University Occupational Health and Safety Guidance Notes

WORKING WITH HUMAN BLOOD, BLOOD PRODUCTS OR BODILY FLUIDS

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1. PURPOSE

In workplaces where staff and students may have contact with human blood, blood products or bodily fluids (including human tissue samples) there is a potential for transmission of blood-borne pathogens. Staff and students who work with such material in combination with needles, syringes or other sharp instruments are at increased risk of exposure to blood-borne viruses such Hepatitis B, Hepatitis C and HIV.

This Guidance Note is designed to assist University of Strathclyde personnel with the process of hazard identification, assessment and control as it relates to potential exposure to human blood, blood products and bodily fluids (including tissue) in the workplace. It should be used in conjunction with the Occupational Health and Safety Standard for Biological Safety.

2. SCOPE

This document applies to all staff, post graduate students and visitors (for example visiting academics) who work with human blood, blood products and bodily fluids (including tissue) in the workplace, or have managerial responsibilities for such work at the University of Strathclyde.

3. ABBREVIATIONS

BBV	Blood-Borne Virus
CL	Containment Level
COSHH	The Control of Substances Hazardous to Health Regulations
DEC/SEC	Department/School Ethics Committee
DSC	Departmental Safety Convenor
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HEP	Hepatitis
HG	Hazard Group
HIV	Human Immunodeficiency Virus
HoD	Head of Department
MSC	Microbiological Safety Cabinet
OH	Occupational Health
SHaW	Safety, Health and Wellbeing
SIRIS	Strathclyde Incident Reporting and Investigation System
PI	Principle Investigator
UEC	University Ethics Committee

4. SPECIFIC RESPONSIBILITIES

General roles and responsibilities are detailed in Section 5 of the OHS Biological Safety Standard.

5. BIOLOGICAL WORKER REGISTRATION AND APPROVAL TO WORK

Anyone handling blood, blood products, bodily fluids (animal or human) must register as a Biological Worker with SHaW giving details of samples and sources Registrations should be completed on the BP system hosted on the Pegasus system. Registration must take place annually to reflect any changes in work activity. Work must not commence until the registration has been approved by the DSC. Registrations must be reviewed at least once a year.

The above requirement includes staff, post graduate students undertaking an MSc or PhD, 4th year undergraduate students carrying out an individual research project, and visitors (e.g. visiting researchers/scientists). All persons involved in such work must be made fully aware of the potential risks and must receive the appropriate training and supervision.

Further information: See Section 6.2 of the OHS Biological Safety Standard.

6. RISK ASSESSMENT

Several factors should be considered when assessing the likely presence of a BBV including the medical history of the donor/patient, whether the samples are from a symptomatic individual, and the incidence of disease that are endemic in the local population.

The risk of contracting a BBV depends on the amount of virus in the blood or bodily fluid and the type of contact. For example, a piercing through the skin poses a greater risk than a splash on the

skin. If you come into contact with blood and bodily fluids always treat them as potentially infectious.

6.1 Assessing the risks from work with blood, blood products and bodily fluids

The potential pathogens that users may be exposed to must be identified during the risk assessment process where work with blood, blood products or bodily fluids is being undertaken. Both a general risk assessment for the activity and a COSHH assessment for substances identified as being hazardous or potentially hazardous to health should be carried out.

The risk assessments should identify suitable risk control measures and emergency procedures to deal with spillages and accidental exposure.

Further information: See Section 6.1 of the OHS Biological Safety Standard.

6.2 Main hazards

6.2.1 Blood-borne viruses

Whenever the term BBV is used, or blood is otherwise mentioned, it should be taken to include any high-risk bodily fluid unless stated otherwise.

The main risk of occupationally acquired blood-borne infection relates to viruses that persist in the blood and are known to be endemic in the UK population. In these cases, the infectious agent is usually a BBV. BBVs of major concern are:

- HIV (which causes Acquired Immune Deficiency Syndrome or AIDS);
- HBV and HCV which may result in viral hepatitis;
- The Hep-D virus is a defective virus and will only infect and replicate in the presence of HBV.

Note that Hep-A and Hep-E viruses are mainly spread by the faecal oral route and do not result in chronic infection and therefore do not present a significant risk of blood-borne infection.

6.2.2 Bodily fluids

Other bodily fluids can also pose a risk to the individual including:

- Blood
- Cerebrospinal fluid
- Pleural fluid
- Breast milk
- Amniotic fluid
- Vaginal secretions
- Peritoneal fluid
- Pericardial fluid
- Synovial fluid
- Semen
- Other bodily fluids containing blood

Urine, faeces, saliva, sputum, tears, sweat and vomit, present a minimal risk of BBV infection unless they are contaminated with blood. However, they may be hazardous for other reasons.

6.3 Route of exposure

Blood may be contaminated by viruses which were present in the donor and transmitted to the employee handling the blood, blood product or bodily fluid by:

- Contamination of open cuts, grazes in the skin (including skin conditions such as eczema);
- By accidental contamination by a sharp instrument (e.g. needle or broken glass);
- Penetration of mucous membranes (e.g. eyes and mouth).

6.4 Containment requirements

The aforementioned viruses all belong to HG3 and **must only be handled at CL3.** At the present time there are no CL3 containment facilities within the University of Strathclyde and therefore no work with HG3 agents should knowingly be undertaken unless derogations apply and notification from the HSE has been sought.

All blood samples should be treated as potentially harmful including blood obtained from the Blood Transfusion Service which, although screened for the presence of HBV, HCV and HIV and also the causal agent of syphilis, should be treated at a minimum of CL2 and within an appropriate MSC, especially if there is a risk of infectious aerosols being generated. In multi-user CL2 laboratories is it advisable to undertake such work in a designated area of the room separated from other work activities.

Other sources of blood or bodily fluids, where the screening status is unknown, must always be handled at CL2 within an MSC, using the appropriate safety measures following the controls identified using a COSHH risk assessment.

7. OCCUPATIONAL EXPOSURE

Within the workplace setting, occupational exposure usually occurs as a result of a needle stick injury, injury with other contaminated sharp instruments, or as a result of contamination of the mucous membranes (eyes, nose and mouth) and broken skin.

7.1 Immunisation

Vaccination is available against HBV but not other BBVs. The need to be immunised should be determined by risk assessment. The risk to laboratory staff is likely to be significantly less than that posed to healthcare workers. The Department of Health has identified occupational groups that are at an increased risk of exposure to BBV and recommend that they be immunised against HBV: Those that affect University staff are:

- Laboratory staff handling biological material that may be virally contaminated;
- Staff handling human remains received from hospital theatre staff;
- Forensic pathologists.

Those individuals considered to be at risk of occupational exposure to HBV should be advised to obtain pre-exposure immunisation as appropriate, this should be identified as a risk control measure during the risk assessment process and should be provided free of charge. **Immunisation should never be regarded as a substitute for good laboratory practice.** Health advice regarding vaccinations can be sought from the University Occupational Health Service however they are unable to vaccinate. Vaccination can be carried out at a GP surgery or at a travel clinic. Those accepting vaccination will be informed of the benefits and drawbacks of both vaccination and non-vaccination by staff at the clinics.

A vaccination record should be kept by departments, which should be made available to the worker in question on request.

7.2 Emergency action following exposure to BBV

7.2.1 Immediate first aid requirements

Risk assessments for activities involving the use of substances containing, or potentially containing, BBVs must include details of emergency action to be taken in the event of exposure. Where possible the use of sharps (including needles) should be avoided when working with blood, blood products and bodily fluids.

If you are contaminated with blood or other bodily fluids, take the following action without delay:

- Wash splashes off your skin with soap and running water;
- If your skin is broken, encourage the wound to bleed, do not suck the wound – rinse thoroughly under running water for at least 5 minutes;
- Wash out splashes in your eyes using tap water or an eye wash bottle if clean running water is not available;

- Wash out splashes in your nose or mouth with plenty of tap water – do not swallow the water;
- Record the source of contamination;
- Report the incident to your supervisor/line manager/DSC;
- If required, go straight to hospital or follow University procedure in Section 7.2.2 to obtain transportation.

7.2.2 Incident evaluation

Prompt medical advice is important following exposure to a BBV. Treatment might be appropriate following infection with a BBV but, to be effective, it may need to be started quickly. The University procedure is to dial 2222 in an emergency and a request for immediate transport to hospital should be made.

The circumstances of the incident need to be assessed and consideration given to any medical treatment required dependent on whether the exposure is assessed to be significant or not. The results of the assessment will contribute to decisions on whether HIV and/or HBV post-exposure prophylaxis, or follow-up for evidence of HCV transmission, is required.

The significant finding of the risk assessment should be taken to the hospital and should contain information on the following (for further information HSE: How to deal with an exposure incident):

- **The type of body fluid to which the recipient has been exposed -** blood carries the highest risk, but BBV can be transmitted by other body fluids, especially if they are also contaminated by blood.
- **Route of exposure** – percutaneous, mucous membranes (which include eyes, mouth), and skin. Splashing of blood/body fluids onto mucous membranes may result in virus transmission:
    - If intact, skin is impervious to these 3 viruses; however,
    - If the skin is **not** intact e.g., through cuts or abrasions, or chronic dermatitis such as eczema, then transmission may occur;
- **Direct or indirect of exposure -** An assessment should be made as to whether exposure to blood/body fluids was direct, or indirect, e.g. through an item, such as a contaminated device or instrument.
    - If indirect, then in what way had the item become contaminated? Contaminated hollow bore needles (e.g. those used for injection) are more likely to transmit than solid needles (e.g. those used in suturing);
    - Needles that have been present in a blood vessel are more likely to transmit than needles used for intramuscular injection;
    - How soon after the sharps became contaminated did the exposure incident occur? The viability of the BBV will decrease rapidly on drying, so, for instance, transmission is very unlikely from a dried-up needle;
- **Personal protective equipment** use – e.g., were gloves in use? There is a wiping effect as a needle pierces a glove, which may reduce the likelihood of transmission.
- **The source**
    - If the source is known, it may be possible to determine their BBV infection status, or the presence of risk factors for BBV infection, from serological testing with informed consent or from medical notes; and
    - If the incident arose from an unknown source, a risk assessment may still be possible in the light of local knowledge of the prevalence of BBV infections.
- **Hepatitis B immunisation status of the recipient** - has the recipient previously received any doses of HBV vaccine? If so, was the vaccine effective?

7.2.3 Post-exposure management

Specific additional measures may sometimes be required following an incident where exposure to an infected individual, pathogen or contaminated surface occurs. Following an immediate hospital attendance, advice should be sought from the University's Occupational Health Adviser who will provide information on counselling services such as the Brownlee Centre or the staff counselling and employee assistance programme.

7.2.4 Reporting

All accidents, incidents and near misses must be reported immediately to the line manager / supervisor and by submitting an incident report via the SIRIS incident reporting webform.

8. RESEARCH PROJECTS INVOLVING VOLUNTEERS

The University seeks to ensure that, where investigations involving human beings as participants are undertaken within the University, in the course of teaching or research, standards set by professional bodies are conformed to. The UEC and associated DEC/SECs have been established to consider the ethical issues relating to such investigations. These committees aim to provide impartial advice to participants and investigators and to protect the dignity, rights, safety and wellbeing of all actual and potential participants. They are also responsible for providing ethical approval for investigations involving human participants. **Ethical approval is required prior to any such investigations commencing.**

Further information on ethical approval can be found in the 'Code of Practice on Investigations Involving Human Beings' which is available on the University's Ethics Committee website.

The following sections provide specific guidance relating to research projects involving University of Strathclyde staff and students volunteering as donors.

8.1 Ethics approval and consent

All projects which involve the use of staff or students as volunteers must have the prior approval of the HoD (or other nominated person) and either UEC, SEC or DEC approval. HoD approval should also be sought for non-invasive projects that would not normally be subject to ethical committee approval.

8.1.1 Informed consent

University staff or students who donate blood for experimental procedures should be asked to sign a consent form prior to doing so. A record should be kept of all significant donations giving the date and time of donation and the quantity of blood taken per individual. These should be reviewed at regular intervals to ensure that excessive frequency or volume of donation by an individual is avoided.

Although many of the procedures and techniques used in experiments on human subjects will be familiar to staff and student volunteers, investigators should not assume that it is unnecessary to explain fully the precise nature, purpose and possible effects of any experiment. A staff or student volunteer should be treated the same way as any other volunteer and should be asked to sign a consent form only after a briefing has been given.

It is left to the discretion of departments to devise consent forms best suited to their particular requirements, however in some cases these will be prescribed by the UEC. The University nevertheless advises that the issues outlined are given full consideration before a consent form is drawn up.

8.1.2 Undergraduate laboratories

Experiments involving human blood in undergraduate laboratories are rarely justified; therefore, any project or experiment involving the use of human blood samples taken by skin puncture from volunteer undergraduates or other persons must be approved by the HoD and the UEC prior to commencing work.

8.1.3 Insurance

Consent forms in themselves are not acceptable as disclaimers for the defence in any ensuing criminal action.

Guidance on Insurance details can be found in the code of practice in Annex 5 of the *Investigations Involving Human Beings* available on the University's Ethics Committee website.

8.1.4 Records

A record of donations, the total collected, and the purpose for which the blood was used should be kept by the project PI for at least 40 years (see Section 8.6).

8.2 Risk assessment

A COSHH assessment must be completed which will emphasise the use of individual 'one person-one use' disposable blood-letting equipment and the immediate safe disposal of such equipment. Risk assessment for the procedure should explain fully, the steps to be taken following an exposure to a BBV.

Risk assessments will generally be requested as part of the ethical approval and should be prepared in advance of the project commencing.

8.3 Recruitment

Members of staff or students must never be coerced, or placed in a position where they may feel under obligation, to volunteer for studies. We recommend that recruitment is undertaken by indirect rather than direct means, e.g. by way of a notice board announcement calling for volunteers or from a group gathering in which the value of volunteers to a particular study is explained by the project leader.

Staff or students should only participate in one experiment at a time and should not be paid for volunteering their services except on the same basis as other volunteers in the same study. In order to monitor staff involvement, a departmental list should be kept of staff participation, independent of the research records. As above, guidance should be followed using the 'Code of Practice on Investigations Involving Human Beings' available on the UEC website.

8.4 Blood donation

Blood samples should only be taken by a registered clinician, phlebotomist or other person trained and certified by a registered medical practitioner as competent. Samples should be taken in a suitable area set aside for this purpose and should never be taken in laboratories or non-clinical offices. When large quantities of blood are required, (e.g. >50 ml) a registered medical practitioner or registered nurse must be present.

8.5 Culture of own or close colleagues' cells or tissues

It is inadvisable to culture one's own or close colleagues' cells or tissues and unacceptable to use such cells in genetic modification experiments or if there is any risk of the cells becoming transformed in culture. The concern stems from the potential failure of the immune system to recognise as foreign, a cell that has been deliberately or inadvertently transformed or modified in vitro if those cells are then accidentally re-introduced into the original donor.

The following guidance should be followed:

- Transformation of one's own cells is dangerous and **must not be carried out under any circumstances**. When cells are put into culture and in particular when they are deliberately immortalised then the risk to the donor of those cells subsequently being recognised as "self" in the event of a needle stick accident should be recognised. Donors are therefore not permitted to handle their own immortalised cells or cells in long term culture where there is the risk of spontaneous transformation;
- A donor must not be present in the laboratory at any time when their cells are being handled by others and preferably should not have any access to these laboratories;
- A similar restriction applies to the use of host cells capable of colonising workers, for example the worker's own cells or those from other workers having access to the laboratory, in genetic modification activities involving the use of eukaryotic viral vectors; and
- Records of primary cell cultures and the individuals from whom they were isolated should be kept.

IF THE BLOOD IS TO BE USED IN GENETIC TRANSFORMATION WORK THEN THE DONOR MUST NEVER BE EXPOSED TO THEIR OWN CELLS AFTER ANY TRANSFORMATION WORK HAS BEEN CARRIED OUT.

8.6 Confidentiality

Information recorded relating to staff or student volunteers must be treated in the strictest confidence and subject to the Data Protection Act 2018. Arrangements for keeping study

information and access to it by other members of staff may need to be modified to accommodate this level of confidentiality.