

### **A3 Protocols for performing post-mortem examinations on known or suspect 'high-risk' infected cadavers: Hazard Group 3 infections HIV, hepatitis C, tuberculosis, Creutzfeldt-Jakob disease**

#### **A3.1 HIV/AIDS**

1. NAME OF INFECTION  
HIV-1 and HIV-2
2. RISK AT AUTOPSY  
Acquisition of viral infection, AIDS  
Associated infections in HIV-infected cadavers: tuberculosis, HBV, HCV
3. DOES INFECTION DECLINE OVER TIME  
Yes, but infection documented up to 16 days after death. Therefore assume always infectious  
Note: patients treated effectively with anti-retroviral therapy frequently have a blood HIV viral load below the limits of detection (<50 copies/ml). Although the risk of infection from such patients through an accident during an autopsy is therefore exceedingly low, the autopsy protocols should be the same as for those patients with known high viral loads or unknown viral load
4. MODES OF ACQUISITION  
Percutaneous injury, mucosal contamination, skin contamination
5. RISK OF ACQUISITION OF INFECTION  
Percutaneous injury: 0.3% risk of infection (without PEP – see point 33 below)  
Mucosal contamination: 0.03% risk  
Skin contamination: uncertain, but has occurred through broken skin in nursing environment  
To date, one pathologist known to have contracted HIV from percutaneous injury whilst performing a post-mortem (removing the scalp)
6. WHO IS PROSECTOR  
Consultant histopathologist or experienced junior pathologist
7. WHO IS ASSISTANT APT  
Diplomate in Anatomical Pathology Technology, i.e. MTO2 grade or higher
8. NEED FOR CIRCULATOR  
Ideally yes, but not essential
9. OTHER PEOPLE PERMITTED IN AUTOPSY ROOM AT SAME TIME  
Yes, but at distance from blood splash contamination
10. PREVIOUS STAFF VACCINATIONS  
BCG, HBV are essential
11. ESSENTIAL TO USE SEPARATE 'HIGH-RISK SUITE' IN MORTUARY  
No, but the mortuary must have adequate ventilation, water supply and drainage; a separate suite is desirable

12. CLOTHING FOR PROSECTOR AND ASSISTANT APT  
Standard: scrub suits, disposable waterproof gown that covers the arms, disposable plastic apron covering the tops of boots, rubber boots, hat
13. RESPIRATORY PROTECTION  
Surgical mask to prevent oral/nasal contamination  
If tuberculosis is known or seriously suspected: a visor with ventilation, or a special filter mask (see A3.3, Protocol for tuberculosis)
14. EYE PROTECTION  
Wide-area glasses or goggles or visor essential
15. GLOVES  
Two layers essential: option – neoprene cut-resistant gloves plus latex – this is now standard and the preferred option. The best possible protection is a triple glove sandwich of latex-neoprene-latex, so that if the outer glove is punctured it is not necessary to stop working to change the glove, yet the skin is completely protected. Consider chain-mail glove over the latex glove on the non-saw hand when removing the skull
16. POST-MORTEM TO BE PERFORMED IN BODY BAG  
No
17. TOOLS FOR DISSECTION AND ORGAN EXAMINATION  
Standard, but minimum with sharp points  
Blunt-ended PM40 and scalpel blades are available
18. POST-MORTEM LIMITED TO CERTAIN ORGANS  
No
19. ‘NON-STANDARD’ ORGANS TO BE EXAMINED (best practice)  
Eyes and spinal cord if clinically relevant (e.g. CMV), subject to appropriate consent
20. BRAIN EXAMINATION  
Fix for 2–3 weeks before cutting, subject to appropriate consent from the Coroner or appropriate consent from relatives
21. SPECIFIC ORGANS OR PARTS THAT MUST BE EXAMINED FOR CASE ASCERTAINMENT  
None
22. SPECIAL PRECAUTIONS IN REMOVING ORGANS  
None, save care with sharp bone edges
23. HOW TO SEW UP CADAVER  
Standard twine or clips
24. FIXATIVE FOR STANDARD HISTOLOGY  
Formalin – kills HIV rapidly; brain disinfected by two weeks in formalin
25. FRESH TISSUE SAMPLES AND DESTINATION  
For microbiology if necessary (e.g. suspected TB, mycosis, septicaemia)
26. DISPOSAL OF TISSUES NOT REPLACED IN CADAVER  
Incineration

27. FATE OF INSTRUMENTS USED IN DISSECTION  
Standard cleaning and decontamination
28. SPECIAL SURFACE DECONTAMINATION AND CLEANING REQUIREMENTS  
None – standard cleaning procedures
29. NEED TO NOTIFY UNDERTAKERS OF RISK OF INFECTION  
Yes
30. NOTIFICATION OF INFECTIOUS AUTOPSY CASE TO OTHERS  
No, but keep secure register in mortuary for health and safety purposes, i.e. note HIV-infected status in the routine autopsy register book  
If a new diagnosis of HIV is made at autopsy, the laboratory that performs the serology will routinely notify the Public Health Laboratory Service Communicable Diseases Surveillance Unit of the case
31. SPECIAL PRECAUTIONS FOR PROCESSING TISSUES AFTER ROUTINE FORMALIN FIXATION  
None
32. HISTOPATHOLOGY BIOMEDICAL SCIENTISTS WHO MAY PREPARE MICROSCOPY SLIDES  
No limitation
33. WHAT TO DO IF EXPOSURE OCCURS  
The hospital's occupational health (OH) units have protocols for dealing with occupational exposure to HIV, access to appropriate post-exposure prophylaxis chemotherapy (PEP) and counselling. (PEP appears to significantly reduce risk of infection after percutaneous exposure)
- If incident (percutaneous injury) occurs, stop the post-mortem and report immediately to OH.
- In a public mortuary setting, there should be protocols for obtaining rapid local advice, and PEP if considered appropriate

### **A3.2 HEPATITIS C VIRUS**

1. NAME OF INFECTION  
Hepatitis C virus (HCV)
2. RISK AT AUTOPSY  
Acquisition of HCV infection, with consequent risk of developing cirrhosis or hepatocellular carcinoma (about 50% risk by 30 years)  
A proportion of HCV-infected cadavers are co-infected with HIV (see A3.1, [Protocol for HIV/AIDS](#))  
Up to 70% of IV drug users in London are HCV-infected
3. DOES INFECTIOUSNESS OF CADAVERS DECLINE OVER TIME?  
Yes, but not significantly – assume always infectious
4. MODES OF ACQUISITION  
Percutaneous injury is the only significant mode. Inhalation, mucosal and cutaneous exposure are not a significant hazard

5. RISK OF ACQUISITION OF INFECTION  
3% likelihood following a needlestick injury, therefore probably similar following a cut
6. WHO IS PROSECTOR  
Consultant pathologist or experienced junior pathologist
7. WHO IS ASSISTANT APT  
Diplomate mortuary technical officer, i.e. MTO2 grade or higher
8. NEED FOR CIRCULATOR  
Ideally yes, but not essential
9. OTHER PEOPLE PERMITTED IN AUTOPSY ROOM AT SAME TIME  
Yes
10. PREVIOUS STAFF VACCINATIONS  
BCG, HBV essential
11. ESSENTIAL TO USE SEPARATE 'HIGH-RISK SUITE' IN MORTUARY  
Ideal, but not essential
12. CLOTHING FOR PROSECTOR AND ASSISTANT APT  
Standard
13. RESPIRATORY PROTECTION  
Standard surgical mask is sufficient
14. EYE PROTECTION  
Glasses or goggles to be worn
15. GLOVES  
Two layers essential: option – neoprene cut-resistant gloves plus latex – this is now standard and the preferred option. The best possible protection is a triple glove sandwich of latex-neoprene-latex, so that if the outer glove is punctured it is not necessary to stop working to change the glove, yet the skin is completely protected. Consider chain-mail glove over the latex glove on the non-saw hand when removing the skull
16. POST-MORTEM TO BE PERFORMED IN BODY BAG  
No
17. TOOLS FOR DISSECTION AND ORGAN EXAMINATION  
Standard
18. POST-MORTEM LIMITED TO CERTAIN ORGANS  
No
19. 'NON-STANDARD' ORGANS TO BE EXAMINED  
None
20. SPECIAL PRECAUTIONS IN REMOVING ORGANS  
None, save care with sharp bone edges
21. HOW TO SEW UP CADAVER  
Twine or clips

22. **FIXATIVE FOR STANDARD HISTOLOGY**  
Formalin – kills HCV
23. **FRESH TISSUE SAMPLES AND DESTINATION**  
Not necessary
24. **DISPOSAL OF TISSUES NOT REPLACED IN CADAVER**  
Incineration
25. **FATE OF INSTRUMENTS USED IN DISSECTION**  
Standard cleaning and decontamination
26. **SPECIAL SURFACE DECONTAMINATION AND CLEANING REQUIREMENTS**  
Standard cleaning
27. **NEED TO NOTIFY UNDERTAKERS OF RISK OF INFECTION**  
Yes
28. **NOTIFICATION OF INFECTIOUS AUTOPSY CASE TO OTHERS**  
Not needed unless the autopsy is making a new diagnosis of HCV: the local consultant in communicable disease control must be informed, directly or via the Coroner, and appropriate contact tracing thereby instigated (see Appendix 4, Notification of infectious diseases). The hospital's infection control department should also be informed
29. **SPECIAL PRECAUTIONS FOR PROCESSING TISSUES AFTER ROUTINE FORMALIN FIXATION**  
None
30. **HISTOPATHOLOGY BIOMEDICAL SCIENTISTS WHO MAY PREPARE MICROSCOPY SLIDES**  
No limitation
31. **WHAT TO DO IF EXPOSURE OCCURS**  
Stop the autopsy; clean the skin wound thoroughly; notify the hospital's occupational health department

### **A3.3 TUBERCULOSIS**

1. **NAME OF INFECTION**  
Mycobacterium tuberculosis  
The other commonly encountered mycobacteria in hospital patients – *M. avium-intracellulare*, *M. kansasii*, etc. – do not present a hazard in the autopsy environment and do not require protocols different from the routine autopsy.
2. **RISK AT AUTOPSY**  
Acquisition of tuberculosis. Most strains are drug-sensitive; but a small proportion of TB cadavers encountered in this mortuary will be known, suspected (not yet proven) or possible (i.e. possible from contact history) multi-drug-resistant strains. Both strains are equivalently infectious  
A significant proportion of TB-infected cadavers will be co-infected with HIV (see A3.1, Protocol for HIV/AIDS if that is the case)
3. **DOES INFECTIOUSNESS OF CADAVERS DECLINE OVER TIME?**  
Not significantly

4. **MODES OF ACQUISITION**  
Inhalation of mycobacteria from tissues; percutaneous injury; mucosal contamination
5. **RISK OF ACQUISITION OF INFECTION**  
Inhalation: variable, there have been small epidemics of TB among previously uninfected and non-BCG-vaccinated staff and students, attributable to acquisition from autopsy  
Percutaneous injury – it is recorded ('prosector's wart')
6. **WHO IS PROSECTOR**  
Consultant pathologist or experienced junior pathologist
7. **WHO IS ASSISTANT APT**  
Certificated mortuary technical officer, i.e. MTO1 grade or higher
8. **NEED FOR CIRCULATOR**  
Not essential
9. **OTHER PEOPLE PERMITTED IN AUTOPSY ROOM AT SAME TIME**  
Only if wearing appropriate respiratory protection (see below)
10. **PREVIOUS STAFF VACCINATIONS**  
BCG, HBV essential
11. **ESSENTIAL TO USE SEPARATE 'HIGH-RISK SUITE' IN MORTUARY**  
Not essential, but preferable
12. **CLOTHING FOR PROSECTOR AND ASSISTANT APT**  
Standard
13. **RESPIRATORY PROTECTION**  
Ordinary surgical mask is inadequate. Must wear either microfilter face mask such as Tecno 95 mask, or equivalent tight fitting mask with filter, or visor with ventilation.
14. **EYE PROTECTION**  
Glasses, goggles or visor essential
15. **GLOVES**  
Two layers essential; the best option is neoprene cut-resistant glove under latex
16. **POST-MORTEM TO BE PERFORMED IN BODY BAG**  
No
17. **TOOLS FOR DISSECTION AND ORGAN EXAMINATION**  
Standard, but minimum with sharp points
18. **SPECIAL PRECAUTIONS IN REMOVING ORGANS**  
Care with sharp bone edges on ribcage  
Filling the lungs via the bronchi with formalin – and completing the autopsy the next day – is not recommended or required; it does not sterilise the lungs nor disseminate TB lesions.  
Do the autopsy in standard fashion with appropriate respiratory protection
19. **HOW TO SEW UP CADAVER**  
Standard twine or clips
20. **FIXATIVE FOR STANDARD HISTOLOGY**  
Formalin – kills Mycobacterium tuberculosis of all strains

21. **FRESH TISSUE SAMPLES AND DESTINATION**  
Sample of tuberculous tissue to microbiology/infection department for culture confirmation, resistance determination, molecular typing and archiving – whether patient comes from hospital or outside
22. **DISPOSAL OF TISSUES NOT REPLACED IN CADAVER**  
Incineration
23. **FATE OF INSTRUMENTS USED IN DISSECTION**  
Standard cleaning and decontamination
24. **SPECIAL SURFACE DECONTAMINATION AND CLEANING REQUIREMENTS**  
None
25. **NEED TO NOTIFY UNDERTAKERS OF RISK OF INFECTION**  
Yes
26. **NOTIFICATION OF INFECTIOUS AUTOPSY CASE TO OTHERS**  
Not needed for known drug-sensitive TB strains. If known or suspected drug-resistant strain, the hospital's occupational health (OH) unit should be informed, along with the infection control department  
If the autopsy is making a new diagnosis of TB, the local consultant in communicable disease control must be informed, directly or via the Coroner, and appropriate contact tracing thereby instigated (see Appendix 4, Notification of infectious diseases). The hospital's infection control department should also be informed
27. **SPECIAL PRECAUTIONS FOR PROCESSING TISSUES AFTER ROUTINE FORMALIN FIXATION**  
None
28. **HISTOPATHOLOGY BIOMEDICAL SCIENTISTS WHO MAY PREPARE MICROSCOPY SLIDES**  
No limitation
29. **WHAT TO DO IF EXPOSURE OCCURS**  
Inhalation exposure is reduced to the minimum by these protocols. If a previously unsuspected cadaver is later determined to have active TB infection (i.e. multibacillary lesions or typical AFB-neg lesions preferably with culture proof) and full respiratory protection was not used, notify OH of the incident. Include names of the assisting APTs and other staff present in the autopsy suite at time of autopsy. Also in previously unknown cases, the infection control department must be informed  
  
Percutaneous exposure: wash the lesion thoroughly, and later notify OH (as with all percutaneous injuries at autopsy that generate bleeding)

#### **A3.4 CREUTZFELDT-JAKOB DISEASE**

1. **NAME OF INFECTION**  
Creutzfeldt-Jakob disease (CJD) is a member of the group of disorders known as transmissible spongiform encephalopathies. Those encountered in humans are sporadic, variant, iatrogenic and familial CJD; Gerstmann-Straussler-Scheinker, familial fatal insomnia and kuru. 'CJD' is used in this section to include all of these disorders
2. **RISK AT AUTOPSY**  
Acquisition of CJD

3. DOES INFECTIOUSNESS OF CADAVERS DECLINE OVER TIME  
Not significantly
4. MODES OF ACQUISITION  
Percutaneous injury; mucosal contamination
5. RISK OF ACQUISITION OF INFECTION  
There is a theoretical risk. There are no recorded cases of CJD acquired at autopsy, but some patients have been infected through inoculation using surgical instruments  
Percutaneous exposure will not occur if steel mesh undergloves are worn  
Full face visor eliminates mucosal contamination
6. WHO IS PROSECTOR  
Consultant pathologist
7. WHO IS ASSISTANT APT  
Diplomate mortuary technical officer, i.e. MTO2 grade or higher
8. NEED FOR CIRCULATOR  
Ideal, but not essential
9. OTHER PEOPLE PERMITTED IN AUTOPSY ROOM AT SAME TIME  
No
10. PREVIOUS STAFF VACCINATIONS  
None available.
11. ESSENTIAL TO USE SEPARATE 'HIGH RISK SUITE' IN MORTUARY  
Not essential but preferable
12. CLOTHING FOR PROSECTOR AND ASSISTANT APT  
Disposable gowns and aprons
13. RESPIRATORY PROTECTION  
None required beyond a standard face mask
14. EYE PROTECTION  
Full face visor essential
15. GLOVES  
Steel mesh gloves under latex when removing the skull, brain and spinal cord. Cut-resistant gloves, as for other HG#3 infectious autopsies, appropriate for the rest of the internal dissection
16. POST-MORTEM TO BE PERFORMED IN BODY BAG  
Yes
17. TOOLS FOR DISSECTION AND ORGAN EXAMINATION  
Disposable instruments as far as possible
18. POST-MORTEM LIMITED TO CERTAIN ORGANS  
No; apart from the useful gathering of further information about CJD, the suspected clinical diagnosis may be incorrect and visceral lesions be the correct cause of death

19. 'NON-STANDARD' ORGANS TO BE EXAMINED  
Spinal cord
20. BRAIN EXAMINATION  
After fixation
21. SPECIFIC ORGANS OR PARTS THAT MUST BE EXAMINED FOR CASE ASCERTAINMENT  
Yes – brain
22. SPECIAL PRECAUTIONS IN REMOVING ORGANS  
Minimise environmental contaminations. If possible, remove brain with head enclosed in polythene bag. Absorbent wadding to collect spillages of blood and cerebrospinal fluid (CSF)
23. HOW TO SEW UP CADAVER  
Disposable stapler
24. FIXATIVE FOR STANDARD HISTOLOGY  
Formalin followed by disinfection of blocks for histology with 96% formic acid
25. FRESH TISSUE SAMPLES AND DESTINATION  
Freeze and store small samples of brain and CSF separately clearly labelled as 'CJD'
26. DISPOSAL OF TISSUES NOT REPLACED IN CADAVER  
Incineration
27. FATE OF INSTRUMENTS USED IN DISSECTION  
Disposable: disinfection with 2M NaOH followed by incineration  
Re-usable: autoclaving, following guidelines in standard publications
28. SPECIAL SURFACE DECONTAMINATION AND CLEANING REQUIREMENTS  
2M NaOH for minimum of one hour with repeated wetting of surfaces
29. NEED TO NOTIFY UNDERTAKERS OF RISK OF INFECTION  
Yes and return body in body bag
30. NOTIFICATION OF CJD AUTOPSY TO OTHERS  
Yes, to the National CJD Surveillance Unit once diagnosis is confirmed
31. SPECIAL PRECAUTIONS FOR PROCESSING TISSUES AFTER ROUTINE FORMALIN FIXATION  
Disinfect blocks for histology by immersion in 96% formic acid for one hour prior to processing. Collect formalin used for brain fixation, absorb in sawdust and incinerate. Collect and incinerate wax trimmings. Decontaminate microtome with 2M NaOH after sectioning completed
32. HISTOPATHOLOGY BIOMEDICAL SCIENTISTS WHO MAY PREPARE MICROSCOPY SLIDES  
No limitation
33. WHAT TO DO IF EXPOSURE OCCURS  
Record names of all staff present in the autopsy suite at time of autopsy and retain records for 40 years