Livewell Southwest

Haemorrhagic Fevers Guidelines (Lassa fever, Marburg disease, Ebola and Congo-Crimean haemorrhagic fever)

Version No.1.1

Review: November 2017

Notice to staff using a paper copy of this guidance

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	1989-1990 US epizootic. Arch Virol Suppl 1996; 11 : 115-34. 13. Fisher-Hoch SP, Simpson DI. Dangerous pathogens. Br Med Bull 1985: 41:391-5. 14. Ergonul O. Crimean-Congo haemorrhagic fever. Lancet Infect Dis 2006; 6: 203-14. 15. Colebunders R, Borchet M. Ebola haemorrhagic fever – a review. J Infect 2000; 40: 16-20. 16. Richmond JK, Baglole DJ. Lassa fever: epidemiology, clinical features and social consequences. BMJ 2004; 327: 1271-5. 17. Ftika L, Maltezou HC. Viral haemorrhagic fevers in healthcare settings. J Hosp Infect 2013; 83: 185-92. 18. Viral Haemorrhagic Fevers Risk Assessment (version 2: 09.07.2014) http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317135155050
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0.1	New document	August 2014	Director of Infection Prevention & Control	New Guidelines
1	Minor amend	November 2014	Policy Ratification Group	Ratified
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Haemorrhagic Fevers Guidelines

Purpose

1. Ensure that patients with suspected or confirmed Viral Haemorrhagic Fever (VHF) undergo appropriate risk assessment, and receive effective and appropriate care

2. Minimise the risk of transmission of VHF to healthcare workers or other patients.

This guidance covers those VHFs that are classified as Hazard Group 4 pathogens, particularly Lassa fever, Marburg disease, Ebola and Congo-Crimean haemorrhagic fever. Other diseases with haemorrhagic manifestations such as dengue, yellow fever, chikungunya, Rift Valley fever, and hantaviruses are not covered by this guidance.

These guidelines are applicable to all staff, to include Ministry of Defence (MOD) personnel; contractors, those employed on a fixed term contract, honorary contract, agency or locum staff, and students affiliated to educational establishments and volunteers.

1 Summary

- Patients with suspected viral haemorrhagic fevers (VHF) may be admitted to the hospital.

- The symptoms are non-specific.

- Determining exact dates of travel and onset of symptoms is essential.

- The diagnosis should be considered in a patient with onset of fever **within 21 days** of visiting an endemic area and a VHF Risk Assessment (Appendix A) should be completed.

- The risk category will determine the actions needed to control the risk of acquiring a VHF infection in a healthcare setting and prevent spread of infection

- In most cases, patients with a high possibility of or confirmed VHF should be transferred to a High Security Infections Disease Unit (HSIDU)

- Staff should be familiar with this policy before sending any laboratory investigations.

2 Guideline objectives and scope

These guidelines aim to:

1. Ensure that patients with suspected or confirmed Viral Haemorrhagic Fever (VHF) undergo appropriate risk assessment, and receive effective and appropriate care

2. Minimise the risk of transmission of VHF to healthcare workers or other patients.

   This guidance covers those VHFs that are classified as Hazard Group 4 pathogens, particularly Lassa fever, Marburg disease, Ebola and Congo-Crimean haemorrhagic fever. Other diseases with haemorrhagic manifestations such as dengue, yellow fever, chikungunya, Rift Valley fever, and hantaviruses are not covered by this guidance.

3 Background

3.1 Several viruses from the arenavirus, filovirus, bunyavirus and flavivirus families are known to cause haemorrhagic fevers. These zoonotic or arboviral infections are dependent on an animal or insect host for transmission, and are geographically restricted to the areas of their host species.

3.2 Haemorrhagic diseases that are theoretically capable of being transmitted from man to man include Lassa, Marburg, Ebola and Congo-Crimean haemorrhagic fever. Humans are not the natural reservoirs of any of these viruses, but can become infected when they come into contact with infected hosts. In addition, many of these viruses are capable of person-to-person transmission, usually via direct contact with infected blood or body fluids, or indirectly via contact with environments contaminated with splashes or droplets of blood or body fluids.[1] In Africa, transmission of VHF has been associated with the re-use of unsterilized needles as well as the provision of patient care without appropriate barrier precautions to prevent exposure to virus-containing blood and other body fluids, including vomitus, urine and stool.[2,3] The risks associated with specific body fluids have not been defined, as most healthcare workers who caught VHF had had multiple contacts with multiple fluids. Airborne transmission is thought unlikely, but may be a possibility in rare instances from patients in advanced stages of the disease. However, VHF may be transmitted by the airborne route in non-human primates.[4-7] The risk to contacts is greatest from people who are bleeding, vomiting, have diarrhoea and are shocked.

3.3 In October 2012, a case of Crimean-Congo haemorrhagic fever was confirmed in the UK in a person who had travelled to Afghanistan. A fatal case of probable Crimean-Congo haemorrhagic fever was diagnosed in 1997 in an

elderly person who had travelled to Zimbabwe. Between 1970 and November 2013, 12 cases of Lassa fever have been imported to the UK. Viral haemorrhagic fevers remain of particular public health importance because they can spread readily within a hospital setting, have a high case-fatality rate, are difficult to recognise and detect rapidly, and there is no effective treatment.

3.4 Lassa Fever

3.4.1 Lassa fever has been recognised since 1969 and is normally transmitted to man by contact with or inhalation of aerosols of excreta, or materials contaminated with excreta, of infected multimammate rat (*Mastomys* spp). These rats inhabit certain well-defined areas in West and Central Africa and are more commonly found in remote rural areas. Transmission may also occur through contact with blood or body fluids from infected patients, or sexual contact. The usual incubation period is 10-14 days, but a range of 5-21 days has been recorded. In Africa, although clinically identified cases show a high mortality, subclinical and mild undetected infections commonly occur. Lassa fever may respond to ribavirin.

3.5 Marburg disease

3.5.1 Marburg disease was described in 1967 following an outbreak in Marburg, Germany, in which virus was transmitted to technicians from African Green Monkeys that were used in the preparation of cell cultures. It occurs in Central and Eastern Africa. Human to human transmission also occurs via infected blood and body fluids. Although several animal reservoirs have been proposed, the definitive host is not known. In an epidemic in Congo infection was generally acquired in subterranean gold mines which has led to speculation that bats may be a reservoir. There is some evidence for airborne transmission. The incubation period is 3-8 days, but may be as long as 21 days. There is no treatment.

3.6 Ebola

3.6.1 Ebola is separate virus in the same family as Marburg virus and was identified during simultaneous outbreaks of haemorrhagic fever in the Democratic Republic of Congo and the Sudan. It occurs in Western, Central and Eastern Africa. Although no known source or natural reservoir has been identified, recent studies have drawn connections to bats as a potential vector. Major outbreaks have occurred in hospitals in central and southern Africa and transmission via infected blood or body fluids to healthcare workers is well described. The largest ever known outbreak of Ebola virus disease was first reported in March 2014 in Guinea. Despite earlier expectations that the outbreak would be brought under control, at the end of May 2014 there was a surge in the number of new cases, and the outbreak spread to previously unaffected areas in Guinea, Liberia and Sierra Leone. The incubation period is 6-9 days, but may be up to 21 days. There is no treatment.

3.7. Congo-Crimean haemorrhagic fever

3.7.1 Congo-Crimean haemorrhagic fever arises from a family of similar viruses that are widespread in East and West Africa, Central Asia, Central and Eastern

Europe including the former USSR, and the Middle East. Transmission is usually by tick-bite and man-to-man spread has only been shown to result from contact with infected blood or tissues of infected patients or livestock. Strains from parts of the Middle-East, north India and Pakistan tend to be more virulent than those from South Africa. The incubation period is 3-6 days, but may be as long as 14 days. Some studies suggest that ribavirin may be effective.

3.8. Other Hazard Group 4 haemorrhagic fever viruses

3.8.1 Further detail on the above and other Hazard Group 4 haemorrhagic fever viruses (Lujo, Chapare, Guanarito, Junin, Machupo, Sabiá, Kyasanur forest disease, Alkhurma (Al Khumrah) haemorrhagic fever and Omsk haemorrhagic fever), their diseases, geographies and transmission routes is given in the Advisory Committee on Dangerous Pathogens Guidelines (ACDP).[1]

3.9. Clinical features

3.9.1 The clinical features of each of these diseases are very similar. Patients will present with a history of fever, malaise, myalgia, anorexia, nausea, headache, sore throat, diarrhoea, petechial rash or bleeding (e.g. from throat, skin, gut). Pharyngitis and chest pain are characteristic early symptoms. Later the disease is characterised by prostration, hypotension, bruising and bleeding, respiratory distress and rising hepatic transaminases. Congo-Crimean haemorrhagic fever may present as encephalitis.

3.9.2 Without a bleeding diathesis, the syndrome is non-specific and the diagnosis cannot be made clinically. The most important risk factors are travel to and behaviour in an endemic area. Patients who have been in rural areas of Sierra Leone and lived in a tent are much more likely to have Lassa fever than those who stayed in hotels in cities. A detailed, accurate travel history is therefore necessary to decide the level of risk of VHF.

3.9.3 Patients with non-specific fever are far more likely to have malaria, typhoid or non-VHF viral illness than VHF. Sensible precautions should be taken with the blood and excreta from all febrile patients from the Tropics and every care should be taken to reduce the risk of aerosols and needlestick accidents from blood.

4 Duties

4.1 The plan of investigation and care of patients, and the measures to prevent secondary transmission are based on the UK Advisory Committee on Dangerous Pathogens (ACDP) Guidelines and are outlined in Appendix A.[1] The risk categories are based a new assessment of the risks of transmission of VHF infection by the ACDP. Evidence from outbreaks strongly indicates that the main routes of transmission of VHF infection are direct contact (through broken skin or mucous membrane) with blood or body fluids, and indirect contact with environments contaminated with splashes or droplets of blood or body fluids. The greatest potential risk to staff is by needlestick injury from a patient with VHF or contamination of open cuts by infectious blood or secretions. The risk of transmission probably increases in the terminal stages

of the illness when there is a high viraemia with overt bleeding. Note that all viruses are shed in secretions for long periods after recovery from infection.

4.2 Experts agree that there is no circumstantial or epidemiological evidence of an aerosol transmission risk from VHF patients. Although unproven, airborne transmission of VHF is a hypothetical possibility during procedures that generate aerosols and should be considered in the development of infection control precautions.

4.3 The risk categories are important for deciding on an action plan on admission. It is particularly important to assess the degree of risk of VHF before taking specimens, especially blood, for investigation. Following the revised risk assessment, the guidance also recommends control options for the isolation of VHF patients in the UK. These options now include flexibility in the isolation of a patient with a VHF infection within a specialist High Level Isolation Unit (HLIU).

4.4 VHF is restricted to relatively well-defined geographical areas, including parts of Africa, South America, the Middle East and Eastern Europe. A detailed history of travel and behaviour is essential to rule out exposure. Referral to current geographical information about outbreaks is essential and may be obtained on the National Travel Health Network and Centre (NaTHNaC) (http://www.nathnac.org/), Public Health England. (http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/ViralHaemorrhagicFever/VHFMaps/) and CDC websites (http://www.cdc.gov/). It is important to note that VHFs are considered endemic in some areas.

4.5 Risk Assessment

4.5.1 Viral haemorrhagic fever should be considered for any patient presenting with an undiagnosed fever within 21 days of returning from an endemic area. The purpose of risk assessment is to enable decisions to be made about the actions needed to control the risk of acquiring a VHF infection in a healthcare setting and prevent spread of infection. Risk assessment therefore embraces both assessment of the patient for possibility or high possibility of VHF and assessment of associated risks to staff. Measures to control any risks include implementation of practical infection control measures, information provision, training and health surveillance where the assessment shows that these are required.

4.5.2 In the UK, only persons who have;
(i) travelled to an area where VHFs occur; and/or
(ii) been exposed to a patient or animal infected with VHF (including their blood, body fluids or tissues); or
(iii) worked in a laboratory with the infectious agents of VHFs; are at risk of infection from VHFs.

4.5.3 The risk assessment algorithm in Appendix A should be used to determine whether a febrile patient with a travel or exposure history within 21 days may have a VHF infection. The patient's risk assessment determines the level of staff protection and the management of the patient. The risk to staff may

change over time, depending on the patient's symptoms, the results of diagnostic tests and/or information from other sources. Patients with a VHF can deteriorate rapidly.

4.6. How to conduct the patient risk assessment

4.6.1 The patient risk assessment should be led by a senior member of the medical team responsible for the acute care of patients, for example the emergency department consultant or admitting team consultant. The on-call consultant microbiologist should be contacted (available by air call via switchboard) to assist with this process.

4.6.2 For any patient who has had a fever [> 38ºC] or history of fever in the previous 24 hours and a travel history or epidemiological exposure within 21 days, follow the major steps in the pathway from identification to diagnosis in the patient risk assessment algorithm (Appendix A). This will establish the patient's VHF risk category, which determines the subsequent management of the patient and the level of protection for staff. The algorithm deals with the management of the patient, diagnostic testing and the level of staff protection, all of which are dependent on the possibility of VHF infection and the patient's symptoms. Further information is provided in the subsequent sections of this guidance.

4.6.3 Standard precautions and good infection control are paramount to ensure staff are not put at risk whilst the initial risk assessment is carried out. It is assumed throughout this guidance that staff will be using standard precautions as the norm. If these measures are not already in place they must be introduced immediately when dealing with a patient in whom VHF is being considered.

4.6.4 The patient's VHF risk category can change depending on the patient's symptoms and/or the results of diagnostic tests. It is important to note that a patient with a VHF infection can deteriorate rapidly.

4.7. Healthcare workers and students returning from Masanga, Sierra Leone

4.7.1 Plymouth Hospitals NHS Trust and the Peninsula Schools of Medicine and Dentistry have close links with the Masanga Hospital in Sierra Leone. Healthcare workers and students volunteering to work at this hospital may be involved in the care of patients with suspected or confirmed Lassa Fever or Ebola virus disease, and hence are potentially at risk of acquiring disease. Prior to departure for Sierra Leone, staff and students should familiarise themselves with this Policy and be aware of what they should do if they develop a fever within 21 days of return.

4.7.2 If a healthcare worker or student develops a fever within 21 days of return from Masanga Hospital, they should contact either Dr Austin Hunt, Dr Stuart Dickson or the on-call Consultant in Acute Medicine. The on-call Consultant Microbiologist should be informed of the case and will be available to assist with the risk assessment and ongoing management of the individual. The

individual should be admitted directly to a single side room, preferably under negative pressure and with dedicated en-suite facilities or at least a dedicated commode. The standard risk assessment should then be performed outlined in Appendix A.[1] The investigation and care of these individuals, and the measures to prevent secondary transmission are otherwise as outlined in this Policy.

4.8 The patient's VHF risk category

4.8.1 Following the risk assessment, the patient will be categorised as one of the following:

- Unlikely to have a VHF (see below).
- Low possibility of VHF (Section 4).
- High possibility of VHF; (Section 5).
- Confirmed VHF. (Section 6).

4.8.2 Summary information on VHF endemic areas is available in Appendix 1 of the ACDP Gudance,[1] and detailed information is provided in the VHF risk maps on the Public Health England website. (http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/ViralHaemorrhagicFever/VHFMaps/). Information on recent VHF outbreaks can be accessed on travel health websites such as Travax (http://www.travax.nhs.uk/) and NaTHNaC (http://www.nathnac.org/), the Public Health England website (https://www.gov.uk/government/organisations/public-health-england) and via daily global disease updates on ProMed (http://www.promedmail.org/index.php).

4.9 Patients who are unlikely to have a VHF infection

4.9.1 Patients with a fever >38ºC are unlikely to have a VHF infection if:

- they have **not** visited a VHF endemic area within 21 days of becoming ill;
- they have not become unwell within 21 days of caring for or coming into contact with the bodily fluids of/handling clinical specimens from a live or dead individual or animal known or strongly suspected to have a VHF;
- if their UK malaria screen is negative and they are subsequently afebrile for >24 hours;
- if their UK malaria screen is positive and they respond appropriately to malaria treatment;
- if they have a confirmed alternative diagnosis and are responding appropriately.

4.9.2 The risk of VHF in the patient should be reassessed if a patient with a relevant exposure history fails to improve or develops one of the following:

- nosebleed;
- bloody diarrhoea;
- sudden rise in aspartate transaminase (AST);
- sudden fall in platelets;

- clinical shock;
- rapidly increasing O2 requirements in the absence of other diagnosis

4.10 Patients with suspected VHF infection

4.10.1 Patients with suspected VHF should be isolated, preferably in a negative-pressure isolation room with en suite toilet facilities, until the results of specific VHF investigations are obtained from the Rare and Imported Pathogens Laboratory, which may take up to 24 hours.

4.10.2 It is important not to delay the diagnosis and treatment of more common diseases, such as malaria and typhoid, during this period. Any specimens must be transported in person i.e. not be sent on automatic transport systems (the pneumatic transport system).

4.10.3 In most cases, patients with a high possibility of or confirmed VHF should be transferred to a specialist High Level Isolation Unit (HLIU).

5. Management of a patient categorised as 'Low possibility of VHF'.

5.1 Patient categorised as 'possibility of VHF'

5.1.2 It is recommended that, if a patient has extensive bruising or active bleeding, the lead clinician should manage the patient as "high possibility of VHF".

5.1.3 For a patient categorised as 'low possibility of VHF':-

- A senior member of the medical team who is responsible for the acute care of the patient should be the lead clinician;
- Infection control measures appropriate to the patient's risk category and clinical care procedures should be put in place;
- Instigate urgent malaria screen and local diagnostic investigations as normal;
- If an inpatient who is malaria negative has a continuing fever and relevant travel history, without diagnosis, discuss with a Consultant Microbiologist with a view to arranging VHF screen. Also reassess daily and continue other diagnostic investigations. It is recommended that, if a patient is bruised or bleeding, there should be discussion with the Imported Fever Service concerning further management. See Appendix B for contact details.

5.2 Infection control measures

5.2.1 A patient categorised as 'low possibility of VHF' should be isolated in a single side room immediately to limit contact until the possibility of VHF has been ruled out. The side room should preferably be under negative pressure and have dedicated en-suite facilities or at least a dedicated commode.

5.2.2 It is assumed that all staff will already be using standard precautions as appropriate. If not, these must be immediately introduced. The level of any additional staff protection is dependent on the patient's symptoms as follows:

Infection control measures for 'low possibility of VHF'

Staff protection	**Control measures**
Standard precautions	• hand hygiene • gloves • plastic apron
Additional protection for splash inducing procedures	• Fluid repellent surgical facemask • Eye protection
Additional protection for potential aerosol generating procedures based on risk assessment for other infections known to be transmitted by aerosol.	• FFP3 respirator or EN certified equivalent • Eye protection

5.2.3 *Potential aerosol-or splash-inducing procedures include: endotracheal intubation; bronchoscopy; airway suctioning; positive pressure ventilation via face mask; high frequency oscillatory ventilation; central line insertion; aerosolised or nebulised medication administration and diagnostic sputum induction.

5.2.4 Appendix E gives information on personal protective equipment including respiratory protection. Single use (disposable) equipment and supplies should be used. The use of a needle-free intravenous system to eliminate the risk of needlestick injuries should be considered. Guidance on waste, laundry and decontamination and disinfection is provided in Appendices G and H.

5.2.5 Communication with staff about potential infection risks is paramount. Staff must be informed about and understand the risks associated with a VHF patient, for example:

- the severity of a VHF if infection is confirmed;
- that virus may be present:
    - in blood;
    - in body fluids, including urine;
    - on contaminated instruments and equipment;
    - in waste;
    - on contaminated clothing;

    - on contaminated surfaces.
- that exposure to virus may occur:
    - **directly**, through exposure (broken skin or mucous membranes) to blood and/or body fluids during invasive, aerosolising or splash procedures;
    - **indirectly**, through exposure (broken skin or mucous membranes) to environments, surfaces, equipment or clothing contaminated with splashes or droplets of blood or body fluids.

5.6 Diagnostic investigations

5.6.1 All samples from patients in the 'low possibility of VHF' category can be treated as standard samples. Investigations required will include URGENT malaria investigations. Other investigations, as appropriate, may include full blood count, urea and electrolytes (U&Es), liver function tests (LFTs), glucose, C-reactive proteins (CRP), coagulation studies, urine, stool and blood cultures, and chest x-ray (CXR). Liaison with the on call Consultant Microbiologist prior to investigation is advised, particularly if the patient has bruising or bleeding.

5.6.2 Malaria remains most likely diagnosis and therefore screening for malaria is most urgent even if the patient has already had a malaria screen performed abroad with a negative result.

5.6.3 Testing of specimens taken for patient management may be conducted locally at standard containment level 2 conditions, subject to a suitable risk assessment. Appendix C provides guidance on collecting and handling specimens and Appendix D on the appropriate laboratory procedures for the processing of specimens from a patient categorised as 'low possibility of VHF'.

5.7 Diagnostic test results and subsequent patient management

5.7.1 Malaria investigation results

5.7.2 If the malaria result is positive, treatment for malaria can begin immediately and the patient may be re-categorised as 'VHF highly unlikely' if they are responding to malaria treatment. However, patients who fail to respond appropriately to antimalarial therapy, particularly if there is the development of further features suggestive of VHF, should be re-evaluated for the possibility of VHF and investigated accordingly. See Section 3.3 for information on the management of patients categorised as 'VHF unlikely'.

5.7.3 If the malaria test is negative, but an alternative diagnosis has been made and/or the patient becomes apyrexial, then the patient can be managed locally.

5.7.4 If the malaria result is negative and the patient remains pyrexial (>38ºC) and no diagnosis has been made, contact the on call Consultant Microbiologist who will require the patient's travel and occupational history, collected during

the patient risk assessment.. Further advice may be sought from the Imported Fever Service, who may recommend an urgent VHF screen on EDTA and clotted blood. Results are usually available within 6 hours following receipt of the specimen. See Appendix B for details of reference laboratory locations and contact numbers.

5.7.5 Diagnostic investigations should continue and the patient should be re-assessed at least daily whilst awaiting results.

5.6 VHF screen results

5.6.1 If the VHF screen is positive, a number of urgent actions are required – see Section 7 for details.

5.6.2 If the VHF screen is negative, the possibility of the patient having a VHF infection should be maintained until an alternative diagnosis is confirmed or the patient has been afebrile for 24 hours. The patient should therefore remain isolated in a single side room, and the infection control measures, including staff protection, as outlined in this Section should be maintained until an alternative diagnosis is confirmed.

6 Management of a patient categorised as 'High Possibility of VHF'

6.1 Patient categorised as 'high possibility of VHF'

- The lead clinician who is responsible for the acute care of the patient should be a senior member of the medical team;
- The patient should be immediately isolated in a negative-pressure, single side room immediately to limit contact. The side room should have dedicated en-suite facilities or at least a dedicated commode;
- Enhanced infection control measures appropriate to the patient's symptoms and clinical care procedures should be put in place;
- Carry out an urgent **malaria screen**, and other diagnostic investigations as appropriate;
- If malaria test is negative, discuss with on call Consultant Microbiologist. Infection Consultant to arrange VHF screen with Imported Fever Service;
- Contact the Local Health Protection Unit;
- If the patient's VHF screen is **positive**, contact the HLIU (Appendix B) and launch full public health actions.

6.2 Infection control measures

6.2.1 The patient should be isolated in a negative-pressure, single side room immediately to limit contact. The side room should have dedicated en-suite facilities or at least a dedicated commode.

6.2.2 The number of staff in contact with the patient should be restricted.

6.2.3 The level of staff protection required is dependent on the patient's symptoms and is set out in the table below:

Infection control measures for 'high possibility of VHF'	
Staff protection	**Control measures**
Standard precautions plus droplet precautions where the patient DOES NOT have extensive bruising, active bleeding, uncontrolled diarrhoea or uncontrolled vomiting.	• Hand hygiene • Gloves • Plastic apron • Fluid repellent surgical facemask • Eye protection
Additional protection for potential aerosol generating procedures.	• FFP3 respirator or EN certified equivalent
Standard plus droplet plus respiratory precautions when the patient DOES have extensive bruising, active bleeding, uncontrolled diarrhoea or uncontrolled vomiting.	• Hand hygiene • Double gloves • Fluid repellent disposable gown or suit • Eye protection • FFP3 respirator or EN certified equivalent

6.2.4 Appendix E gives further information on personal protective equipment including respiratory protection.

6.2.5 It is recommended that, if a patient is bruised or bleeding or has uncontrolled diarrhoea or uncontrolled vomiting, the lead clinician should have an urgent discussion with the nearest HLIU concerning patient management and consider early transfer to the HLIU. See Appendix B for contact details and Section 6 for transport information.

6.2.6 Single use (disposable) equipment and supplies should be used. The use of a needle-free intravenous system to eliminate the risk of needlestick injuries should also be considered.

6.2.7 Guidance on waste, laundry, decontamination and disinfection is provided in Appendices G and H.

6.2.8 Communication with staff about the potential VHF risks and infection control measures is paramount. Staff must be informed about and understand the risks associated with a VHF patient, for example:

- The severity of a VHF if infection is confirmed;
- That virus may be present:
  - in blood;
  - in body fluids, including urine;
  - on contaminated instruments and equipment;
  - in waste;
  - on contaminated clothing;
  - on contaminated surfaces.
- That exposure to virus may occur:
  - **directly**, through exposure (broken skin or mucous membranes) to blood and/or body fluids during invasive, aerosolising or splash procedures;
  - **indirectly**, through exposure (broken skin or mucous membranes) to environments, surfaces, equipment or clothing contaminated with splashes or droplets of blood or body fluids.

6.2.9 Commence early public health actions as soon as the patient is categorised as 'high possibility,' and launch full public health actions if VHF screen positive (see Section 8).

6.3 Diagnostic investigations

6.3.1 Investigations required will include URGENT Malaria tests as well as full blood count, U&Es, LFTs, clotting screen, CRP, glucose and blood cultures. These tests should be performed using containment level 2 laboratory procedures (Appendix D). Analysis of specimens should not be delayed whilst awaiting the results of VHF screens. Appendix C provides guidance on collecting specimens from a patient categorised as 'high possibility of VHF'.

6.3.2 Malaria remains the most likely diagnosis and therefore screening for malaria is urgent regardless of a previous negative malaria screen performed elsewhere.

6.3.3 For waste disposal purposes, the laboratory should be informed that specimens are to be retained until VHF status is known.

6.3.4 If the malaria screen is negative and VHF is still suspected clinically, the case should be discussed promptly with the on call Consultant Microbiologist who should contact the Imported Fever Service to arrange an **urgent VHF screen** (on EDTA and clotted blood). Information will be required on the patient's travel and occupational history as collected during the patient risk assessment. Laboratory results should be available within 6 hours following receipt of the specimen. The Local Health Protection Unit should also be informed at this stage.

6.4 VHF screen results and subsequent patient management

6.4.1 If the VHF screen is positive, a number of urgent actions are required – see Section 6 for details. These will include urgent transfer to the local HLIU and launch full public health actions. See Section 8 for public health actions.

6.4.2 If the VHF screen is negative, a VHF infection in the patient should still be considered until either the patient has been afebrile for over 24 hours or an alternative diagnosis is confirmed. The patient should therefore remain isolated in a single side room and the infection control measures continued until VHF infection is no longer being considered. If there is further clinical concern the patient should be discussed with Imported Fever Service.

7 Management of a patient with a positive VHF screen

7.1 Patient with a positive VHF screen

7.1.2 A patient who has had a positive VHF screen result should be managed in an HLIU, unless exceptional circumstances prevent transfer of the patient;

- Full public health actions should be launched;
- Once the patient has been transferred, testing of specimens should be carried out in the dedicated laboratory at the HLIU.

7.1.3 If a patient has a confirmed VHF, the following **urgent** actions are required:

- **Restrict** the number of staff in contact with the patient and compile a list of all staff who have been in direct contact with the patient;
- Enhance levels of personal protection for those in direct contact with the patient:
    - Hand hygiene;
    - Double gloves;
    - Fluid repellent disposable gown or suit;
    - Plastic apron (over the disposable gown or suit);
    - Disposable visor;
    - FFP3 respirator or EN certified equivalent.
- Lead clinician should discuss urgently with the HLIU to arrange for the immediate transfer. (see Appendix B for contact details);
- **Notify** the infection prevention and control team of the positive VHF screen result;
- **Launch** full public health actions (see Section 6), including formation of an Incident Control Team.

7.1.4 If, after discussion with the HLIU, it is judged that the condition of the patient precludes transfer to the HLIU, an immediate discussion with the Director of Infection Prevention and Control should take place regarding local risk assessment and control measures. Discussions with the Health and Safety Executive and experts at the HLIU are also necessary. Advice on managing a VHF positive patient in a non-HLIU environment is provided in section 7.3.

7.1.5 Prior to transfer or if the patient is unable to be transferred, testing of specimens should be carried out in accordance with Appendix 7.

7.2 Principles for the isolation of patients with a positive VHF screen

7.2.1 VHFs are severe and life-threatening diseases for which there is no proven treatment or prophylaxis. Therefore, patients in whom VHF infection is diagnosed should be managed in a specialist High Level Isolation Unit (HLIU). The purpose of an HLIU is the complete containment of patients infected with an ACDP Hazard Group 4 pathogen. There is currently one HLIUs in the UK at the Royal Free Hospital in London (see Appendix B for contact details). Staff at the HLIU are available for advice on the safe care and transfer of high risk patients, as well as taking over the management of seriously ill patients.

7.3 Managing a VHF positive patient in a non-HLIU

7.3.1 In exceptional circumstances it may not be possible to transfer patients to an HLIU. The patient must be housed in a single occupation negative-pressure single room with lobby and en-suite sanitary facilities and where complete physical separation from other patients can be achieved. This will provide acceptable containment under exceptional circumstances. Advice should be sought from HLIU specialist staff.

7.3.2 Access must be restricted to authorised personnel and the general public, including patients, relatives and visitors, should be excluded from the room. One visitor who accompanied the patient to hospital may be allowed in the isolation room and should wear appropriate protective equipment. A register of all personnel including clinical, non-clinical and maintenance staff entering the room must be kept as a means of tracking potential exposure to infection (for example, see Appendix I).

7.3.3 There must be a clear segregation and gradation of clean and potentially contaminated areas in the room, with PPE changing in the lobby of the isolation room.

7.3.4 Procedures as outlined in this guideline or agreed following advice from HLIU specialist staff should be followed for: patient admission and discharge; staff entry and exit; Personal and Respiratory Protective Equipment, use, disposal and storage; management of spillages; taking of specimens and subsequent handling; disinfection, decontamination and terminal cleaning of the room (Appendix G); arrangements for waste handling, disinfection and disposal (Appendix H); arrangements for laundry (Appendix G); emergencies, including evacuation; maintenance and repair.

7.3.5 Enhanced PPE, **including RPE,** should be used as follows:

- FFP3 respirator or EN certified equivalent (whilst inhalation is not strongly linked to transmissibility of VHF, as a precaution RPE must be included, see Appendix E);
- Face visor/goggles;

- Water repellent disposable clothing that covers the whole body including head and neck;
- Waterproof boots/foot covers;
- Double gloves.

7.3.6 A segregated holding area for contaminated material must be designated as near as possible to the side room, with procedures in place for transfer of material to that area with minimum potential for cross-contamination. Procedures should be put in place for safe transfer of waste from the holding area to where it will be inactivated.

7.3.7 If the patient is unable to be transferred, testing of specimens should be carried out in accordance with Appendix D. Procedures must be put in place for disinfection, decontamination and terminal cleaning as soon as possible following transfer of the patient out of the isolation suite. If specialist services such as radiology are necessary, these should be carried out at the patient's bedside where possible.

7.4 Patient containment requirements

7.4.1 Although experts agree that there is no circumstantial or epidemiological evidence of an aerosol transmission risk from VHF patients, a theoretical risk has been postulated. Evidence from outbreaks strongly indicates that the main routes of transmission of VHF infection are direct contact (through broken skin or mucous membrane) with blood or body fluids, and indirect contact with environments contaminated with splashes or droplets of blood or body fluids.

7.4.2 Avoiding contact with a patient's body fluids, minimising contamination of the environment, and safely containing contaminated fluids and materials, is paramount to protecting staff and the wider public against infection risks.

7.4.3 Staff protection must be provided through the use of enhanced PPE, including RPE, as follows:

- FFP3 respirator or EN certified equivalent (whilst inhalation is not strongly linked to transmissibility of VHF, as a precaution RPE must be included, see Appendix E);
- Face visor;
- Waterproof clothing;
- Waterproof boots;
- Double gloves.

7.4.4 Correct protocols for putting on and removing PPE and RPE must be strictly adhered to maintain staff protection. See Appendix E for more information on PPE.

7.5 Transfer of a patient

7.5.1 Transfer of a patient with high possibility or confirmed VHF infection

7.5.2 Transfer of a patient within the UK to an HLIU will be necessary when either:

- the patient has been categorised as ‘high possibility of VHF’ and has bruising or bleeding or uncontrolled diarrhoea or uncontrolled vomiting; or
- the patient has had a positive VHF screen result.

7.5.3 The decision to transfer a patient should be made by the senior clinician responsible for the patient’s care and the DIPC, after consultation and agreement with clinicians at the HLIU to which the patient is to be transferred. Only patients with confirmed VHF should be transferred to the HLIU, however in exceptional circumstances patients may be transferred before the diagnosis is confirmed. The ambulance crew and staff must be made aware of the patient’s clinical condition.

7.6 Transfer by road within the UK

7.6.1 Patients without confirmed VHF being transferred between hospitals (not HLIU) may be transported by standard means provided that they do not have bruising, bleeding, uncontrolled diarrhoea or uncontrolled vomiting.

7.6.2 Transfer by road, in an ambulance, is the preferred option for all patients. VHFs are classified as Ambulance Category 4 infectious diseases and transportation by Ambulance Category 4 will need to be carried out in accordance with a number of basic requirements for communication, ambulance contents, PPE, decontamination and after care. These are beyond the scope of this document, but outlined in Appendix 4 of the ACDP guidelines (1).

7.6.3 Although road transfer is preferable, air transfer may be necessary in some circumstances. Following advice and contacts provided by the receiving HLIU, an ambulant and continent patient may be moved by air ambulance with a crew suitably trained for this level of transport.

8 Public Health Actions

8.1 Public health actions must be launched if the VHF screen result is positive.

- Inform Local Health Protection Team;
- Formation of an Incident Control Team;
- Notification of the case by the reference laboratory to the relevant regulatory health body (PHE);
- Notification of the case by PHE to the European Centre for Disease Control (ECDC) and the World Health Organisation (WHO);
- Categorisation and management of contacts;
- Determine media handling strategy.

8.2 Notification of the highly possible case

8.2.1 In England, VHF is a notifiable disease under Schedule 1 of the Health Protection (Notifications) Regulations 2010, and notification of VHFs is classified as urgent. The registered medical practitioner (RMP) attending the patient must therefore notify the highly possible case by telephone to the proper officer of the local authority in which the patient currently resides, within 24 hours. The oral notification should be followed up with a written notification within three days.

8.2.2 A patient categorised as 'high possibility of VHF' should be notified urgently by telephone during working hours to the consultant in communicable disease control (CCDC), or out-of-hours to the duty public health professional. A patient categorised as 'possibility of VHF' does not need to be notified.

8.2.3 The RMP should not wait for laboratory confirmation or results of other investigations in order to notify a suspect case. If laboratory test results refute the clinical diagnosis later, the RMP is not required to de-notify the case.

8.3. Identification of contacts

8.3.1 It is a public health responsibility:

- to identify, assess, and categorise contacts of a patient with VHF;
- to ensure the appropriate monitoring of higher risk contacts;
- to arrange further evaluation for contacts who develop a temperature of >38ºC within 21 days of the last possible exposure;
- to consider antiviral prophylaxis, and arrange as necessary.

8.3.2 A contact is defined as a person who has been exposed to an infected person or their blood and body fluids, excretions or tissues following the onset of their fever. For management of staff accidentally exposed see Appendix F.

8.3.3 As soon as a patient has been categorised as 'high possibility of VHF', all those who have had contact with the patient should be identified as far as possible. This helps to be prepared for the possibility of a positive test, and the subsequent urgent need to monitor all those who have been exposed to the patient. A register of all personnel including clinical, non-clinical and maintenance staff entering the room must be kept as a means of tracking potential exposure to infection (for example, see Appendix I).

8.4 Assessment, categorisation and management of contacts

8.4.1 A register of all personnel including clinical, non-clinical and maintenance staff entering the room must be kept as a means of tracking potential exposure to infection (for example, see Appendix I). A monitoring Officer should be appointed to be responsible for the assessment, categorisation and management of contacts, as well as to monitor higher risk contacts and undertake follow up actions. Each potential contact should be individually assessed for risk of exposure and categorised according to categories listed in the table below:

Categorisation of contacts	
Risk category	**Description**
No risk (Category 1)	No contact with the patient or body fluids. Casual contact, e.g. sharing a room with the patient, without direct contact with body fluids or other potentially infectious material.
Low risk (Category 2)	Direct contact with the patient, e.g. routine medical/nursing care, handling of clinical/laboratory specimens, but did not handle body fluids, and wore personal protective equipment appropriately.
High risk (Category 3)	Unprotected exposure of skin or mucous membranes to potentially infectious blood or body fluids, including on clothing and bedding. This includes: • unprotected handling of clinical/laboratory specimens; • mucosal exposure to splashes; • needlestick injury; • kissing and/or sexual contact.

8.4.2 Contacts should be managed as outlined in the table below. Sample information sheets (general, category 1, category 2 and category 3) are available from the PHE Duty Doctor (020 8200 6868). Information sheets should include contact details for the Monitoring Officer. There should be no restrictions on work or movement for any contacts, unless disease compatible symptoms develop.

Management of contacts	
Risk category	**Action and Advice**

No risk (Category 1)	Reassure about likely absence of risk; Provide category 1 factsheet;
Low risk (Category 2)	Reassure about low risk; <u>Passive monitoring</u> Self-monitor for fever and other disease compatible symptoms for 21 days from last possible exposure; Report to the Monitoring Officer if temperature >38.0ºC, with further evaluation as necessary; Provide category 2 factsheet;
High risk (Category 3)	Inform about risks; <u>Active monitoring</u> Record own temperature daily for 21 days following last contact with the patient and report this temperature to the Monitoring Officer by 12 noon each day, with further evaluation as necessary; Inform Monitoring Officer urgently if symptoms develop; Provide category 3 factsheet.

8.4.3 Antivirals, specifically ribavirin, have been shown to be effective in the treatment of early-stage arenavirus infections, particularly Lassa fever. There is however evidence to suggest that ribavirin may prolong the incubation period for Lassa fever. Antivirals are not generally recommended for contacts due to the absence of evidence of their proven effectiveness for prophylaxis. However, antivirals may be considered for those direct contacts at highest risk, subject to individual risk assessment.

All policies are required to be electronically signed by the Lead Director. Proof of the electronic signature is stored in the policies database.

The Lead Director approves this document and any attached appendices. For operational policies this will be the Locality Manager.

The Executive signature is subject to the understanding that the policy owner has followed the organisation process for policy Ratification.

Signed: Lead Nurse, Director of Infection, Prevention and Control
Date: 24 November 2014

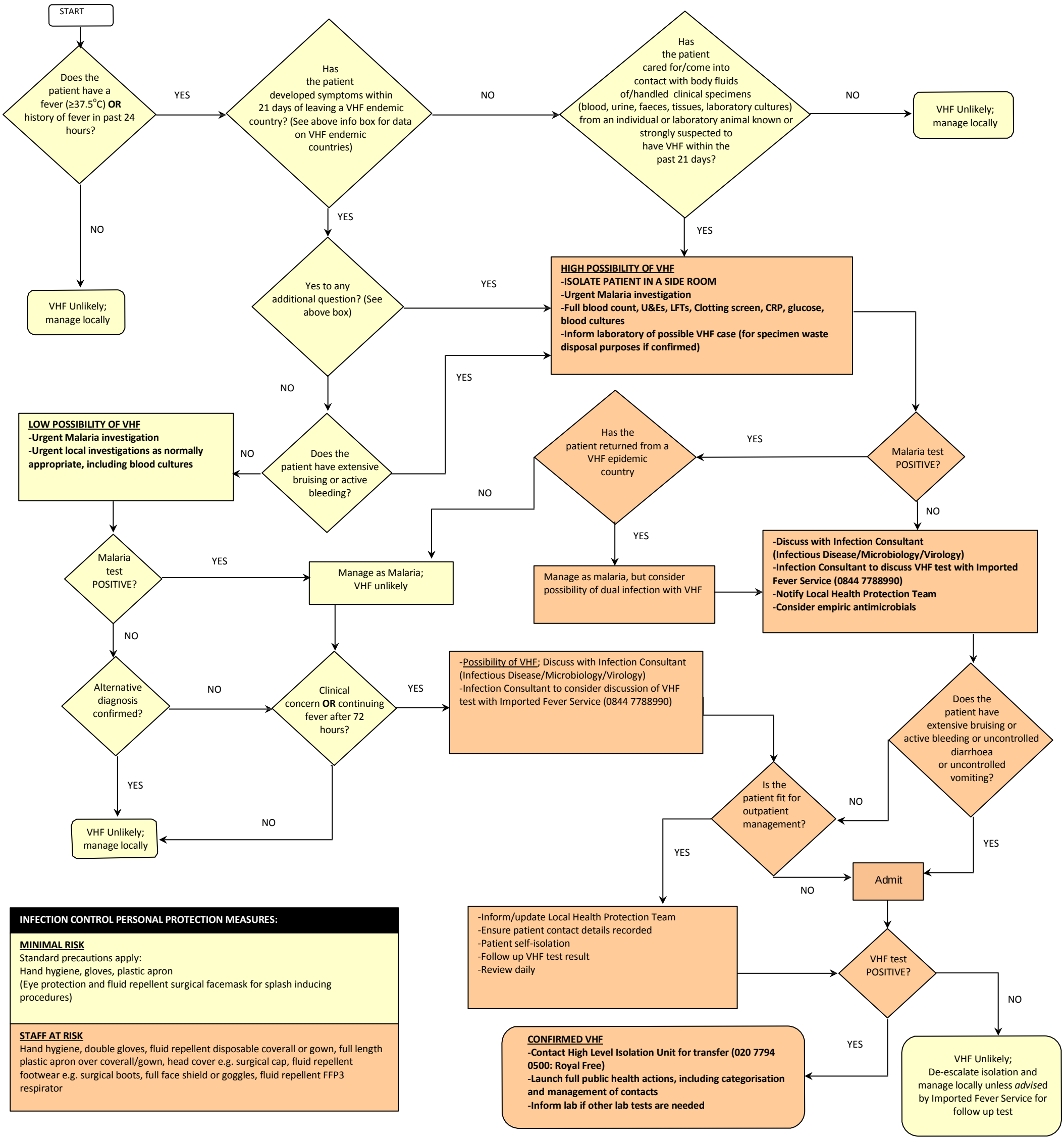
VIRAL HAEMORRHAGIC FEVERS RISK ASSESSMENT (Version 6: 15.11.2015)

VHF ENDEMIC COUNTRIES:

Information on VHF endemic countries can be found at https://www.gov.uk/viral-haemorrhagic-fevers-origins-reservoirs-transmission-and-guidelines
or see VHF in Africa map at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/365845/VHF_Africa_960_640.png

ADDITIONAL QUESTIONS:

-Has the patient travelled to any area where there is a current VHF outbreak? (http://www.promedmail.org/) **OR**
-Has the patient lived or worked in basic rural conditions in an area where Lassa Fever is endemic? (https://www.gov.uk/lassa-fever-origins-reservoirs-transmission-and-guidelines) **OR**
-Has the patient visited caves / mines, or had contact with or eaten primates, antelopes or bats in a Marburg / Ebola endemic area? (https://www.gov.uk/ebola-and-marburg-haemorrhagic-fevers-outbreaks-and-case-locations) **OR**
-Has the patient travelled in an area where Crimean-Congo Haemorrhagic Fever is endemic (http://www.who.int/csr/disease/crimean_congoHF/Global_CCHFRisk_20080918.png?ua=1) AND sustained a tick bite* or crushed a tick with their bare hands OR had close involvement with animal slaughter? (*If an obvious alternative diagnosis has been made e.g. tick typhus, then manage locally)



INFECTION CONTROL PERSONAL PROTECTION MEASURES:

MINIMAL RISK
Standard precautions apply:
Hand hygiene, gloves, plastic apron
(Eye protection and fluid repellent surgical facemask for splash inducing procedures)

STAFF AT RISK
Hand hygiene, double gloves, fluid repellent disposable coverall or gown, full length plastic apron over coverall/gown, head cover e.g. surgical cap, fluid repellent footwear e.g. surgical boots, full face shield or goggles, fluid repellent FFP3 respirator

Specialist High Level Isolation Unit (HLIU).

Royal Free Hampstead NHS Trust, London, NW3 2QG
Telephone (24 hrs, ask for infectious disease physician on call) +44 (0)20 7794 0500 or 0844 8480700 (local rate number when calling from outside London).
www.royalfree.nhs.uk

Reference laboratories – for VHF screen

The Microbiology Department will contact the Reference Laboratory for advice before sending any samples. The laboratory must be also be notified when samples are actually dispatched.

Samples should be packed and labelled according to current regulations for Hazard Group 4 pathogens.

Imported Fever Service - 0844 7788990
This number automatically routes to the clinician's mobile phone.

Rare and Imported Pathogens Laboratory (RIPL) on call clinician - 07789 031672
This also re-routes to the on-call person's phone.

If all else fails or to contact laboratory technician - 01980 612100
PHE Porton switchboard, who will ensure someone returns call.

Address:

PHE Porton
Porton Down
Salisbury Wiltshire
SP4 0JG

The Imported Fever Service will usually direct the referring laboratory to send samples to RIPL as above. In unusual circumstances, where the RIPL lab is not available, samples may be directed to Colindale at the address below.

Microbiology Services Division – Colindale
61 Colindale Avenue
Colindale
London
NW9 5HT

Tel: 0208 200 4400 or 0208 200 6868 (24 hour)

Specimens collected from patients categorised as 'low possibility of VHF'

The main risk of infection to the healthcare worker when collecting the specimens is direct contact with blood or body fluids from the patient. The risk of exposure to a VHF when collecting specimens from patients categorised as 'low possibility' is small, as an alternative diagnosis such as malaria is usually found. There are therefore no additional precautions to be taken for these specimens, above those already in place under standard precautions. It is not necessary for the managing doctors to inform the laboratory, as the risk to laboratory staff is extremely low.

Healthcare waste generated as a result of specimen collection from patients categorised as 'low possibility of VHF' must be treated as Category B infectious waste.

Specimens collected from patients categorised as 'high possibility of VHF'

Although the risk of infection from patients categorised as 'high possibility of VHF' many eventually turn out to be low as a result of an alternative diagnosis for example malaria, until an alternative diagnosis has been confirmed enhanced standard precautions should be followed. It is important to inform the laboratory, to ensure that (i) the appropriate laboratory containment (CL2) is in place for specimen handling and (ii) correct waste disposal procedures are followed in the event of subsequent confirmation of VHF infection, which would require disposal by Category A waste.

Specimens must be transported to the laboratory using appropriate precautions i.e. specimens should be carried in suitably sealed containers.

Healthcare waste generated as a result of specimen collection from patients categorised as 'high possibility of VHF' must be treated as Category B infectious waste.

Specimens from patients with confirmed VHF

There are potential risks of infection to the healthcare worker associated with collecting and handling specimens from patients with confirmed VHF. The main risk of infection when collecting and handling specimens is direct contact with blood or body fluids from the patient, for example by accidental inoculation (needlestick) or contact with broken skin or mucous membranes.

In patients with confirmed VHF, specimens taken for laboratory analysis should be kept to the minimum necessary for patient management and diagnostic evaluation. Specimens should be discussed in advance between clinicians and the appropriate specialist for each laboratory area. During specimen collection, standard infection control principles and practices should always be adopted. In addition, staff must select PPE in accordance with the risk category of the patient – see the patient risk assessment algorithm and Appendix E.

Healthcare waste generated as a result of specimen collection from patients with confirmed VHF must be treated as Category A infectious waste. Waste should be dealt with according to the guidance set out in "https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/167976/HTM_07-01_Final.pdf" (HTM 07-01) i.e. autoclaved on site or incinerated (see Appendix H)

The following principles should be followed to ensure safe transfer of these specimens to the laboratory:

- Laboratory staff should be notified prior to receipt of all specimens from patients with confirmed VHF;
- Specimens must be transported in person i.e. not be sent on automatic transport systems (e.g. pneumatic transport systems) nor in standard mail;
- Specimens must be transported to the laboratory using appropriate precautions i.e. specimens should be carried in suitably sealed containers;

If a member of staff is exposed to body fluids during specimen collection e.g. accidental percutaneous contamination, or requires information about decontamination of body fluid spillages, please refer to Appendices G and H.

There are potential risks of infection to laboratory staff associated with handling specimens from all types of patient. Patients suspected of VHF infection are clinically assessed as one of the following categories:

- Low possibility of VHF infection;
- High possibility of VHF infection;
- Confirmed VHF infection;
- VHF infection unlikely.

For specimens from all patients in whom VHF is being considered, appropriate risk assessments together with local codes of practice must be in place. This information can be used to ensure that the risks are effectively managed; relevant facilities are in place and are managed properly. The risk assessment should include evaluation of the risks associated with each analytical technique and the application of appropriate control measures.

As autoanalysers are usually closed systems, using them to process laboratory samples is considered to pose minimal risk to laboratory staff. Processing samples in routine, even if not closed systems, for each of the above categories therefore pose no greater risk than samples containing Hepatitis B, Hepatitis C, HIV and other blood-borne viruses. To ensure a safe system of work, protocols for machine decontamination, maintenance, management of spillages and waste disposal must be in place and followed.

Specimens from a patient categorised as 'low possibility of VHF'

The overall risk to laboratory workers from specimens from these patients is considered to be minimal, and specimens may be processed at containment level 2. Analysis of specimens should not be delayed whilst awaiting the results of VHF screens. Routine laboratory tests should be carried out where possible in autoanalysers using standard practices and procedures at **containment level 2.**

Specimens from a patient categorised as 'high possibility of VHF'

The overall risk to laboratory workers from specimens from this category of patient is also considered to be low, and specimens may continue to be processed (for the restricted list of investigations – see algorithm) at containment level 2 in routine autoanalysers. Waste from these machines is not considered to pose a significant risk because of the small sample size and dilution step and will therefore require no special waste disposal precautions. Procedures must be in place for the effective management of spillages (see Appendix G). A sealed centrifuge bucket or rotor should be used for centrifugation procedures that are being undertaken manually i.e. not within an autoanalyser.

For specimens categorised as 'high possibility of VHF' laboratory staff should be informed so that original patient specimens can be retained and provision made for disposal as category A waste in the event that VHF is subsequently confirmed.

7. Blood film slides for malaria testing should be disposed of in a dedicated sharps bin, which should be retained and processed as category A waste in the event that VHF is subsequently confirmed in any of the samples. After use, the work surfaces should be treated with 1,000 ppm available chlorine (see Appendix G).

Specimens from a patient with confirmed VHF

The number of patients with a positive VHF screen in the UK is very low (~1-2 cases every two years). In most cases, patients with a positive VHF screen will be transferred to an HLIU and specimens will be analysed at the dedicated HLIU laboratory. However, where transfer is delayed or considered inadvisable, the specimens may be processed in a containment level 2 laboratory using routine autoanalysers provided that the additional precautions outlined below are followed.

Additional precautions

- Experienced laboratory staff should be available to manage the coordination of testing and liaise where appropriate with other laboratories.
- Specimen cuvettes from routine autoanalysers should be safely disposed of as category A waste.
- A risk assessment should be carried out for test protocols not undertaken in routine autoanalysers that are likely to result in the production of splashes or aerosols. Where appropriate, these tests should be undertaken in a microbiological safety cabinet or other equipment providing a similar level of protection.
- For manual centrifugation procedures, a sealed centrifuge bucket or rotor must be used.
- Patient samples that are not for immediate disposal should be packed in rigid containers, which should be surface decontaminated and retained within the laboratory awaiting safe disposal.
- Disinfection and decontamination procedures, validated as effective against blood-borne viruses, must be in place.
- Autoanalyser disinfection procedure should be carried out following sample processing and before scheduled maintenance.
- Retained specimens must be disposed of as Category A waste and inactivated by autoclave.
- Blood film slides should be disposed of in a dedicated sharps bin, which must be processed as category A waste.
- Work surfaces should be treated with 1,000 ppm available chlorine

(see Appendix G).

Specific instructions for speciality areas

Automated instruments can be used to process blood cultures for microbiological analysis; however, care should be taken when subculturing potentially positive specimens and procedures should be undertaken in a microbiological safety cabinet by experienced staff.

If a member of staff is assessed as likely to have been exposed to VHF positive specimens, they should liaise with their occupational health provider about following health monitoring (see Appendix F).

Control and containment when managing patients who may have VHF infection, or confirmed VHF, is important to protect staff and the wider community. The isolation of the patient in either a single side room or a negative pressure isolation room, supplemented by appropriate PPE, or a physical barrier are key risk control measures. To ensure the effectiveness of PPE, care will need to be taken in its initial selection and subsequent maintenance, storage and use, as described in this Appendix.

Criteria for appropriate selection of PPE

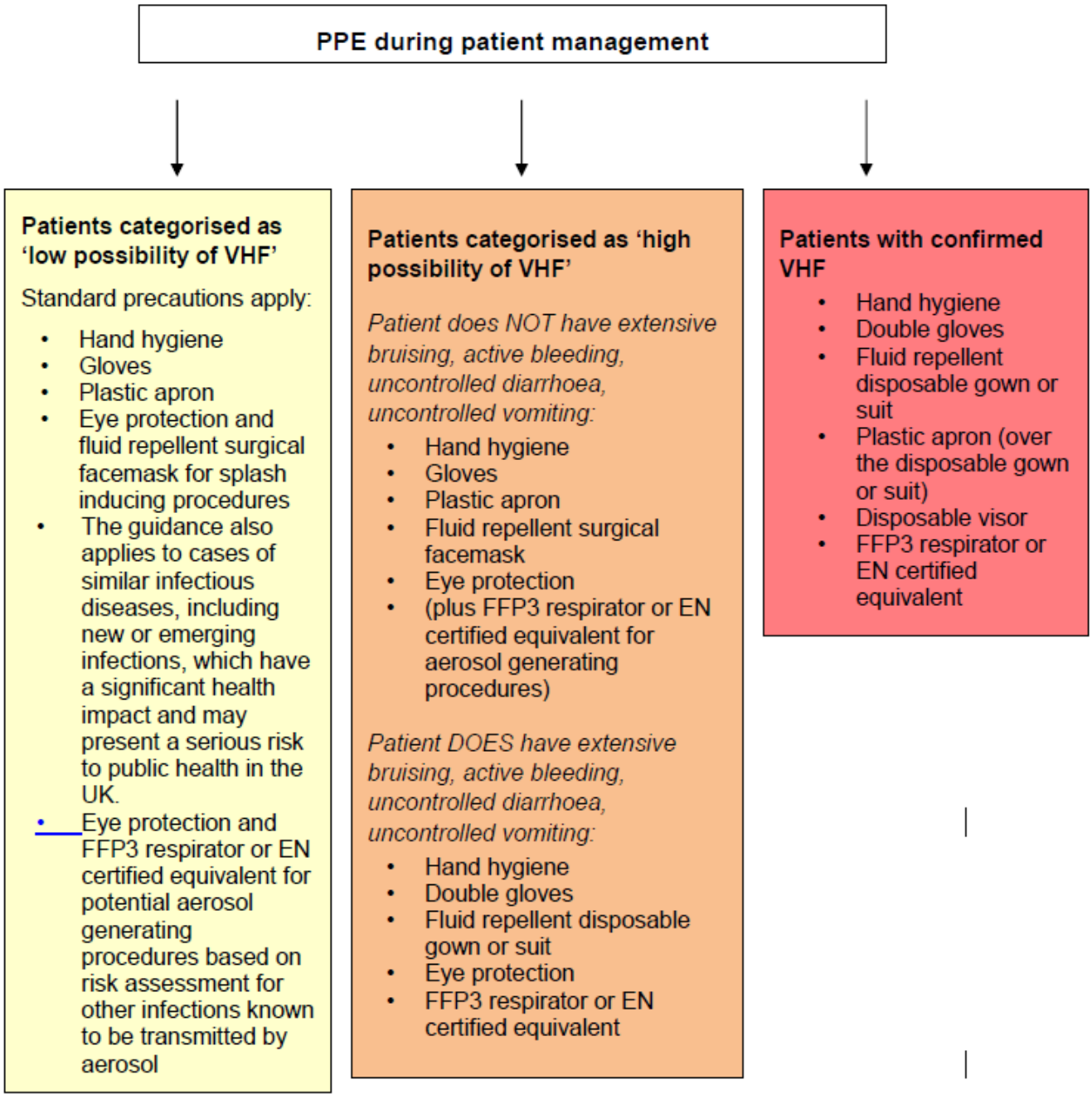
When selecting appropriate and practical PPE controls the infection risk, the tasks to be undertaken, the environment in which the PPE is being used and the person using the PPE must be considered.

When selecting PPE for protection of healthcare and laboratory staff the potential exposure routes to be considered are **direct contact** (through broken skin or mucous membrane) with blood or body fluids, and **indirect contact** with environments contaminated with splashes or droplets of blood or body fluids. Regarding VHF infection risk:

- transmission has usually been associated with patient care in the absence of appropriate barrier precautions to prevent exposure to blood and other body fluids;
- the risk for person-to-person transmission of VHF viruses is highest during the later stages of illness, when vomiting, diarrhoea, and often haemorrhage, may lead to splash and droplet generation.

PPE selection – general

In patient management, PPE selection should be proportionate to the likelihood of VHF infection as defined in the algorithm:



Ergonomic factors should be considered. PPE must be chosen to give maximum protection while ensuring minimum discomfort to the wearer. Uncomfortable equipment is unlikely to be worn properly. More than one type or size of PPE may be needed and should be tested to fit the wearer. Some types of RPE e.g. disposable respirators and half- masks, are not suitable for staff with beards or facial hair as they will not seal to the wearer's face, and achieving a good face fit can be a particular problem for a person with a small face (see also below).

The PPE selected should be of suitable quality and construction to provide the required level of protection in the working conditions and must bear a "CE" mark that signifies compliance with the Personal Protective Equipment Regulations 2002. This implements the European PPE Directive concerning design and manufacture and demonstrates conformance with European (EN) or International (ISO) standards.

Further guidance on the selection of RPE is given in the HSE guidance 'Respiratory protective equipment at work: A practical guide' (http://www.hse.gov.uk/pubns/priced/HSG53.pdf). Information on suitability and instructions for correct use should be provided by RPE manufacturers.

PPE selection – further considerations for management of patients with confirmed VHF
It is imperative that the PPE provides a barrier of adequate coverage and integrity to prevent staff contact (direct or indirect) with contamination. The barrier function will need to be maintained throughout all clinical/nursing procedures, and when following appropriate procedures for the removal and disposal or decontamination of potentially contaminated equipment by the wearer.

The PPE/RPE combination has to establish a barrier against contact with contaminated surfaces, splash, spray, bulk fluids and aerosol particles as follows:

- Should provide complete adequate coverage of all exposed skin, with sufficient integrity to prevent ingress or seepage of bulk liquids or airborne particles, under foreseeable conditions of usage;
- The materials from which the PPE is made should resist penetration of relevant liquids/suspensions and aerosols;
- The various components (body clothing, footwear, gloves, respiratory/face/eye protection) should be designed to interface sufficiently well to maintain a barrier, e.g. sleeves long enough to be adequately overlapped by glove cuffs.

Whilst there is no circumstantial or epidemiological evidence of aerosol transmission risk from VHF patients, as a precaution RPE to a high level Assigned Protection Factor of 20 (APF20) is considered appropriate. This would normally be achieved by the use of a disposable filtering face-piece (FFP) respirator type EN 149 FFP3, certified as PPE under the European Directive 89/686/EEC.

It is important that wearers have undergone face-fit testing to ensure such respirators achieve a good seal as required under the Control of Substances Hazardous to Health (CoSHH) 2002 as amended. While disposable RPE may be more practical to avoid the need for decontamination of re-usable RPE, facial hair (a beard or stubble) may prevent a good seal being achieved with a disposable respirator. In this instance a powered hood type respirator given a classification of TH2 according to European Standard EN 12941 may be necessary. Likewise, certain face shapes may prevent a good seal being achieved with a disposable respirator, but in this case a half mask re-usable respirator with P3 filter may be a practical solution.

Putting on and taking off PPE
As described above, PPE should be chosen to ensure an adequate barrier to exposure is created and maintained. This will need to be taken into consideration when putting on the various items of PPE. After use, it should be assumed that PPE may be contaminated and an inappropriate removal procedure therefore could expose the wearer. Consequently, a detailed and pre-defined sequence for putting on and taking off items should be developed, implemented and monitored.

PPE should be put on before starting procedures likely to cause exposure and only removed after moving away from a source of exposure.

PPE should not be a source of further contamination e.g. by being removed and left on environmental surfaces.

Disposal or decontamination
Following removal, disposable PPE will need to be placed into suitable disposal receptacles and treated as clinical infectious waste. If re-usable PPE is unavoidable, it must be decontaminated using an appropriate method prior to storage. The method should be validated as effective against VHF (see Appendix G) and compatible with the PPE to ensure it is not damaged so that its effectiveness in subsequent use is not compromised.

Storage and Maintenance
PPE should be suitably stored to prevent accidental damage and contamination. Infrequently used PPE should be subject to stock selection and control procedures with regard to shelf-life to ensure it is available for use at short notice with no deterioration in protective qualities. RPE requiring powered respirator units should be thoroughly examined, tested and maintained at suitable intervals (at least once a month). Records of the tests must be kept for at least five years after the date of the test.

Staff training on the use of PPE
Staff should be trained in procedures to put on and especially to take off PPE, including the correct order to avoid cross contamination, and to check that the RPE with which they are provided fits properly. They must also receive clear instructions on when it is to be used and how it is to be disposed of or, as appropriate, decontaminated, maintained and stored. This training should be held regularly.

Summary of good practice in the use of PPE/RPE

- PPE must be appropriate, fit for purpose and suitable for the person using/wearing it. A scheme for periodical repetition of face fit testing (either annually, due to change of facial features, or alteration to respiratory function) should be developed and implemented;
- Training must be provided with consideration of susceptibility to human error;
- A strategy for implementing and monitoring the correct use of PPE which could include visual check, cross check or supervision by responsible person should be developed;
- A detailed and pre-defined sequence for putting on and taking off items should be developed, implemented and monitored;
- PPE should be located close to the point of use;
- Hand washing should not be performed while wearing gloves, nor products such as alcohol based hand rub used to clean gloves as it may increase glove permeability;
- PPE should not be a source of further contamination e.g., by being removed and left on environmental surfaces, or by being removed inappropriately thus contaminating the wearers hands;
- The use of PPE such as gloves does not negate the need for hand hygiene;
- The integrity of PPE should not be compromised during nursing procedures. It might otherwise potentially lead to exposure to blood or body fluids. For example solvents or certain products such as hand creams, can affect integrity;
- There should be validated procedures for the disinfection of re-useable PPE;
- Stocks of PPE should be stored off the floor, e.g., on appropriate shelving in a designated, clean and dry storage area to ensure that they are not contaminated prior to use.

Management of staff accidentally exposed to potentially infectious material | Appendix F

Procedures must be in place to deal with any accidental exposure of staff to blood or body fluids from high possibility or confirmed cases of VHF.

Accidental exposures that need to be dealt with promptly are:

- **percutaneous injury e.g. needlesticks:**

Immediately wash the affected part with soap and water. Encourage bleeding via squeezing.

- **contact with broken skin:**

Immediately wash the affected part with soap and water.

- **contact with mucous membranes (eyes, nose, or mouth):**

Immediately irrigate the area with emergency wash bottles, which should be accessible in case of such an emergency.

In all cases, the incident will need to be reported and the individual referred urgently to the on call Clinical Microbiologist and the Department of Occupation Health and Wellbeing.

The individual should be followed up, as a minimum, as a Category 3 contact – see Section 7.2.1 for details. The incident may need to be reported under Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) to HSE (http://www.hse.gov.uk/riddor/). Under RIDDOR, a definite exposure would be reported as a dangerous occurrence, whereas if the staff member actually acquired an infection it would need to be reported under the occupational disease category.

Decontamination, including treatment of laundry | Appendix G

For patients categorised as low possibility of VHF, standard precautions, cleaning and decontaminating procedures apply, including the treatment of laundry.

The information in this Appendix applies to those patients who have been categorised as high possibility of VHF or have been confirmed with VHF infection.

Staff should ensure that areas and equipment used for the care of patients who have been categorised as high possibility of VHF or have been confirmed with VHF infection are decontaminated and cleaned following the procedures in this Appendix. Decontamination and cleaning must be conducted wearing appropriate PPE (see Appendix H).

It is important to ensure that products used in the decontamination procedure have been validated as effective against VHF agents.

Bleaches, hypochlorites and chlorine releasing agents

In various protocols and guidance, reference will be made to bleach or hypochlorite solution. To clarify:

* The active disinfectant component of bleach is sodium hypochlorite (NaOCl).
* Typical household bleach is a solution of sodium hypochlorite generally containing 50,000 ppm available chlorine.
* It is important to check the concentration in the formulation before use, as it is likely to require dilution.
* The strength of the bleach may reduce with long-term storage.
* Typical in-use concentrations are 10,000 ppm for the disinfection of blood-spills and 1,000 ppm for general environmental cleaning.
* Sodium dichloroisocyanurate (NaDCC) may be used as an alternative to NaOCl. This is also available in granule form, which may be practical to absorb, contain and disinfect spills. Refer to suppliers' instructions for in-use concentrations.
* Note that there is a minimum contact time for chlorine-based absorbent granules. This contact time is usually 2 minutes, but may vary from product to product.
* Suitable PPE, including gloves, should be worn when using chlorine-based products.
* Ensure adequate ventilation when disinfecting areas with chlorine-based products i.e. open windows or doors where necessary.

Recommended procedures when there has been no obvious contamination by blood and/or body fluids

Validated standard washing and cleaning methods can adequately treat areas and equipment, which have not been contaminated with blood, body fluids or laboratory specimens.

Recommended procedures when there has been contamination by blood and/or body fluids

VHF viruses have been known to survive for two weeks or even longer on contaminated fabrics and equipment. Persons carrying out decontamination and cleaning procedures must wear appropriate PPE and use suitable disinfectant products determined by a robust risk assessment.

Crockery and cutlery

Disposable crockery and cutlery should be used where possible for those patients categorised as high possibility or confirmed VHF. These items should be disposed of as category A waste.

Toilets
Toilets or commodes may be used by patients categorised as 'high possibility' or 'confirmed' for VHF infection. Where commodes are employed, a dedicated commode should be used with a disposable bowl. After use, the contents are to be solidified with high-absorbency gel and then autoclaved or incinerated. Toilets and commodes should be disinfected with hypochlorite containing 10,000 ppm available chlorine at least daily, preferably after each use, and upon patient discharge. For non-ambulant patients, disposable bedpans should be used and the contents to be solidified with high-absorbency gel and then autoclaved or incinerated.

Treatment of Laundry
Use and treatment of disposable linen
The use of disposable linen should always be considered when appropriate, in particular when caring for a patient with a 'high possibility of' or 'confirmed' VHF infection. This linen must be treated and disposed of as category A waste.

Use and treatment of non-disposable linen
All re-useable linen from patients with a 'high possibility' or 'confirmed' for VHF infection should not be returned to a laundry and must therefore be treated and disposed of a category A infectious waste as set out by Health Technical Memorandum HTM 07-01 Safe Management of Healthcare Waste (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/167976/HTM_07-01_Final.pdf).

Terminal disinfection of negative pressure rooms for VHF positive patients
Following VHF positive patient discharge, negative pressure rooms should be decontaminated by fumigation (see info box on room fumigation below). This will need to be carried out following a thorough risk assessment and procedures for decontamination will be established in consultation with HILU staff.

Spillages of blood or body fluids

For small spots of blood or small spills:
* Gloves should be worn and lesions on exposed skin covered with waterproof dressings;
* Contamination should be mopped up with absorbent material (e.g. disposable paper towels), which are then disposed of through the correct waste stream;
* The area should then be disinfected with freshly prepared hypochlorite solution containing 10,000 ppm available chlorine ensuring a contact time of two minutes before wiping up with disposable paper towels;
* The surface should then be washed with warm water and detergent;
* All waste, including gloves and paper towels, should be autoclaved or incinerated.

For larger spills:
* The procedure followed should be as per small spills, however, the following additional measures may be required:
* Where possible, allow any potential aerosols to settle out;
* It may be necessary based on a risk assessment to wear disposable plastic overshoes or rubber boots;
a) If splashing is likely to occur while cleaning up, other appropriate PPE should be worn;

b) Towels, gloves, disposable overshoes and any contaminated clothing should be autoclaved or incinerated, according to local protocols. Rubber boots may be cleaned then disinfected with hypochlorite solution containing 10,000 ppm available chlorine.

Room fumigation

In order to ensure successful room decontamination, gross contamination will need to be cleaned and disinfected appropriately prior to the fumigation process (refer to box above on spillages).

The fumigant and fumigation process used should be validated for use.

Staff undertaking the fumigation process must be fully trained to do so and maintain infection control procedures when preparing the room for fumigation.

Rooms to be fumigated must be suitably sealed so as to prevent leakage of fumigant into unwanted areas.

It may be necessary to move nearby patients to a more suitable location during the fumigation procedure.

Air outside the room being fumigated must not contain levels of fumigant above the Workplace Exposure Limit (WEL) and as such should be monitored to ensure the room has been adequately sealed.

Post fumigation, levels of fumigant within the now decontaminated room must be below the WEL before re-entry. Where this is not possible e.g. where windows are required to be opened for ventilation purposes, suitable PPE including RPE must be worn following a risk assessment;

Post fumigation, rooms should be cleaned following locally established protocols.

The Department of Health (DH) SMHW 1.0 (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/167976/HTM_07-01_Final.pdf) contains comprehensive, best practice guidance on the management of all types of healthcare waste in the UK, including waste that is highly infectious. Further information is also available in the ACDP Guidance on VHF.[1]

All waste from patients classified as 'low possibility of' having a VHF infection should be treated as Category B infectious waste.

All waste from patients classed as 'high possibility of' or 'confirmed' VHF infection is classified as Category A infectious waste, on the basis that it is known or suspected to be contaminated with pathogens presenting the most severe risk of infection. All treatment, disposal and transport of waste should therefore follow the guidance for Category A infectious waste as set out in SMHW 1.0, i.e. autoclaved on site or sent for incineration.

Category A infectious waste should be double-bagged in high risk orange bags clearly labelled at the site of use and transported directly in a dedicated sealed, leak proof clinical waste bin for incineration. These oranges bags may be obtained from the Site Services Department (xtn. 39736 or 39738). A tracking form (chain of evidence) should be completed and returned to the ward. Potentially infectious solid medical waste (e.g. contaminated needles, syringes, and tubing) will be placed in appropriate sealable bins for incineration. All waste should be sealed with Hazard tape and marked "For Incineration". Special arrangements are to be made to ensure these are taken to the incinerator safely.

Used clinical samples of any sort should be autoclaved in Microbiology and then incinerated.

In some cases, an assessment will need to be made of reasonably practicable means for safe storage, disposal and transport dependent upon such factors as the volume of waste, the availability and practicality of on-site autoclaving, the availability of secure storage and safe methods of transfer off site. The Site Services Department and IPCT should be contacted to assist with such assessments. Further information on the disposal and transport of waste is available in the ACDP Guidance[1] and SMHW 1.0.

Patients with suspected VHF should be isolated in a side room, ideally with en suite toilet facilities wherever possible. There is no evidence for transmission of haemorrhagic fever viruses to humans or animals through exposure to contaminated sewage.

All waste from patients classed as 'high possibility of' or 'confirmed' VHF infection is classified as Category A infectious waste (including commode faecal material and urine from catheterised patients) and should be handled as such. All waste from patients classified as 'low possibility of' having a VHF infection should be treated as category B infectious waste. Care should be taken to avoid splashing when disposing of these materials and full protective clothing should be worn.

Inactivation of waste on-site

As far as reasonably practicable, Category A infectious waste should be treated on-site prior to transport to a disposal facility. On-site treatment will in most cases involve the autoclaving of waste in purpose-built facilities (e.g., dedicated autoclaves in HLIUs). However, in the case of other infectious

disease units or hospital ward environments, an assessment will need to be made of reasonably practicable means for safe storage and disposal dependent upon such factors as:

- The volume of waste;
- The availability and practicality of on-site autoclaving;
- The availability of secure storage;
- Safe methods of transfer off site –see below

Before transporting waste to a remote autoclave, arrangements to coordinate transport should be put in place. Waste should be contained within two layers of containment with the secondary containment being robust, leak-proof containers with a secure lid, transported on a trolley where appropriate. Autoclavable bags should be used as the primary containment. Waste should be transported direct to the autoclave for immediate treatment, thus avoiding storage in the autoclave room or in communal areas.

Autoclave cycles must be appropriately validated to ensure that the required temperature and pressure conditions are reached for the appropriate length of time. Autoclaves must comply with British Standard BS 2646-1:1993 (Autoclaves for sterilization in laboratories. Specifications for design, construction, safety and performance) and must be maintained according to the Pressure Systems Safety Regulations 2000.

After autoclaving, waste is no longer considered to be infectious and should be classed as EWC Non-hazardous 18.01.04 “offensive waste”, which can be disposed of via landfill or municipal incineration/energy from waste as described in HTM 07-01.

Laboratory waste

The infectious component of laboratory waste can be classified as either Category A (specimens from patients classed as ‘high possibility of’ or ‘confirmed’ VHF infection) or Category B (specimens from patients classed as ‘low possibility of’ VHF infection) as set out in HTM 07-01.

Irrespective of whether the infectious waste is categorised as A or B, all cultures of pathogens should be inactivated on site prior to final disposal because of the increased risk of exposure associated with higher concentrations of biological agents. Further detailed guidance on the handling of laboratory waste can be found in the relevant section of HTM 07-01.

Waste from routine analysers is not considered to pose a significant risk because of the small sample size and dilution step and will therefore require no special waste disposal precautions.

Inactivation of waste off-site

It is recognised that it may not always be reasonably practicable to autoclave on-site the large volumes of waste generated during the clinical care of a patient. Other exceptional circumstances could involve autoclave malfunction. In these circumstances, waste should be packaged for carriage and transferred to an incinerator as soon as possible. Waste (including sharps receptacles) must be placed in appropriate yellow UN-approved packages for transport.

A reputable and licensed waste contractor must undertake transport to the incinerator. Adequate contingency arrangements should be made in advance with the contractor to ensure safe collection,

transport and disposal demonstrably in full compliance with The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).

Prior to collection by the contractor, waste must be stored securely and access restricted to authorised and trained personnel.

Staff and Visitor Contact Record Sheet | Appendix I

Name of index patient:

Hospital number of index patient:

Date of record:

PLEASE RECORD YOUR NAME IF YOU ENTER THE ROOM

Name	Date of Birth	Contact number	Time of entry	Time leaving	Procedure(s) performed

After death care | Appendix J

A post-mortem examination on a person known to have died of VHF exposes staff to unwarranted risk and should not be performed.

Where a patient suspected of having VHF dies prior to a definitive diagnosis, it may be necessary to undertake some diagnostic tests to either establish or eliminate the diagnosis of VHF or to provide an alternative diagnosis including e.g. malaria. Consultation with appropriate specialists may help to determine the extent of the limited amount of sampling that will suffice such an assessment.

Personnel undertaking diagnostic tests must wear appropriate PPE following the guidance for safe collection and transport of specimens. Specimens should be taken before transferring the body to a leak-proof body bag. Where the results of such tests have found the deceased to be negative for VHF then a post mortem may be required.

Staff wearing suitable PPE/RPE (see Appendix E) should place the body of a confirmed or suspected VHF patient in a double body bag. Absorbent material should be placed between each bag, and the bag sealed and disinfected with 1000 ppm available chlorine or other appropriate disinfectant. The bag should be labelled as high-risk of infection and then placed in a robust coffin, which will need to have sealed joints. An infection control notification sheet should be completed in readiness for the funeral directors. It should then be kept, by special prior arrangement with mortuary staff, in a separate and identified cold store unit to await prompt cremation or burial.

Once sealed as above, the coffin and body bag should not be opened. Only in exceptional circumstances should the coffin or body bag be opened and only then by a designated person after consultation, and with the authority of, the Consultant in Communicable Disease Control (CCDC).

Funeral directors will need to be consulted beforehand and provided with sufficient information of the infection risk normally provided by an infection control notification sheet.

It is recognised that in most other circumstances in this country, bodies often receive some form of hygienic preparation or are fully embalmed as a means of delaying putrefaction (e.g. when the funeral is delayed or for transportation over long distances within the UK or internationally). However in the case of confirmed VHF cases, embalming or hygienic preparation of bodies presents an unacceptably high risk and should not be undertaken.

Exceptions to the above include necessary preparation of bodies for other safety reasons. For example, it is a requirement to remove pacemakers and some other implants before cremation. In addition to the information provided on the infection control notification sheet, it is advised that the funeral director discusses appropriate infection control procedures, use of personal protective equipment and waste disposal arrangements with specialists (CCDC and HLIU consultants).

As far as is reasonably practicable the needs and wishes of the deceased’s family should be respected. However, the serious nature of this infection and the associated occupational and public health risks necessarily impose significant limitations and constraints, which aim to limit contact with the body by the next of kin. Due to the unusual circumstances, there will be a need to communicate sensitively that the following will need to be avoided: religious/ritual preparation of the body, washing, dressing, viewing, touching or kissing of the deceased.

The transportation of VHF infected bodies out of the country is not recommended. However, following cremation, ashes may be safely transported. In the unlikely event of a VHF infected body being embalmed abroad and transported back to the UK, it would need to be contained within a sealed zinc lined transport coffin in accordance with IATA requirements. Upon arrival in the UK a change of coffins is to be avoided and this may dictate the options for burial or cremation, which should be promptly arranged.

In principle clothing, personal effects and valuables may be returned to relatives in accordance with normal health service procedure following decontamination.

However:

- Items of clothing visibly contaminated should be safely disposed of, other items of clothing should be autoclaved prior to laundering;
- Wedding rings, jewellery and other physical artefacts should either be autoclaved or decontaminated using a validated disinfectant.

Further information can be found in the Handling of Cadavers Policy and the ACDP Guidance.[1]

- **What is viral haemorrhagic fever?**

  Viral haemorrhagic fever (VHF) includes infections caused by organisms such as Lassa and Ebola viruses. The clinical presentation ranges from a mild to severe illness.

- **How is it spread?**

  Transmission is via blood and body fluids (including sharps injury) and through intimate close contact.

- **What are the risks?**

  VHF need not pose a high risk for healthcare workers provided that good infection control measures are practised, particularly when dealing with sharps, blood and body fluids.

  Lassa fever should be suspected in those who present with fever, sore throat or a “flu-like” illness and who have been in West Africa within the previous 3 weeks. Malaria must first be excluded as a matter of urgency. Other VHF that are found, for example in East or central Africa, are dealt with in the same way.

- **How do I reduce the risk?**

  Follow the local hospital policy for VHF. This includes wearing of protective clothing and care with blood and body fluids.

- **What if I think I am at risk?**

  Follow the local hospital policy for VHF. This includes wearing of protective clothing and care with blood and body fluids.

- **What if I think I am at risk?**

  Contact Occupational Health and Wellbeing or the Infection Prevention and Control Team for more information.

- **Are my family and friends at risk?**

  They may be at slight risk if they have been in contact with the patient. You will be advised what to do by the Public Health England.

- **Can I visit a patient with VHF?**

  Visiting will be restricted to close family who have already been in contact with the patient. If the patient is confirmed as having VHF, they may be transferred to a specialist infectious diseases unit.
  Further information can be found in the hospital policy or by contacting the Infection Prevention and Control Team on xtn. 34167.