



## Human Tissues, Blood and Samples

### 1. Introduction

This guidance is provided to help you understand the controls used for safe working with human tissues, blood, blood products, samples and any other related materials. The Control of Substances Hazardous to Health Regulations (COSHH) requires that suitable controls are used to protect people from exposure to biological agents. The controls described here are some of the common methods used to protect people from exposure to the biological agents which are associated with activities involving these types of materials in laboratories, although there are many others and exactly which controls are required has to be determined by risk assessment. This guidance does not however cover deliberate work with pathogens which would require their own specific risk assessments and more robust containment and control measures, and it is not aimed at workers carrying out activities in clinical settings at the point of contact with patients or volunteers or in any health care situation.

### 2. Guidance Sources for Human Tissues, Blood and Samples

There is general guidance and information on safe working with biological materials and BA risk assessment, containment and control available on other parts of the Biosafety Unit website. There is also extensive guidance on biological safety which is available from the Health and Safety Executive (HSE) and other sources which can be found below.

#### 2.1 Guidance

- [HSE ACDP Management and operation of microbiological containment laboratories](#)
- [HSE ACDP Approved list of biological agents](#)
- [HSE ACDP Infection risks to mothers and babies](#)
- [HSE Managing infection risks when handling the deceased](#)

#### 2.2 Websites

- [HSE Biological Safety](#)
- [HSE Biological Agents](#)

Please contact your School Biological Safety Adviser if you need advice on any aspect of biological safety including work involving human tissues and samples, pathogens, biological agents, BA risk assessments and control measures.



### 3. Risk Assessment and Controls

A BA risk assessment should be carried out for all work involving handling of human tissues, samples, blood, blood products and any other related materials. The risk assessment should deal with the scope and risks of the specific work activities and the biological materials involved and must determine what control measures are required to enable the work to be done safely.

#### 3.1 Scope and Risks

The nature and source of samples is relevant but is not the main factor in determining the risks relating to human tissues which must always be assumed to contain unknown pathogens and therefore be potentially infectious and hazardous. There is of course particular concern in relation to human pathogens such as the common blood borne viruses (BBV) like hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) which may be present in materials but there could be many other pathogens present in these types of materials. Nevertheless it is important to evaluate the source of the materials where this is feasible and whether they are from a general population or special population in relation to the incidence of any known human pathogens. Pertinent factors might include any relevant donor source information, whether the samples are from individuals or groups showing clinical symptoms of infectious disease, and the incidence of the various pathogens that are endemic in the general or local population.

Broadly for example, materials from the UK general population might normally be regarded as 'lower risk' whereas those from populations in which the incidence of specific pathogens was known to be significantly increased (eg intravenous drug users) would be regarded as 'higher risk'. If any materials are from populations or individuals known or strongly suspected to be infected with a hazard group 3 pathogen because of evidence, epidemiological or clinical indications, then these are obviously higher risk. Higher risk materials must only be handled strictly according to the requirements for the specific pathogens involved and must not be treated in the same way as used for the 'lower risk' general population materials.

It is however very important to remember that all human tissues and related materials must always be treated as potentially infectious as a general precaution since we usually do not know which ones do or do not contain pathogens?

It is worth mentioning also that we need to always consider whether a less hazardous substance, or form of the substance, can be used instead. If it can, then it should be used or justification be given as to why it is not being used. In many cases there will be good reasons for using samples from specific sources since these are the subject of the research, but if not needed then the least hazardous materials should be used.



### 3.2 Containment and Control Measures

Any work with human tissues, samples and related materials normally requires at a minimum the use of COSHH containment level 2 and related control measures. The following describes some examples of control measures used for handling human tissues and related materials but the exact types of controls which may be required and there are many others will depend on the specific type of work involved and the local risk assessment and should be proportionate to the risks. These controls may help to provide protection against inhalation, injection, ingestion and absorption, and contamination of working surfaces and equipment. Particularly important control measures when working with any human tissues and related materials are maintaining good working practice standards and avoiding or controlling the use of sharps to help to protect against the transmission of common blood borne pathogens by the skin injection exposure route.

- Local rules and standard operating procedures (SOP) should be drawn up to ensure that working practices take into account the measures necessary to control exposure that may arise from the specific work activity. Controls should be established and implemented for all aspects of work including safe handling, propagation, storage, transport, disinfection, inactivation and waste disposal, waste disposal and emergency procedures.
- Access to the laboratory must be restricted to authorised persons who have received training for work in that laboratory.
- Dedicated equipment should ideally be used for work with human materials.
- Systems of work should be in place to ensure that the person carrying out the work is free from the risk of disturbance from others in the laboratory.
- All specimen reception should be undertaken in the laboratory by trained workers. Arrangements should be made to ensure that untrained workers do not inadvertently handle samples particularly if these are received in the postal system.
- There should be sufficient room to work safely. There should be enough bench space to ensure the workstation is not cluttered and working practices are not compromised due to lack of space.
- Appropriate control measures must be adopted where handling or processing may generate aerosols, large droplets or splashes.
- A microbiological safety cabinet or other relevant form of enclosure or containment should be available for use in the laboratory and any procedures that may give rise to potentially infectious aerosols must be conducted in the cabinet or containment.
- The use of sharps should be avoided. If this is not feasible then handling procedures should be designed to reduce the risks of sharps injuries. The term sharp should be taken to refer to any item that is sharp and not be restricted to needles and scalpels. Commonly used items that could easily cause damage to the skin include all glass items like microscope slides and cover slips, ampoules, pointed nose forceps, dissection instruments, scissors, wire loops that are not closed circles and gauze grids used in electron microscopy work. This list is not exhaustive and all items should be assessed for sharp edges.



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- Use of sharps resistant gloves for procedures involving sharps is to be highly recommended since the risks of exposure by the injection route is high when working with human tissues and related materials. There are lightweight sharps resistant gloves available which can be worn underneath standard laboratory gloves.
- If it is necessary to use disposable sharps then used sharps should be placed directly into a sharps bin. Equipment should not be put down and transferred later as this increases the risks. Needles should not be re-sheathed. All sharps and hypodermic needles must be disposed of directly to a sharps waste container. Sharps bins should not be overfilled since used sharps protruding from bins are very dangerous for those who have to handle them. Sharps and sharps bins must never be placed in plastic waste bags.
- Reusable sharps should be safely contained as soon as practicable after use so they do not pose a danger and can then be safely transported, stored and cleaned.
- Personal protective equipment (PPE) should be used by workers where required such as lab coats, gloves, eye protection etc.
- Gloves should be worn at all times when handling samples in the laboratory.
- Gloves should be removed and disposed of, hands should be washed and clean gloves put on if during use they become damaged or contaminated.
- Gloves should always be removed and discarded and hands should be washed on completion of work.
- Eye protection (eg goggles or safety glasses) and a plastic overall should be worn if splashing is likely to occur.
- Good basic hygiene practices and good microbiological practices including regular handwashing, must be practised at all times.
- Since infections can occur via lesions in the skin all workers in the laboratory should cover cuts and abrasions with a waterproof dressing.
- Contamination of benches and equipment should be avoided and at the end of each working session or day these should be routinely cleaned and disinfected.
- Equipment must be decontaminated prior to maintenance work.
- Suitable disinfectants should be selected and used where required for decontaminating equipment, surfaces and waste materials. The disinfectants, concentrations and contact times used should be specified for work involving human tissues blood and other related materials.
- All surfaces should be disinfected immediately following any spillage, at the end of the working day and before any maintenance or cleaning staff are permitted to work in the area where work with blood or blood products has been carried out.
- Local rules must specifically state the arrangements for disposal of contaminated materials and all contaminated waste must be safely disposed.
- Human tissues, blood and samples must be safely transported to and from the laboratory.
- Safety critical procedures should be available and displayed where needed in the laboratory for use by workers on the safe operation of key equipment and emergency procedures etc.
- Emergency procedures (eg personal exposure, spillage, release etc) must be available to workers preferably on a laminated sheet in a brief list of bulleted or numbered



actions and put up on display in locations in the lab where needed and they should be clearly visible and readable so that they can be followed in an emergency.

- Emergency and first aid procedures must be implemented where needed following an incident and the incidents must be reported and investigated to help prevent the recurrence of similar incidents.

### 3.3 Immunisation

Vaccination may be offered to workers handling infectious materials although this must be specified in the risk assessment. In particular HBV vaccination may be offered for work with human tissues or other related materials. Further information on vaccinations can be found on the University Occupational Health Service website.

### 3.4 Information, Training and Supervision

Managers and principal investigators must provide workers with the necessary information, instructions and training on the general and emergency procedures and be properly supervised to enable them to safely carry out their work.

### 3.5 Incident Reporting and Investigation

Incidents should be reported to the manager responsible for the work and as soon as practicable to the Health and Safety Department using the incident reporting system. Incidents should be investigated by Schools and managers to identify the root causes and especially to help prevent the recurrence of similar incidents.

## 4. Controls for Work with Human Pathogens and Genetically Modified Organisms

Finally please note that it is a requirement under the COSHH Regulations that if any hazard group 3 pathogens are known or strongly suspected to be present in the material then they must be handled in a full or derogated containment level 3 laboratory subject to risk assessment, GMBSC approval, HSE notification and consent. Note also that if the work involves genetically modified organisms then the requirements of the Genetically Modified Organisms (Contained Use) Regulations (GMOCU) would in addition have to be applied. If there is any likelihood that materials might contain hazard group 4 pathogens these must not be brought in to the University. The School Biological Safety Adviser should be contacted for further advice where needed.



## Document version

Version number	Summary of change	Date and by whom
V1.0	New template	June 2023 HE
V1.1	Minor updates to text and links	January 2024 PH

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