Aims

To provide guidance for infection control precautions during the transport of patient with confirmed or suspected transmissible respiratory tract infection (including influenza).

Application

EMRS Team members
SAS Paramedics
Air crew and pilots

Background

During the emergence of the 2009 Influenza A [H1N1] pandemic the text below was developed with Health Protection Scotland and then presented to the various agencies providing aviation services to EMRS (namely GAMA, Bond, MoD and Coastguard). Each of these agencies either approved it as a policy or declared it compatible with their own internal guidance.
Although the pandemic is over the guidance remains relevant given the precautions advised by Health Protection Scotland to reduce the transmission of respiratory tract infections, especially when these may be of viral origin.

Routes of transmission:

Spread of viral respiratory tract infections is by contact, droplet (travel only 1m), and airborne (travel greater distances).

Transmission by contact is prevented by standard infection control procedures (hand hygiene, gloves, apron, cleaning of surfaces etc.) and should not therefore require modification of current EMRS practice. Droplet infection is prevented by the addition of a surgical facemask. Droplets only travel ~1m from source and therefore this precaution is only necessary when close contact is anticipated. Airborne transmission may occur whenever an aerosol generating procedure (AGP) is performed and more specific precautions are required. Airborne transmission can occur over greater distances and all exposed surface within an enclosed space may be contaminated. Furthermore several air exchanges will need to occur before the risk is reduced. Appropriate PPE is therefore determined by the degree of patient contact and whether an AGP is planned or anticipated.

Aerosol Generating Procedures (AGPs):

AGPs that EMRS may encounter include:

- Intubation, extubation and related procedures, for example manual ventilation and open suctioning. Although not part of official guidance disconnection from the ventilator for any reason clearly may be an AGP (depending where the circuit is broken).
- CPR
- Non-invasive ventilation (NIV) or CPAP.
- Rarely, bronchoscopy and high frequency oscillatory ventilation (included for completeness).

Certain other procedures/equipment may generate an aerosol from material other than patients' secretions but are not considered to represent a significant infectious risk. Procedures in this category include:

- Administration of pressurised humidified O₂
- Administration of medication via nebulisation

During nebulisation, the aerosol derives from a non-patient source (the fluid in the nebuliser chamber) and does not carry patient-derived viral particles. If a particle in the aerosol coalesces with a contaminated mucous membrane, it will cease to be airborne and therefore will not be part of an aerosol.

PPE for AGPs (airborne precautions):
• Fluid repellent gown
• Eye protection
• FFP3 respirator
• Gloves
• Standard infection control precautions

Patients

This policy applies to any patient in whom a transmissible respiratory tract infection is suspected. This will particularly apply during the annual influenza season. For guidance refer to current Health Protection Scotland guidance and guidance from the Chief Medical Officer Scotland.

Approved guidance

The guidance approved by the aviation agencies relevant to EMRS is as follows:

The presumption in this policy is that no aerosol generating procedure will be performed in flight and that droplet precautions are all that are necessary. Where FFP3 respirators are suggested this is not because of concern regarding aerosol exposure but because they are more durable than surgical facemasks and may have already been in use by EMRS personnel.

In the very rare situation where there is considered a high likelihood that an aerosol generating procedure would be necessary in flight (necessitating continuous FFP3 respirator use by all on board, including pilots) then patients will NOT be transferred by air.

• Patients will preferentially not be transported unless there is clear clinical need.

• Patients will wear a surgical facemask (or valveless FFP3 respirator see below) unless mechanically ventilated.

• If patients require supplemental oxygen the preferred route will be by nasal cannulae.

• Facemask oxygen can, if necessary, be applied over a surgical facemask (or valveless FFP3 respirator according to fit and efficacy of oxygen delivery).

• For ventilated patients the Draeger Oxylog 3000 ventilator will be used, with a viral/bacterial filter (Pharma Systems, Pharma Mini or equivalent) between the ventilator circuit and the patient.*

• Precautions will be taken to ensure that inadvertent disconnection of the ventilator circuit will not occur in flight.

* the design of this ventilator and the integrated patient breathing circuit means that only one filter is required to isolate both inspired and expired gas.
• Escorts working in close proximity to the patient in flight will wear surgical masks or FFP3 respirators.

• Wherever practicable separation of >1m will be maintained between the patient and any air crew member.

• Communication will be prioritised over infection control especially during take off and landing. However, tests with the EC135 helicopter suggest that on board communication by EMRS personnel is not significantly impaired by the wearing of masks.

• During loading and unloading procedures any personnel required to work in close proximity to patients will be given appropriate protective equipment (apron/surgical mask/gloves).

• PPE will be disposed of as clinical waste as per HPS guidance, and hands washed with soap and water or decontaminated with alcohol hand rub. It will be recommended that aircraft be deep cleaned following transport of suspected cases and that as a minimum that all surfaces in contact with the patient are wiped down with detergent wipes.

**Additional guidance**

• PPE is available at EMRS base. Every clinician on the service should have been formally 'fit-tested' (using the hood and Bitrex spray) for a FFP3 mask and should be aware of which brand and model they need. We will ensure we have a stock of all necessary models.

• Good packaging will minimise the risk of contaminated apparatus, secretions coming into contact with other surfaces or personnel during transfer.

• HMEF must be used between the ETT and ventilator circuit.

• ETCO₂ adaptor must be on the ventilator side of the HMEF (so does not accumulate contaminated secretions)

• Consider **taping** all breathing circuit connections after intubation and connection to ventilator to prevent inadvertent disconnection and aerosol generation during transport. At the very least each junction should be pushed tight before departure.

• It is necessary to break the circuit during the transfer then, if at all possible, only break the breathing circuit distal to the HMEF, thus preventing contaminated aerosol generation.

• Use of the vacuum mattress is encouraged, as per the packaging SOP.

SOP- Infection control policy for transfer of patients with transmissible respiratory tract infection (including influenza)
• NIV is clearly not appropriate for patient transport.

• Appropriate decontamination of equipment post-mission is crucial.

• Detergent wipes are suitable.

• It would be sensible to carefully consider being vaccinated against seasonal influenza as per NHSS guidance.

• The guidance is applicable to road transfers, which may be secondarily required, or may the primary means of transfer. If it’s absolutely necessary it may be possible to isolate the patient cabin from the front cabin in order to allow an AGP to be performed. It is of course easier for road ambulance crew and escorts to wear all necessary PPE during a road transfer and this should be considered.

Use of the FFP3 respirator

• To fit the FFP3 respirator, refer to the enclosed instructions (copies are in the PPE box). The checks given in the supplied. Instructions vary according to the design of the respirator. In general, the metal strip on the mask must be moulded to the bridge of the nose. The two elastic bands must be separated and one fitted to the top of the head, and one to the back of the neck to ensure the respirator fits closely to the face.

• **Fit is critically important.** The respirator must seal tightly to the face or air will enter from the sides. A good fit can only be achieved if the area where the respirator seals against the skin is clean-shaven. Beards, long moustaches, and stubble may cause leaks around the respirator.

• Pre use fit-testing the FFP3 respirators is to fit it as per the instructions, and then pant hard a few times. The mask should move in and out with the breaths if it is fitted correctly and there are no air leaks from the sides.

• After donning PPE the EMRS team should check fit and seal on EMRS team on each other

• Respirators are effective for approximately 8 hours.

• Respirators used in close contact with a possible or probable influenza case should be disposed of immediately after use; they should not be re-used.

Reference:

Health Protection Scotland Website