

Literature Review

Infection Prevention and Control During Care of the Deceased

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V2.0	September 2018	Literature review updated to align with new HSE guidance: HSG283. Managing infection risks when handling the deceased. Guidance for the mortuary, post-mortem room and funeral premises, and during exhumation. 2018	
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Purpose:	To inform the National Infection Prevention and Control Manual in order to facilitate the prevention and control of healthcare associated infections associated with deceased individuals in health and social care settings.
Target audience:	All those involved in the care of the deceased and the prevention and control of infection in Scotland. This includes staff within the mortuary, post-mortem room, funeral premises, and during exhumation.
Circulation list:	
Description:	This literature review examines the available professional literature on infection prevention and control during care of the deceased.
Update/review schedule:	Updated in real time with changes made to recommendations as required.
Cross reference:	National Infection Prevention and Control Manual
Update level:	Practice – <i>No significant change to practice</i> Research – <i>No significant change to research</i>

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1. Objectives

The aim of this review is to examine the extant scientific literature and guidance regarding infection control during care of the deceased. The specific objectives of the review are to determine:

- How should standard infection control precautions (SICPs) be applied by healthcare workers when providing care to the deceased?
- How should transmission-based precautions (TBPs) be applied by healthcare workers (HCWs) when providing care to the deceased?
- How should infection risk from the deceased be communicated to all those handling the deceased?
- What evidence is there that pathogenic transmission from recently deceased individuals can occur?
- What activities may increase the risk of transmission of infectious agents from deceased individuals?
- What additional precautions should be taken during such activities?
- When should a body bag be used for the deceased?
- When should the washing and/or dressing of the deceased be avoided?
- When should viewing of the deceased by the bereaved be avoided?
- What additional precautions should be applied in suspected or confirmed cases of transmissible spongiform encephalopathies (TSEs)?
- What additional precautions should be applied in suspected or confirmed cases of infection or colonisation with hazard group 4 organisms (including viral haemorrhagic fevers (VHFs)) and other infectious diseases of high consequence (IDHC)?

N.B. Mandatory recommendations are taken from the Health and Safety Executive's ['Managing Infection Risks When Handling the Deceased'](#) which supersedes previous guidance 'Safe working and the prevention of infection in the mortuary and post-mortem room' (2003) and 'Controlling the risks of infection at work from human remains' (2005).

2. Methodology

This targeted literature review was produced using a defined methodology as described in the [National Infection Prevention and Control Manual: Development Process](#).

3. Recommendations

This review makes the following recommendations based on an assessment of the extant scientific literature on infection control during care after death:

How should standard infection control precautions (SICPs) be applied by healthcare workers (HCWs) when providing care to the deceased?

SICPs as described in the National Infection Prevention and Control Manual (NIPCM) should be applied during care after death, as during life, by all staff, in all care settings, at all times, for all patients whether infection is known to be present or not. These should be determined by an assessment of risk to the individual and should include the task, level of interaction and/or the anticipated level of exposure to blood and/or other body fluids.

(Mandatory)

How should transmission-based precautions (TBPs) be applied by healthcare workers (HCWs) when providing care to the deceased?

TBPs as described in the NIPCM should be applied in addition to SICPs during care after death, as during life, when the deceased individual is suspected or known to be colonised or infected by an infectious agent/disease.

(Mandatory)

If an infection risk becomes apparent during a post-mortem procedure, (e.g. discovery of tuberculosis lesions) appropriate TBPs should be applied immediately.

(Mandatory)

How should infection risk be communicated to all those handling the deceased?

Information on the infection status of the deceased should be sought and communicated at each stage of handling and risk assessments performed.

The hazard notification sheet provided by the Health and Safety Executive (or similar local document) should be used to provide information on infection risk to those who will handle the deceased.

This should include the risk of infection, the route of transmission and relevant TBPs. Where the deceased are not properly identified and their infection status is unknown, they should be labelled and treated as an increased infection risk.

Where the deceased has requested that information surrounding their health remains confidential but there is a known or suspected infection risk, sufficient information should be provided, i.e. route of transmission, however disclosure of the infectious agent is not always necessary.

(Mandatory)

What activities may increase the risk of transmission of infectious agents from deceased?

Activities that are thought to increase the risk of transmission of infectious agents from the deceased include:

- techniques which cause liquid dispersion or splashing;
- processes that may generate aerosols e.g. use of mechanical oscillating saws;
- use of instruments which may cause injury e.g. sharps, manual saws etc;
- embalming (exposure to sharps and potentially large volumes of blood and body fluids).

(Mandatory)

When should a body bag be used for the deceased?

The deceased should be placed in a body bag whenever there is leakage or high probability of leakage of body fluids regardless of infectious status. In the case of advanced decomposition or trauma multiple body bags may be necessary. Conditions such as hepatitis A and E or haemolytic uraemic syndrome may increase the likelihood of leakage of body fluids.

(Mandatory)

The deceased should be placed in a body bag when they are known or suspected to have been infected with any of the following key infectious agents or illnesses: tuberculosis, Middle East Respiratory Syndrome (MERS), Severe Acute Respiratory Syndrome (SARS), invasive streptococcal infection, anthrax, transmissible spongiform encephalopathies (TSEs) including Creutzfeldt-Jakob Disease (CJD), Hazard Group 4 organisms* such as viral haemorrhagic fevers (VHFs) or other infectious diseases of high consequence (IDHC). In these cases procedures and handling of the deceased must be minimised. In the cases of VHFs a double body bag should be used.

(Mandatory)

* - see [ACDP approved list of biological agents](#)

When should the washing and/or dressing of the deceased be avoided?

Those undertaking washing and/or dressing of the deceased (also known as 'hygienic preparation') should be informed of any infectious risks and advised of the appropriate precautions to take e.g. personal protective equipment (PPE).

(Mandatory)

Washing and/or dressing should not be carried out when the deceased is known or suspected to have been infected by any of the following key infectious agents: invasive streptococcal infection, Hazard Group 4 organisms*, anthrax, rabies or other IDHC.

(Mandatory)

When should viewing of the deceased by the bereaved be avoided?

Those viewing the body should be informed of any infection risk from touching or kissing the deceased and should be discouraged from doing so if the risks are considered significant. This does not mean that the organism of infection must be named e.g. if this is against the wishes of the deceased. If there has been physical contact with the deceased, hand hygiene should be encouraged afterwards.

(Mandatory)

Viewing of the deceased should be avoided when the deceased is known or suspected to have been infected by Hazard Group 4 organisms*, specifically those causing VHFs (including Ebola, Lassa etc.), anthrax or other IDHC.

(Mandatory)

* - see [ACDP approved list of biological agents](#)

What additional precautions should be applied in suspected or confirmed cases of transmissible spongiform encephalopathies (TSEs)?

Post-mortem examination of deceased individuals known or suspected to have been infected by TSE-causing agents should be carried out in such a way as to minimise contamination of the working environment. If opening the skull with a (dedicated) bone-saw, the head and neck should be enclosed in a large plastic bag with the saw introduced through a hole in the bag. Post-mortem examination should be carried out with the body inside a body bag with absorbent wadding alongside the body but within the bag, to collect body fluids. Following post-mortem examination, any soiled wadding should be removed and, if necessary, replaced with clean wadding. Soiled wadding should be incinerated.

(Mandatory)

Where possible, single-use instruments should be used and incinerated after use. Alternatively, a set of dedicated instruments should be used for known, suspected or at-risk cases.

(Mandatory)

Where CJD is not diagnosed until after a post-mortem examination has taken place, all equipment should be decontaminated following the ACDP TSE guidance.

(Mandatory)

Embalming should not be performed in cases suspected or confirmed to have TSE.

(Mandatory)

What additional precautions should be applied in suspected or confirmed cases of infection or colonisation with hazard group 4 organisms (including viral haemorrhagic fevers (VHFs)) or other infectious diseases of high consequence (IDHC)?

Viewing of the deceased by the bereaved should be avoided when the deceased is known or suspected to have been infected by hazard group 4 organisms* or other IDHC.

(Mandatory)

Washing and/or dressing of the deceased should not be allowed when the deceased is known or suspected to have been infected by hazard group 4 organisms* or other IDHC.

(Mandatory)

In the case of VHFs including Ebola, Lassa etc. staff wearing suitable PPE (see [HPS guidance](#)) should place the deceased in a double body bag with absorbent material placed between each bag and the bag sealed and the outer surface disinfected with 1000 ppm av. chlorine or other appropriate disinfectant.

The body bag should be sealed, labelled as high-risk of infection and then placed in a robust coffin, which will need to have sealed joints.** It should then be kept in a separate and identified cold store unit to await prompt cremation or burial.

(Mandatory)

Embalming should not be performed when the deceased is known or suspected to have been infected by hazard group 4 organisms* or other IDHC.

(Mandatory)

* - see [ACDP approved list of biological agents](#)

** - A sealed coffin is a coffin with all the joints sealed to prevent loss of fluids. A silicon sealant is often used. Hermetically sealed coffins are airtight and have a zinc lining. However, hermetically sealed coffins can only be used for burial as they cannot be cremated].

Post-mortem examination should not be performed when the deceased is known or suspected of having been infected by hazard group 4 organisms* or other infectious diseases of high consequence. However where a post-mortem is deemed essential for medico-legal reasons, it should be referred to a specialist centre where specific protocols have been developed.

(Mandatory)

Appropriate PPE must be worn at all times as detailed in Advisory Committee on Dangerous Pathogens (ACDP) Guidance (see summary [HPS guidance](#)).

(Mandatory)

If it is suspected, but not confirmed, that a deceased individual has been infected by group 4 organisms*, blood sampling should be undertaken to confirm or exclude this diagnosis. This sampling should be undertaken in the mortuary by a competent person.

(Good practice point (GPP))

* - see [ACDP approved list of biological agents](#)

4. Discussion

4.1 Implications for practice

How should SICPs and TBPs be applied by HCWs when providing care to the deceased?

After death, individuals may still carry infectious organisms and even those individuals who are not known to be infected may have been asymptomatic carriers or their symptoms may have been masked by other disease.¹ As such, all patients should be considered potentially infectious and SICPs are equally applicable after death as they are during life.² To prevent transmission of specific infectious agents, TBPs are additionally required to be used by staff when the deceased is known or suspected to be colonised or infected by an infectious agent/disease.¹ The proper utilisation of SICPs and TBPs provides the greatest protection against disease transmission from the deceased. Little research has been performed into the efficacy of SICPs or TBPs after death. However, one study found that embalmers who reported routinely wearing gloves were ten times less likely to have serological markers for hepatitis B virus (HBV) infection than those who did not.³

There are additional precautions which should be taken during post-mortem examinations, such as extra protective clothing. Details of these precautions are given in the relevant HSE guidance: [Managing Infection Risks When Handling the Deceased](#).¹

How should infection risk from the deceased be communicated?

Information on the infection status of the deceased should be sought and communicated at each stage of the pathway of the deceased.¹ A hazard notification sheet (provided by HSE)¹ or similar document should be used to provide information to aid those who will handle the deceased.¹ This should include whether the patient presents an infection risk.¹ Where the deceased has requested that information surrounding their health remains confidential but there is a known or suspected infection risk, sufficient information to reduce the risk of transmission should be provided; this should include the mode of transmission of the organism.¹

A local assessment should be performed to assess the risk of infection and whether this risk can be managed adequately.¹ Where the deceased are not properly identified and their infection

status is unknown, they should be labelled and treated as an increased infection risk. This risk assessment may be adjusted if additional information becomes available.¹

What evidence is there that pathogenic transmission from recently deceased individuals can occur?

The organism most frequently reported as causing infection after transmission from deceased individuals is *Mycobacterium tuberculosis*, the causative agent of tuberculosis (TB). Those identified as most at risk of contracting TB from the deceased include embalmers,⁴⁻⁶ funeral directors⁷ and those involved or present during post-mortem examination.⁸⁻¹⁷ There are several reports detailing cases of individuals who contracted tuberculosis from deceased individuals;^{5;6;10-15;18} and several studies have detected higher tuberculosis prevalence among the relevant professional groups.^{4;7-9;16}

Infection is primarily caused by inhalation of infected aerosols, though the rarer 'prosector's wart' can be caused by cutaneous infection by *M. tuberculosis*.^{14;19} The bacterium has previously been found to remain infectious on inadequately decontaminated mortuary tables 24 hours after post-mortem examination.⁹ A 2007 paper investigating *M. tuberculosis* in post-mortem examinations in a large hospital in Ireland between 1991 and 2004 found that two thirds of the cases were not suspected of having the infection prior to post-mortem examination.²⁰ Additionally, a study conducted in 2014 highlighted that *M. tuberculosis* can survive in cadavers for a significant time post-mortem.²¹

Blood-borne viruses also present a significant potential risk to those working with the recently deceased. Studies have found varying degrees of hepatitis B virus (HBV) prevalence among those who work with the deceased, ranging from no increased risk for funeral service practitioners,²² to a prevalence of twice that of a comparison population for embalmers.³

Human immunodeficiency virus (HIV) has been found to be viable for days to weeks after death²³⁻²⁸ and so staff should be mindful of the potential for infection when undertaking care after death. Only one case of a confirmed HIV infection originating from a deceased individual could be found in the literature. This case involved a pathologist who received a scalpel wound while performing a post-mortem examination on a patient who had died of AIDS-related illness.²⁹ A 1999 review further identified three possible cases of occupationally-acquired HIV in embalmers and mortuary technicians.³⁰ However, it could not be confirmed that these were

occupationally acquired and other studies have failed to find association between HIV infection and working with deceased individuals;^{3;22} as such, the risk of HIV transmission from the deceased may be considered very low. Furthermore, those individuals in whom HIV has been diagnosed before death are likely to have received viral load-reducing treatment, making the risk of infection lower.

Other organisms identified in the literature as having caused infection where a deceased individual was identified as the source include *Vibrio cholerae*³¹ (the causative agent of cholera), Varicella-Zoster virus³² (the causative agent of chickenpox), Ebola virus,^{33;34} Lassa fever³⁵ and Nipah virus.³⁶ While these examples took place in more resource-poor countries, they serve as examples of the potential for pathogenic spread from the deceased, including from newly emerging pathogenic organisms.

No reported cases of transmission of transmissible spongiform encephalopathies (TSEs) such as CJD from the recently deceased were identified in the literature. However, it must be noted that the long incubation time together with difficulty of diagnosis mean that occupational link to diagnosis would be difficult, possibly resulting in under-reporting. There is evidence that the prions which cause these diseases can remain infectious in tissues for some time after death.³⁷ As such, TSEs should be considered as a potential risk from the deceased, especially in cases where the brain/nervous tissue is exposed.

What are the potential routes of transmission from recently deceased individuals?

There are four key potential routes of transmission of pathogenic organisms from the recently deceased. Appropriate application of SICPs and TBPs should minimise the potential for transmission through these routes.^{1;4;38-40}

1. Airborne – the transmission of infectious airborne particles (or aerosols). These are usually less than 5 µm in diameter and can remain suspended in the air for extended periods of time.¹ While the deceased is unable to cough or sneeze, expulsion of air from the lungs (especially when the body is moved¹⁹) and frothing can occur, potentially releasing infectious agents. Furthermore, certain activities after death increase the production of potentially infected aerosols, such as pathologist use of electric saws¹⁹ e.g. *Mycobacterium tuberculosis*.

2. Droplet– the transmission of droplets (5µm to 200µm in diameter) to susceptible mucosal surface or conjunctiva. Individuals working with the recently deceased should remain aware of the possibility of transmission through splashes into the mouth, nose or eyes. While the maximum distance for cross-transmission of droplets is not known, droplets have been known to cause risk of infection at a distance of 1 metre from the infected individual.¹
3. Direct Contact – the direct transmission of pathogens from an infectious body to another individual. This can occur when blood or body fluids come into contact with a mucous membrane or via cuts or abrasions to the skin.¹
4. Indirect Contact – the transmission of pathogens from an infectious body to another individual via a fomite or another person. This can occur if adequate hand hygiene is not performed, via contaminated equipment and surgical instruments or equipment which have not been adequately disinfected between uses.¹

What activities may increase the risk of transmission of infectious agents from deceased individuals?

Any operations used in post-mortem examination may pose as an increased risk of infection. Techniques which minimise liquid dispersion, splashing and the generation of aerosols should be used and any instruments which may cause injury should be handled with care.¹

Embalming - The embalming procedure can expose the embalmer to potentially infectious blood and bodily fluids. Embalming may also generate infectious aerosols as a result of the high pressure used to disperse the embalming fluid through the arteries.^{1;21;38} If the deceased is known or suspected to be infected with *M. tuberculosis* appropriate RPE should be worn.²¹ A higher prevalence of some diseases has been noted in embalmers compared to comparator populations and cases of transmission of infection from deceased individuals to embalmers have been identified.^{3-6;18} However, it is not clear whether the increased prevalence is due to increased risk inherent to the procedures or lesser application of SICPs and TBPs. Embalming should only take place if the appropriate controls are in place to protect staff and visitors, these are laid out in the Health and Safety Executive (HSE) guidance.¹ Embalming should not be carried out on persons known or suspected to have been infected with anthrax, rabies, VHF, TSE or invasive streptococcal infection.¹

Choice of saw - During post-mortem examination, it may be necessary to perform cutting or sawing procedures on bone or cartilage, such as for the opening of the skull and removal of the brain. The HSE advises that mechanical saws may produce aerosols and increase the risk of splashing, though appropriate bone dust collection by vacuum will minimise this risk. Manual handsaws provide an alternative, though they increase the likelihood of accidental injury and so cut-resistant gloves are recommended for this procedure.¹ If an oscillating saw is used it should be properly fitted with an air extraction hood during use.¹

When should a body bag be used for the deceased?

It is important to note that placing a body in a body bag is not without disadvantages. Deceased individuals placed in body bags cool more slowly, speeding the decomposition process.^{38;41} This can be an issue for those to whom the body may be given for disposal, e.g. funeral directors, and may preclude the possibility of viewing of the body by the bereaved.³⁸ Furthermore, viewing of a loved one within a plastic bag which has been folded back may be distressing for the bereaved. In some other countries such as Ireland, however, it is advised that all bodies should be placed in a body bag.⁴²

The HSE advises that a body bag should be used where there is 'a known high risk of infection or where the risk is not known and there is leakage of body fluids'.¹ Body bag requirements for specific organisms are provided in appendix 1 of the HSE guidance.¹ Body bags should be used in all cases where there is leakage of body fluids, regardless of known infectious status.¹ Additionally, in the case of advanced decomposition or trauma multiple body bags may be necessary.¹

Recently updated guidance from the Advisory Committee on Dangerous Pathogens (ACDP) provides details of necessary procedures for management of deceased individuals known or suspected to have been infected by pathogenic agents responsible for viral haemorrhagic fevers (VHFs, including Ebola, Lassa etc.).⁴³ This includes advice to use double body bags for deceased individuals known or suspected to have had VHF and storing the deceased in a sealed coffin.⁴⁴ Current HSE guidance states that a body bag is required if there is a known or suspected infection of tuberculosis, MERS, SARS, invasive streptococcal infection, anthrax, VHF and TSE. In these cases procedures and handling of the deceased should be minimised.¹ Body bags should also be considered for other infectious diseases of high consequence.

When should the washing and/or dressing of the deceased be avoided?

The washing and dressing of a body (also known as 'hygienic preparation') may be performed by a number of people: healthcare workers (HCWs, where it is described as 'last offices'), anatomical pathology technologists, funeral staff (where it is known as 'first offices') or family/religious officials. The process can be undertaken to improve the appearance and odour of the body for viewing by the bereaved or for ritual purposes in certain religious and cultural traditions.

HSE guidance states that those undertaking washing of the body should be informed of any infectious risks and advised of the appropriate precautions to take e.g. PPE.¹ Hygienic treatment should not be carried out if the deceased is known or suspected to be infected by invasive streptococcal infection, anthrax, rabies or VHF.¹ Washing and/or dressing of the deceased should also be avoided when the deceased is known or suspected to be infected by other infectious diseases of high consequence.

When should viewing of the deceased by the bereaved be avoided?

With the possible exceptions of neonatal fatalities and stillborn or terminated foetuses,⁴⁵⁻⁴⁸ the general consensus in the literature is that viewing of the recently deceased by the bereaved is psychologically beneficial to the grieving process;^{45;49-52} though very little systematic evidence is available. As such, viewing should not be restricted without good reason.

HSE guidance includes recommendations for individuals viewing the recently deceased.¹ The Association of Anatomical Pathology Technology has developed post-mortem standards to ensure that the risk of infection is minimised and the deceased is suitable for viewing after post-mortem examination.¹

Appendix 1 of the HSE guidance (2018) sets out microorganisms for which viewing should be restricted and precautions to minimise risk of transmission; viewing is only restricted for Anthrax and VHF.¹ World Health Organisation (WHO)⁵³ and Department of Health⁵⁴ guidance on TSEs states that viewing should be allowed and that 'superficial contact, such as touching or kissing the face, need not be discouraged, even if a post-mortem examination has been conducted'.⁵³

A 2004 review for the British Institute of Embalmers (BIE) identified no cases of infection in the published literature resulting solely from the viewing of the deceased.³⁸ This may be due in part

to a number of factors including the restriction of viewing in the case of certain diseases and should not be taken to mean that there is no potential risk to those viewing a body.

Where there has been physical contact with the deceased during viewing, staff should encourage thorough hand-washing afterwards. Where there is a significant risk of infection from touching or kissing the body, the bereaved should be informed of this and discouraged from doing so.¹ The body should not be viewed when the deceased is suspected or known to be infected with anthrax or VHF.¹ The viewing of the body should also be avoided when the deceased is suspected or known to be infected with other infectious diseases of high consequence.

What additional precautions should be undertaken in suspected or confirmed cases of transmissible spongiform encephalopathies (TSEs)?

In recent years there has been concern over the transmission of TSEs, especially variant Creutzfeldt-Jakob disease (vCJD), the causative agent of which was widespread in the UK food supply up until 1997. There are no reported cases of TSE transmission from a deceased individual, though evidence shows that the prions responsible for CJD may remain infectious after death³⁷ and so there remains a risk. The HSE recommends that post-mortem examination of individuals known or suspected of having TSE infection should be 'carried out in such a way as to minimise contamination of the working environment'.¹ For example, when opening the skull with use of a bone-saw, the head and neck should be enclosed in a large plastic bag with the saw introduced through a hole in the bag.¹ This hole may then be sealed with tape.¹ Furthermore, HSE, Department of Health (DH) and World Health Organisation (WHO) guidance states that the post-mortem examination should be performed within an open body bag with absorbent wadding so that contaminated fluids can be captured.^{1;53;54} Any soiled wadding should be removed and replaced following post-mortem. Soiled wadding should be incinerated.¹ Where possible, single use instruments should be used and incinerated after use. If single use instruments are not available, a set of dedicated instruments should be used for known, suspected or at-risk cases.¹ Guidance from a paper by Healing *et al.* and HSE guidance recommend that embalming should not be carried out on a body known or suspected to have been infected with a TSE,^{1;19} though WHO advise that embalming can be safely performed by following some additional precautions which can be found in their 1999 guidance.⁵³

The advisory committee on dangerous pathogens' transmissible spongiform encephalopathy (ACDP TSE) subgroup have produced guidance for working with CJD 'Minimise transmission risk of CJD and vCJD in healthcare settings' which should be followed. Where CJD is not diagnosed until after a post-mortem examination has taken place, all equipment should be decontaminated following the ACDP TSE guidance. Embalming should not be performed in cases suspected or confirmed to have TSE.^{1;55}

What additional precautions should be undertaken in suspected or confirmed cases of infection by hazard group four organisms (e.g. viral haemorrhagic fevers, VHF) or infectious diseases of high consequence (IDHC)?

The Advisory Committee on Dangerous Pathogens (ACDP) classifies pathogenic organisms according to three factors: the likelihood that the organism will cause disease in humans; the likelihood that the organism will spread to the community; and the availability of prophylaxis or treatment.⁵⁶

Organisms are classified as group 4 according to the following criteria:

*Causes severe human disease and is a serious hazard to employees; it is likely to spread to the community and there is usually no effective prophylaxis or treatment available.*⁵⁶

Group four pathogens of particular concern are the viral haemorrhagic fevers (VHFs) such as Ebola, Marburg and Crimean-Congo haemorrhagic fever (CCHF). The HSE and ACDP advise that viewing by the bereaved, hygienic preparation, embalming and post-mortem examination should not be carried out on bodies known or suspected to be infected with a group 4 organism.^{1;44} If the patient is suspected of being infected with a VHF, sampling should be undertaken to confirm or exclude the diagnosis. It is not necessary to transport the patient to specialist facilities for sampling to obtain a diagnosis – transporting a potentially infectious patient presents an unnecessary additional risk. Appropriate specialists should be consulted to ascertain the amount of sampling which is necessary in the interest of public health.⁴⁴ As with a living patient suspected of VHF infection, SICPs and TBPs apply and appropriate PPE should be worn at all times as discussed in ACDP guidance.⁴⁴ Infectious agents or diseases that have been identified as IDHC by national or international public health organisations typically fall into hazard group 3 or 4 of the Approved List of Biological Agents and are capable of human to

human transmission.⁵⁷ Hazard group 3 agents can cause severe human disease and may be a serious hazard to employees; they may spread to the community, but there is usually effective prophylaxis or treatment available. A [literature review](#) was conducted by HPS which contains further information about the use of PPE for infectious diseases of high consequence.⁵⁸

Recently updated guidance from the ACDP provides details of necessary procedures for management of deceased individuals known or suspected to have been infected by pathogenic agents responsible for viral haemorrhagic fevers (VHFs, including Ebola, Lassa etc.). This includes advice to double-bag deceased individuals who have been infected by VHFs who were not cared for in an isolator and storing the deceased in a sealed coffin.⁴⁴

Post-mortems should not be carried out in cases of known or suspected VHF, however where a post-mortem is deemed essential for medico-legal reasons, it should be referred to a specialist centre where specific protocols have been developed.^{1;43}

4.2 Implications for research

The vast majority of the recommendations within this review are derived from guidance by the Health and Safety Executive and are therefore mandatory. The HSE guidance itself relies on 'a review of scientific knowledge' as well as expert feedback from stakeholders and therefore could be considered expert opinion. It would be advantageous to have a more robust evidence base; however, it is clear that the risk of infection from cadavers is similar to that of living patients and that the same infection control precautions should apply.

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