INFECTION CONTROL ADVICE

Middle East respiratory syndrome coronavirus (MERS-CoV)
INFECTION CONTROL ADVICE – POSSIBLE OR CONFIRMED MERS-CoV CASES

This document outlines infection control and other general advice for those involved in investigating, receiving and caring for patients, primarily within healthcare settings, who are, or may be, infected with MERS-CoV. It should be used in conjunction with the document Infection Control Precautions to Minimise Transmission of Respiratory Tract Infections (RTIs) in the Healthcare Setting and with local policies. The web page has the latest information: http://www.hpa.org.uk/webw/HPAweb&Page&HPAwebAutoListName/Page/1317136202637

In the absence of effective drugs or a vaccine, control of this disease relies on the appropriate management and isolation of possible and confirmed cases, and the investigation and follow up of close contacts. In preparation, healthcare professionals or facilities that may be involved in the investigation or management and care of possible or confirmed cases should:

- Review their local policies and ensure that operational procedures are described and staff are familiar with them; for example, where personal protective equipment is stored and how it should be used.
- Ensure that staff are aware of what actions to take if a possible or confirmed case presents.
- Ensure that staff are aware of where a possible or confirmed case will be isolated and the need for a negative pressure room, if it is available.
- Ensure that staff who are likely to be caring for possible or confirmed cases are familiar with an FFP3 respirator conforming to EN149:2001, and that fit testing has been undertaken before using this equipment.
- Ensure staff are aware of how to access MERS-CoV surveillance forms on the PHE website and any local record sheets.
- Ensure that adequate supplies/equipment are available, including:
  - Supplies of FFP3 respirators
  - Gloves - disposable and latex-free alternatives, e.g. nitrile
  - Gowns/Aprons - disposable fluid-resistant full-sleeve gowns and single-use plastic aprons
  - Eye protection e.g. tight-fitting goggles or face shield - disposable, or if non-disposable, with a wipeable surface - not with elastic straps
  - Leak-proof, clinical waste disposal bags
  - Hand hygiene supplies
  - General-purpose detergent and disinfectant solutions

Introduction

Coronaviruses are mainly transmitted by large respiratory droplets and direct or indirect contact with infected secretions. They have also been detected in blood, faeces and urine and, under certain circumstances, airborne transmission is thought to have occurred from aerosolised respiratory secretions and faecal material. As coronaviruses have a lipid envelope, a wide range of disinfectants and detergents are effective. Personal protective equipment and good infection control are extremely useful in preventing spread but can never completely eliminate risk as they are user dependent.

The remainder of this document concerns infection control advice for possible or confirmed cases of MERS-CoV.
Isolation

- Patients requiring assessment and investigation should be assessed in a single cubicle or room or at home if this is possible.
- Patients requiring admission should be admitted directly to negative-pressure, single rooms, if available. If this is not possible then a single room with en-suite facilities should be used. Room doors should be kept closed. Positive-pressure, single rooms should not be used.
- If on a critical care unit, the patient should be nursed in a negative-pressure room where available, or, if not available, a neutral-pressure side room (with closed ventilator circuit if required) should be used.
- Staff should wear protective clothing as detailed below. Rooms should be appropriately decontaminated before being used again (see below: Cleaning). Suitable written information must be placed on the isolation room door indicating the need for respiratory and enteric isolation, though there will be a need to respect patient confidentiality.
- Only essential staff should enter the room.
- A record should be kept of all staff in contact with a possible/confirmed case.

Staff

- Staff must comply with all infection control procedures as detailed above.
- A record must be maintained of all staff involved in the assessment, care and management of the patient. The record sheet should be placed at the door and all staff entering must complete this.
- The use of bank or agency staff should be avoided wherever possible.
- All staff should be vigilant for any respiratory symptoms in the 14 days following last exposure to a case and should not come to work if they have a fever or cough. They should seek advice from their infection control team/occupational health department as per the local policy. Their hospital infection control team and/or local Health Protection Team will advise on where they should be medically assessed. During this period, symptomatic staff should avoid close contact with people both in the hospital and in the general community.

Visitors

- The number of visitors should be restricted.
- Visitors entering the isolation room must wear PPE as previously detailed.
- Visitors must be trained in the appropriate use of protective clothing and hand hygiene.
- A log of all visitors must be kept.

Contact tracing

- Follow up of staff contacts of patients will be co-ordinated by the Trust Occupational Health Department.
- Follow up of community contacts of patients will be co-ordinated by the local Health Protection Team.
Protective clothing

To be worn by ALL staff and visitors entering the room (see appendix 1: putting on and removing personal protective equipment)

- Long sleeved, fluid-repellent disposable gown – if staff wore scrubs underneath this would obviate problems with laundering of uniforms and other clothing.
- Non-sterile surgical gloves.
- An FFP3 respirator conforming to EN149:2001 to be worn by all personnel carrying out clinical care, visitors or staff in the room during aerosol-generating procedures. **Fit testing must be undertaken before using this equipment and a respirator should be fit-checked every time it is used.** A poster outlining how this is done is available – this is being updated by the Department of Health.
- Eye protection (prescription glasses do not provide adequate protection against droplets, sprays and splashes).

It is vital that the protective clothing described above is worn for all airway management, including intubation.

Hand hygiene

- This is essential before and after all patient contact, removal of protective clothing and cleaning of the environment.
- Use soap and water or use alcohol hand rub if hands are **socially clean**
- Rings (other than a plain smooth band), wrist watches and wrist jewellery must not be worn by staff.

Medical procedures

- Procedures that produce aerosols of respiratory secretions, e.g. bronchoscopy, induced sputum, positive-pressure ventilation via a face mask, intubation and extubation, and airway suctioning carry an increased risk of transmission. Where these procedures are medically necessary, they should be undertaken in a negative-pressure room, if available, or in a single room.
- The minimum number of required staff should be present and they **must** wear personal protective equipment (PPE) as described above, including eye protection. Entry and exit from the room should be minimised during the procedure.
- If a room is used for a procedure it should be left for 20 minutes, cleaned and is then ready for re-use. This is because the large particles will fall out within seconds and the small aerosol particles will behave almost as a gas. Clearance of any aerosol is dependent on the ventilation of the room. In hospitals this is usually around 12-15 air changes per hour, and so after about 20 minutes there would be less than 1 per cent of the starting level (assuming cessation of aerosol generation).
- Coronaviruses have a lipid envelope and a wide range of disinfectants and detergents are effective.

Equipment

- Use dedicated equipment in the isolation room.
- Dispose of single use equipment as clinical waste inside room.
- Re-useable equipment should be avoided if possible. If used, disinfect according to the manufacturer’s instructions.
Ventilators should be protected with a high efficient filter, e.g. BS EN 13328-1, and standard decontamination procedures followed.
Closed system suction should be used.
Crockery should be treated as normal.
Use of equipment that re-circulates air (e.g. fans) should not be used as this has the potential to turn a negative-pressure room into a positive-pressure room.

Cleaning

Domestic staff to wear protective clothing as indicated above, and they must be made aware of the need for additional precautions and be trained in these.
Daily cleaning should be carried out with more frequent cleaning of commonly used hand-touched surfaces.
The isolation area should be cleaned after the rest of the ward area.
Dedicated or disposable equipment must be used for cleaning.
Cleaning equipment must be decontaminated following use.

Linen

Bag linen inside single room - do not carry through ward/department.
Linen should be bagged in accordance with procedures for infected linen and the laundry informed of the high-risk nature.

Waste

Dispose of all waste as clinical waste; in particular, ensure the appropriate disposal of faeces and urine.
Waste to be handled as per local policy.

Specimens

All specimens must be treated as biohazard:
  - Label with biohazard label
  - Mark request form accordingly
  - Double bag
For confirmed cases all specimens will be handled at Containment Level 3.
Transportation of samples between laboratories should be by enhanced category B (category A packaging and category B courier). Further advice available on the laboratory testing page.

Critical care

All respiratory equipment must be protected with a high efficiency filter e.g. BS EN 13328-1.
Disposable respiratory equipment should be used wherever possible. Re-usable equipment must, as a minimum, be disinfected in accordance with the manufacturer’s instructions.
The ventilator circuit should not be broken unless absolutely necessary
Ventilators must be placed on standby when carrying out bagging.
Protective clothing detailed above must be worn
The use of non-invasive positive-pressure ventilation equipment carries with it an increased risk of transmission of infection.
• Water humidification should be avoided and a heat and moisture exchanger should be used if possible.
• Only essential staff should be in the patient's room when AGPs are being carried out.

Theatres

• Theatres must be informed in advance.
• The patient should be transported directly to the operating theatre and should wear a surgical mask if it can be tolerated.
• The patient should be anaesthetised and recovered in the theatre.
• Staff should wear protective clothing as detailed above.
• Disposable anaesthetic equipment should be used wherever possible.
• Re-usable anaesthetic equipment should be decontaminated in line with the manufacturer's instructions.
• The anaesthetic machine must be protected by a filter with viral efficiency to 99.99%.
• Instruments and devices should be decontaminated in the normal manner. Instruments must be transported safely.
• The theatre should be cleaned as per local policy.
• Theatres should not be used for 15 minutes after the patient leaves if conventionally ventilated, or 5 minutes if ultraclean ventilation is used.

Transfers to other departments

• Where possible, all procedures and investigations should be carried out in the single room with a minimal number of staff present during any procedures.
• Only if clinical need dictates, and in conjunction with the infection control team, should patients be transferred to other departments; the following procedures then apply:
  o The department must be informed in advance.
  o The patient must be taken straight to and from the investigation/treatment room, and must not wait in a communal area.
  o To allow appropriate decontamination after any procedure, patients should be at the end of a list.
  o The patient should wear a ‘surgical ’ mask if this can be tolerated - this will prevent large droplets being expelled into the environment by the wearer.
  o The treatment/procedure room, trolley/chair and all equipment should be cleaned with a suitable agent after use.
  o Staff carrying out procedures must wear the protective clothing indicated above.
  o It is possible that the virus can survive in the environment for at least 48 hrs, so environmental decontamination is vital.

Transfer to other institutions

• Transfer of cases to another hospital should be avoided unless it is necessary for medical care.
• Patients should not be transferred solely for the purpose of accommodation in a negative-pressure room.
• If transfer is essential, the Infection Control Team at the receiving hospital and the ambulance staff must be advised in advance of the special circumstances of the transfer.

Handling dead bodies
The act of moving a recently deceased body onto a hospital trolley for transportation to the morgue might be sufficient to expel small amounts of air from the lungs and thereby present a minor risk. A body bag should be used for transferring the body, but hospital porters carrying out this task with an unbagged body should wear full PPE.

Once in the hospital mortuary it would be acceptable to open the body bag in order to view the body.

Washing or preparing the body is acceptable if those carrying out the task wear long-sleeved gowns and gloves which should then be discarded. Facial protection may be considered against splashing and should be guided by a local risk assessment.

Mortuary staff and funeral directors must be advised of the biohazard risk.

Embalming is not recommended because of the potential presence of virus in blood.

If a post mortem is required then it needs to be undertaken using safe working techniques (e.g. manual rather than power tools) and wearing full PPE, as per pandemic influenza, in the event that power tools are used. High security post mortem suites are available if needed.

Summary of advice

If a patient fitting the case definition for possible MERS-CoV is admitted, infection control personnel should follow transmission-based precautions (droplet and contact precautions), the full details of which can be found in the document Infection Control Precautions to Minimise Transmission of Respiratory Tract Infections (RTIs) in the Healthcare Setting. In addition, given that MERS-CoV has been detected in faeces, enteric precautions should also be followed.

Infection control personnel should be notified immediately of any possible or confirmed cases of MERS-CoV admitted or diagnosed whilst in care. In addition to standard precautions, infection control measures for inpatients should include:

- **Airborne precautions, e.g.**:
  - Either an isolation room with negative-pressure relative to the surrounding area or a single room with own bathroom and toilet facilities.
  - Use of FFP3 respirators conforming to EN 149:2001 for persons entering the room. Fit testing should be undertaken prior to using this equipment.
- **Contact and droplet precautions** (including use of long-sleeved fluid-repellent gown and latex or similar non-latex gloves with long tight-fitting cuffs for contact with the patient or their environment).
- **Standard precautions** to include careful attention to hand washing and hygiene.
- **When caring for patients**, clinicians should wear eye protection for all patient contact. Contact local Infection Control Team for advice.
- **Enteric precautions**
- **Standard precautions** when handling any clinical waste, which must be placed in leak-proof clinical waste bags or bins and disposed of safely.
- Laundry should be classified as infected.
Appendix 1

Putting on and removing personal protective equipment

Putting on PPE

The level of PPE used will vary according to the procedure being carried out, and not all items of PPE will always be required. PPE should be put on before entering a side room. If full PPE is required, for example for a potentially infectious aerosol generating procedure, all staff in the room, or entering a room that has not been appropriately cleaned, should wear the following PPE, put on in the following order:

2. FFP3 respirator.
3. Eye protection, i.e. goggles or face shield.
4. Disposable gloves.

The order given above is practical but the order for putting on is less critical than the order of removal given below.

Removal of PPE

PPE should be removed in an order that minimises the potential for cross-contamination.

Before leaving the side room gloves, gown and eye protection should be removed (in that order, where worn) and disposed of as clinical (also known as infectious) waste. After leaving the area, the respirator can be removed and disposed of as clinical waste. Guidance on the order of removal of PPE is as follows:

1. Gloves

   - Grasp the outside of the glove with the opposite gloved hand; peel off.
   - Hold the removed glove in gloved hand.
   - Slide the fingers of the ungloved hand under the remaining glove at the wrist.
   - Peel the second glove off over the first glove and discard appropriately.

2. Gown

   - Unfasten or break ties.
   - Pull gown away from the neck and shoulders, touching the inside of the gown only.
• Turn the gown inside out, fold or roll into a bundle and discard.

3. Eye protection
   • To remove, handle by headband or earpieces and discard appropriately.

4. Respirator
   • Untie or break bottom ties, followed by top ties or elastic, and remove by handling ties only and discard appropriately.
   • To minimise cross-contamination, the order outlined above should be applied even if not all items of PPE have been used.

Clean hands thoroughly immediately after removing all PPE.