MANCHESTER 1824
The University of Manchester

INOCULATION INJURIES PREVENTION/ACTION & ADVICE FOR HEALTH CARE WORKERS

An inoculation injury can be from:

- A needlestick injury or a cut with a sharp instrument, e.g. lancet in theatre.
- Blood or other body fluids coming into contact with non-intact skin (e.g. cuts, abrasions, sores, chapped skin etc.), or mucous membranes, including the eyes and mouth.
- Bites from patients; therefore this advice should be followed in the event of a bite from a patient.

The vast majority of inoculation injuries are preventable by employing safe working practices and applying universal precautions and prevention should be the mainstay of any inoculation policy. It is your responsibility to make sure that your working practices do not put yourself, or others, at unnecessary risk.

PREVENTION:

Avoid inoculation injury by using these simple measures:

- Dispose of the sharp into the bin provided immediately after use.
- Never lay used sharps down on bedside lockers, window sills or work surfaces, or leave lying amongst swabs, paper towels or linen.
- Never re-sheath used needles.
- Pick up all dropped sharps carefully and dispose of them safely.
- Remember! Open – Use – Dispose – Do not let anything interrupt this sequence of events.
- Cover all cuts and breaks in your skin with waterproof dressings or gloves.
- Wash your hands thoroughly after accidental splashing.
- Wear spectacles, goggles or visor when dealing with hazardous materials particularly blood and other body substances which may splash in eyes or mouth.
- If you have a skin problem such as eczema, seek advice from the Occupational Health Department.
- Hands must never be inserted in the sharps bin.
- Close sharps bin and lock securely – never fill beyond the ¾ full.

ACTION TO BE TAKEN IN THE EVENT OF AN INOCULATION INJURY

- **Bleed it** – encourage the wound to bleed (**do not** suck it)
- **Clean it** – wash the wound in clean water. Splashes into the eyes should be bathed with copious amounts of clean tap water as soon as possible.
- **Cover it** – cover the wound with a waterproof dressing.
- **Report it** – report the injury to your Line Manager as soon as possible.
- Attend the Occupational Health Department (OHD) for assessment at Waterloo Place or at the Trust Hospital where you are working. If out of office hours, assessment and treatment of the inoculation injury should be undertaken by the Accident & Emergency (A/E) Department.

The OHD or A/E should be informed immediately (within the hour) if you have sustained a high risk (known or suspected HIV) injury so that you can be considered for post exposure prophylactic treatment (PEP).

Your follow-up appointments, should take place at: Waterloo Place OHD. (undergraduate students)
The Mill OHD (Staff & Postgraduate Students)

For further information, please refer to the UoM Innoculation/sharps injury protocol/Action to be taken protocol on the University Occupational Health web pages.

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PROTOCOL:	Innoculation Injury/Sharps Injury Staff and Students V4

Date Of Issue	Version	Revision Date	Author	Approved By
May 2011	1.needlestick Injury 2. renamed Sharps Injury 5/4/13 3. Health and Safety (Sharp Instruments in Healthcare) Regulations 2013.	Reviewed 5 April 2013 V4. 09/8/2017	J Lambert	

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This protocol applies to all University of Manchester staff and students. Contractors and visitors should be referred to local Accident and Emergency department and/or GP.

The major blood-borne pathogens of concern associated with sharps injury are:

- hepatitis B virus (HBV)
- hepatitis C virus (HCV)
- human immunodeficiency virus (HIV).

Needlestick or sharps injuries occur when a needle or other sharp instrument accidentally penetrates the skin. This is called a percutaneous injury. If the needle or sharp instrument is contaminated with blood or other body fluid, there is the potential for transmission of infection, and when this occurs in a work context, the term occupational exposure (to blood, body fluid or bloodborne infection) is used.

When blood or other body fluid splashes into the eyes, nose or mouth or onto broken skin, the exposure is said to be mucocutaneous.

The risk of transmission of infection is lower for mucocutaneous exposure than for percutaneous exposures. Other potential routes of exposure to blood or other body fluids include bites and scratches.

Management of blood and body fluid exposure incidents

First aid treatment

- If the mouth or eyes are involved, they should be washed thoroughly with water (Cullen BL et al, 2006).
- If skin is punctured, free bleeding should be gently encouraged and the wound should be washed with soap or chlorhexidine and water, but not scrubbed or sucked.

- If there is any possibility of HIV exposure, urgent advice should be sought about the relative indications for anti-retroviral post-exposure prophylaxis.

Depending on local arrangements, body fluid exposures in a healthcare/education setting may be managed by a number of different departments including occupational health, accident and emergency, infection control, infectious diseases, genitourinary medicine, sexual health, HIV services, microbiology or virology.

Assessment of the risk of blood-borne virus (BBV) transmission

Average estimated seroconversion risks from published studies and reports are:

- 0.3 per cent for percutaneous exposure to HIV-infected blood
- 0.1 per cent for mucocutaneous exposure to HIV-infected blood
- 0.5-1.8 per cent for percutaneous exposure to HCV-infected blood with
- detectable RNA
- 30 per cent for percutaneous exposure of a non-immune individual to
- HBeAg positive source.

Factors that may increase the risk, and influence management of the incident are:

- percutaneous injury rather than mucous membrane or broken skin exposure
- injury with a device from a source patient's artery or vein
- blood exposure rather than exposure to blood-stained fluid, diluted blood
- (for example in local anaesthetic solution) or other body fluid
- injury from hollow bore rather than solid bore needle (Doebbeling B, 2003)
- injury from wide gauge rather than narrow gauge needle
- deep rather than superficial injury
- visible blood on the device
- no protective equipment used (like gloves, double gloves, eye protection)
- first aid measures not implemented (washing, bleeding)
- HCV RNA detectable in source patient on most recent blood test
- high viral load of HIV in source patient
- HBeAg detectable in source patient blood
- exposed person not or inadequately immunised against hepatitis B
- source patient co-infected with more than one BBV.

When a body fluid exposure occurs and is reported, the first priority is to assess how likely it is that the incident will result in blood-borne virus transmission, and then take steps to reduce that risk as far as possible. The initial assessment and management has to be based on the information available at the time.

Relevant information to consider

The source patient

1. Known or unknown?
2. If unknown, is there any indication of the origin of the device or body fluid?
3. For example, was the device from a unit or area with patients known to have hepatitis B or C or HIV?
4. If known, is the source patient known to be infected with hepatitis B, hepatitis C or HIV?

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5. The validity of negative results varies depending on how long ago the tests were done and current risks factors.
6. If the source patient is not known to carry any of these infections, do they have any risk factors for them?
7. The risk of being infected with HIV is increased in people from areas of high prevalence, particularly sub-Saharan Africa, gay men, intravenous drug users, and people with HIV-infected mothers or with HIV-infected sexual partners.
8. The risk of being infected with hepatitis C is increased by receipt of unscreened blood or untreated plasma products (in the UK prior to September 1991 and 1985 respectively)
9. Sharing of injecting equipment while misusing drugs; sharps injury or mucous membrane splash exposure to blood from patients known to be infected, or at risk of infection with hepatitis C.
10. Involvement as a employee/student or a patient in invasive medical, surgical, dental or midwifery procedures in parts of the world where infection control precautions may have been inadequate; or with populations with a high prevalence of hepatitis C infection (like Egypt) (Cardo D et al 1997).
11. The risk of being infected with hepatitis B is increased in intravenous drug users, gay men and in people with hepatitis B-infected mothers or hepatitis B-infected sexual partners.
12. If the source patient is known to be infected with HCV, is HCV RNA detectable on most recent test?
13. If the source patient is known to be infected with HIV:
    a) has there been a recent current seroconversion illness?
    b) are they terminally ill with HIV-related disease? If so viral load may be high.
    c) what is the most recently recorded viral load?
    d) are they taking anti-retroviral drugs?
    e) is there any evidence of viral drug resistance?
14. If the source patient is known to be infected with hepatitis B, are they:
    - HBsAg positive?
    - HBeAg positive?

The exposed person

Hepatitis B immune status:

- unvaccinated?
- one, two, three or more doses of hepatitis B vaccine?
- date of last booster?
- most recent HBsAb result and date?
- HBcAb positive (natural immunity)?

Protocol for management of exposures

In all cases:

1. A blood sample from the exposed person should be sent to a virology or microbiology laboratory for serum to be saved and stored. There is no point in testing this sample for blood-borne viruses at this stage, unless there is reason to believe the exposed person may already be infected. The purpose of this sample is to be able to show that, in the unlikely event of subsequent seroconversion, the member of staff was not infected at the time of the exposure, and therefore the infection was 4

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occupationally acquired. As occupational acquisition of blood-borne virus infection is fortunately rare, in the majority of cases this sample is never tested.

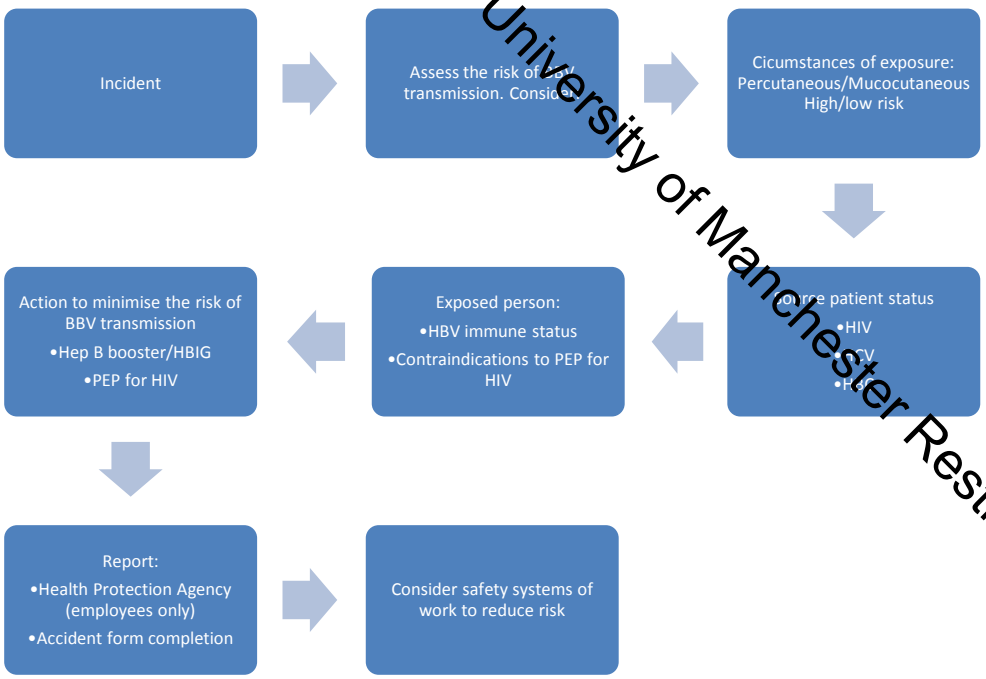
2. The exposed person should be given time to talk about their concerns following the incident and discuss the available information about risks from the exposure.

Counselling of the exposed person should include information about:

- statistics regarding seroconversion risks
- risks involved in this particular incident
- steps to reduce the risk of BBV transmission
- follow-up procedure and rationale behind it
- 'window period' if the source patient has ongoing risk factors for BBV infection
- infection control precautions (ie safe sex) and no blood donation during follow-up period but no additional work restrictions unless EPP worker (OHP)
- establishing support networks: friends, family and so on
- allowing time to express anxieties and concerns and to answer questions
- HIV and HCV follow-up tests (and HBV if not immune)
- confidentiality.

3. Follow-up to confirm that occupational blood-borne virus transmission has not occurred. See Figure 1.

Figure 1: Incident flow chart



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Managing exposures from unknown sources

Systematic assessment of the risk from any incident involves consideration of three categories of information: the circumstances of the exposure, the source of the exposure and the exposed individual.

It is important to establish whether exposure has indeed occurred. Was the skin actually breached by the needle?
There is no evidence to suggest that blood-borne viruses can be transmitted across intact skin, or from a needle that has not been used.
Deep injury from a large, hollow bore needle with visible, fresh blood will carry a higher risk than one from a superficial scratch from an old, blunt, solid or subcutaneous small needle through protective clothing.
First aid measures such as washing and bleeding the wound (but not scrubbing or sucking it) will help to minimise the risk.

Unless there are clues about the possible origin of the needle (for example, found in the surgery waiting room after a diabetic clinic), a discarded needle may well have been used to inject illicit intravenous drugs. However, blood in the bore of the needle is probably diluted with injection material, and viral load should diminish as it dries. Blood on the outside of the needle is likely to have been wiped by contact with grass, soil, clothing and so on. All this reduces the likely risk of HIV transmission from a needle of unknown source to no more than 1 in 30,000. This does not justify the risks of post-exposure prophylaxis with anti-retrovirals in most cases. Although HIV is often the greatest fear, in fact hepatitis C and hepatitis B are more common and more transmissible. Hepatitis C seroconversion has been documented following injury from a needle in a hospital waste bag. However, hepatitis C transmission is unlikely in the absence of detectable HCV-RNA, and similarly many chronically-infected hepatitis B carriers are also of low infectivity.

If the source patient is infected with HIV (DOH 2004)

In the case of definite exposures to blood or other high risk body fluids known or considered to be at high risk of HIV infection, post-exposure prophylaxis
(PEP) should be offered as soon as possible, preferably within one hour of the incident.

It may still be worth considering up to two weeks after the exposure, but the relative benefit of prophylaxis diminishes with time.

The current standard recommended regimen for PEP is a 28-day course of

- Zidovudine 250 mg bd
- Lamivudine 150 mg bd
- Nelfinavir 1250mg bd.

Anti-emetics such as metaclopramide, domperidone, cyclizine, ondansetron, and anti-motility drugs, such as loperamide, are often co-prescribed for the side effects.

Anti-retroviral drugs are not licensed for PEP, so must be prescribed on a ‘named patient’ basis by a doctor. The regimen may need to be modified if there is evidence that the source patient is infected with a virus that is resistant to any of these drugs. In this case, specialist advice should be sought from the HIV physician treating the source patient.

Exposed persons should be counselled about the side effects and the potential risks and benefits of PEP, so that staff /student can make an informed choice whether to take PEP or not.

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. The exposed person should be followed up weekly while taking PEP for:

- psychological support
- blood samples:
    - biochemistry (urea and electrolytes)
    - liver function tests (including gamma GT and amylase)
    - haematology (full blood count)
- monitoring of side effects

The exposed person should return for testing (with informed consent) for HIV antibodies at six weeks, three months and six months after completing postexposure prophylaxis. Of these, the three-month test is probably the most important.

If the exposed person tests positive for HIV antibodies, it will be necessary to test the stored baseline sample and refer them to a specialist in HIV medicine.

If the source patient is infected with HCV

There is no prophylaxis available for hepatitis C. Blood should be taken and serum sent for saving and storage. Transmission is unlikely from HCV RNA negative sources.

The exposed person should return for blood tests for:

- HCV RNA at six weeks
- HCV RNA and HCV antibodies at 12 weeks
- HCV antibodies at 24 weeks after the exposure

If any of the results are positive, the baseline sample should be tested for HCV antibodies. It will be necessary to refer the exposed person to hepatologist.

If the source patient is infected with HBV

If the exposed person is not immune or has incomplete immunity to hepatitis B, the patient's HBsAg status should be requested urgently. Follow-up blood testing will only be necessary if the exposed person was non-immune at the time of the incident. Test for HBsAg at:

- six weeks
- three months
- six months
- and save serum at the time of the incident

If the source patient is unknown or testing cannot be done

These cases are considered on an individual basis. As much detail about the exposure as possible should be obtained.
There will usually be no follow-up other than the initial serum save and check for HBV immunity (if required) for the exposed person, unless there are particular reasons for concern (for example, a patient strongly suspected to be infected with a blood-borne virus).
If the exposed person is very anxious, follow-up testing for HIV, HCV and HBV
(if not immune) may help alleviate their anxiety. Hepatitis C PCR testing is not appropriate in these circumstances.
If blood test results are given over the telephone, it will be necessary to first confirm identity and ensure confidentiality is maintained.

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Preventing further incidents

Consideration of the circumstances of individual exposures should prompt further investigation of working practice and/or equipment with a view to minimising the risk of future incidents. An Incident report form should be completed and returned to Health and Safety Services if a member of UOM staff regardless of where they are based.

Health and Safety (Sharp Instruments in Healthcare) Regulations 2013

Available at: http://www.hse.gov.uk/pubns/hsis7.htm

Appendices:

4. Consent for blood screening following a sharps/contamination incident
5. Sharps/contamination incident source questionnaire
6. Roles and responsibilities regarding sharps and needlestick injuries for clinical placement students

Reporting and Good Practice

The Biological Safety Officer will report under RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995) all cases of needlestick injuries resulting in 3 or more days absent from work. (HSE 2011).

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HSE (RIDDOR) 2011 Available at: http://www.hse.gov.uk/healthservices/needlesticks/index.htm

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Avilable at: www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/GreenBook

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Appendix 1

CONSENT FOR BLOOD SCREENING FOLLOWING A SHARPS / CONTAMINATION INCIDENT

It has been explained to me that following a recent sharps contamination incident a member of staff / student may have been contaminated and it is considered necessary for a sample of my / my child's blood to be screened for a number of blood borne viruses which may include :-

Hepatitis B

Hepatitis C

HIV

In order to ensure that appropriate action can be taken to protect the member of staff / student, from infection.

I agree for my / my child's blood to be tested.

Signature: _____ Date:_____

Signature of parent/guardian _____ Date: _____

Printed name: _____

Child's name: _____

I wish to be informed of the result of testing: Yes / No

If Yes- Address _____

_____

_____

Contact telephone number:_____

Name of consultant / manager in charge:_____

Contact details / telephone Number:_____

_____

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Appendix 2

SHARPS / CONTAMINATION INCIDENT SOURCE QUESTIONNAIRE

The member of staff / student involved with your treatment has suffered a sharps / contamination incident. It is important to know if this will put them at risk. In order to decide on appropriate action to protect that member of staff / student we would be grateful if you will answer the following questions.

We accept that these are of a highly personal nature but you can be reassured that they are used routinely in screening blood donors and your answers will remain confidential and will not affect your future treatment.

Below are two lists of questions (one for males and one for females) to establish whether an individual is in a high risk category for infection with a blood borne virus.

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Female Questions **Please Tick/Write**

1	Have you ever had an HIV test?	Yes		No	
	Is so what was the result?	Positive		negative	
2	Have you ever had sex with a bisexual man?	Yes		No	
3	Have you ever paid or been paid for sex?	Yes		No	
4	Have you had sex with anyone who injected drugs?	Yes		No	
5	Have you ever had sex with anyone from abroad?	Yes		No	
	If yes, which country were they from?				
6	Have you ever injected drugs?	Yes		No	
7	Have you ever had a blood transfusion?	Yes		No	
	If yes, when and where?				

Male Questions **Please Tick/Write**

1	Have you ever had an HIV test?	Yes		No	
	Is so what was the result?	Positive		negative	
2	Have you ever had sex with a man?	Yes		No	
3	Have you ever paid or been paid for sex?	Yes		No	
4	Have you had sex with anyone who injected drugs?	Yes		No	
5	Have you ever had sex with anyone from abroad?	Yes		No	
	If yes, which country were they from?				
6	Have you ever injected drugs?	Yes		No	
7	Have you ever had a blood transfusion?	Yes		No	
	If yes, when and where?				

Signature _____Date _____

Print name _____

Appendix 3

Roles and responsibilities regarding sharps and needlestick injuries for clinical placement students

Schools in the Faculty of Medical and Human Sciences to:

a. ensure each placement provider has a documented procedure in place for the management and reporting of sharps and needle stick injuries and that there is a mechanism of conveying the information to placement students;
b. ensure that each placement student is provided with instructions to follow the placement provider's procedure for sharps and needlestick injuries whilst on placement
c. ensure that each student is made aware of the University Occupational Health's guidance on the action to be taken in the event of needlestick/sharps injuries [add link to Occ Health documents]
d. ensure that the placement students have suitable practical skills for the work experience;
e. provide appropriate support to any placement student who is injured by a sharp known to be, or suspected of being, contaminated with a blood-borne virus (BBV), e.g. hepatitis B or C or HIV;
f. regularly review the number of injuries reported by their placement provider;
g. obtain reassurance that the placement provider can discharge the responsibilities described below.

Clinical Placement provider, as per the Health and Safety (Sharp Instruments in Healthcare) Regulations 2013 to:

a. monitor the number of sharps and needlestick injuries reported by medical placement students;
b. evaluate the risk of blood borne virus infection from the patient and take a sample from patient and placement student for testing if deemed necessary in the event of an injury;
c. ensure employee has immediate access to medical advice in the event of a sharp/needlestick injury;
d. offer post-exposure prophylaxis and any other medical treatment as advised by a doctor;
e. consider whether counselling would be appropriate for the employee;
f. report to the Health and Safety Executive (HSE) under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR) if a placement student is injured by a sharp known to be, or suspected of being, contaminated with a blood-borne virus as a dangerous occurrence;
g. inform University Occupational Health of the results of any samples being tested to evaluate for its blood borne virus status;

University Occupational Health to:

a. carry out an initial health screening and provide suitable vaccinations;
b. regularly provide a report on the number of sharps and needlestick injuries to the relevant Schools;
c. to follow up any reported accident with injured placement student to provide medical counselling and support, and any relevant additional screening or treatment which may be required.

University Safety Services to:

a. inform the School and University Occupational Health of any relevant accidents if these have not been reported through the correct channels as described above.

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