# Ebola Guideline – Critical Care

## WHAT TO DO – QUICK REFERENCE GUIDE

1. ***Assessment of possible Ebola case for enhanced monitoring e.g. continuous ECG, accurate fluid management, $SpO_2$ etc.***
    a. Obtain and read the Critical Care Action Cards
    b. Gather information from outside the isolation facility
    c. Only enter isolation if the benefits of personal assessment outweigh the risks
    d. The patient will remain in the isolation facility until the Infectious Diseases (ID) consultant decides on transfer or stepping down the isolation.
    e. Ensure liaison with ID, Virology, Health Protection Team, Public Health
    f. If the case is confirmed as Ebola, they should be discussed with High Level Isolation Unit (HLIU) at the Royal Free Hospital, London.

2. ***Assessment of possible Ebola case for critical care intervention e.g. invasive monitoring, vasoactive drugs, renal replacement therapy (RRT), non-invasive or invasive ventilation.***
    a. Many patients who are suspected with Ebola will have something else e.g. malaria
    b. We would consider critical care support in the isolation facility pending *Ebolavirus* test results.
    *c.* ***As per 1. a-f***
    d. If the case is confirmed as Ebola, transfer may not be possible for many reasons and local management is the most likely option, which may include limitation or withdrawal of therapy.

3. ***Assessment of confirmed Ebola case for critical care intervention e.g. invasive monitoring, vasoactive drugs, RRT, non-invasive or invasive ventilation.***
    a. This may occur if a patient is confirmed with Ebola and deteriorates after test results are available where transfer to a HLIU facility has been delayed or deferred.
    b. Invasive ventilation, RRT and vasopressor support has been used in one published survivor of Ebola so far. Other reports of multiple organ support in patients with Ebola are awaited but some have been unsuccessful. In all cases, organ support was commenced once the patient was in HLIU or equivalent.
    *c.* ***As per 1. a-f***
    d. Transfer. ***As per 2. d***

4. ***Assessment of possible or confirmed Ebola case for whom critical care intervention has already started, where Ebola had not previously been suspected***
    a. There is a possibility that a hospitalized critically ill patient is found to be Ebola positive, e.g. following trauma, or where no history was available.
    b. Isolate the patient immediately in their existing environment/facility.
    c. Inform ID, Health Protection Team, Virology, Public Health
    *d.* ***As per 1. a-f***
    e. Risk/Benefit. ***As per 2. b*** pending Ebola test results
    f. Lack of evidence for critical care intervention. ***As per 3. b***
    g. Transfer. ***As per 2. d***
    h. Contact Staff should be referred to Occupational Health

**Aim** To provide information to aid decision making when assessing possible or confirmed Ebola cases.
This is in addition to the Critical Care Action Cards.

**This does not replace the current NHS Lothian Viral Haemorrhagic Fever (VHF) guideline**
http://intranet.lothian.scot.nhs.uk/NHSLOTHIAN/HEALTHCARE/A-Z/RIDU/Pages/ClinicalGuidelines.aspx
**National guidance from Health Protection Scotland**
http://www.hps.scot.nhs.uk/travel/viralhaemorrhagicfever.aspx

This does not specifically address other VHFs as they have different causative agents, different hosts and vectors and differing presentations and outbreak mortalities.

## Background

- Ebola Virus Disease (EVD), also known as Ebola haemorrhagic fever, is a severe, often fatal, illness in humans.
- It is caused by a *Filovirus*, genus *Ebolavirus*. 5 species of *Ebolavirus* have been described *Zaire, Bundibugyo, Sudan, Reston* and *Taï Forest*. The current 2014 outbreak has been caused by the *Zaire Ebolavirus.*
- *Ebolavirus* is one of the VHF pathogens classified as Hazard Group 4 by the UK Advisory Committee on Dangerous Pathogens (ACDP)
- The natural hosts for *Ebolavirus* are thought to be *Pteropodidae* fruit bats, and the virus infects humans through close contact with the bodily fluids of the bats or more commonly infected animals such as chimpanzees, gorillas, monkeys and antelope, which may be prepared and consumed as 'bushmeat'
- *Ebolavirus* then spreads between humans by direct contact (broken skin or mucous membranes) with bodily fluids of an infected individual.
- The current outbreak in West Africa (2014) is the largest and most complex Ebola outbreak ever recorded.

## EVD Symptoms, Diagnosis and Treatment

- Incubation period 2-21 days
- Humans are not infectious until they develop symptoms
- First Symptoms: Fever, fatigue, myalgia, headache, sore throat.
- Next symptoms: Vomiting, diarrhoea, rash, bleeding from mucous membranes (e.g. gums and blood in stools)
- Later symptoms: Kidney failure, liver failure, hypovolaemic shock, multiple organ failure, death.
- In the UK, laboratory diagnosis is made by molecular methods.
- Treatment is supportive, especially fluid resuscitation and replacement.
- Experimental treatments being considered include immunotherapies such as ZMapp, TKM-Ebola, and plasmapheresis from Ebola survivors. Experimental preventative measures include vaccines (GSK have reported that a vaccine is unlikely to be ready till 2015)

## Current situation

- West Africa has been badly hit by the current Ebola outbreak.
- Imported cases of Ebola have been reported in Europe and it is becoming increasingly likely a UK case may arise.
- The current Ebola outbreak has been reported with an index case of a 2 year old in a village in Guinea in December 2013.
- The countries mainly affected are Liberia, Sierra Leone and Guinea.
- The current outbreak mortality of lab confirmed cases is approximately 57% (CDC figures, Nov 2014)

***This situation is evolving and this guidance will be regularly updated.***

## EVD and Critical Care

- To date there has been one confirmed published case of an Ebola Virus Disease (EVD) patient having survived critical illness where they required invasive ventilation, RRT and vasopressors (Literature search, Nov 2014 and personal correspondence with HLIU, RFH).
  jasn.asnjournals.org/content/early/2014/11/13/ASN.2014111057.full.pdf

- This patient required intubation and vasopressors on day 9 and RRT on day 11 (i.e. late in the illness)

- We do not know what the mortality rate would be if multiple organ support were offered to all patients with EVD if needed and there are also non-published case reports of patients with EVD dying despite multiple organ support.

- EVD is not a primarily respiratory condition and any need for ventilation would most likely be in a patient *in extremis*.

- Risks to critical care healthcare staff would be very high unless in a trained High Level Isolation Unit (HLIU) or equivalent.

- Critical care support in the developed world carries a risk of transmission of infection to healthcare workers. The mechanism of this transmission is unclear but may be failure of proper PPE donning and disrobing procedure.

- In Critical Care we have a duty of care to
  - Patients - including not offering treatments that are not in their best interests or physiologically futile
  - Our staff – including protection from avoidable risks
  - Patients relatives and next of kin - including not offering treatments which may give false hope

- The HLIU at the Royal Free Hospital, London (RFH) can provide care for 2 patients in negative pressure isolator 'Trexlar' facilities. They may be able to provide invasive ventilation and inotropic or vasopressor support in the HLIU but renal replacement therapy is currently a work in progress (Personal correspondence with HLIU, RFH).

- UK surge capacity for 'Trexlar' beds is being developed with Newcastle, Sheffield and Birmingham proposed as surge centres.

- The Air Transport Isolator (ATI) from the RAF has not been designed or used to transfer Level 3 ventilated patients (Personal correspondence with Clinical Lead for AeroMed, RAF).

- Although there are plans in place for long distance road transfer by ambulance services, there is no provision on a national level for transfer medical support for those that require critical care (this includes prolonged assisted ventilation, drug assisted BP support, drug infusions or anything outwith the skills of a paramedic practitioner)

- Patients with EVD who are critically ill can be discussed with the ID service at HLIU, RFH on a case-by-case basis but the risk of transfer may outweigh any potential benefits of transfer.

- Critical care support for possible Ebola cases will be provided in the front door areas of NHS Lothian, if deemed appropriate.

- A Scottish VHF Test centre (Containment level 4 lab) based at the NHS Virology Lab at the Royal Infirmary of Edinburgh opened 1st December 2014; see last page for request form.

**Statement from the Intensive Care Society (ICS)**

From the ICS website (in the members section behind the login): October 2014

> "The Intensive Care Society refers its members to the Ebola guidance given on the Department of Health website. It is anticipated that all suspected cases will be transferred to a high level isolation unit (Royal Free Hospital or Newcastle). The ICS recommends that critical care admission should be considered only where full Trexler isolation facilities can be provided. Currently this means that referral and transfer to a high level isolation unit should precede the decision to offer critical care support (see the Public Health England guidance, https://www.gov.uk/government/collections/ebola-virus-disease-clinical-management-and-guidance http://www.nejm.org/page/ebola-outbreak).
>
> Ebola is primarily a disease causing gastrointestinal disturbance and haemorrhagic fever, with associated problems of fluid balance. It is not a primary respiratory condition, and the clinical need for respiratory support is thought to be very rare except in those patients in extremis. The risk-benefit ratio of artificial ventilation and the associated creation of aerosols, which could pose a significant risk to other patients, relations, staff and thereby of dissemination of the condition to the wider public, should be carefully balanced against the assumed benefit to the individual, on a case-by-case basis."

**Clearly this opinion may change in the face of future cases and responses to various forms of organ support and novel therapies**

## Critical Care involvement for possible or confirmed EVD in NHS Lothian

NHS Lothian has 3 acute hospitals, the Royal Infirmary of Edinburgh (RIE), the Western General Hospital (WGH) and St John's Hospital (SJH)

The potential points for patients to self-present with possible EVD

- Emergency Departments (RIE and SJH) – Isolation rooms identified
- Minor Injury Unit (WGH)
- Acute Receiving Unit (WGH)
- Maternity Unit (RIE and SJH)

Patients who have accessed another healthcare service (e.g. GP) should have had EVD considered and thus risk assessment should have taken place in discussion with Regional Infectious Disease Unit (RIDU, WGH), with direct transfer to RIDU if deemed necessary.

However there is potential for a possible EVD case to be present in hospital out with these areas, if for example they are a visitor and subsequently become unwell or are admitted via outpatient clinics or by transfer from another hospital where the diagnosis has not been considered.

## Interhospital Transfer

Possible in 2 circumstances

1. Transfer from another NHS Lothian unit to RIDU, WGH
2. Transfer from an NHS Lothian site to HLIU, RFH

If patient transfer is being considered, the ID Consultant **MUST** be aware of this plan and approve the transfer. Confirmed or high possibility cases will need ambulance Category 4 precautions (Cat 4 transfer).

To arrange a transfer from an NHS Lothian site to RIDU, WGH

- Liaise with RIDU and agree transfer of patient and risk assessment category
- Scottish Ambulance Service (SAS) Ambulance Control Centre (ACC)
  - 0845 602 3999
  - Ask for National Operations Manager. They will take the details
  - They will then liaise with National Resilience Centre and Special Operations Response Team (SORT)
  - Remember SORT paramedics cannot deliver medical therapies outwith JRCALC guidelines (this includes prolonged assisted ventilation, drug assisted BP support, drug infusions or anything outwith the skills of a paramedic practitioner)
  - A response may take several hours to co-ordinate

To arrange a transfer from NHS Lothian to HLIU, RFH

- Liaise with RIDU and HLIU, RFH and agree the transfer of the patient
- HLIU will make all further arrangements (do not attempt to contact SAS or RAF directly)
- Road transfer is the preferred option but the RAF ATI may be used.

- If air transport is chosen, the ATI team will attend the referring unit in full PPE to assess the patient, and if appropriate take the patient from the referring unit to the airport in an SAS vehicle with the SORT paramedics. At the airport the patient will be transferred to the ATI.
- The ATI team will probably include a physician from the HLIU, RFH, an Air Evacuation physician and an anaesthetist. The anaesthetist is **NOT** there to provide critical care but to provide basic airway support, if needed during flight.

## Appendices and Contacts

### *Liaison Specialties*

1. Infectious Diseases, RIDU, WGH
2. Virology, RIE
3. Imported Fever Service (Tel. 0844 7788990)
   https://www.gov.uk/imported-fever-service-ifs
4. Rare and Imported Pathogens Lab (Tel. 01980 612100)
   https://www.gov.uk/government/collections/rare-and-imported-pathogens-laboratory-ripl

### *Interhospital Transfer*

1. Ambulance requirements for confirmed VHF
   http://www.naru.org.uk/wp-content/uploads/2014/08/VHF.pdf
2. SAS VHF HS003t (March 2014, there is also an updated August 2014 version)
   https://www.documents.hps.scot.nhs.uk/travel/vhf-transportation-patient.pdf
3. Air transport isolator www.raf.mod.uk/PMRAFNS/organisation/airtransportisolator.cfm
4. Royal Free HLIU 0844 848 0700 or 020 7794 0500
   www.royalfree.nhs.uk/services/services-a-z/infectious-diseases/high-level-isolation-unit

### *General Information and Reference*

1. Health Protection Scotland
   http://www.hps.scot.nhs.uk/travel/viralhaemorrhagicfever.aspx
2. UK Government and Health Protection England
   https://www.gov.uk/government/collections/viral-haemorrhagic-fevers-epidemiology-characteristics-diagnosis-and-management
   https://www.gov.uk/government/collections/ebola-virus-disease-clinical-management-and-guidance
3. WHO Ebola Virus Disease
   www.who.int/csr/disease/ebola/en/
4. CDC Ebola HF
   www.cdc.gov/vhf/ebola/
5. ECDC Ebola
   http://www.ecdc.europa.eu/en/healthtopics/ebola_marburg_fevers/pages/index.aspx

| **Title**: Ebola Guideline – Critical Care | |
|---|---|
| **ID:** EGCCv3.20141128 | **Authors:** M Dunn, M Gillies, M Blackstock, C Walker |
| **Category:** Infection/VHF | **Document Version:** 3 |
| **Status Draft/Final:** Final | **Review Date:** March 2015 |
| **Authoriser:** Ebola Preparedness | **Date Authorisation:** Oct 2014 |
| **Date added to Intranet:** | **Key words: Ebola, VHF** |

# Scottish National Viral Haemorrhagic Fever Test Service

*In partnership with the Rare and Imported Pathogens Laboratory at Porton Down*

## Test Request Form

*[Please circle **all** options (in italics) that apply. (Version 1_17 11 2014)]*

### Sample Details

Collection time: _____ Collection date: _____

Sample type: *Clotted blood - EDTA blood - Urine - Other (specify):* _____

Post mortem: YES - NO

### Sender's Details

Name: _____

Address: _____

_____

_____

Postcode: _____ Email: _____@nhs.net

Telephone: _____ Pager/Mobile: _____

### Patient's Details

Name: _____

Date of Birth: _____ CHI: _____ Gender: M - F

Hospital Number: _____ Location: _____

Pregnant: YES - NO - Unknown

### Clinical Details

Foreign travel within last 21 days? YES - NO

Purpose of travel: _____ Occupational history: _____

Date of UK departure: _____ Date of return to UK: _____

Details of visit (specify): _____

Any unusual activities (specify): _____

Countries visited (specify): _____

Areas visited: *Urban area – Rural area – Open country – Forests*

Risk exposures: *Mosquito bites – Tick bites – Other bites – Livestock or other animal exposure – Other exposure (specify):* _____

Travel vaccination history: _____

Signs/symptoms: Onset date of signs/symptoms: _____

*Arthralgia – Diarrhoea - Encephalitis – Endocarditis – Eschar – Fever - Haemorrhage – Leucopenia – Raised LFTs - Lymphocytosis - Meningitis – Myalgia – Neutrophilia – Rash – Respiratory symptoms - Retro-orbital Pain - Sore Throat – Thrombocytopenia – Vomiting*

Other clinical details (specify): _____

Suspected diagnosis (specify): _____

Antimicrobials given (specify): _____

**Name**: _____**Signature**: _____**Date**: _____

**Scottish National Viral Haemorrhagic Fever Test Service**
Laboratory Medicine, the Royal Infirmary of Edinburgh, Little France, Edinburgh EH16 4SA
Telephone: 0131 536 1000 (RIE switchboard) - Email: snvts@nhs.net - Hayes DX 6231202 (Royal Infirmary of Edinburgh)