**Managing the risks of infection in the mortuary, post mortem room, funeral premises and exhumation**

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Contents

[Introduction 1](#_Toc431820873)

[Section 1 Risk Assessment 4](#_Toc431820874)

[Section 2 Training and competence 9](#_Toc431820875)

[Section 3 Occupational hygiene precautions 12](#_Toc431820876)

[Section 4 Collection, transportation and transfer of information relating to the deceased 16](#_Toc431820877)

[Section 5 Managing the risks of infection in the post mortem room and mortuary 20](#_Toc431820878)

[Section 6 Managing the risks of infection in funeral premises 30](#_Toc431820879)

[Section 7 Managing the risks of infection in exhumations 38](#_Toc431820880)

[Appendix 1 Key infections in the deceased which require application of transmission based precautions 43](#_Toc431820881)

[Appendix 2 Hazard notification sheet 45](#_Toc431820882)

[Appendix 3 Cleaning and decontamination 46](#_Toc431820883)

[Appendix 4: Health surveillance and immunisation 48](#_Toc431820884)

[Appendix 5: Dealing with incidents and accidents 50](#_Toc431820885)

[Appendix 6: Managing exposure and post-exposure prophylaxis 52](#_Toc431820886)

[Glossary 53](#_Toc431820887)

[References 54](#_Toc431820888)

# Introduction

1. This publication provides guidance on managing the risks of infection when handling the deceased. It is aimed at those in:
* The mortuary and post mortem room – anatomical pathology technologists (APTs) and pathologists;
* Funeral service – funeral directors and their staff, including embalmers;
* Exhumations - cemetery employees, the police, Environmental Health Officers (EHOs), archaeological researchers and redevelopment/construction companies.
1. This guidance may also be useful for workers who come into contact with the deceased through their work activities, such as ambulance workers, the police or porters/domestic cleaners etc. The guidance does not cover infection control in healthcare settings caring for patients.

**What is in the guidance and how to use it**

1. The guidance is structured to reflect the pathway of the deceased from death to burial or cremation and where required, exhumation. It considers the risks of infection that may be present along that pathway (see Figure 1). Sections of the guidance are intended to reflect each stage in the pathway and as such, some sections will be more relevant to you than others.
2. The pathway is colour-coded to help direct you through the guidance. This ensures you can focus on areas most relevant to your particular work activity. Some sections of the guidance are common to all aspects of managing the risks of infection from the deceased, and will be relevant to all.

**Risk of infection from the deceased**

1. Workers in a range of different occupations are required to handle the deceased at various stages of the pathway from death to burial or cremation and as such, may be exposed to a risk of infection eg during preparation of the deceased by funeral service staff, at post mortem examination and during the process of exhumation.
2. In the UK, a relatively small number of deaths each year (approximately 70,000) are known to be caused by infectious diseases. Although infection may not have been the cause of death (as officially recorded), individuals may have either had an infectious illness at the time of death, or else have been infected without showing any obvious signs or symptoms.
3. This guidance provides advice on how to manage the risks of infection using the principle of standard precautions and transmission based precautions. The term ‘standard precautions’ is used to describe the minimum control measures that should be implemented to manage the risk of exposure from work activities involving the deceased. The guidance explains for some activities that present an increased risk of infection, additional measures are required over and above standard precautions – these are referred to as ‘transmission based precautions’.
4. Transmission based precautions are control measures that should be implemented when the deceased are known or are suspected to have an infection. These should be implemented, as required, in addition to standard precautions. Transmission based precautions are categorised according to the route of transmission of the infectious agent, ie – airborne, droplet or contact transmission (see Section 1 Risk Assessment).
5. Appendix 1 provides a table of the key infections that may be found in the deceased and provides an indication to the activities that may or may not be undertaken, some of which should only be carried out when applying transmission based precautions. This table is not exhaustive and a risk assessment must also be carried out to ascertain whether the risk of infection can be adequately managed. The key consideration in this is the route of transmission of the infection and which transmission based precautions need to be implemented.
6. The process of infection is often compared to the links in a chain - breaking a particular link in the chain at any point will often control the risk of infection. More information relating to the chain of infection is provided in Section 1 Risk Assessment.

**Health and safety management**

1. Duties under the *Health and Safety at Work Act etc. 19741* apply to the risks of infection that may arise from work activities. However, where you are self-employed and your work activity poses no potential risk to the health and safety of other workers or members of the public, then health and safety law will not apply to you. If you are self-employed and employ others the law will apply to you. For more information see HSE guidance on the self-employed2.
2. T*he Management of Health and Safety at Work Regulations 1999*3 provides a broad framework for managing health and safety at work. This extends to a responsibility to coordinate and cooperate between employers sharing a work premises. Given the involvement of different professions, it is imperative that there is an adequate and appropriate exchange of information between the people involved in different stages. This information is of direct relevance to completing a suitable and sufficient risk assessment, leading to the effective control of infection risks from the deceased.
3. More specifically, the *Control of Substances Hazardous to Health (COSHH)* *2002*4 provides a framework of actions designed to control the risk from a range of hazardous substances, including infectious microorganisms (defined as biological agents in COSHH).
4. COSHH requires employers to consider the main hazards associated with work activities, and how exposure to harmful substances (eg microorganisms) can be adequately controlled. This guidance is intended to help employers to:
5. Identify and assess the risks based on information they are provided with;
6. Take precautions to eliminate or adequately control the risks; and
7. Prepare and implement effective and safe working practices, which set out the procedures and precautions to be taken by all employees, contractors’ staff and visitors on their premises.
8. You have a duty under health and safety law to consult your employees about health and safety matters; this includes safety and union representatives. As well as giving employees information, you need to listen, and take account of what employees say before making any health and safety decisions. Employees may be able to tell you about hazards that they have come across when carrying out their work and assist with the risk assessment process (see Section 1 Risk Assessment).

**Figure 1** The path of the deceased from death to burial or cremation & exhumation

**Deceased person – collection & transport**

**Funeral Directors**

*Transfer of information;*

*Risk assessment*

*Information, instruction & training*

*Occupational hygiene measures*

**Body Preparation**

**Exhumation**

**Post mortem**

Deceased person in Mortuary

Deceased person at home

**Embalming**

**Burial**

**Cremation**

*Transfer of information;*

*Risk assessment*

*Information, instruction & training*

*Occupational hygiene measures*

*Transfer of information;*

*Risk assessment*

*Information, instruction & training*

*Occupational hygiene measures*

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| Section 1 Risk Assessment |

1. This section is aimed at all those involved in handling the deceased. This section explains the process of carrying out a risk assessment. More detailed information about the risks arising from specific activities is explained in the relevant sections.
2. While this guidance focuses on managing the risks of infection, risk assessments should also cover other risks including manual handling (eg moving bodies) and use of chemicals (eg disinfectants and embalming fluid). Fatalities resulting from industrial accidents or poisoning episodes may present an increased chemical or radiological exposure risk to those performing post mortem examinations and embalming. Although rare, such circumstances do need to be assessed on a case by case basis.
3. When preparing a risk assessment you need to obtain competent advice if you do not have sufficient knowledge and experience to complete the process yourself.

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| **Chain of infection**The process of infection can be represented as a chain – breaking a link in the chain at any point will control the risk of infection. When you identify the hazard, you need to find out about the links in the chain to help you identify the best way to break the chain and so control the risk.[insert chain of infection diagram]  |

**Sources**

1. There are four main sources of infection that you need to consider when handling the deceased:
2. Blood and other body fluids (for example saliva, pleural fluids);
3. Waste products, such as faeces and urine;
4. Aerosols of infectious material, such as might be released when moving or opening the body; and
5. Direct contact with tissues, eg skin.

**Transmission**

1. In order to become infected, the microorganism has to get from the source into the host by some means. Most microorganisms usually have a particular route of entry, but in some cases infection can occur by more than one route. Infection can occur via:
2. Airborne transmission - breathing in small airborne particles (aerosols) from the air which can be generated by post mortem procedures involving high-speed devices;
3. Droplet transmission - breathing in infectious droplets which are produced from the respiratory tract during moving or opening the body or splashes or spraying of blood and other body fluids;
4. Contact transmission – this is broken into two distinct types:
	* + 1. Direct - splashes of blood and other body fluids into the eye or other mucous membranes, such as the nose and the mouth or broken skin if it comes into direct contact with the microorganism (or something contaminated by microorganisms); and
			2. Indirect – Putting contaminated hands and fingers (or pens etc) into the mouth, nose or eyes, or a skin penetrating injury, for example via a contaminated needlestick or other sharp instrument.

**Host**

1. Unbroken skin and the lining of the mouth, throat and gut and airways all serve to provide a barrier to infection. The cells of these linings and other substances they produce are the body’s first line of defence. If a microorganism does manage to cross the barrier, the next line of defence is the immune system. Whether or not an infection occurs depends on the outcome of a contest between the microorganism and the immune system.
2. Some people may be more susceptible to infection than others, for example those with reduced immunity because of a pre-existing illness, as a result of some medical treatments or new and expectant mothers (see HSE guidance on new and expectant mothers5). Some people may be naturally immune to disease, for example because they had the disease as a child or else have been immunised. You should check this before employees start work, so that you can make sure they are protected or give them less hazardous work to do (see Appendix 5 Health surveillance and immunisation).

**Infections which present an increased risk of infection to those handling the deceased**

1. Those infections which are known to present an increased risk of infection in the deceased when undertaking certain procedures, such as a post mortem examination or embalming, are indicated in Appendix 1.
2. When a body is known or suspected to be infected with an infection listed in Appendix 1, the need for a post mortem examination or embalming should be considered carefully. This is because the likelihood of exposure to blood, body fluids or airborne particles is greater and requires additional precautions, known as transmission based precautions, to further reduce the risk of exposure.
3. Employers need to ensure that anyone handling these types of bodies know about the risks and follow the safe working practices (see safe working practices in the relevant sections). Examples where transmission based precautions should be applied are:
4. The transmission of blood borne viruses can predominantly occur from inoculation through the skin, but can also take place through splashing, so contamination of the eyes and mucous membranes may result in infection hence the need to apply transmission based precautions.
5. *Mycobacterium tuberculosis,* which presents a serious risk of infection by inhalation in circumstances where aerosols are generated (eg post mortem examination). In such circumstances, additional transmission based precautions are required to control exposure to aerosols.
6. Creutzfeld-Jakob Disease (CJD) in the deceased presents a risk of exposure to Major prion protein (PrP), predominantly via inoculation injury. However, PrP are resilient and also present challenges for disinfection.
7. Post mortem examinations and embalming should not be carried out on the deceased known to be infected with the most hazardous microorganisms (referred to as a hazard group 4 microorganisms, eg ebola virus) except under exceptional circumstances (ie clinical or medico-legal reasons) by specialised units.

**Risk assessment**

Identify the hazards

1. You need to consider how your employees or others entering your premises might be exposed to a risk of infection. For example, direct contact with the deceased as well as contact with objects such as contaminated sharps, soiled work surfaces, clothing, coffins, soil, vehicles etc that may have become contaminated with infectious microorganisms. Table 1 below shows activities and requirements that need to be considered as part of the risk assessment.

**Table 1** Arrangements, processes and procedures to consider when handling the deceased

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| **Specific arrangements/ process/procedure** | **Relevant to mortuary & post mortem staff** | **Relevant to funeral service staff/embalmers** |
| Buildings and facility design to facilitate safe occupational hygiene procedures | **Yes** | **Yes** |
| Transport of the deceased from initial collection point | **No** | **Yes** |
| Formal receipt and storage of the deceased | **Yes** | **Yes** |
| Post mortem examination | **Yes** | **No** |
| Hygienic treatment (first offices such as washing, dressing, trimming hair, nails etc) | **Yes**  | **Yes** |
| Embalming  | **Occasionally** | **Yes** |
| Safe supervision of visitors/observers to the premises | **Yes** | **Yes** |
| Cleaning and decontamination | **Yes** | **Yes** |
| Other domestic duties eg cleaning of vehicles, laundering | **No** | **Yes** |
| Waste disposal | **Yes** | **Yes** |
| Information, instruction, training and monitoring  | **Yes** | **Yes** |
| Health surveillance and immunisation | **Yes** | **Yes** |
| Dealing with incidents and accidents | **Yes** | **Yes** |

1. The risk of infection will be determined in part by the following factors:
2. Which microorganisms may be present;
3. Their virulence (severity of the disease caused);
4. The routes of infection, ie airborne, droplet or contact; and
5. Their transmissibility (some microorganisms can be transmitted by more than one route).

Decide who might be harmed and how

1. Once you have identified the source(s) and routes of infection in your work place, you need to consider how likely it is that infection will result - think about:
2. How often the task is carried out
3. The task being undertaken and the equipment being used (eg sharps);
4. How many employees are exposed; and
5. How much infectious material (ie body fluids) is being handled.
6. The people who could be exposed to the deceased or contaminated materials/areas include trained staff at your premises but also visitors such as police, students, and relatives of the deceased or contractors, including cleaners.

Evaluate the risks

1. The risk is the likelihood of harm occurring. Employers need to evaluate likely risks arising from any exposure to infectious microorganisms, taking into account:
2. the clinical history of the deceased, where available, and the prevalence of particular infections in the community;
3. the nature of any likely contact with the body, including the amount of leakage and potential contamination of clothes, equipment or contact with blood or body fluids;
4. the likelihood of infection from microorganisms present;
5. the individual susceptibility of people working in the mortuary;
6. the severity of the diseases caused and how easily it is spread.
7. Once you have carried out your risk assessment, your first duty under COSHH is to stop your employees from being exposed to a source of infection. You should consider if you can:
8. changing the way that you work so that the activity/equipment that exposes your employees to a source of infection isn’t needed any more; or
9. modifying your work to cut out any hazardous by-products or waste.
10. When deciding if existing measures are adequate or whether further controls are necessary, employers need to evaluate the suitability and effectiveness of their working facilities and working practices for their staff and others. Where assessments identify the need for improvements, employers need to plan how to do this and make sure their plans are put into action.
11. If you can’t prevent exposure, then COSHH requires that you adequately control it. This means controlling exposure, ie the risk of infection, to a level that won’t harm people’s health. However, you need to remember that, unlike some chemicals, there are no exposure limits for microorganisms and your control measures need to take into account the fact that:
12. microorganisms can grow and multiply; and
13. infection could be caused by exposure to only a few microorganisms.
14. Controlling the risk of infection is fairly straightforward and there are a number of basic measures that you should use for most activities such as good occupational hygiene measures (see Section 3 Occupational hygiene precautions), in the areas where work activities are carried out and the equipment/tools that are used.
15. Additional measures, ie those used in addition to the basic controls, and/or specific measures for post mortem examinations, embalming and exhumation are explained in the relevant sections.
16. For control measures to work you need to provide information, instruction and training (see Section 2 Training and competence) so that your employees know about the risks that you have identified and the measures you have put in place to control exposure. They need to know and understand when and how to apply the controls, including the use of personal protective equipment; and what to do in an emergency.

Record your significant findings

1. The main findings of the risk assessment must be written down in all but the simplest of cases. Employers often incorporate these in the safe working practices. These procedures are then used as working documents for managers, employees and safety representatives.

Review your risk assessment and update if necessary

1. Employers should review their risk assessments regularly to check that they are still valid. Remember, risk assessments are living documents and should reflect any changes in the work that you do, new equipment that is used or a new work activity that is added if this changes the risk or leads to new hazards being introduced. Some useful things to consider when reviewing are whether:
2. Safe working practices are relevant to current work being undertaken at the premises;
3. Equipment such as personal protective equipment for particular activities is available, suitable and being used, stored and disposed of properly;
4. Staff have received appropriate information, instruction and training about their work (see Section 2 Training and competence);
5. The system for reporting and responding to accidents, incidents and cases of occupational disease is in place and being followed (see Appendix 5 Dealing with incidents and accidents).
6. It is important to learn from situations when things go wrong. The risk assessments should be reviewed in light of any accidents or incidents that have occurred.
7. If you identify gaps in your risk assessment, you should revise it and make any necessary changes. As an employer you also need to make practical checks to ensure that staff and visitors are following the safe working practices appropriately. By actively monitoring whether systems are working you can improve them without waiting until something goes wrong. This is a key part of a successful monitoring regime and part of a line manager’s responsibility. Further guidance on managing for health and safety6 and risk assessment7 is available on the HSE website.

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| Section 2 Training and competence |

1. This section is aimed at all those involved in handling the deceased. This section explains and emphasises the importance of providing information, instruction and training to employees, contractors and visitors so they know the safe working practices and procedures applicable to them while working in, or attending the mortuary, post mortem room, funeral premises or undertaking an exhumation. The section also explains the importance of ensuring employees competence to carry out activities which may expose them to infectious microorganisms.
2. The extent of the information, instruction and training will vary with the complexity of the hazards, risks, processes and controls associated with the activity. For example, given the increased risk associated with invasive procedures on the deceased such as post mortem examination and embalming, the training should be more detailed and supported with appropriately detailed documentation. For more basic activities, such as simple handling of the deceased, the information, instruction and training, as well as records of this having been provided, may be appropriately captured in a single code of practice or local rules. The measures taken to demonstrate competence should be similarly proportionate to the level of risk and complexity of the task.

**Information, instruction and training**

1. Employers are required to identify particular staff needs, including any gaps in knowledge and/or experience and provide the necessary information, instruction and training. This information could be given in the form of verbal instructions, or else it may form part of written job instructions/the local code of practice or safe working practices.
2. You should also encourage employees to obtain relevant vocational and educational qualifications, for example:
3. For APTs - The Royal Institute of Public Health (RIPH), which is accredited by the Qualifications and Curriculum Authority, provides nationally recognised qualifications for APTs at Certificate and Diploma level. Qualifications are awarded after assessment by written examination, practical assessment, and oral examination. The qualifications are recognised within the system of Clinical Pathology Accreditation; and
4. For the funeral and embalming industry - the Diploma in Funeral Directing or other relevant qualifications offered by the British Institute of Embalmers, ICCM Diploma, SCOTVEC or BTEC.
5. As well as providing information and training for those regularly involved in routine activities, others who visit the mortuary, such as cleaners or porters, need appropriate information and instruction on the hazards they may face and what to do about them. This is particularly important where managers are not responsible for the recruitment and supervision of such staff, for example when work is contracted out.

**Competence**

1. Completion of a training program does not automatically ensure that users are competent and able to do their job safely. To provide assurance that risks from work with the deceased are being adequately controlled, an assessment of the employees understanding of their information, instruction and training (ie competency) should be performed. The competency assessment measures a trained user against a set benchmark.

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| **What is competence?**Competence can be described as the combination of training, skills, experience and knowledge that a person has and their ability to apply them to perform a task safely. Other factors, such as attitude and physical ability, can also affect someone’s competence. |

1. Competence can be assessed in different ways. It can involve simple written or verbal tests of knowledge; observing people using the skill that has been taught; collecting evidence of demonstrated skills for assessment; or setting up an assessment exercise to test how they act and respond to a situation. The method used should be appropriate for the knowledge and skills, and the competency level for the task.
2. Training and competency is not a one-off exercise and unless it is periodically repeated there is a risk that the competency of the users will diminish over time. There is no defined period in which refresher training and assessment should be performed as it will be dependent on the complexity and risks associated with the work.

**Information, instruction and training for handling the deceased with an increased risk of infection**

1. Where employees are carrying out invasive procedures, such as post mortem examinations or embalming, on the deceased known to be or suspected to present a risk of infection (eg those infections listed in Appendix 1), additional information, instruction and training is required.
2. This training may have already been undertaken as part of the relevant vocational and education qualifications mentioned in paragraph 45, eg a specific module of a qualification which focuses on increased risk activities. Alternatively, this can be assessed based on an employees’ level of experience and therefore competence of carrying out these types of procedures and their level of understanding of the risks involved.

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| **Employees carrying out increased risk activities need to:**1. Be aware of the risks involved with carrying out invasive procedures on the deceased which present an increased risk of infection;
2. Understand how to implement transmission based precautions;
3. Be competent in carrying out such procedures;
4. Ensure the appropriate personal protective equipment is worn;
5. Ensure there is plenty of time to carry out the procedure at a slower rate to prevent contamination and likelihood of exposure to any infection;
6. Work as part of a team, where required; and
7. Ensure tools and equipment are placed in a safe place to prevent any injuries to other members of the team.
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**Monitoring**

1. The overall responsibility for health and safety in mortuaries, post mortem rooms and funeral services rests with the employer and cannot be delegated. Employers must therefore make arrangements to manage health and safety. This can only be done effectively with line management communication.
2. To carry out their job effectively, designated safety managers need:
3. Appropriate training in safety procedures and requirements;
4. Authority from their line management;
5. Sufficient time to carry out their duties.
6. Many funeral service businesses are likely to be small to medium sized and operate using a small team of similarly qualified employees. Even if this is the case it is possible for:
7. Responsibility for health and safety to be allocated to a named member of the team. This may be the premises manager within a small business;
8. For the responsible person to ensure that sufficient time and diligence is set aside for health and safety related planning and decisions.

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| Section 3 Occupational hygiene precautions |

1. This section is aimed at all those involved in handling the deceased. This section explains and highlights the importance of good occupational hygiene precautions as a means of controlling the risks of infection from the deceased.
2. These measures are a combination of organisational arrangements, safe working practices, and use of personal protective equipment (PPE) and behaviours.

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| **Occupational hygiene precautions include:**1. Providing clear demarcation of clean and dirty areas within the workplace to prevent contamination (see section below on segregation of clean and dirty areas);
2. Prohibiting drinking, eating, smoking or applying cosmetics in any work or rest area within a mortuary. Such activities should only be permitted within a designated restroom or canteen, separate from the mortuary;
3. Always washing hands before leaving any of the designated work areas where the deceased are handled;
4. Working in a manner that avoids bringing hands (gloved or otherwise) into contact with the face, eyes, nose and mouth (eg cleaning and touching spectacles or contact lenses);
5. Always wearing the appropriate PPE in work areas (see section below on PPE);
6. Using dedicated clothing for work with the deceased – for post mortem examination/embalming this involves changing from outdoor clothing to appropriate PPE;
7. Removing dedicated PPE after use and not wearing it outside the mortuary;
8. Disposing of contaminated waste safely (see section below on disposal of waste);
9. Protecting any broken skin with waterproof dressings before starting work;
10. Ensuring people with open wounds or active dermatitis on exposed skin do not come directly into contact with the deceased, body fluids or specimens, unless the wound/affected skin can be adequately protected by dressings; and
11. Referring skin problems, especially on the hands, to the Occupational Health advisor or a doctor before an individual is permitted to handle the deceased.
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**Segregation of ‘clean’ and ‘dirty’ areas**

1. Mortuaries, post mortem rooms and funeral premises should have designated ‘clean’ and ‘dirty’ areas to ensure that individuals do not spread contamination. Examples of what might be included within the different areas have been listed in Table 2.

**Table 2** Examples of area segregation for infection control

|  |  |  |
| --- | --- | --- |
| **Clean areas** | **Transition zones\*\*** | **Dirty areas** |
| Reception and waiting areas  | Showering facilities | Post mortem /hygienic preparation/ embalming room |
| Viewing rooms | Washing facilities | Utility room (eg housing contaminated materials) |
| Stock and linen stores | Storage areas for reusable protective clothing | Soiled protective clothing discard area |
| Offices, rest rooms and canteens | Changing rooms | Refrigerators in body storage area |
| Post mortem examination observation area |  |  |

\*\*Transition zones are those located between clean and dirty areas to allow staff and visitors to change into the appropriate PPE before going into the post mortem /hygienic preparation/embalming room or moving between clean and dirty areas.

1. Demarcation of clean and dirty areas can be by a physical barrier, signage, or a red line or similar marking on the floor. Where barriers are used they should be clearly visible. Warning notices (eg relating to risk of infection) are required at the points of access to and exit from the dirty areas. Safe working practices also need to set out the precautions required for work in the dirty areas, such as the body store, including the precautions for anyone delivering or collecting bodies.
2. Safe working practices should specify local arrangements for transition zones. The procedures should be based on careful consideration of:
3. The local layout and a practical route for movement of work and people;
4. Where people access and exit the area; and

c) How levels of contamination may change (high – when a post mortem examination or embalming is in progress; low – once the post mortem or embalming room has been cleaned and disinfected).

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| **Measures to prevent contamination of clean areas include:**1. minimising unnecessary movement of people and materials within the mortuary;
2. preventing unauthorised entry;
3. clearly marking clean and dirty working areas; and
4. ideally maintaining a one-way flow from the clean to the dirty areas.
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**Personal protective equipment**

1. The use of PPE is one of the control measures for managing the risk of infection. Appropriate PPE should be identified and worn and the items worn will depend on the nature of the risk and the outcome of a risk assessment. Gloves and aprons will control personal contamination for most routine activities.
2. The term standard precautions includes the minimum standards of PPE which should be adopted to minimise the risk of infection from the deceased. When carrying out invasive procedures, such as post mortem examinations and embalming, on the deceased known or suspected to present a risk of infection, transmission based precautions should be implemented.
3. A supply of suitable disposable gloves in various sizes and materials should be readily available. Safe working practices need to take account of the potential for sensitisation to latex and, if necessary, include arrangements for staff that have been sensitised. Other materials, such as nitrile, are available and latex should only be used if the gloves are low protein and powder free. Further guidance on the selection of gloves is available on the HSE website8.

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| **Use of personal protective equipment**Safe working practices need to specify the arrangements for using PPE. They should explain why it is needed, when to use it and what its limitations are. This should include appropriate decontamination, during and after use. The following actions need to be considered and included:1. Washing blood or other body fluids from gloves frequently during periods of work;
2. Changing perforated or split gloves immediately and thoroughly washing hands before putting on a new pair to prevent contaminating the skin;
3. Removing reusable PPE worn in a dirty area before entering the clean area and placing it in a dedicated and appropriately labelled laundry container;
4. Placing used disposable PPE, such as gloves or aprons on the dirty side of the barrier, in a clinical waste bag for disposal; and
5. Decontamination procedures for reusable PPE should be compatible with local infection policies.
 |

**Disposal of waste**

1. Safe working practices should detail the waste disposal requirements for the mortuary. Consideration must be taken as to whether the waste will leave the site for disposal and be transported by road. Reference should be made to HSE guidance on the transport of dangerous goods by road. For hospital post mortem facilities, safe working practices should also be compatible with the hospital trust policies on waste disposal.
2. All waste from the post mortem and embalming rooms should be classified as clinical waste and further guidance is available in *Management and disposal of healthcare waste9.*

**Facilities for changing clothing and washing**

1. Where changing and shower facilities are provided (eg staff working in the post mortem and embalming room), they should be conveniently situated so they do not themselves become contaminated, be appropriate for the type and scale of work (eg sufficient to accommodate the number and frequency of workers) and be designed to prevent spread of contamination from PPE to personal clothing.
2. Where required, staff and visitors should be provided with appropriate PPE and there should be suitable separate storage for work and outdoor clothing and adequate space for PPE. All storage areas need to be secure, clean, dry and well ventilated.

**Rest facilities**

1. Where possible, employers should set aside a clean area, where employees can take breaks, prepare and eat food and drink (eg staff restroom). This needs to be separated from dirty areas but convenient for access from both the working and washing facilities. Where it is not possible to set aside an area, rest breaks and meal breaks should not be allowed in work areas. Employees should remove any PPE and contaminated clothing when leaving a dirty work area and not enter clean areas wearing PPE.

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| Section 4 Collection, transportation and transfer of information relating to the deceased |

1. This section is aimed at those involved in the collection and transportation of the deceased, such as funeral service or ambulance staff. It explains the need for precautions that need to be implemented at this stage in the process to control the risk of infection. The collection and transportation may be from the community (eg a home or other premises) or from the mortuary.
2. A key component of this section is the importance of transferring appropriate information from different parties about known or suspected risks of infection from the deceased.

**Initial collection of the deceased and appropriate transfer of information**

1. Prior to collection of the deceased from the community or from a NHS or public mortuary, you should find out as much information as possible or be informed about the condition of the deceased and any potential infection risks.
2. When collecting a body from the community, the coroner, the doctor certifying the death, the police or medical examiner are best placed to provide this information. This information is essential to ensure the collection is adequately planned, coordinated and executed. This includes application or availability of any appropriate equipment (eg body bags) or control measures (eg PPE) that may be identified as being required.
3. To facilitate the exchange of appropriate and sufficient information, Appendix 2 of this guidance provides a template for the type of information that should be provided with the deceased - this is known as the ‘hazard notification sheet’.

**Hazard notification sheet**

1. The hazard notification sheet should be completed when there is a known or suspected risk of infection from the deceased. It provides the necessary information so that those handling the deceased can carry out a risk assessment and ensure the risks of infection can be controlled appropriately (these are explained further in the relevant sections). In many cases, it may not be possible to provide specific details of the infection (see paragraph 77) but as a minimum it provides the means of transmission of any infection such as airborne, droplet and contact. This information is essential to enable those handling the deceased to implement appropriate control measures.
2. In some cases, the deceased may have requested that information relating to their health remains confidential (eg infection status). The General Medical Council provide information about confidentiality after a patient’s death in their general medical practice guidance10. This guidance says that the duty of confidentiality continues after a patient has died. Whether and what personal information may be disclosed after a patient’s death will depend on the circumstances. Where there is a known or suspected risk of infection, and the deceased has requested such information to be withheld, it is appropriate that specific details of the infectious agent are not disclosed. However, information on the route of transmission should be provided to those who require the information to handle the body safely.
3. Where the specific infection is known and the appropriate consent has been provided to disclose this information by the deceased before their death, or by their family, then this should be included on the hazard notification sheet. This information is helpful but not essential to ensure that the appropriate control measures are applied.
4. When provided with relevant information, it is important to remember that this information is passed on, in an appropriate form (eg what control measures to apply), to others (eg employees, non-employees such as embalmers and in some cases relatives) who need to handle the body.

**Implantable medical devices**

1. While not an infection risk, cardiovascular implanted electronic devices (CIEDs) such as permanent pacemakers and implantable cardioverter defibrillators (ICDs) present a risk to those performing post mortem examinations. Some of these devices need to be deactivated before any attempt is made to remove them or to perform a post mortem examination to mitigate the risk of electric shock to the person carrying out the procedure.
2. The hazard notification sheet includes information on whether an implantable device is still present in the deceased as they need to be removed before cremation because of the potential for explosion when such devices are heated.
3. The removal process may be carried out within a hospital mortuary, or at the funeral service premises. Funeral service staff should first check to see if a device has already been removed by checking the hazard notification sheet or obtaining information from the deceased’s GP, hospital or relatives.
4. Arrangements should be in place to ensure safe disposal of these devices after removal. Guidance on safe removal of implantable defibrillators is available from the Medicines and Healthcare Products Regulatory Authority11.
5. These and other devices, should be returned to the local hospital, where possible, for decontamination and return to the manufacturer for final disposal. This requires written consent from the relatives of the deceased where this can be obtained.

**Safe working practices**

1. When transporting the deceased with a known infection risk, (eg from a mortuary to the funeral premises or from the collection point to a mortuary), a body bag will minimise the potential for exposure of workers and contamination of the vehicle. Some hospitals use body bags for all the deceased as standard practice to minimise leakage of body fluids. If the body bag has been used to control the risks of infection, the mortuary staff should have completed a hazard notification sheet which will provide information on why the bag has been used.
2. Similarly, if the deceased collected from the community has undergone significant deterioration, a body bag should be used. It may be necessary to use additional waterproof containers.

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| **General precautions for funeral service staff and other staff during delivery or removal of the deceased to and from the mortuary:**1. Never smoke, eat, chew, drink or do anything else that will bring your hands into contact with your mouth, eyes or nose;
2. Make sure that any cuts or abrasions, particularly on your hands, are covered by a waterproof dressing. If there is any doubt about the effectiveness of the cover, obtain medical advice;
3. Make sure disposable protective gloves and aprons are readily available and employees are trained into when these should be applied and removed; and
4. Make sure freshly prepared disinfectant solution, swabs and cloths are available and used.
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**Presentation of the deceased**

1. Presentation of the deceased by mortuary staff should ensure that risks to funeral service staff are minimised. The internal organs should be bagged and placed inside the body cavity, and the body placed in a body bag to prevent leakage of body fluids. All incisions made during the post mortem examination should be secured to prevent leakage of body fluids. When the brain has been removed, and is not to be returned to the body, the brain and the cranial cavity should be packed with wadding. Clinical or other waste arising from the post mortem should not be secured to or within the body, but should be disposed of safely. Post mortem sharps should be safely disposed of before collection and transportation by funeral service staff.
2. After delivering or collecting a body, funeral staff and ambulance staff should:
3. Remove any protective clothing and dispose of it safely; and
4. Thoroughly wash their hands before leaving the mortuary.

**Intravenous lines**

1. Intravenous lines, such as intravenous cannulas, drains, indwelling catheters may be present in the deceased. When and how these are removed should be considered by mortuary staff and funeral service staff, and agreed before collection where required. Suitable information should also be exchanged on any residual risk of exposure to sharps.

**Repatriation/expatriation of human remains**

1. The movement of the deceased, either those being transported abroad, or those being received from abroad, is governed by a number of authorities as regards control of infection:
2. The receiving country (normally regarded as being the body of law that controls how the deceased should be handled as regards control of infection);
3. The country of origin; and
4. The carrier (whose requirements will be governed by the International Air Transport Association (IATA)).
5. For any movement, the deceased must be accompanied by a ‘free from infection’ certification. This may involve the deceased being embalmed prior to transfer to prevent decomposition of the body during transport and therefore an embalming certificate is required.
6. Your assessment will also need to address the transfer of the deceased, as would be necessary for cremation, since the transport coffin has to be zinc (or lead) lined in accordance with IATA requirements.
7. Where embalming cannot take place, eg if the deceased contains a hazard group 4 infection, then the body must be buried or cremated in the country where the death occurred.

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| Section 5 Managing the risks of infection in the post mortem room and mortuary |

1. This section is aimed at pathologists, APTs and others working in the mortuary and post mortem room. It outlines the requirements for a suitable facility, the process of post mortem examination, the risks that should be considered and the safe working practices to controls those risks.

**Facility design**

1. Guidance on the design and construction of new and upgraded mortuaries and post mortem rooms is provided by the Department of Health in *Facilities for mortuary and post mortem room services* for England and Wales12, and in Scotland *Mortuary and Post mortem Room: Scottish Hospital Planning Notes13*.
2. Minimum requirements for general workplace conditions such as lighting, ventilation, floor surfaces and temperature are set out in the *Approved Code of practice and guidance for Workplace (Health, Safety and Welfare) Regulations 199214*.
3. The size of the mortuary (including the body store and post mortem room) should be based on the maximum anticipated storage requirements for bodies and post mortem examination requests.

1. Floor surfaces should be suitable for the work carried out. They need to be constructed from hard-wearing, easily cleanable materials with impervious surfaces which are resistant to damage by chemical action, including disinfectants. They should not be slippery or uneven. Coved edges to floors make cleaning easier, and sloping towards drains and gullies helps drainage.
2. All fittings and furniture, particularly post mortem tables, dissecting surfaces and walls, should similarly be constructed from hard-wearing, easily cleanable materials with impervious surfaces which are resistant to chemical damage.
3. A separate area may be used for the deceased known or suspected to present an increased risk of infection (those infections listed in Appendix 1). However, if such facilities are not available, it is possible to control risk adequately, providing properly trained staff adopt the appropriate transmission based precautions and the mortuary facilities are suitable for such work.
4. Communication equipment designed for use when the hands are contaminated is best activated by voice, elbow or foot.

Ventilation

1. There should be an adequate fresh airflow throughout the mortuary and post mortem room. The design requirements of the mortuary and post mortem room specify the importance of odour control. Specimen storage facilities will also require adequate ventilation, which may include purpose designed local extraction to control odour from preserved samples (see paragraph 109 on body and specimen storage).
2. Airflow from ventilation systems is best directed away from observers, preferably by drawing air into the mortuary at a high level and discharging it at a low level. Downdraught tables are a good way of minimising the risk of infection by direction of airflow. COSHH requires local exhaust ventilation systems to be thoroughly examined every 14 months by a competent person.

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| **Control of exposure to formaldehyde**Formaldehyde has been classified as a Category 1b carcinogen under the Classification, Labelling and Packaging (CLP) Regulation. COSHH requires exposure to formaldehyde to be controlled as low as possible below the workplace exposure limit (WEL) which for formaldehyde is currently 2 parts per million (ppm), time weighted average over 8 hours. The short term limit (averaged over ten minutes) is 2 ppm). Formaldehyde levels may need to be monitored in storage areas.Employers must monitor the exposure of employees to formaldehyde to be sure that the WEL is not exceeded and to monitor the effectiveness of the ventilation control measures.  |

**Observation areas within the post mortem room**

1. Observation areas should be sited within a clean area of the mortuary, separate from the dirty post mortem room (see Section 3 Occupational hygiene precautions). Access to this area should be directly from a clean part of the mortuary.

**Viewing facilities for friends and relatives**

1. Suitable waiting areas, including toilet facilities, and viewing room should be available for relatives or friends wishing to view the deceased. Visitors should not be able to enter any dirty or transitional areas of the mortuary when using or accessing these rooms.

**Body reception at the mortuary**

1. Arrangements should be set out for preparing the deceased before they are delivered to the reception area in the mortuary:
2. Adequate identification of bodies;
3. Covering bodies and containing leakage of body fluids from all external orifices and wounds, either by:
4. The use of well labelled body bags as determined by the risk assessment, ie where there is a known increased risk of infection (see Appendix 1), or
5. Where the risk is not known and there is no leakage of body fluids, the appropriate covering should be determined by a risk assessment.
6. It may be necessary to use multiple body bags for the deceased where the body is badly decomposed or traumatised. Appendix 1 provides information about when multiple body bagging is required for the deceased which present an increased risk of infection.
7. Safe working practices should ensure that the APTs are informed of all potential infection risks when the body is delivered to the mortuary. This information may also be provided in advance using the hazard notification sheet (Appendix 2).

**Body and specimen storage**

1. Body storage capacity needs to be adequate to cope with public holiday periods or any other need for a temporary increase in body numbers. There should be contingency arrangements in place to transfer bodies to other suitable premises should storage capacity become a problem.
2. The body store should provide direct access to the post mortem room and one way of achieving this is by having double-ended refrigerated storage compartments between it and the post mortem room. Storage compartments should be designed to be easily cleaned and maintained and size should be considered in order to accommodate paediatric and bariatric bodies.
3. Before a post mortem examination is performed, bodies are normally stored in cabinets at a reduced temperature (approximately 4°C) and should be returned pending removal for burial or cremation. Regular temperature checks of cold storage facilities should be completed to confirm that refrigeration units are working effectively or alarms can be used to consistently monitor the temperature. Bodies not for examination should be similarly stored. Long-term storage of bodies should be in a deep freeze compartment. If specimens are kept for any period of time and any hazardous chemicals are used for preservation then the area must be adequately ventilated to control exposure.

**Safe working practices in the mortuary and post mortem room**

1. It is essential that mortuary staff are fully aware of the risk of infection associated with a body. Information should be sought from the clinical team which was responsible for the patient or, where cases are brought to the mortuary from the community, from Coroner’s Officers, Procurators Fiscal or general practitioners.
2. Employers responsible for staff in mortuaries and post mortem rooms must ensure that safe working practices are in place and being followed. Pathologists and APTs should assess risk prior to commencing any post mortem examination. This includes:
3. Known or suspected infection hazards (eg from the hazard notification sheet) and the need for transmission based precautions;
4. Timing of post mortems, eg the importance of taking sufficient time for each case (hurried procedures increase the likelihood of accidents) and temporal separation, eg dealing with the deceased which present an increased risk of infection last to reduce the likelihood of contamination;
5. Where several bodies are being worked on consecutively in the post mortem room, the systems in place to avoid cross contamination;
6. The number of staff required and whether visitors or observers should be excluded.
7. A high level of vigilance should ensure that adequate control is maintained at all times during post mortem examinations. Should a situation arise, such as the discovery of tuberculosis lesions, then transmission based precautions should be implemented immediately.
8. The mortuary manager may need to authorise staff who do not normally work in the mortuary, such as porters and nurses, to enter the body storage area outside normal working hours (for example, they may need to place bodies in to refrigerated storage). Such staff need proper instruction from competent mortuary staff in the safe working practices which are appropriate to the tasks they are undertaking and will include the use and disposal of appropriate PPE (see Section 3 Occupational hygiene precautions).

**Access to post mortems**

1. The number of people present in the post mortem room should be kept to a minimum, but at least two people should be present during an examination; usually the pathologist and an APT. By organising workflow and controlling access to the mortuary and post mortem room, unnecessary movements which might interfere with infection control procedures and increase the risk of accidents can be kept to a minimum.
2. Unauthorised people should not enter the mortuary. All visitors should be supervised by a member of the mortuary staff and where necessary given appropriate PPE to wear. Additional precautions to mitigate the risk of cross contamination are provided in Section 3 Occupational hygiene precautions.
3. Where the post mortem examination is being carried out for training and educational purposes, the same precautions as those described in paragraph 117 apply. However, post mortem examinations on the deceased which present an increased risk of infection should not be used for training and education purposes.

**Personal protective equipment**

1. Everyone present during a post mortem examination should enter the room via the changing facilities, where they should put on the PPE specified in the safe working practices.

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| **Standard precautions include making sure the following items are worn by pathologists and APTs during all post mortems:**1. A surgical scrub suit;
2. A waterproof or water resistant disposable gown that completely covers the arms, chest and legs;
3. A plastic disposable apron to cover chest, trunk and legs;
4. Waterproof boots with dorsal reinforcement;
5. A form of eye protection or plain unventilated visor;
6. A face mask to protect the mouth and nose from direct splash contamination if a visor is not worn; and
7. Cut-resistant protective gloves
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1. Additional protection may be provided by double gloving, for example covering an inner surgeon style glove with a thicker outer glove which extends beyond the cuff of the gown. Heavy-duty gloves of elbow and shoulder length should be available if needed and plastic sleeve covers. Safe working practices should set out the requirements according to risk.
2. Anyone entering a dirty area should wear a gown, rubber boots, a plastic apron and a visor, even though not actively engaged in the work.
3. The PPE worn in the designated clean/dirty areas in the mortuary (such as the body store) and also the post mortem room after it has been decontaminated need not be the same as that required during post mortem examination. Safe working practices should clearly specify what is required, and anyone entering such areas should comply with these requirements. Normally gloves are sufficient, but a risk assessment may indicate that additional PPE is necessary. People handling the deceased should always wear gloves and wash their hands afterwards (see Section 3 Occupational hygiene precautions).

**Equipment and instruments**

1. The requirements for equipment and instruments for post mortem examinations need to be decided locally, taking account of the projected workload. Instruments need to be kept sharp, clean and ready for use. As a minimum, there should be three sets of instruments available. This allows one set to be in use, a second set ready for use and a third set being cleaned, disinfected, and autoclaved as necessary.
2. Disposable instruments should be used wherever possible for CJD cases, and incinerated after use. Where this is not feasible, a set of dedicated instruments for known, suspected or at risk cases is recommended, to minimise the frequency of their use and the risk of transmitting infection to staff. Further detail can be found in the *Advisory Committee on Dangerous Pathogens (ACDP) Transmissible Spongiform Encephalopathy (TSE) Subgroup Minimise transmission risk of CJD and vCJD in healthcare settings15*.

**Safe use of sharps**

1. The Health and Safety (Sharp Instruments in Healthcare) Regulations 201316 require employers in healthcare to use safer sharps where the use of sharps cannot be avoided. Safer sharps mean medical sharps that incorporate features or mechanisms to prevent or minimise the risk of accidental injury. These regulations also prevent the recapping of needles and require secure containers and instructions for safe disposal of medical sharps close to the work area. *Health and Safety (Sharp Instruments in Healthcare) Regulations 2013: Guidance for employers and employees17* provides further information.

**Post mortem examination**

1. Before post mortem examinations are carried out, staff will need to prepare the post mortem room and equip it in accordance with the safe working practices. Related information is given in the information box below.
2. To minimise the risk of transmission of infectious agents during post mortem examination the techniques used need to ensure that liquid dispersion and splashing are minimised and that all instruments likely to cause puncture wounds or cuts are handled appropriately to avoid sharps injury.

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| **Before a post mortem examination begins, APTs should ensure:**1. An adequate supply of PPE is available;
2. Heavy-duty gloves and aprons are readily available, if required;
3. Air supply and extraction systems are working properly;
4. Drains are clear and have been cleaned and disinfected and the water supply is working;
5. There is an adequate supply of soap, freshly prepared disinfectants, detergent solutions and specimen containers; and
6. Tools and equipment required during post mortem examination are properly maintained, clean and ready for use, and are set out as required at examination tables and dissecting benches.
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1. A post mortem examination should only be undertaken when the adequate controls are in place (as identified by the risk assessment) to prevent or minimise any risk of infection. A general summary of precautions is given in the information box below.

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| **General precautions for post mortem examination**1. Never pass instruments from hand to hand during a post mortem examination;
2. Once used instruments are no longer required during a post mortem examination, they should be set aside for decontamination;
3. Never attempt to catch a falling instrument. To help prevent accidental falls, do not lay instruments down indiscriminately after use. Wherever possible, avoid operations likely to cause splashing or generate aerosols, such as washing down with high pressure hoses, cleaning instruments under running water and squeezing organs that have been removed from the body;
4. Wear a visor. All cutting operations, particularly sawing, can produce particles and splashing. Visors provide a physical barrier and also prevent staff from touching their face and enable spectacles to be worn;
5. Saws should be fitted with an extraction hood; and
6. Follow specified cleaning and disinfection procedures for decontamination of work, floor and wall surfaces and of equipment, including PPE where appropriate.
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1. Dissection and fixation of the organs after evisceration may be carried out on a suitable non-slip surface at the post mortem examination table. However, a dedicated bench with a smooth impervious surface fitted with local exhaust ventilation is required where there may be a risk of infection by inhalation. This will also help control exposure to other hazardous substances, such as formalin fixative vapour.
2. During dissection of the body, the number of sharp instruments present on the post mortem table should be kept to a minimum. Blunt-ended scissors and scalpel blades should be used whenever possible or suitable alternatives.
3. If blood or body fluids are aspirated by needle and syringe, the needle should not be removed. Used needles and syringes should be discarded safely immediately after use into a sharps container which should be positioned close to the areas where medical sharps are used. The needle must not be re-capped. Scalpel blades should not be changed by removal from the handle during the post mortem examination; an adequate supply of new, mounted blades should be laid out before the start.
4. Particular care is needed when carrying out cutting and sawing procedures on bone and cartilage tissues, including opening the skull for removal of the brain. Mechanical oscillating saws can produce droplets and cause splashing and it is important to ensure the particle captor hoods are properly fitted during use. The traditional handsaw can also provide a practical alternative in certain circumstances and is less likely to generate any airborne particles. However, accidental injury to the operator’s non-cutting hand may be more likely and the wearing of cut-resistant gloves is recommended.
5. Safe working practices should ensure that all work with bodies, organs and unfixed specimens is only carried out in dirty areas. When transporting specimens outside the post mortem room, staff must ensure that they are placed in suitable containers, which have clean outer surfaces. Secondary containment in a robust lidded carrier will also be appropriate when transferring specimens to other areas, such as the pathology laboratories and local infection policies will provide further detail.

**Post mortem examination on the deceased which present an increased risk of infection**

1. Where bodies are not properly identified or persons have died in suspicious circumstances, and particularly where there is no satisfactory medical record, staff need to:
2. Label and treat such bodies as increased risk cases, unless additional information becomes available; and
3. Enclose all bodies labelled increased risk in a leak-proof body bag where the risk assessment deems this necessary.
4. The deceased known to present an increased infection risk should be examined using transmission based precautions in addition to standard precautions. The options include the use of down-draught tables and ventilated visors to help prevent exposure to any infectious airborne particles where the assessment considers this appropriate. If safe conditions for the examination cannot be met, the body should be transferred to a more appropriate facility.
5. All staff working in the post mortem room during such examinations will need adequate training in mortuary procedures and safety precautions for such cases (see Section 2 Training and competence).
6. PPE should be removed immediately after procedures that require transmission based precautions and disposed of safely, or decontaminated in accordance with local infection policies.

**Respiratory protective equipment**

1. Adequate and suitable respiratory protective equipment (RPE) should be used for post mortem examinations where the assessment identifies a risk of exposure through airborne transmission. RPE should always be fitted with the highest efficiency filter possible (FFP3 and provide a protection factor of at least 20) to control exposure of microorganisms down to the lowest levels. Due to the length of time the task can take, those carrying out post mortem examinations on the deceased infected with tuberculosis might find a powered hood type respirator is most suitable, in addition to using general extraction in the room to control exposure.
2. Tight fitting face pieces should be face-fit tested to the individual wearing it and appropriate training should be provided on the safe use of the equipment. RPE should also be stored and maintained in accordance with its use. *Respiratory protective equipment at work: A practical guide18* provides further information.

**Safe working practices**

1. For the deceased known to present an increased risk of infection, the number of people engaged on the examination of a body should be kept to a minimum and usually include:
2. The pathologist;
3. An APT (or another pathologist);
4. A circulator, who will be another member of the pathology staff, who will undertake tasks ancillary to the post mortem, thus limiting the spread of contaminated material.
5. The pathologist and assistant should ideally not work in the absence of the circulator. Circulators should, so far as is possible, remain remote to the actual procedures at the post mortem examination table. If their PPE becomes soiled, they should change it immediately. They may be required to perform duties such as:
6. Communication, recording and observation;
7. Providing clean instruments and replacement protective equipment;
8. Arranging for removal of specimens for laboratory tests; and
9. Photography.
10. When required for use by the pathologist or assistant, the circulator should place instruments on a side table, from where they can be picked up. This practice is advised for all examination procedures. It is important that the circulator also constantly looks out for any risks associated with the presence and use of sharp tools, instruments, spillage and splashing.
11. The pathologist is always responsible for the safety of procedures in opening, removing organs and examining the body, but may authorise a suitably trained assistant to assist with this work. The assistant should not handle sharp instruments or tools unless specifically instructed to do so by the pathologist. The pathologist and assistant should not handle sharp tools and instruments at the same time.
12. Everyone in the post mortem room should obey warnings from any member of the examination team and stop work until the matter has been resolved.
13. At the end of the examination, one of the team should make sure that all PPE worn during the examination is disposed of correctly or treated according to local infection rules, where appropriate.

**Post mortems on the deceased with hazard group 4 microorganisms**

1. Post mortem examination should not be carried out on the deceased with a known hazard group 4 present, eg viral haemorrhagic fever. If a post mortem is deemed essential for clinical or medico-legal reasons, it should be referred to a specialist centre where specific protocols have been developed. The guidance document from *ACDP on Management of Hazard Group 4 viral haemorrhagic fevers and similar human infectious diseases of high consequence19* provides further information about work with hazard group 4 microorganisms.

**Post mortems on the deceased with CJD**

1. In cases of CJD, the post mortem examination should be carried out in such a way as to minimise contamination of the working environment. It is recommended to enclose the entire head within a large plastic bag during use of a bone saw. The bag is fitted over the head and neck of the body and the saw is introduced through a hole in the bag, which may then be sealed by tape as necessary. It is also recommended that the examination be carried out with the body inside an open body bag with absorbent wadding alongside the body, but within the bag, to collect the body fluids.
2. At the end of the post mortem examination, the body should be sewn up leaving the wadding in the bag. Any excess wadding should be incinerated. The guidance document from the ACDP Transmissible Spongiform Encephalopathy (TSE) Subgroup *Minimise transmission risk of CJD and vCJD in healthcare settings (Annex H After death)15* provides further detail on appropriate precautions. Advice may also be sought from the National CJD Research and Surveillance Unit in Edinburgh.
3. Where a diagnosis of CJD is not made until after a post mortem examination has taken place, procedures for decontamination laid out in the ACDP TSE guidance referred to in paragraph 115 should be followed.

**Specimen transport**

1. For mortuaries and post mortem facilities located within hospital trusts, the specimen collection, packaging and transport arrangements should be compatible with the policy of that hospital.
2. Tissue specimens for histopathology should be placed in appropriately sized containers which allow them to be totally immersed in fixative solution. Staff should decontaminate the outside of the containers, in accordance with safe working practices, before sending them to the pathology laboratory.
3. All specimens sent to laboratories should be suitably packaged within robust, sealable carriers to minimise the risk of leakage and labelled to make clear the nature of the contents. Further guidance on specimen transport is available in *ACDP guidance Biological Agents: Managing the risks in laboratories and healthcare premises20.*

**Visitors and observers in the mortuary and post mortem examination room**

1. The risk assessment should identify groups of people who may be at risk, specify the nature of the risk and how this might change (eg between entering the post mortem examination room while it is operative and when it is clean) and how the risks to them are to be controlled.
2. Visitors to the mortuary may be from other parts of the hospital and from outside. They should not normally be admitted to the post mortem room while it is in operation unless it is for training and education purposes (see paragraph 118).
3. There will be occasions when workers, such as maintenance personnel, will need access to the post mortem room. They should only be allowed to enter under a permit-to-work or equivalent system, and should be excluded until cleaning of the suite has taken place.

**Arrangements for viewing by relatives and others**

1. Next of kin and representatives of religious orders may wish to see the deceased, either before or after the post mortem examination. If any visitors have had physical contact with the deceased, mortuary staff need to encourage them to wash their hands thoroughly before leaving the mortuary.
2. Mortuary staff will need to advise visitors if there could be a health risk from touching or kissing the body. If these risks are significant, relatives should be discouraged from doing so and informed about any risks. This should be done tactfully and ideally by a trained member of staff.
3. Viewing of the deceased with infection from the most hazardous microorganisms (hazard group 4) is not permitted in the mortuary.
4. When, for religious purposes, there is a requirement to wash a body which may present a risk of infection, those concerned need to be clearly informed of the nature of any risk and advised on the precautions to take, eg the use of suitable PPE.
5. Relatives asking if a patient died from an infectious disease should be referred to the relevant medical practitioner. Relatives/friends who are worried about having been exposed to any microorganisms should be referred to an appropriate clinician.

**Porters, domestic/cleaning staff and service/maintenance staff**

1. Safe working practices and training procedures need to specify the precautions needed to prevent exposure to infectious materials for porters, domestic/cleaning staff and service/maintenance staff who may be unaware of the risks they may encounter. These should include:
2. co-operating with other employers concerned, and co-ordinating the work to ensure they have sufficient information about occupational hygiene precautions, the PPE which is to be worn, when and where they are allowed to work and under what conditions;
3. procedures for handing over particular areas of the mortuary (eg following decontamination and cleaning procedures and use of permit-to-work procedures);
4. supervision by APTs (eg authorising access, checking that they are following the safe working practices for the mortuary).

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| Section 6 Managing the risks of infection in funeral premises  |

1. This section is aimed at funeral directors and their employees, including embalmers, working in funeral premises. It outlines the requirements for a suitable facility, the process of performing hygienic preparations and embalming, the risks that should be considered and the safe working practices to control those risks.

**Facility design**

1. Funeral service facilities should provide accommodation which enables staff to work safely and this guidance explains what that means.
2. Minimum requirements for general workplace conditions such as lighting, ventilation, floor surfaces and temperature are set out in the *Approved Code of practice and guidance for Workplace (Health, Safety and Welfare) Regulations 199214*.
3. The size of the facility (including the body store and embalming room, where required) should be based on the storage requirements for bodies and embalming anticipated to take place.
4. Floor surfaces should be suitable for the work being carried out. They need to be constructed from hard-wearing, easily cleanable materials with impervious surfaces which are resistant to damage by chemical action, including disinfectants. They should not be slippery or uneven. Coved edges to floors make cleaning easier, and sloping towards drains and gullies helps drainage.
5. All fittings and furniture, particularly embalming tables, should similarly be constructed from hard-wearing, easily cleanable materials with impervious surfaces which are resistant to chemical damage.
6. A separate area should be used for embalming where possible (sometimes referred to as an embalming theatre). If the room is also used for generic hygiene preparations then embalming should not take place at the same time as other activities being carried out an another body.
7. Communication equipment designed for use when the hands are contaminated is best activated by voice, elbow or foot.

**Ventilation**

1. There should be an adequate fresh airflow throughout the workplace for the purposes of odour control. In many cases, windows or other openings will provide sufficient ventilation in some or all parts of the workplace. Where necessary, mechanical ventilation systems should be provided. Whatever the means of providing fresh air, (natural or mechanical), you need to ensure that measures are taken to control the entry of pests such as flies and rodents.
2. In areas where embalming is carried out, local exhaust ventilation will be required to control levels of exposure to embalming fluid. The need for personal and workplace monitoring should also be addressed in the assessment. COSHH requires local exhaust ventilation systems to be thoroughly examined every 14 months by a competent person.

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| **Control of exposure to formaldehyde**Formaldehyde has been classified as a Category 1b carcinogen under the Classification, Labelling and Packaging (CLP) Regulation. COSHH requires exposure to formaldehyde to be controlled as low as possible below the workplace exposure limit (WEL) which for formaldehyde is currently 2 parts per million (ppm), time weighted average over 8 hours. The short term limit (averaged over ten minutes) is 2 ppm). Formaldehyde levels may need to be monitored in storage areas.Employers must monitor the exposure of employees to formaldehyde to be sure that the WEL is not exceeded and to monitor the effectiveness of the ventilation control measures.  |

**Body reception at funeral premises**

1. Safe working practices should ensure that the funeral service staff are informed of all cases where an infection risk is known or thought to exist before the body is delivered to the funeral premises. This information should be provided using the hazard notification sheet (Appendix 2) (also see Section 4 Collection, transportation and transfer of information relating to the deceased).
2. The information provided should enable staff to assess the likelihood of infection from all bodies, make any special arrangements required and, where necessary, seek advice. Where there is a known or suspected risk of infection, additional labelling indicating the nature of the risk is needed. This may be done by indicating the potential route of transmission (airborne, droplet, contact) of any infectious microorganisms. Where this information is not provided it is advisable to contact the local healthcare practice to ascertain this information where possible.

**Body storage**

1. Body storage capacity needs to be adequate to cope with public holiday periods or any other need for temporary increase in body numbers. There should be contingency arrangements in place to transfer bodies to other suitable premises should storage capacity become a problem.
2. Storage compartments should be designed to be easily cleaned and maintained and size should be considered in order to accommodate paediatric and bariatric bodies.
3. The handling of the deceased should be minimised to control the risk of exposure and keeping the deceased cool controls further deterioration by controlling further growth of any bacteria present (see information box below). You should try to minimise the number of times the deceased are removed from cold storage, eg by implementing controlled viewing times where possible.
4. If bodies are to be held for less than 48 hours, storage at 6°C or less is appropriate. If you need longer term storage, this should be carried out at temperatures of approximately 4°C. Regular temperature checks of cold storage facilities should be completed to confirm that refrigeration units are working effectively or alarms can be used to consistently monitor the temperature.

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| **Storage of remains before burial/cremation**Keeping the remains cold limits the rate of decomposition by slowing the growth of bacteria which contribute to the decomposition process. Certain drugs (administered before death) may also influence the rate of decomposition.Ideally, a refrigerated body store should be used for this purpose, but this may not be practicable in smaller premises where only a limited number of bodies are handled. However, there are a number of other means by which cooling could be achieved, for example, by:1. using cold tables or cool blankets;
2. installing air chillers;
3. using facilities at larger premises (if site is a satellite premises);
4. making arrangements with local hospitals to delay collection, where possible.
 |

**Safe working practices in funeral premises**

1. Employers responsible for staff in funeral directors premises must ensure that safe working practices are in place and being followed. The risks should be assessed prior to commencing hygienic preparations or embalming. This includes:
2. Known or suspected infection hazards (eg from the hazard notification sheet) and the need for transmission based precautions;
3. Timing of procedures, eg the importance of taking sufficient time for each case (hurried procedures increase the likelihood of accidents) and temporal separation eg dealing with increased infection risk cases last to reduce the likelihood of contamination;
4. The number of staff required and whether visitors or observers should be excluded.
5. A high level of vigilance should ensure that adequate control is maintained at all times during hygienic preparations and embalming.

**Access to hygienic preparations and embalming**

1. The number of people present when carrying out hygienic preparations or embalming should be kept to a minimum. By organising workflow and controlling access to the areas where hygienic preparations or embalming are carried out, unnecessary movements, distractions or interruptions which might interfere with safe working procedures or increase the risk of accidents can be kept to a minimum.
2. Unauthorised people should not enter areas where hygienic preparations or embalming are carried. All visitors should be supervised by a member of the funeral services staff and given appropriate PPE to wear, where required. Additional precautions to mitigate the risk of cross contamination are provided in Section 3 Occupational hygiene precautions.
3. Where the hygienic preparations or embalming is being carried out for training and educational purposes, the same precautions as those described in paragraph 148 apply. However, embalming on the deceased which present an increased risk of infection should not be used for training and education purposes.

**Personal protective equipment**

1. Everyone present during hygienic preparations or embalming should wear PPE specified in the safe working practices.
2. The PPE worn in the designated clean/dirty areas in the mortuary (such as the body store) and also the embalming room after it has been decontaminated need not be the same as that required during hygienic preparations or embalming. Safe working practices should clearly specify what is required, and anyone entering such areas should comply with these requirements. Normally gloves are sufficient, but a risk assessment may indicate that additional PPE is necessary. People handling the deceased should always wear gloves and wash their hands afterwards (see Section 3 Occupational hygiene precautions).

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| **Standard precautions include making sure the following items are worn during embalming procedures:**1. A surgical scrub suit;
2. A waterproof or water resistant disposable gown that completely covers the arms, chest and legs;
3. A plastic disposable apron to cover chest, trunk and legs;
4. Waterproof boots with dorsal reinforcement;
5. A form of eye protection or plain unventilated visor
6. A face mask to protect the mouth and nose from direct splash contamination if a visor is not worn; and
7. Cut-resistant protective gloves
 |

**Equipment and Instruments**

1. The requirements for equipment and instruments for hygienic preparations and embalming need to be decided based on the projected workload. Instruments need to be kept sharp, clean and ready for use. As a minimum, there should be three sets of instruments available. This allows one set to be in use, a second set ready for use and a third set being cleaned and disinfected.

**Safe use of sharps**

1. The Health and Safety (Sharp Instruments in Healthcare) Regulations 2013 (the Sharps Regulations) do not apply to the funeral service. However the associated guidance to ensure that risks from sharps injuries are adequately assessed and control measures are in place, provides one way of fulfilling duties required under COSHH. Health and Safety (Sharp Instruments in Healthcare) Regulations 2013: Guidance for employers and employees16 provides further information.
2. These regulations require employers to use safer sharps where the use of sharps cannot be avoided. Safer sharps mean medical sharps that incorporate features or mechanisms to prevent or minimise the risk of accidental injury. These regulations also prevent the recapping of needles and require secure containers and instructions for safe disposal of medical sharps close to the work area.

**Hygienic treatment**

1. Hygienic treatment includes first/last offices, washing, dressing, trimming hair, nails etc. The activities involved with this treatment could expose employees to the blood of the deceased through cutting or piercing the skin. This could be intentional, eg during suturing or unintentional when cutting hair or nails.
2. Some procedures carried out as part of first offices may also involve emptying the contents of the bowel and bladder and entail the plugging of orifices. Such procedures could result in exposure to body fluids such as urine and faeces, which may present a risk of infection. The condition of the deceased is also important to consider, eg those who have undergone a post mortem examination or have undergone significant deterioration before any hygienic treatment may require transmission based precautions to control the risk of exposure to any sources of infection (see Appendix 1).

**Embalming**

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| **What is embalming?**Embalming is defined as the preservation of a body from decay through injection of a chemical embalming fluid. The preservative solution (the embalming fluid) replaces the blood as well as treating the body cavity and organs. You or a member of your staff may carry out the process, or a trade embalmer may use your premises to carry out the work. |

1. Before embalming begins, staff will need to prepare the embalming room and equip it in accordance with the safe working practices.

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| **Before embalming begins, embalmers should ensure that:**1. An adequate supply of PPE is available;
2. Heavy-duty rubber gloves and aprons are readily available, if required;
3. Air supply and extract systems are working properly;
4. Drains have been cleaned and disinfected and the water supply is working;
5. There is an adequate supply of soap, freshly prepared embalming fluids, disinfectants, detergent solutions and paper towels; and
6. Tools and equipment required during the embalming procedure are properly maintained, clean and ready for use, and are set out as required.
 |

1. Embalming should only be undertaken when the adequate controls are in place (as identified by the risk assessment) to prevent or minimise any risk of infection. It is essential that the funeral director provides any information about known or suspected infection risks from the deceased to the embalmer, preferably by providing a copy of the hazard notification sheet (Appendix 2). A general summary of precautions is given in the informatioin box below.

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| **General precautions for embalming procedures:**1. Once used instruments are no longer required, clean them thoroughly in detergent solution;
2. Never attempt to catch a falling instrument. To help prevent accidental falls, do not lay instruments down indiscriminately after use;
3. Wherever possible, avoid operations likely to cause splashing or generate aerosols, such as washing down with high pressure hoses and cleaning instruments under running water; and
4. Follow specified cleaning and disinfection procedures for decontamination of work, floor and wall surfaces and of equipment, including use of PPE where appropriate.
 |

1. The risk assessment should consider whether embalming needs to be carried out as not all bodies are embalmed. The needs of the family need to be taken into consideration, if the body needs to be repatriated, and any other risks that embalming may present. Where the risks from embalming cannot be managed, alternatives should be offered to allow the family to view the deceased where this is feasible.
2. The embalming process involves direct contact with the body, exposure to blood and other body fluids, and the use of sharps (and hazardous chemicals). There may be additional risks when embalming individuals that have been involved in an accident or have undergone post mortem examination, (eg exposure to damaged bones/bone splinters). Extra care should be taken when passing embalming fluid into a body that has undergone a post mortem examination as larger blood vessels normally used for infusion may be damaged. As a result of using smaller blood vessels, embalming fluids might leak from the cranium.
3. To minimise the risk of transmission of microorganisms during embalming, the techniques used need to ensure that liquid dispersion and splashing are minimised and that all instruments likely to cause puncture wounds or cuts are handled appropriately.
4. During embalming, the number of sharp instruments present on the embalming table/trolley should be kept to a minimum. Used disposable sharp instruments such as scalpel blades should be placed directly into a suitable sharps container. Blunt-ended scissors and scalpel blades should be used whenever possible. Scalpel blades should not be changed by removal from the handle during the embalming procedure; an adequate supply of new, mounted blades should be laid out before the start.

**Embalming the deceased which present an increased risk of infection**

1. Where the deceased are not properly identified, particularly where there is no satisfactory hazard notification form or in suspicious death cases, staff need to:
2. Label and treat such bodies as increased infection risk cases, unless additional information becomes available;
3. Enclose all bodies labelled increased risk in a leak-proof body bag marked in accordance with safe working practices.
4. The deceased known to present an increased risk of infection should be embalmed using transmission based precautions in addition to standard precautions. The condition of the body should be considered as part of the risk assessment. If safe conditions for the embalming cannot be met, the body should be transferred to a more appropriate facility.
5. All embalmers should be adequately trained and competent in performing embalming on increased risk cases (see Section 2 Training and competence) and work according to safe working practices.

**Safe working practices**

1. For the deceased known to present an increased risk of infection, the number of people engaged on the embalming should be determined by a risk assessment. It is advisable to have the embalmer to carry out the invasive procedures and a second person to assist with the process.
2. The embalmer is always responsible for the safety of invasive procedures, but may authorise a suitably trained assistant to assist with this work. The assistant should not handle sharp instruments or tools unless specifically instructed to do so by the embalmer. The embalmer and assistant should not handle sharp tools and instruments at the same time.
3. Everyone in the embalming room should obey warnings from any member of the embalming team and stop work until the matter has been resolved.
4. If PPE becomes soiled, it should be changed immediately. At the end of the embalming procedure all PPE worn during the procedure needs to be disposed of correctly or treated, where appropriate, as contaminated linen and, for example, collected in appropriate bags.

**Embalming on the deceased with hazard group 4 microorganisms**

1. Embalming should not be carried out on known hazard group 4 infected cases, eg viral haemorrhagic fever.

**Visitors and observers in funeral premises**

1. Visitors to the facility should not normally be admitted to the embalming room while it is operative.
2. There will be occasions when workers, such as maintenance personnel, will need access to the embalming room. They should only be allowed to enter under a permit-to-work system, where this is practical, or with supervision in smaller premises and should be excluded until cleaning of the room has taken place.

**Religious/ritual preparations**

1. There are considerable variations between people of different faiths, ethnic backgrounds and national origins in their approach to, and practices for death and dying, as regards preparation for burial or cremation.
2. At the time of death, these practices may require involvement in last offices/first offices. If there is a requirement for involvement, you need to inform those carrying out washing, dressing etc of any risks and advise them of the control measures that should be used. The responsible person will need to advise relatives if there could be a health risk from touching or kissing the body. If these risks are significant, relatives should be discouraged from doing so and informed about possible consequences for their health. This should be done tactfully and ideally by a trained member of staff.

**Viewing**

1. When relatives and others wish to view the deceased, you will need to advise them if there is a risk of infection if they touch or kiss the deceased, as well as advising them of any controls they need to take after contact, for example washing of hands.
2. Certain infectious disease (see Appendix 1 for details) will present a significant risk, so relatives should be informed about the risks involved, and provided with PPE if appropriate. Alternatively, viewing could take place either at a distance or by use of a viewing panel in the coffin. An alternative is to use a viewing room with a glass screen.
3. Viewing of the deceased with infection from the most hazardous microorganisms (hazard group 4) is not permitted.

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| Section 7 Managing the risks of infection in exhumations |

1. This section is aimed at those involved with exhuming the deceased. It outlines the risks that should be considered and the safe working practices to control those risks.

**Exhumations**

1. The Ministry of Justice issues the majority of licences for the exhumation of the deceased each year (approximately 1000), and the Church of England Chancellors also authorise a small amount via a faculty. In addition, some exhumations result from an accidental disturbance in road or building construction. The main reasons for planned exhumations are:
2. redevelopment of old cemeteries or crypts, often with associated archaeological investigations;
3. medical/criminal investigations;
4. individual requests for exhumation from family or relatives for reburial or cremation; or
5. archaeological reasons.

**Risk of infection**

1. In the vast majority of cases, the risk of infection from the deceased that have been exhumed is negligible. There may be additional infection risks from the environment that need to be considered. In certain cases, where the microorganism can survive for prolonged periods or where the deceased has been preserved, the potential for infectious microorganisms being present increases.
2. The infectious microorganisms may present a risk to those carrying out exhumation of the recently deceased, however, the majority of these microorganisms will no longer be viable after a period of about six months. However, if the deceased has died from a transmissible spongiform encephalopathy (eg Creutzfeldt-Jakob Disease) this may remain viable for a substantial period of time.
3. None of the organisms that caused mass death in the past, (eg plague, cholera, typhoid and tuberculosis) are unlikely to survive in the deceased for any significant amount of time following death. However, those organisms that cause anthrax may have survived in the deceased and these need to be considered in any risk assessment. You may find it helpful to examine such items as parish records or similar records that may give information on the cause of death for a particular exhumation site. Further information on these agents, and others that may be present in the environment, is given in the Table 3.
4. In addition to the infectious microorganisms that may be present in the recently deceased, soil in a burial site could also present a source of infection, either because of environmental microorganisms or because of contamination.
5. Where the body has been preserved in air-tight (lead lined) coffins or crypts, there is the potential that the microorganisms may have survived for prolonged periods. There have been attempts to isolate certain microorganisms (eg small pox or Spanish flu) from the deceased known to have died of these diseases. These attempts have not isolated living microorganisms.

**Occupational hygiene precautions**

1. The requirements in Section 3 Occupational hygiene precautions apply to exhumations, however, there are some elements that are specific to exhumation sites that should be considered below, but may be altered depending on the situation.

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| **Occupational hygiene precautions for exhumation sites**1. Hands (and arms, if necessary) should be washed before eating, drinking, smoking, using the telephone, applying make-up, or leaving the work area;
2. There should be suitable facilities provided for staff to wash, with hot running water and soap;
3. Hands should still be washed even if gloves have been worn, alternatively alcohol hand-rubs can be used on physically clean hands;
4. If your employees don’t have direct access to warm running water to wash their hands, you may be able provide a suitably designed vehicle with facilities on board.
 |

1. Where on-site exhumation is undertaken, arrangements should be made to provide clear demarcation of clean and dirty areas and the provision of washing and decontamination facilities on site so that employees can wash and leave contaminated clothing, waste etc on site, before leaving or moving to clean areas, eg site offices.
2. Your risk assessment should take into account the likelihood of exposure to blood and body fluids and contact with the deceased during exhumation.
3. All existing cuts and grazes should be covered with waterproof dressings and/or gloves before starting any work that involves contact with the deceased. If cuts and/or grazes occur during work, these should be washed immediately.
4. Hand to mouth/nose or hand to eye contact should be avoided. Care should be taken with pens etc, these should not be put in the mouth, or taken from dirty to clean areas.
5. Rest breaks and meal breaks should be taken away from the main work area. Employees should remove any PPE and contaminated clothing when leaving a dirty work area and not enter clean areas wearing PPE.
6. When exhuming from soil burial, most of the soil will be used to refill the excavation; the soil that was removed from immediately above and around the coffin should be replaced first. Where there are mass exhumations, there may be large quantities of coffin waste, which should be securely bagged and sent to landfill. Almost all mass exhumations will be from old burial grounds, so the infection risk is low and landfill disposal is usually appropriate.

**Personal protective equipment**

1. Appropriate protective clothing should be selected and worn based on the nature of the risk.
2. All single use clothing should be disposed of as clinical waste. Reusable clothing should be washed (at the highest temperature possible and separately from other uncontaminated clothing). Equipment such as boots and face visors should be washed and decontaminated, dried and stored in a clean area.

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| **Personal protective equipment for exhumations**1. Heavy duty overalls;
2. Waterproof trousers and jackets;
3. Working boots with toe and sole protection;
4. Waterproof heavy duty gloves;
5. A standard construction site helmet (hard hat);
6. A face visor, if there is a likelihood of splashing.
 |

**Respiratory protective equipment**

1. Respiratory protective equipment is unlikely to be necessary but should be considered when carrying out exhumations in crypts. This will protect against the inhalation of infectious microorganisms, but the main purpose of wearing this equipment is to protect employees from wood and lead dust. Surgical masks do not provide suitable respiratory protection. RPE should always be fitted with the highest efficiency filter possible (FFP3 and provide a protection factor of at least 20) to control exposure of microorganisms down to the lowest levels.
2. Tight fitting face pieces should be face-fit tested to the individual wearing it and appropriate training should be provided on the safe use of the equipment. RPE should also be stored and maintained in accordance with its use. *Respiratory protective equipment at work: A practical guide18* provides further information.

**Equipment and instruments**

1. All equipment should be easy to clean and decontaminate, eg vehicles, removal shells, trolleys, excavation equipment etc and should be cleaned and disinfected as determined by the risk assessment. This could mean at the end of a procedure and before the equipment leaves the site.

**Special precautions when a smallpox-infected body is suspected**

1. When a body is exhumed, particularly in a lead-lined coffin, there may be good preservation of the skin surface. Before work starts, you should check whether there is any evidence that smallpox was the cause of death. If so, those carrying out the exhumation should try to make sure that the coffins remain intact. Such coffins should not be opened, even for archaeological reasons. If archaeologists wish to open coffins, particularly from crypt burials, an additional risk assessment must be carried out, bearing in mind the serious consequences of a release of smallpox. If the integrity of a lead lined coffin fails when exhumed, or the coffin is deliberately opened by archaeologists, the body must be examined in situ to see whether intact skin is present, and if there is evidence of smallpox scabs or scars. If so, you should then:
2. Clear the area of all personnel. All PPE and other clothing should be disinfected and disposable PPE bagged and sent for incineration;
3. Contact a suitably qualified expert (such as a pathologist with virological expertise) to inspect the body (while wearing appropriate PPE) to see if the body shows evidence of smallpox. If there is no evidence of smallpox, then the exhumation may resume.
4. If there is evidence of smallpox scabs/lesions, the expert should remove some of the skin and contact the Rare and Imported Pathogens Laboratory at PHE Porton to obtain advice about appropriate infection control, sending of specimens and testing.
5. Following the removal of this tissue, you should:
6. Make the area secure and post 24-hour security to ensure that there is no entry into the area until a final report is received. You should inform local police who may wish to put in place additional security arrangements;
7. Inform the local Environmental Health Officer (EHO) who may in turn contact Specialist Inspectors from the Biological Agents Unit of the Health and Safety Executive (HSE).
8. If you are informed that viable smallpox virus has been isolated from the skin sample, you should tell the local EHO and the local HSE office.

**Table 3** Microorganisms that need to be considered when exhuming a body

| **Agents/disease** | **Means of transmission** | **Survivability** | **Notes of guidance** |
| --- | --- | --- | --- |
| *Bacillus anthracis*/ anthrax | Breathing in aerosols, direct contact with broken skin, and by hand to mouth contact | Probably indefinitely in the spore form | Anthrax spores may be found in the exhumed body, and also in items such as pillows and linings stuffed with horsehair. Anything stuffed with animal hair should be bagged and disposed of as clinical waste |
| Variola major virus/ smallpox | Inhalation and contact | Can survive for long periods of time in dry scabs (13 years has been documented). However, in normal environmental conditions, the virus is very unlikely to survive for more than 48 hours  | The virus that caused smallpox has been eliminated from the world population and the last cases that occurred in this country were mainly in the 1930s, however there were sporadic cases after that date but none after the 1970s. Intact virus was found in a body exhumed at Spitalfields in 1985, this body was more than 100 years old. But the virus could not be grown, so was not considered to be infective |
| *Clostridium tetani*/ tetanus | Skin-penetrating injury | Commonly found in soil | Employees should be immunised against tetanus. You should ensure that this remains current |
| *Leptospira icterohaemorrhagiae*/ Weil’s disease | Contact with broken skin | Found in association with rats | Agent is excreted in infected rat urine, so soil/water present on site may be contaminated |

# Appendix 1 Key infections in the deceased which require application of transmission based precautions

| **Infection** | **Causative agent** | **Is a body bag needed?** | **Can the body be viewed?**  | **Can post mortem be carried out?** | **Can hygienic preparation be carried out?** | **Can embalming be carried out?** |
| --- | --- | --- | --- | --- | --- | --- |
| **Airborne:** small particles that can remain airborne and travel considerable distances |
| Anthrax (also contact) | Bacillus anthracis | Yes | No | No | No | No |
| Tuberculosis  | Bacterium – *Mycobacterium tuberculosis* | Yes | Yes | TBP | Yes | Yes |
| MERS-CoV  | Middle east respiratory syndrome | Yes | Yes | TBP | Yes | Yes |
| SARS-CoV | Severe acute respiratory syndrome | Yes | Yes | TBP | Yes | Yes |
| **Contact:** either direct via hands of employees, or indirect via equipment and other contaminated articles |
| Dysentery (bacillary) | Bacterium - *Shigella dysenteriae* | No\* | Yes | TBP | Yes | TBP |
| Hepatitis A, D & E | Hepatitis A , D & E virus | No\* | Yes | TBP | Yes | TBP |
| Enteric fever (typhoid/paratyphoid fever) | Bacterium – *Salmonella typhi /paratyphi* | No\* | Yes | TBP | Yes | TBP |
| Haemolytic uraemic syndrome (HUS) | Verocytotoxin or shiga toxin producing *E.coli* strains (eg O157:H7) | No | Yes | TBP | Yes | TBP |
| Invasive Streptococcal infection | Bacterium – *Streptococcus pyogenes* (Group A) | Yes | Yes | TBP | No | No |
| Brucellosis | Brucella spp | No\* | Yes | TBP | Yes | TBP |
| **Blood borne:** Transmitted by contact with blood (and other body fluids which may be contaminated with blood) via a skin-penetrating injury or via broken skin. Through splashes of blood (and other body fluids which may be contaminated with blood) to eyes, nose and mouth |
| Acquired Immune Deficiency Syndrome | Human immunodeficiency virus | No\* | Yes | TBP | Yes | TBP |
| Hepatitis B and C | Hepatitis B and C virus | No\* | Yes | TBP | Yes | TBP |
| Rabies | Lyssaviruses. | No\* | Yes | No | No | No |
| **Droplet**: large particles that do remain airborne for very long and do not travel for from source |
| Meningitis  | Bacterium – *Neisseria meningitidis*  | No | Yes | TBP | Yes | TBP |
| **Other infectious agents** |
| Viral haemorrhagic fevers (transmitted by contact with blood) | Various viruses, eg Lassa fever virus, Ebola virus | Yes\*  | No | No | No | No |
| Transmissible spongiform encephalopathies (transmitted by puncture wounds; ‘sharps’ injury; contamination of broken skin; splashing of mucous membranes) | Various prions, eg Cruetzfeld Jacob disease, variant CJD | Yes | Yes  | TBP | Yes  | No |

TBP Transmission based precautions

No\* unless leakage of body fluids

Yes\* with double body bag

**Notification of reportable diseases**

Certain diseases are reportable under national legislation. Please refer to the relevant legislation for notifiable diseases.

England - Health Protection (Notification) Regulations 2010 <http://www.legislation.gov.uk/uksi/2010/659/schedule/1/made>

Wales - Health Protection (Notification) (Wales) Regulations 2010 <http://www.legislation.gov.uk/wsi/2010/1546/schedule/1/made>

Scotland – Public Health etc. (Scotland) Act 2008 <http://www.legislation.gov.uk/asp/2008/5/schedule/1>

# Appendix 2 Hazard notification sheet

|  |  |
| --- | --- |
| **Name of deceased** |  |
| **Date and time of death** |  |
| **Source hospital and ward** |  |
| The deceased is a potential source of infection (ring as appropriate – see note 1 below) : |
| Yes | Suspected | Unknown |
| If yes (see note 2), the remains present a risk of transmission by (ring as appropriate)  |
| **Airborne** | **Droplet** | **Contact** |
| **Specific infection** (note 3) |  |
| Instructions for handling remains (tick as appropriate): |
| Body bag is necessary |  |
| Viewing is not recommended |  |
| Embalming presents an increased risk and requires transmission based precautions |  |  |
| Deceased has implantable device (ring as appropriate) | Has been removed | Has been switched off (where required) | Needs to be removed |
| Signed (note 4) |  |
| Print name |  |
| On behalf of | (hospital/mortuary/general practitioner) |
| NotesNote 1: Not all infected patients display typical symptoms, therefore some infections (including blood borne viral infections) may not have been identified at the time of death.Note 2: In accordance with health and safety lawNote 3: The specific infection can only be provided where there is consent to disclose such information from the deceased or their family. Note 4: In hospital cases, the doctor and/or nursing staff certifying death is asked to sign this notification sheet; where a post mortem examination has been undertaken, the pathologist (or qualified Anatomical Pathology Technologist) is asked to sign this sheet; in non-hospital situations, the doctor certifying death is asked to sign this sheet.  |

# Appendix 3 Cleaning and decontamination

1. Cleaning and decontamination provide basic infection control measures that should be in place. This is particularly important, where you need to control the risk of exposure to infectious microorganisms and other hazardous substances when carrying out relevant processes, for example:
* Using wetted physical cleaning methods for cleaning large areas, to avoid creating infectious aerosols;
* Ensuring the disinfectant doesn’t cause any health problems for your employees, eg exposure to gaseous emissions from chlorinated disinfectants can cause breathing problems for some;
* Ensuring that any chemicals used for cleaning are compatible with each other and/or with other chemicals that might be in use. For example when formaldehyde comes into contact with a source of free chlorine, such as hypochlorite disinfectants, harmful chemical by-products may be formed.
1. Regular cleaning using detergent and water is usually adequate for facility surfaces. This will render areas physically cleaner and may remove some of the microorganisms that are associated with soiling. For known or suspected increased infection risk cases, appropriate disinfection should be carried out. This actively reduces the levels of harmful microorganisms on surfaces, instruments etc. The choice of disinfectant should be suitable for the range of infectious microorganisms that might be encountered and should effectively reduce them to a level that is not harmful to health.
2. Disinfection procedures must specify which types of disinfectant should be used where, and for what purpose. This is because different disinfectants may be effective for some surfaces but not for others, or are only effective against certain groups of microorganisms. Your procedures should be compatible with hospital trust policy if you are based in a healthcare setting. In all cases the procedures should state the in-use dilution which needs to be used and the amount of time needed for the disinfectant to be effective. This information is typically provided by the disinfectant manufacturer. It may be appropriate to use more than one type of disinfectant depending on the types of microorganism anticipated. Effective removal of organic matter is essential before any disinfection takes place as organic matter can neutralise the action of the disinfectant.
3. Staff need to ensure that adequate supplies of disinfectants at in-use concentration are available throughout the facility for both standard procedures and emergency clean up. Most disinfectants are hazardous and should always be stored and handled in accordance with the supplier’s instructions and COSHH.
4. As well as carrying out routine cleaning, you also need to have arrangements in place to deal with spillage, for example of blood and other body fluids. Spillages should be dealt with immediately, using an appropriate disinfectant and the area then cleaned.
5. The main use of disinfectants is to ensure that work areas and equipment are decontaminated and safe to work in/handle. This is particularly important for PPE.
6. The use of disinfectants should be specified in the safe working practices and include the types of disinfectant used, applications, working dilution, any contraindicating conditions and renewal frequency. Staff will also need to have suitable instruction and training on the safe working practices for these disinfectants.

**Equipment and instruments**

1. Effective decontamination of instruments is vital for the protection of the people using them. An automated washer-disinfector should be provided for the cleaning and disinfection of instruments after use. Where sterilisation of non-electrical instruments is required, as determined by a risk assessment, it is recommended that they are transported to the hospital sterile service department for processing in a robust, lidded, secure container, in line with trust policy for the packaging, containment and transport of instruments.
2. Staff should segregate equipment for reuse from disposable items. Reusable equipment should be placed in containers with solid sides and bottoms, made of metal or autoclavable plastics, and which allow adequate steam penetration throughout the equipment inside.

**Surfaces**

1. Tables, benches and floors require regular decontamination to remove blood and other spillages occurring during and between procedures, as well as being thoroughly cleaned and disinfected at the end of each day. Staff should also clean all floor drains and gullies at least daily.

**Spillage**

1. Spillage of potentially infectious material which may arise during a post-mortem examination, hygienic preparations or embalming needs to be dealt with promptly and in line with the safe working practices. Depending on the size and nature of any spill, an assessment should determine whether direct disinfection, or detergent cleaning followed by disinfection, is appropriate. When assessing how to decontaminate potentially infectious material the volume of organic matter should be taken into account. The efficacy of many disinfectants can also be adversely affected by incompatibility with some detergents and other chemicals.

# Appendix 4: Health surveillance and immunisation

**Health surveillance**

1. Health surveillance allows for early identification of ill health and helps identify any corrective action needed. Health surveillance is required by law if your employees are exposed to noise or vibration, solvents, fumes, dusts, biological agents and other substances hazardous to health, or work in compressed air.
2. Employers should provide employees with information about the sorts of infections that are relevant to their work and the symptoms that can occur. They should train employees to exercise personal vigilance so that prompt medical attention is sought if they develop early signs of infection.

**Before employment**

1. Routine medical examination before employment is not considered necessary. Instead, candidates can complete a questionnaire. The results of the questionnaire will indicate whether there is a need to see an occupational health nurse or physician.
2. The Occupational Health Department or a qualified adviser needs to provide advice on the health surveillance requirements and immunisation arrangements for staff directly handling the deceased and for those who visit the mortuary or funeral premises on a regular basis.

**Immunisation**

1. If the risk assessment identifies a risk of exposure to infectious microorganisms for which effective vaccines are readily available, a pre-exposure screening programme and appropriate follow-up assessments should show if employees are immune to the relevant microorganism. The screening records should include the dates of employee’s vaccinations and when any boosters or follow-up screenings are due.
2. The requirement for immunisation should be based on guidance from Public Health England immunisation against infectious diseases21 although invariably mortuary and funeral service staff who handle the deceased will need to be immunised against Hepatitis B, tetanus and tuberculosis.
3. The protection from immunisation should, however, only be seen as a supplement to reinforce procedural controls and the use of PPE. COSHH requires employers to make effective vaccines available to employees exposed to biological agents. As this is a specific requirement under health and safety law, employers cannot charge their employees for such vaccines.
4. In providing vaccines, employers should ensure that employees are made aware of the advantages and disadvantages of immunisation, and its limitations. Adequate records should be kept of any vaccines given and of the checks that are made to ensure protection.
5. The employer responsible for the mortuary should co-operate with employers of others who may attend the mortuary, for example at a post mortem examination, to make sure that those who may be at risk are suitably immunised.

**Record keeping**

1. Accurate occupational health records are needed for all staff, and more detailed records kept for those who may be regularly exposed to infection hazards. Arrangements should be in place to ensure the recall of staff and follow up for re-immunisation and boosters. It is important that where hazards exist, employers monitor the health of their staff and note and act upon occurrences of work-related illness, such as sickness absence. Active health surveillance will be required for sharps injuries and following exposure to significant pathogens, eg *Mycobacterium tuberculosis*. Further information on health surveillance22 can be found on the HSE website.
2. Where there is significant risk to the health of employees arising from work activities involving known or suspected cases of hazard group 3 biological agents, employers are required under COSHH to keep employee health records. These records will include:
* The type of work the employee does;
* Dates of when work was started and, when appropriate, finished;
* The biological agents to which they have been exposed;
* Records of any exposures, accidents and incidents.
1. Further details of the information which must be kept can be found in COSHH. Health records must be maintained in most cases for a period of 10 years following the last known exposure. In certain instances, such as work exposure to *Mycobacterium tuberculosis*, CJD and some blood borne viruses, the records need to be kept for 40 years from the date of the last entry.

# Appendix 5: Dealing with incidents and accidents

**Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013**

1. All employers, the self-employed and people in control of work premises have duties under the *Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR)23*. They must report certain work-related injuries, cases of ill health and dangerous occurrences. HSE will pass details to the relevant enforcing authority.
2. Reporting under RIDDOR does not suggest the acceptance of responsibility or liability. It is simply informing the enforcing authority that an incident has occurred. Under RIDDOR, it is an offence not to report.

**Reporting occupational diseases**

1. Employers must report certain occupational diseases, where this is likely to have been caused or made worse by their work. This includes any disease attributed to an occupational exposure to a biological agent.
2. A report should be made whenever there is reasonable evidence suggesting that a work-related exposure was the likely cause of the disease. The doctor may indicate the significance of any work-related factors when communicating their diagnosis.
3. The self-employed have similar duties to report occupational diseases attributed to their own work. You can find more information about reporting at [www.hse.gov.uk/riddor](http://www.hse.gov.uk/riddor).

**What you need to do as an employer**

1. Employers need to devise and implement a mechanism for reporting and responding rapidly and effectively to accidents where an injury results, incidents where there was potential for injury or ill health to result and cases of ill-health as diagnosed by a doctor. RIDDOR requires employers to report and keep records of specified types of accident, incident and occupational disease. For effective monitoring of health and safety arrangements, the internal reporting system needs to take account of all incidents and accidents that may occur in the premises, not just the more serious ones.
2. There needs to be clear procedures in place for dealing with incidents and accidents which could occur to staff or visitors. In addition, employees and other workers in the facilities should be encouraged to report incidents of ill-health. Safe working practices should cover the arrangements for:
* Immediate action in the event of an accident, fire or other emergency, especially where there is a risk of infection. This should include details of where to go to receive medical treatment or assessment;
* Reporting, recording and investigating accidents, incidents and ill-health;
* Notifying employees and their representatives of the causes of the incident and the remedial measures needed.
1. Accident and injury data provide information on the effectiveness of precautions and help everyone to learn from reported experience(s).

# Appendix 6: Managing exposure and post-exposure prophylaxis

1. Procedures must be in place to deal with any accidental exposure of staff to infectious microorganisms. Such exposures might include:
* Splashing of blood/body fluids onto mucous membranes eg eyes, mouth;
* Contaminated sharps injury that breaks the skin; or
* Contamination of broken skin.
1. If intact, the skin offers protection against most microorganisms, however if the skin is **not** intact eg through cuts or abrasions, or chronic dermatitis such as eczema then transmission may occur.

**Immediate actions post exposure**

1. If you are contaminated with blood or other body fluids, through a sharps injury or a body fluid splash into mucous membranes, take the following action without delay;
2. Wash splashes off your skin with soap and running water;
3. If your skin is broken, encourage the wound to bleed, do not suck the wound – rinse thoroughly under running water – do not swallow the water;
4. Record the source of decontamination;
5. Report the incident to your supervisor, line manager or health and safety advisor and your occupational health department or medical adviser if there is one.
6. Prompt medical advice is important. The circumstances of the incident need to be assessed and consideration given to any medical treatment required. Post exposure prophylaxis may be required for exposure to a blood borne virus, but to be effective, it may need to be started quickly. If your workplace does not have a medical adviser, contact the nearest Accident and Emergency department for advice, without delay.
7. If you think you have been infected with a blood borne virus, you should have access to support, advice and reassurance.

# Glossary

**Airborne** A route of transmission for infection – small particles that can remain airborne and travel considerable distance.

**Contact** A route of transmission for infection – either direct via hands of employees, or indirect via equipment and other contaminated articles.

**Droplet** A route of transmission for infection – large particles that do not remain airborne for very long and do not travel far from source.

**Increased risk** The deceased which present an increased risk to employees because of a known or suspected risk of infection.

**Mortuary** An area where the deceased are handled. This term can apply to the post mortem sector or funeral service premises.

**Rest room** An area for employees that is separate from work areas and is considered a ‘clean’ area.

**Standard precautions** The minimum control measures that should be implemented to manage the risk of exposure from work activities involving the deceased.

**Transmission based precautions** These are control measures that should be implemented when the deceased are known or suspected to have an infection. These should be implemented, as required, in addition to standard precautions. Transmission based precautions are categorised according to their route of transmission of the infectious agent, ie airborne, droplet or contact transmission.

# References

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