

**State of Kuwait**

**Ministry of Health**

**Infection Control Directorate**

# Infection Control Guidelines in Mortuary Services

2009

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## **Introduction**

All dead bodies are potentially infectious and standard precautions should be implemented for every case. Although most organisms in the dead body are unlikely to infect healthy persons, some infectious agents may be transmitted where workers are in close contact with blood, body fluids and tissues of dead body who died with infectious diseases. To minimize the risks of transmission of known and also unsuspected infectious diseases, dead bodies should be handled in such a way that workers' exposure to blood, body fluids and tissues is reduced. A rational approach should include staff training and education, safe working environment, appropriate work practices, the use of recommended safety devices and vaccination against hepatitis B.

There is a need to maintain the confidentiality of a patient's medical condition even after his/her death. At the same time, there is obligation to inform personnel who may be at risk of infection through contact with dead bodies so that appropriate measures may be taken to guard against infection. The discrete use of labels such as "Danger of infection" on the dead body is considered appropriate.

## **Engineering controls**

### **Facility design**

The mortuary shall be designed so as to allow a proper separation of clean and dirty areas by transitional zones. These areas shall be clearly marked and so arranged that the transfer of all personnel to and from dirty areas shall be through a transitional zone.

1. Movement of the case should be from the reception (transitional area) where a risk assessment occurs into either storage (transitional) or the autopsy (dirty area).
2. Visitors to the mortuary (other staff, students, relatives, undertakers, etc.) are confined to a recognized clean area without potential for contamination.

### **Facility construction**

A brief description of minimum standards for each area follows.

#### **Clean areas**

This category includes areas such as the viewing room, offices, and receptions areas. Clean areas shall have adequate ambient climate control. This needs to control any potential for irritant odors and vapours from preserving or cleaning fluids. There needs to be provision of adequate hand washing and toileting areas.

### ***Clean storage***

Storage of clean equipment needs to be provided in the clean areas, with no risk of soiling from dirty areas.

### **Transitional areas**

The control of mortuary staff movements needs to follow the principles of controlled transition from clean to dirty areas.

Access to the dirty areas must only be allowed via the transition areas, and clear demarcation of the transition needs to be achieved either by physical barriers or by appropriate signage.

It is important that all workers and visitors to dirty areas move through the transition areas, and are provided with adequate information about personal protection, safety issues and emergency evacuation procedures prior to their entry.

Transitional areas include such areas as:

**Vehicle bay** — large enough to allow the maneuvering of large cars and vans, preferably at a discrete location.

**Body store** — needs to be a chiller maintained at 4<sup>0</sup>C. Integrity of the power source needs to be provided in case of reticulated power failure. The store needs to be of adequate capacity to cope with peak demands over public holidays. It needs to provide non-porous surfaces that are easy to clean and provide ergonomic solutions to the problems of manual handling of heavy bodies. There needs to be a system of containment of leaking body fluids and control of nuisance odours.

## **Categorization of precautions for handling dead bodies**

Based on the mode of transmission and risk of infection of different diseases, the following categories of precautions for handling dead bodies are advised:

**Cat. 1:** Signified by a **BLUE** label.

-Standard precautions are recommended for all dead bodies other than those with infectious diseases as listed under Categories 2 & 3.

**Cat. 2:** Signified by a **YELLOW** label .

-Additional precautions are recommended for dead bodies with known:

- (a) Human Immunodeficiency Virus infection (HIV)
- (b) Hepatitis C
- (c) Creutzfeldt-Jacob disease (CJD) without necropsy,
- (d) Severe Acute Respiratory Syndrome, and
- (e) Other infectious disease as advised by the physician and the infection control doctor.

**Cat. 3:** Signified by a **BLACK** label .

Stringent infection precautions are recommended for dead bodies with known

- (a) Anthrax
- (b) Plague
- (c) Rabies
- (d) Viral haemorrhagic fevers
- (e) Creutzfeldt-Jacob disease (CJD) with necropsy, and
- (f) Other infectious disease as advised by the physician, the infection control doctor.(Appendix 1).

## **Infection Control procedures for deceased patients**

### **1-Body Covers**

- **Use of Body Covers :**

- Thin, plastic body covers must be used for all bodies, unless a stronger body bag (Cadaver bag) is required for infectious cases or to prevent excessive leakage.
- A body cover should be placed inside the trolley and taken to the ward/department, whereby the patient is moved across into the body cover.
- The body will remain in the body cover until they are released from the Mortuary.

- **Use of Cadaver Bags :**

- Cadaver (body) bags may be required for use after death in certain situations in order to protect subsequent body handlers, e.g. mortuary staff, undertakers, porters etc.
- They are required for use in the following situations:
  - A) Death from some types of infectious diseases. In some situations once the bag is sealed it is never reopened e.g. Anthrax. For other diseases only the head section is opened to facilitate viewing e.g. HIV.
  - B) For transport of bodies to the mortuary following:
    - i) Death from severe trauma (to physically contain remains and body substances)
    - ii) For those dying from conditions where there is excessive body substance leaking which is not containable by packing and dressings
- Cadaver bags should not be used unnecessarily as the body cools more slowly inside these bags, decomposition is therefore accelerated which may render tissues unsatisfactory for histopathological examination.
- All bodies that require bagging should be dealt with and transported for refrigeration as quickly and efficiently as is practicable.

- A supply of body bags should be available on all wards.
- Viewing on the ward by family and friends should be encouraged.

## **2-Dealing with dead body by ward staff**

- Hepatitis B vaccination is recommended for all staff likely to come into contact with dead bodies.
- The body will be classified by attending physician as category 1, 2 or 3. Tags for classification categories of dead bodies should be attached to dead body, body bag and mortuary sheet.
- Avoid direct contact with the dead body, blood or body fluids discharged from the dead body. Nursing and other personnel who handle dead bodies must wear protective clothing consisting of gown, apron, mask, caps and gloves; wear goggles if necessary.
- They should cover all cuts and abrasions with waterproof bandages or dressing.
- All orifices should be packed and leaking wounds padded and sealed with waterproof tape.
- Wound drainage and needle puncture holes of the dead body should be disinfected with 5000p.p.m. hypochlorite and covered with impermeable material. Hypochlorite solution must be freshly prepared.
- Extreme caution should be exercised when removing intravenous catheters and other devices which are sharp. They should be disposed into puncture resistant containers or sharp box immediately.
- All body orifices should preferably be plugged with swabs soaked in 5000p.p.m. hypochlorite.
- The body should be cleaned and dried.
- After identifying and attaching to the body the identity label and Cat.1 tag , the body should be wrapped with mortuary sheet before being placed on mortuary trolley and transported to the mortuary.
- After removing protective clothing and gloves, hands should be washed thoroughly.
- A danger of infection label must be attached to the outside of the bag. Ensure that patient details are completed and enclosed in the clear sleeve of the Cadaver bag.
- Mortuary staff **must** be informed of the diagnosis.
- Porters transferring the body to the mortuary should only be informed of the infection risk and any precautions they need take – but not the actual diagnosis.
- **In certain situations**, following some deaths there may be a statutory requirement e.g. for the purpose of forensic studies, all orifices should be packed and leaking wounds padded and sealed with waterproof tape. Catheters, ryles tubes, airways, IV access lines etc. should be left insitu, sealed and occluded (spigotted). The precautions taken and protective clothing worn should be the same as those observed during life.

### **Additional precautions for handling dead bodies with Infectious Diseases listed under Category 2 or 3:**

- The relatives should be informed beforehand so that they can bring the necessary clothing in advance. If the decease's own clothing is not available, the decease should be dressed with a hospital pyjama.

-Shaving should be avoided following a death from an infectious disease and a danger of infection/biohazard label **must** be attached to the body.

-Identify the body and attach to the body the appropriate identity label. The body should be placed in a cadaver bag of not less than 150 µm thick, which should be zippered or closed tightly with tapes and bandage strips. Pins are not to be used.

-Cadaver bag is to be used, bags are available from the Mortuary. However, all wards should have their own supply.

- The outside of the cadaver bag should be wiped with 5000p.p.m. hypochlorite if soiled.

- After attaching to the body bag with the Cat. 2 or Cat. 3 tag, the bagged body should then be placed in another robust plastic bag with zip before being placed on mortuary trolley and transported to the mortuary. The mortuary sheet should be attached with a Cat. 2 or Cat. 3 tag.

- Disposable items should be discarded into yellow plastic bag, which should be securely tied up and sent for disposal.

- For Cat. 2 case, the used linen or protective clothing should be wrapped in a water-soluble plastic bag, which is available for ordering laundry store. The soiled linen should be labelled with infectious hazard and sent to laundry for thermal disinfection.

- For Cat. 3 case, the used linen or protective clothing should be wrapped in a yellow plastic bag and sent for disposal.

- All surfaces that may be contaminated should be disinfected with 1000p.p.m. hypochlorite

- After removing protective clothing and gloves, hands should be washed thoroughly.

### **3-Precautions for mortuary staff**

1. Hepatitis B vaccination is recommended to staff who is likely to come into contact with dead bodies.

2. All staff should be trained in handling dead bodies with infectious diseases. A high standard of personal hygiene should be adopted.

3. Smoking, drinking and eating is forbidden in the autopsy room, body storage and viewing areas.

4. The mortuary must at all times be kept clean and properly ventilated. Lighting must be adequate. Surfaces and instruments should be made of materials which could be easily disinfected and maintained.

5. Avoid direct contact with the dead body, blood or body fluids. Staffs who handle dead bodies must wear protective clothing consisting of gown, apron, mask, gloves and boots; wear goggles if necessary. They should cover all cuts and abrasions with water proof bandages or dressings.

6. All bodies must be identified and correctly labelled with identity labels and Cat. tags.

7. Any dead body which is contaminated with blood or body fluids should be placed in a disposable plastic bag as soon as possible.

8. Bodies should be stored in cold chambers maintained at approx. 4°C. storage compartments should be easily accessible for both regular cleaning and maintenance.

9. Since all bodies who come to autopsy is a potential source of infection, at all times, pathologist and other support staff should take standard precautions in the performance of any autopsy.
10. All efforts should be made to avoid sharps injury, both in the course of examination and afterwards in dealing with waste disposal and decontamination.
11. Soiled linen, environmental surfaces, instruments and transport trolley should be decontaminated in accordance with established disinfection policy.
12. Single use gloves protective aprons and other waste materials must be discarded in yellow plastic waste bags for disposal.
13. After removing protective clothing and gloves, hands should be washed thoroughly.

**Table (1) : Minimum standards of PPE**

<b>Pathologist and mortuary technician</b>	
<i>Respiratory protection</i>	These should be adequate by design to prevent inhalation of any aerosols produced during bone sawing and any airborne spores, bacteria or viral particles. Consideration can be given to masks that absorb nuisance odours and the respiratory irritants used in the mortuary room, such as formaldehyde (e.g. 3M 1860, Moldex 2200, Gerson G1920).
<i>Impervious aprons</i>	To cover the trunk and extend below the boot line.
<i>Gowns</i>	These similarly can be impervious and cover from neck and wrist to bootline.
<i>Latex gloves</i>	Double gloving is the standard presently accepted although single gloving and the use of chain mail to index and thumb of the non-dominant hand may be acceptable.
<i>Eye protection</i>	Usually in the form of a visor, although splash-proof spectacles are acceptable.
<i>Head gear</i>	As in operating theatre standards.
<i>Rubber boots</i>	As in operating theatre standards.
<b>Mortuary captain and all visitors</b>	
<i>Respiratory protection</i>	Need for visitors at high-risk autopsies must be questioned. Any people present during an high-risk autopsy should use the same level of respiratory protection as the pathologist.
<i>Gowns</i>	Over gowns to bootline.
<i>Eye protection</i>	Only during the potentially splash-producing procedures. Standard safety glasses should be sufficient unless the captain or visitor is in close proximity to the case whereupon they should wear the same level of protection as the pathologist.
<i>Head gear</i>	Optional.
<i>Rubber boots</i>	Optional. Should have separate footwear to street wear or utilise overshoes.

Managing Health And Safety Risks In New Zeland Mortuaries. Guidelines to promote safe working conditions,2000.

### **Property and Valuables**

-As per hospital policy but enclose any valuables or clothing soiled with body fluids in a sealed plastic bag.

-Property must not be destroyed without permission of the next of relatives

### **Transport of bodies with leaking wounds and following severe trauma**

These Cadaver bags must be labelled accordingly:

- Danger of Infection
- Infection Status Not Known
- Major trauma
- Drainage Problems

This enables Mortuary staff/Porters to correctly place bodies in the relevant storage area prior to post mortem.

## **Appendix 1. . Precautions in specific infectious diseases in recently dead**

The diseases and organisms which may pose particular risks vary in different parts of the world but include tuberculosis, streptococcal infection, gastrointestinal organisms, Creutzfeldt-Jakob disease (CJD), hepatitis and HIV infection, a number of viral infections (particularly viral hemorrhagic fevers such as Lassa or Ebola), and possibly meningitis and septicemia (especially meningococcal). In general, as with old burials, the use of appropriate protective clothing will greatly reduce the risk of acquiring infection but some additional precautions may be advisable for particular infections.

### **Tuberculosis.**

Opening cadavers of individuals infected with tuberculosis is dangerous, and workers in morbid anatomy, pathologists, mortuary technicians, and medical students have a high rate of tuberculin conversion. BCG vaccination is advised for such individuals.

### **Meningitis and Septicemia.**

Meningitis can be caused by a wide range of organisms but only tuberculosis (see above) and meningococci are likely to present a risk.

Septicemia is a common terminal event and can be caused by many different organisms (often the patient's own flora), most of which present no hazard. Only cases of meningococcal septicemia or of infection with group A streptococci pose a risk. Life-threatening infections with the latter can result from quite minor injuries.

### **Gastrointestinal Organisms.**

Fecal leakage from bodies is very common. All those handling cadavers should wear gloves and impervious disposable aprons; take care not to contaminate their instruments or their working environment; and wash their hands carefully after procedures and before eating. The bodies of those who have died of diseases such as cholera or typhoid should not be buried in places where they could contaminate water sources.

### **Transmissible Spongiform Encephalopathies (TSE).**

The causative agents of these diseases are highly resistant to most disinfectants and to heat. They are not killed by formalin. Exposure to sodium hypochlorite containing 20,000 ppm available chlorine (for at least 1 hour), to 1 to 2M sodium hydroxide, or to steam autoclaving at 134°C for at least 18 minutes is required for decontamination. The skulls of those who have died of CJD or other high-risk infections should only be opened inside a large plastic bag fitted over the head and neck of the cadaver.

**Hepatitis.**

**Hepatitis A** is transmitted by the fecal-oral route and presents the same hazard as other gastrointestinal pathogens. A highly effective vaccine is available.

**Hepatitis B** is extremely infectious, and the incidence of this infection continues to increase in many countries. Staff working in hospital mortuaries should receive immunization against hepatitis B. The bodies of those who have died of, or were known to be infected with, this virus should be handled only by those wearing full protective clothing.

**Hepatitis C** also is infectious, although probably less so than hepatitis B. It is transmitted by the same routes as hepatitis B. There is no vaccine, and similar precautions to those for hepatitis B should be taken.

**Human Immunodeficiency Virus.**

The routes of transmission of hepatitis B and of HIV are similar, and the precautions required to prevent the transmission of HBV should be adequate to prevent transmission of HIV. HIV is probably about 1000-fold less infectious than hepatitis B, and the risk to those handling infected cadavers is therefore proportionately less. Human immunodeficiency virus can survive for many days post mortem in tissues preserved under laboratory conditions. Care should be taken when handling unfixed, HIV-infected material from cadavers, or when undertaking postmortem examinations of those infected with HIV. Those infected with HIV are often infected with other organisms (such as mycobacteria), which may be more infectious (although less dangerous) than the HIV infection itself.

**Viral Hemorrhagic Fevers.**

Viruses such as Ebola and Marburg are highly infectious and are readily transmitted by contact with infected blood, secretions, and organs. Most of the known outbreaks have been nosocomial. Great care should be exercised when dealing with those who have died of such infections. Staff should wear gloves and protective gowns and masks; postmortem examinations should not be carried out. Bodies should be bagged as soon as possible and should be burned.

## **References**

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2. Infection Control Procedures for Deceased Patients Mid Cheshire Hospitals NHS Trust, 2004
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4. Managing Health And Safety Risks In New Zeland Mortuaries. Guidelines to promote safe working conditions,2000.
5. Healing TD, Hoffman P, Young SEJ. Infection Hazards of Human Cadavers. In: Wenzel R, Edmond M, Pittet D, Devaster JM, Brewer T, Geddes A, Butzler JP eds. A Guide to Infection Control in the Hospital: An official publication of the International Society for Infectious Diseases B.C. Decker Inc. Hamilton London,1998.

## Tags for classification categories of dead bodies

Cat. 1	Standard precautions are recommended for all dead bodies other than those with infectious diseases as listed under Categories 2 & 3	<b>(Blue Sticker )</b>
Cat. 2	<p>Additional precautions are recommended for dead bodies with known:</p> <ul style="list-style-type: none"> <li>• Human Immunodeficiency Virus infection (HIV)</li> <li>• Hepatitis C</li> <li>• Creutzfeldt-Jacob disease (CJD) without necropsy,</li> <li>• Severe Acute Respiratory Syndrome, and</li> <li>• Other infectious disease as advised by the physician and the infection control doctor.</li> </ul>	<b>(Yellow Sticker )</b>
Cat. 3	<p>Stringent infection precautions are recommended for dead bodies with known</p> <ul style="list-style-type: none"> <li>• Anthrax</li> <li>• Plague</li> <li>• Rabies</li> <li>• Viral hemorrhagic fevers</li> <li>• Creutzfeldt-Jacob disease (CJD) with necropsy, and</li> <li>• Other infectious disease as advised by the physician, or the infection control doctor.</li> </ul>	<b>(Black Sticker)</b>

**For the mortuary sheet**



