work environment that minimizes the
risk of cross-infection or acquisition of other BBVs, including
appropriate training, infrastructure, infection control measures and
equipment. HCWs should understand their obligation to report their
BBV status if required under jurisdictional legislation, and should be
informed of relevant policies. They should understand their obligation to
report all sharps injuries, whether or not there was a risk of patient
exposure. Comprehensive reporting is required to enhance surveillance
of possible BBV transmission.

Management

14. All HCWs with BBV infection should be encouraged to be under the
regular care of specialist infectious diseases physician or similar.

15. HCWs must not perform EPPs if they are HIV antibody positive even if
virus levels become undetectable on appropriately monitored anti-
retroviral therapy.

16. HCWs who are known to be HIV-positive and who do not perform
EPPs may continue to provide clinical care to patients.

17. HCWs must not perform EPPs if they are known to be HCV RNA
positive (by PCR or similar test). If an HCV infected HCW undergoes
successful treatment, as indicated by two negative HCV RNA tests
using different assays at least six months after completion of treatment,
he/she may be considered to be non-infectious and can perform EPPs
if the advice from the treating clinician is that the likelihood of relapse is
very low. However, further HCV RNA testing should be performed 6
months later and then yearly thereafter for the duration of their career,
as a component of the recommended annual testing for BBVs for all
HCWs performing EPPs.

18. HCWs must not perform EPPs if they are known to be HBV DNA
positive using an approved PCR assay.

19. An HBsAg positive HCW on suppressive antiviral therapy can only
practise EPPs if HBV DNA undetectable (using an approved sensitive
real-time PCR assay), with regular 3 monthly testing overseen by a
specialist and HBV DNA consistently undetectable.

20. An HBsAg positive HCW who is treated and becomes HBsAg
undetectable on two consecutive occasions at least 3 months apart,
and becomes HBV DNA undetectable, can practise EPPs but needs
annual testing thereafter. With recently available treatments, the loss of
surface antigen is considered to be a complete response to HBV
therapy, with reliable suppression of infection. An HBsAg positive HCW who is treated but remains HBsAg positive
(but HBV DNA undetectable) may be permitted to practice EPPs
provided there is regular 3 monthly testing overseen by a specialist and HBV DNA remains undetectable.

21. Restrictions on working practices of HCWs known to be infected with BBVs should be based on the likelihood that an EPP will form part of the duties of the field of work undertaken and an individual assessment of practice (see Appendix 1).

22. HCWs have a professional obligation, on learning that they are infected with a BBV, to seek formal advice about personal care (e.g. if certain skin conditions present), monitoring and work practices from a medical practitioner with appropriate expertise.

23. All states and territories should have policies that are consistent with the national guidelines for the management of HCWs known to be infected with BBVs.

24. Jurisdictions should form an Expert Advisory Committee (EAC), or its equivalent, if an incident occurs involving an infected HCW who has conducted EPP while infectious or in other specific situations where expert advice is required. The local department of health, through its Communicable Disease Control Directorate or equivalent, should be responsible for convening the EAC. The EAC should have expertise in public health and relevant clinical areas including prevention and infection control and legal policy. The EAC or equivalent would take on the responsibility of reviewing the HCW’s practices and advising on lookbacks in the event of an incident.

25. If a patient presents with an acute BBV infection following an EPP, and the origin of the infection is unclear, the need for a full risk assessment should be decided in consultation with the Director of the jurisdictional Disease Control directorate. This should include an investigation into the circumstances of the transmission including possible system failures (faulty equipment, poor HCW training or supervision), HCW factors (inexperience, poor judgement), and patient factors.

26. A lookback should be considered in all cases where a HCW who is performing EPPs is found to be infected with a BBV. These cases should be assessed on a case-by-case basis. In the absence of known transmission to a patient, a lookback should generally be conducted for all patients who have undergone category 3 procedures (see Table 1) by an infected HCW unless a comprehensive risk assessment identifies a negligible risk. Those who underwent category 1 or 2 procedures (see Table 1) should only be notified if other considerations suggest they are at increased risk.

Relevant considerations include:
1. Suspected transmission of a BBV from the HCW to patient(s)
2. Evidence of poor infection prevention and control practice at the facility during the time the HCW was probably infectious with the BBV
3. Evidence of physical or mental impairment which could affect the HCW’s standard of practice
4. Other relevant HCW medical conditions, e.g. skin diseases such as weeping eczema
5. The employment history of the HCW
6. Any evidence that the HCW has not followed recommended infection control practices
7. Any reported episodes of high risk exposures, e.g. sharps injuries

27. The scope of the lookback consists of contacting the patients, offering a pre-test discussion and encouraging testing for the relevant virus(es). The decision on how far back patient notification should go should be determined on a case by case basis.

28. The disclosure of the identity of a HCW to a patient should not be necessary and the right to confidentiality of the HCW should be respected, even if the infected HCW has died or has already been identified publicly.

§ For the purposes of these guidelines, HCW includes trainee and student HCWs.

‡Risk assessment includes the type of EPP, the standard of practice of the HCW and the general health of the HCW, including whether he/she had a medical condition such as weeping eczema.

§Evidence on transmission risks through occupational exposures since the introduction of effective antiviral treatment regimens for the BBVs will be monitored closely, and changes made if indicated as more information becomes available.

Appendix 1

Definitions

Exposure-prone procedure: an exposure-prone procedure (EPP) is a procedure where there is a risk of injury to the HCW resulting in exposure of the patient’s open tissues to the blood of the worker. These procedures include those where the worker’s hands (whether gloved or not) may be in contact with sharp instruments, needle tips or sharp tissues (spicules of bone or teeth) inside a patient’s open body cavity, wound or confined anatomical space where the hands or fingertips may not be completely visible at all times.

Where a lookback is being considered, the nature of the EPP performed by the HCW can be categorized according to level of risk of transmission, in increasing order of magnitude:

Table 1: Categories of EPPs by risk of transmission

<table>
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<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>Category 1</td>
<td>A procedure where the hands and fingertips of the HCW are usually visible and outside the body most of the time and the possibility of injury to the worker’s gloved hands from sharp instruments and/or tissues is slight. This means that the risk of the HCW bleeding into a patient’s open tissues should be remote, e.g. insertion of a chest drain.</td>
</tr>
<tr>
<td>Category 2</td>
<td>A procedure where the finger tips may not be visible at all</td>
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times but injury to the HCW’s gloved hands from sharp instruments and/or tissues is unlikely. If injury occurs it is likely to be noticed and acted upon quickly to avoid the HCW’s blood contaminating a patient’s open tissues, e.g. appendicectomy.

| Category 3 | A procedure where the fingertips are out of sight for a significant part of the procedure, or during certain critical stages, and in which there is a distinct risk of injury to the HCW’s gloved hands from sharp instruments and/or tissues. In such circumstances it is possible that exposure of the patient’s open tissues to the HCW’s blood may go unnoticed or would not be noticed immediately, e.g. suturing of an episiotomy |

**Lookback**: lookback refers to the process of identifying, tracing, recalling, counselling and testing patients or HCWs who may have been exposed to an infection in a health care setting.

**Sharps injury**: any piercing wound.
Appendix 2
The information below is based on the 2005 UK document: ‘HIV Infected Health Care Workers: Guidance on Management and Patient Notification’. This list is intended to provide a guide only and does not cover all eventualities. Moreover, it is recognised that variations in practice may exist in Australia, and may change over time. It is therefore recommended that the over-arching EPP definition given in Appendix 1 be used as the primary guidance when deciding whether a particular practice is exposure-prone or not.

Examples of advice on Exposure Prone Procedures (EPPs)

Anaesthetics
Procedures performed purely percutaneously are not exposure-prone, nor have endotracheal intubation nor the use of a laryngeal mask been considered so. The only procedures currently performed by anaesthetists that would constitute EPPs are:

- the placement of portacaths (very rarely done) which involves excavating a small pouch under the skin and may sometimes require manoeuvres which are not under direct vision;
- the insertion of chest drains in trauma cases such as patients with multiple rib fractures (refer to Trauma section).

Modern techniques for skin tunnelling involve wire guided techniques and putting steel or plastic trochars from the entry site to the exit site where they are retrieved in full vision. Therefore skin tunnelling is no longer considered to be exposure-prone (see also Arterial cutdown).

Arterial Cutdown
Although the use of more percutaneous techniques has made arterial or venous cutdown to obtain access to blood vessels an unusual procedure, it may still be used in rare cases. However, as the operator’s hands are always visible, it should not be considered exposure-prone.

Biting
Staff working in areas posing a significant risk of biting should not be treated as performing EPPs. Published literature on this subject is very scarce. In follow-up studies of incidents involving infected health care workers working with patients known to be ‘regular and predictable’ biters in the UK, there were no documented cases of transmission from the health care worker to the biter.

However, where biters were infected, there were documented cases of seroconversion in their victims and the risk of infection was increased in the presence of:

- Blood in the oral cavity – risk proportionate to the volume of blood;
- Broken skin due to the bite;
- Bite associated with previous injury i.e. non-intact skin;
- Biter deficient in anti-HIV salivary elements (IgA deficient).
Based on the available information, it can only be tentatively concluded that even though there is a theoretical risk of transmission of a blood borne virus from an infected health care worker to a biting patient, the risk remains negligible. The lack of information may suggest that this has not been perceived to be a problem to date, rather than that there is an absence of risk.

Despite the theoretical risk, since there is no documented case of transmission from an infected health care worker to a biting patient, individuals infected with blood-borne viruses should not be prevented from working in or training for specialties where there is a risk of being bitten.

The evidence is dynamic and the area will be kept under review and updated in the light of any new evidence that subsequently emerges suggesting there is a risk. However, it is important for biting incidents to be reported and risk assessments conducted in accordance with current procedures. Biting poses a much greater risk to health care workers than to patients. Therefore employers should take measures to prevent injury to staff, and health care workers bitten by patients should seek advice and treatment, in the same way as after a needlestick injury.

**Bone Marrow transplants**  
Not exposure-prone.

**Cardiology**  
Percutaneous procedures including angiography/cardiac catheterisation are not exposure-prone. Implantation of permanent pacemakers (for which a skin tunnelling technique is used to site the pacemaker device subcutaneously) may or may not be exposure-prone. This will depend on whether the operator’s fingers are or are not concealed from view in the patient’s tissues in the presence of sharp instruments during the procedure (see also Arterial cutdown).

**Chiropodists** see **Podiatrists**

**Dentistry (including hygienists)**  
Procedures in dentistry which do not involve the possibility of injury to the dentist's hands are not EPPs, e.g. oral examination, radiology. Many procedures in general dentistry are Category 1 or 2. Procedures in dentistry which could be regarded as category 3 comprise:

- maxillofacial surgery and oral surgical procedures, including the extraction of teeth (but excluding extraction of highly mobile or exfoliating teeth)
- periodontal surgical procedures
- endodontic surgical procedures, and
- implant surgical procedures.

**Ear, Nose and Throat Surgery (Otolaryngology)**  
ENT surgical procedures generally should be regarded as exposure-prone with the exception of simple ear or nasal procedures, and procedures performed using endoscopes (flexible and rigid) **provided fingertips are always visible**. Non-exposure-prone ear procedures include
stapedectomy/stapedotomy, insertion of ventilation tubes and insertion of a titanium screw for a bone anchored hearing aid.

**Emergency Departments (ED)**
ED staff who are restricted from performing EPPs must not provide trauma care. These staff should not physically examine or otherwise handle acute trauma patients with open tissues because of the unpredictable risk of injury from sharp tissues such as fractured bones. Cover from colleagues who are allowed to perform EPPs would be needed at all times to avoid this eventuality.

Other EPPs which may arise in an ED setting would include:
- rectal examination in presence of suspected pelvic fracture;
- deep suturing to arrest haemorrhage;
- internal cardiac massage.

(See also Anaesthetics, Biting, Paramedics and Resuscitation)

**Endoscopy**
Simple endoscopic procedures (e.g. gastroscopy, bronchoscopy) have not been considered exposure-prone. In general there is a risk that surgical endoscopic procedures (e.g. cystoscopy, laparoscopy – see below) may escalate due to complications which may not have been foreseen and may necessitate an open EPP. The need for cover from a colleague who is allowed to perform EPPs should be considered as a contingency.

**General Practice**
See Emergency Departments, Minor Surgery, Midwifery/Obstetrics, Resuscitation

**Gynaecology (see also Laparoscopy)**
Open surgical procedures are exposure-prone. Many minor gynaecological procedures are not considered exposure-prone (examples include dilatation and curettage (D& C), suction termination of pregnancy, colposcopy, surgical insertion of depot contraceptive implants/devices, fitting intrauterine contraceptive devices (coils), and vaginal egg collection) **provided fingers remain visible at all times when sharp instruments are in use.**

Performing **cone biopsies** with a scalpel (and with the necessary suturing of the cervix) would be exposure-prone. Cone biopsies performed with a loop or laser would not in themselves be classified as exposure-prone, but if local anaesthetic was administered to the cervix other than under direct vision i.e. with fingers concealed in the vagina, then the latter would be an EPP (category 1).

**Haemodialysis/Haemofiltration**
See Renal Medicine

**Intensive Care**
Intensive care does not generally involve EPPs on the part of medical or nursing staff. (See also Trauma section)
Laparoscopy
These are mostly non-exposure-prone because fingers are never concealed in the patient’s tissues. Exceptions are: if main trochar inserted using an open procedure, as for example in a patient who has had previous abdominal surgery. Also exposure-prone if rectus sheath closed at port sites using J-needle, and fingers rather than needle holders and forceps are used. In general there is a risk that a therapeutic laparoscopy may escalate due to complications which may not have been foreseen necessitating an open EPP. Cover from colleagues who are allowed to perform EPPs would be needed at all times to avoid this eventuality.

Midwifery/Obstetrics
Simple vaginal delivery, amniotomy using a plastic device, attachment of foetal scalp electrodes, and infiltration of local anaesthetic prior to an episiotomy and the use of scissors to make an episiotomy cut are not exposure-prone. The only EPPs routinely undertaken by midwives are repairs following episiotomies and perineal tears: category 1 in the case of first degree lacerations; category 2 in the case of second, third and fourth degree lacerations. Repairs of third and fourth degree tears are normally undertaken by medical staff who may include general practitioners assisting at births in a community setting.

Minor Surgery
In the context of general practice, minor surgical procedures such as excision of sebaceous cysts and skin lesions, cauterization of skin warts, aspiration of bursae, cortisone injections into joints and vasectomies do not usually constitute EPPs.

Sharps Occupational Exposure
Health care workers need not refrain from performing EPPs pending follow up of occupational exposure to a BBV infected source. The combined risk of contracting a BBV from the source patient and then transmitting this to another patient during an EPP is so low as to be considered negligible. However in the event of the worker being diagnosed with a BBV, such procedures should cease in accordance with this guidance.

Nursing
General nursing procedures do not include EPPs. The duties of operating theatre nurses should be considered individually. Instrument nurses do not generally undertake EPPs. However, it is possible that nurses acting as first assistant may perform EPPs (see also Emergency Departments, Renal Medicine/Nursing, and Resuscitation).

Obstetrics/Midwifery
See Midwifery/Obstetrics. Obstetricians perform surgical procedures, many of which will be exposure-prone according to the criteria.

Operating Theatre Technicians
General duties do not normally include EPPs.
Ophthalmology
With the exception of orbital surgery which is usually performed by maxillo-
facial surgeons (who perform many other EPPs), routine ophthalmological
surgical procedures are not exposure-prone as the operator's fingers are not
concealed in the patient's tissues. Exceptions may occur in some acute
trauma cases, which should be avoided by EPP restricted surgeons.

Optometry
The training and practice of optometry does not require the performance of
EPPs.

Orthodontics
See Dentistry (including hygienists)

Orthopaedics
EPPs
- Open surgical procedures;
- Procedures involving the cutting or fixation of bones, including the
  use of K-wire fixation and osteotomies;
- Procedures involving the distant transfer of tissues from a second
  site (such as in a thumb reconstruction);
- Acute hand trauma;
- Zadek's procedure
Non-EPPs
- Manipulation of joints with the skin intact;
- Arthroscopy, provided that if there is any possibility that an open
  procedure might become necessary, the procedure is undertaken
  by a colleague able to perform the appropriate open surgical
  procedure;
- Superficial surgery involving the soft tissues of the hand;
- Work on tendons using purely instrumental tunnelling techniques
  that do not involve fingers and sharp instruments together in the
  tunnel;
- Procedures for secondary reconstruction of the hand provided that
  the operator's fingers are in full view;
- Carpal tunnel decompression provided fingers and sharp
  instruments are not together in the wound;
- Closed reductions of fractures and other percutaneous procedures.

Paediatrics
Neither general nor neonatal/special care paediatrics has been considered
likely to involve any EPPs. Paediatric surgeons do perform EPPs (see also
Arterial cutdown).

Paramedics
In contrast to other emergency workers, a paramedic's primary function is to
provide care to patients. Paramedics do not normally perform EPPs. However,
paramedics who would be restricted from performing EPPs should not provide
pre-hospital trauma care. This advice is subject to review as the work
undertaken by paramedics continues to develop (see also Emergency
Departments, Biting and Resuscitation).
**Pathology**
In the event of injury to an EPP restricted pathologist performing a post mortem examination, the risk to other workers handling the same body subsequently is so remote that no restriction is recommended.

**Podiatrists**
Routine procedures undertaken by podiatrists who are not trained in and do not perform surgical techniques are not exposure-prone. Procedures undertaken by podiatric surgeons include surgery on nails, bones and soft tissue of the foot and lower leg, and joint replacements. In a proportion of these procedures, part of the operator’s fingers will be inside the wound and out of view, making them EPPs (see also **Orthopaedics**).

**Radiology**
All percutaneous procedures, including imaging of the vascular tree, biliary system and renal system, drainage procedures and biopsies as appropriate, are not EPPs (see also **Arterial cutdown**).

**Renal Medicine**
These procedures are not exposure-prone and neither haemofiltration nor haemodialysis constitute EPPs. The working practices of those staff who supervise haemofiltration and haemodialysis circuits do not include EPPs.

**Resuscitation**
Resuscitation performed wearing appropriate protective equipment does not constitute an EPP.

**Surgery**
Open surgical procedures are exposure-prone. This applies equally to major organ retrieval because there is a very small, though remote, risk that major organs retrieved for transplant could be contaminated by a health care worker’s blood during what are long retrieval operations while the patient’s circulation remains intact. It is possible for some contaminated blood cells to remain following pre-transplantation preparatory procedures and for any virus to remain intact since organs are chilled to only 10°C (see also **Laparoscopy, Minor Surgery**).

**Trauma**
Management of trauma patients is a high risk area in which many procedures must be considered to be exposure-prone, and where the emergent situation may result in rapid escalation of procedures. In general, HCWs with BBVs should not work in trauma medicine. Examples of EPPs in trauma management would include:
- insertion of chest drains – where an incision is made and a finger inserted where there may be fractured ribs.
- rectal examination in presence of suspected pelvic fracture;
- deep suturing to arrest haemorrhage;
- internal cardiac massage.

**Volunteer health care workers (including first aid)**
The important issue is whether or not the volunteer health care worker undertakes EPPs.
Appendix 3

Results of lookback investigations

Table 2: Worldwide cases of HCW-patient transmission of HIV, 1992-2005

<table>
<thead>
<tr>
<th>Year reported</th>
<th>Ref</th>
<th>Country</th>
<th>Occupation</th>
<th>Patients infected</th>
<th>Patients tested</th>
<th>% patients infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>2</td>
<td>USA</td>
<td>Dentist</td>
<td>5</td>
<td>1,100</td>
<td>0.45%</td>
</tr>
<tr>
<td>1999</td>
<td>4</td>
<td>France</td>
<td>Orthopaedic surgeon</td>
<td>1</td>
<td>983</td>
<td>0.10%</td>
</tr>
<tr>
<td>2002</td>
<td>5</td>
<td>France</td>
<td>Gynaecologist</td>
<td>1</td>
<td>2294</td>
<td>0.04%</td>
</tr>
<tr>
<td>2003</td>
<td>3</td>
<td>Spain</td>
<td>Obstetrician</td>
<td>1</td>
<td>250</td>
<td>0.40%</td>
</tr>
</tbody>
</table>

Table 3: Worldwide cases of HCW-patient transmission of HCV, 1995-2005

<table>
<thead>
<tr>
<th>Year reported</th>
<th>Ref</th>
<th>Country</th>
<th>Occupation</th>
<th>Patients infected</th>
<th>Patients tested</th>
<th>% patients infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>23</td>
<td>UK</td>
<td>Cardiothoracic surgeon</td>
<td>1</td>
<td>278</td>
<td>0.36%</td>
</tr>
<tr>
<td>1996</td>
<td>24</td>
<td>Spain</td>
<td>Cardiothoracic surgeon</td>
<td>5</td>
<td>222</td>
<td>2.25%</td>
</tr>
<tr>
<td>1999</td>
<td>25,49</td>
<td>UK</td>
<td>Gynaecologist</td>
<td>7</td>
<td>3,628</td>
<td>0.19%</td>
</tr>
<tr>
<td>2000</td>
<td>49</td>
<td>UK</td>
<td>General surgeon</td>
<td>4</td>
<td>1,370</td>
<td>0.29%</td>
</tr>
<tr>
<td>2000</td>
<td>50</td>
<td>UK</td>
<td>General surgeon</td>
<td>2</td>
<td>750</td>
<td>0.27%</td>
</tr>
<tr>
<td>2001</td>
<td>26</td>
<td>USA</td>
<td>Cardiothoracic surgeon</td>
<td>14</td>
<td>937</td>
<td>1.49%</td>
</tr>
<tr>
<td>2001</td>
<td>29</td>
<td>UK</td>
<td>Obstetrician</td>
<td>1</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2002</td>
<td>27</td>
<td>Germany</td>
<td>Orthopaedic surgeon</td>
<td>1</td>
<td>207</td>
<td>0.48%</td>
</tr>
<tr>
<td>2002</td>
<td>28</td>
<td>Germany</td>
<td>Obstetrician</td>
<td>1</td>
<td>2,286</td>
<td>0.04%</td>
</tr>
<tr>
<td>2002</td>
<td>32</td>
<td>USA</td>
<td>Anaesthetist</td>
<td>1</td>
<td>348</td>
<td>0.28%</td>
</tr>
<tr>
<td>2005</td>
<td>30</td>
<td>UK</td>
<td>Obstetrician</td>
<td>1</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2005</td>
<td>30</td>
<td>UK</td>
<td>Dentist</td>
<td>0</td>
<td>2,665</td>
<td>0</td>
</tr>
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</table>
Table 4: Worldwide cases of HCW-patient transmission of HBV, 1991-2005

<table>
<thead>
<tr>
<th>Year of report</th>
<th>Ref</th>
<th>Country</th>
<th>Occupation</th>
<th>Patients infected (probable, possible)</th>
<th>Patients tested</th>
<th>% patients infected (probable, possible)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>35</td>
<td>UK</td>
<td>Cardiothoracic surgeon</td>
<td>20</td>
<td>304</td>
<td>6.57</td>
</tr>
<tr>
<td>1996</td>
<td>35</td>
<td>UK</td>
<td>General surgeon</td>
<td>2</td>
<td>16</td>
<td>12.5</td>
</tr>
<tr>
<td>1996</td>
<td>36</td>
<td>USA</td>
<td>Cardiothoracic surgeon</td>
<td>19</td>
<td>144</td>
<td>13.19</td>
</tr>
<tr>
<td>1997</td>
<td>37</td>
<td>UK</td>
<td>Obstetrics trainee</td>
<td>1 (2)</td>
<td>92</td>
<td>1.1 (3.26)</td>
</tr>
<tr>
<td>1997</td>
<td>37</td>
<td>UK</td>
<td>Obstetrics trainee</td>
<td>1</td>
<td>111</td>
<td>0.9</td>
</tr>
<tr>
<td>1997</td>
<td>37</td>
<td>UK</td>
<td>General surgical trainee</td>
<td>1</td>
<td>189</td>
<td>0.53</td>
</tr>
<tr>
<td>1998</td>
<td>40</td>
<td>UK</td>
<td>Orthopaedic surgeon</td>
<td>1</td>
<td>189</td>
<td>0.53</td>
</tr>
<tr>
<td>1999</td>
<td>39</td>
<td>UK</td>
<td>General surgeon</td>
<td>1 (0, 10)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1999</td>
<td>39</td>
<td>UK</td>
<td>Orthopaedic surgeon</td>
<td>(0, 2)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1999</td>
<td>39</td>
<td>UK</td>
<td>Urologist</td>
<td>(0, 1)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2000</td>
<td>41</td>
<td>UK</td>
<td>Cardiothoracic surgeon</td>
<td>2</td>
<td>124</td>
<td>1.61</td>
</tr>
<tr>
<td>2002</td>
<td>38</td>
<td>Netherlands</td>
<td>General surgeon</td>
<td>8 (2, 18)</td>
<td>1,564</td>
<td>0.51 (0.64, 1.78)</td>
</tr>
</tbody>
</table>

Appendix 4

Technical group members

Dr Michael Ackland (Public Health Physician) - Senior Medical Advisor, Office of the Chief Health Officer, Public Health Branch, Department of Health, Victoria.

Dr Revle Bangor-Jones (Secretariat) - Public Health Physician, Public Health Division, Department of Health, Western Australia.

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Dr Frank Beard (Public Health Physician, Communicable Diseases Network Australia-jurisdictional representative), Senior Medical Officer, Communicable Diseases Branch, Queensland Health.
<table>
<thead>
<tr>
<th>Name</th>
<th>Position and Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Gary Dowse</td>
<td>Medical Epidemiologist, Communicable Disease Control Directorate, Department of Health, Western Australia.</td>
</tr>
<tr>
<td>Professor John Kaldor</td>
<td>Infectious Diseases Epidemiology - Professor of Epidemiology, Kirby Institute, University of New South Wales.</td>
</tr>
<tr>
<td>Associate Professor Ann Koehler</td>
<td>Chair March 2009-] (Clinical Microbiology, Infection Control) - Director, Communicable Disease Control Branch, Public Health &amp; Clinical Systems, Department of Health &amp; Ageing, South Australia.</td>
</tr>
<tr>
<td>Dr Rosemary Lester</td>
<td>Public Health Physician, Communicable Diseases Network Australia-jurisdictional representative) - A/ Chief Health Officer, Department of Health, Victoria.</td>
</tr>
<tr>
<td>Professor Stephen Locarnini</td>
<td>Clinical Virology - Head of Research &amp; Molecular Development, Director of WHO Collaborating Centre for Virus Reference and Research, Victorian Infectious Diseases Reference Laboratory, Melbourne.</td>
</tr>
<tr>
<td>Adjunct Associate Professor Stuart Roberts</td>
<td>Hepatology - Director of Hepatology, The Alfred Hospital, Melbourne.</td>
</tr>
<tr>
<td>Dr Jan Savage</td>
<td>Australian Society for HIV Medicine representative to May 2011) - Australian Society for HIV Medicine.</td>
</tr>
<tr>
<td>Mr Alan Sefton</td>
<td>Legal Advisor - A/ Deputy State Solicitor, State Solicitor's Office, Western Australia.</td>
</tr>
<tr>
<td>Dr Douglas Shaw</td>
<td>Public Health Physician - Senior Medical Consultant, Communicable Disease Control Branch, Public Health &amp; Clinical Systems, Department of Health &amp; Ageing, South Australia.</td>
</tr>
</tbody>
</table>
Dr David Speers
(Infectious Diseases and Clinical Microbiology) - ID Physician and Infection Control Officer, Sir Charles Gairdner Hospital; Head, Department of Clinical Microbiology, PathWest Laboratory Medicine, Queen Elizabeth II Medical Centre, Western Australia.

Dr Paul Van Buynder
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Ms Levinia Crooks
(Australian Society for HIV Medicine representative June 2011-) - Chief Executive Officer, Australian Society for HIV Medicine.
References


