The Management of Viral Haemorrhagic Fevers in Ireland

Scientific Advisory Committee
VHF Sub-committee
National Disease Surveillance Centre

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Front Cover: Transmission electron micrograph of Ebola virus. Image in public domain

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Foreword

Viral haemorrhagic fevers (VHFs) are endemic in a number of parts of the world: Africa, South America, the Middle East and Eastern Europe. Ebola, Lassa fever, Marburg and Crimean-Congo haemorrhagic fever are four VHF agents that are of particular concern because of potential person-to-person spread. They are all potentially fatal diseases for humans. For most European countries, including Ireland, the risk of epidemic spread in the general population is negligible. However, the speed and volume of international travel and commerce have increased the risk that persons incubating any disease, including VHFs, may present in Ireland after returning from high risk areas.

Body secretions and excretions including blood, semen and tissue specimens from infected patients contain infectious virus. In Ireland, onward transmission of the virus from a VHF patient is most likely to occur in a healthcare setting by either coming into contact with the virus in blood, tissue or secretions of a patient or by breathing in airborne particles which the patient can produce by coughing. Persons at highest risk of infection are those who are in closest contact with an infected person or his/her body fluids during the period of incubation and acute illness. Such persons include those with prolonged or close physical contact with patients, those providing direct medical and nursing care and laboratory workers handling blood, tissue or other specimens from a patient.

These guidelines have been drawn up to ensure the Irish healthcare system is ready to deal with a suspected case of VHF. The objectives of these guidelines are to enhance the care of patients with suspected or diagnosed VHF, and to safeguard other patients, health care workers and the public by preventing the spread of VHF if or when it occurs in Ireland.

The Committee would like to acknowledge the work and commitment of Dr. Alan Smith, Secretary of the Committee, in producing this report.

Dr. Darina O'Flanagan
Chairperson
VHF Subcommittee

Summary of Recommendations

Patient Risk Assessment and Categorisation

The purpose of risk assessment and patient categorisation in relation to VHF is to provide efficient and timely management of patients, while affording maximum protection to the laboratory and clinical staff involved. The identification and roles of key players are set out in Appendix 1 and 2.

Suspected VHF patients are assigned to one of two risk groups: **At Risk** and **High Risk** using the risk assessment process presented in this document.

Case Presentation and Lines of Communication

The most likely site of presentation of a suspected or definite VHF case is in the Accident & Emergency Department of a hospital, either as a self-referral or as a referral from a general practitioner. Imported, unusual or emerging communicable diseases may also be identified or suspected at Irish ports of entry i.e. airports or harbour ports (Appendix 3).

All suspected cases should be notified to the relevant Director of Public Health (VHF Regional Response Co-ordinator) and in turn the Director, National Disease Surveillance Centre (VHF National Response Co-ordinator) in accordance with Infectious Diseases (Amendment) Regulations, 2000 (S.I. No. 151, 2000).

Should a suspected case be confirmed as VHF, a multidisciplinary Emergency Incident Committee should be formed to re-examine and direct the future management of the case.

Protective Clothing and VHF

Standard Precautions now apply to all patients regardless of their infectious status. They include hand hygiene, use of gloves and protective clothing, environmental hygiene, safe disposal of waste and precautions for the prevention of sharps injuries.

Strict adherence to the implementation of Standard Precautions, the primary strategy for successful nosocomial infection control, is recommended.

Placement of a Viral Haemorrhagic Fever Patient in a Hospital Setting

The Infection Control Team must be actively consulted and included in all decisions regarding patient isolation requirements, use of personal protective clothing and patient transport requirements.

A patient categorised as **at risk** should be admitted to a single room. An anteroom, stocked with supplies, with facilities for hand washing and an area for donning protective clothing, is useful.

A patient categorised as **high risk** should be admitted to a single room with negative airflow in a designated tertiary care facility. An anteroom, stocked with supplies, with facilities for hand washing and an area for donning protective clothing, is essential.

The minimum criteria for a designated tertiary care facility include: negative air pressure room, ICU availability, infectious disease physician, anaesthetist, microbiologist, haematologist, infection control and occupational health teams and appropriate laboratory facilities.

One adult and one paediatric designated tertiary care facility is recommended.

Transporting a Suspected VHF Patient

The use of ambulance services for transportation should be based on the clinical condition of the patient. Close communication between the attending and receiving clinical teams should be maintained at all times. The VHF Regional and National Response Co-ordinators and the ambulance service should be kept informed.

If the attending clinical team believes that a strong suspicion of VHF exists then transfer to a designated facility should be a priority. For inter- or intra-hospital transport, transportation should be done as early as possible in the course of the disease. A police escort should be arranged to facilitate ambulance transfer. It may be more appropriate that the receiving hospital deploy staff and equipment from their own resources to accomplish the transfer of these patients.

Clinical Waste Management from a VHF Patient

Waste generated from a suspected VHF patient that includes soiled linens and clothing needs to be handled appropriately and separately from the routine management of clinical waste in the hospital setting.

Hypochlorite solution (10,000 ppm available free chlorine) should be liberally added to urine, faeces and body fluids for a minimum of 5 minutes prior to subsequent discharge into the sewage system and decontamination of the bedpan in a bedpan washer.

All waste generated in the course of caring for a suspected VHF patient including soiled linens and clothing will be incinerated in an appropriate licensed facility. To facilitate this process, all waste and clothing etc. other than sharps generated in the course of the patients care should be disposed of in a 30/60 litre yellow rigid container with a black lid. Sharps generated will be disposed of in a yellow sharps bin with a purple lid. Before removal from the patient's room all containers should be wiped all over with hypochlorite solution (10,000 ppm available free chlorine).

Hospital Management of the Viral Haemorrhagic Fever Patient

At risk and **high risk** patients should be admitted to an appropriate single room.

Patient care equipment e.g. thermometers, blood pressure cuffs, stethoscopes etc. should be dedicated to the patient using disposable supplies wherever possible.

A needle free intravenous system should be used to eliminate the risk of needle stick injuries.

Should a patient die, handling of the body should be minimal. A post-mortem is not advised. The corpse should be wrapped in a sealed leak-proof material, not embalmed and promptly cremated or buried in a sealed casket.

For the first six weeks of convalescence, 50-100mls of household bleach should be placed in the toilet bowl prior to urinating and flushing, allowing 5 minutes to elapse before flushing. Sexual intercourse should be avoided for the same period at a minimum.

Laboratory Samples, Processing and Testing

Laboratory testing should be the minimum necessary for diagnostic evaluation and patient care, because of the potential risks associated with handling infectious materials.

Specimens in clinical laboratories should be handled in a Class 1 biological safety cabinet following Containment Level 3 practices.

In Ireland, diagnosis will be made primarily using PCR and secondly by the demonstration of IgM antibody. No attempts will be made at virus isolation.

All diagnostic tests should be carried out in the Containment Level 3 facility which is to be constructed at the National Virus Reference Laboratory (NVRL) in Dublin.

Identification, Surveillance and Management of VHF Patient Contacts

A contact is defined as a person who has been exposed to an infected person or to an infected person's secretions, excretions or tissues within 3 weeks of the patient's onset of illness.

Contacts should be subdivided, depending on exposure, into **low risk contacts** and **high risk contacts** using the categorisation process outlined in this document.

Low risk contacts should be advised to contact their own doctor or a designated person in the relevant health board should they become unwell or develop a temperature >38^{o}C within 21 days after their last possible exposure.

High risk contacts should be placed under surveillance for 21 days after their last contact with the index patient, record their temperature twice daily and report any temperature above 38^{o}C or any symptom of illness to the designated person in the relevant health board responsible for surveillance.

Information Transfer and Media Relations

Following the diagnosis of a case of VHF, a Media Information Committee should be formed and consist of nominated members of the Emergency Incident Committee, the hospital CEO, the relevant Director of Public Health, the Director of the National Disease Surveillance Centre (NDSC) and the Director of the NVRL. This committee will be responsible for all interactions with the media and public.

Implementation

Health Boards should establish local implementation committees to help plan the introduction of these guidelines.

Formal out-of-hours on-call arrangements should be put in place for Departments of Public Health and NDSC for surveillance and control of infectious diseases.

Introduction

1. Introduction

The term viral haemorrhagic fever (VHF) refers to a group of illnesses caused by four distinct families of viruses: the arenaviruses, filoviruses, bunyaviruses and flaviviruses. Each of these families share a number of common features:

- They are all RNA viruses with a lipid envelope.
- Their survival is dependent on an animal or insect host.
- The viruses are geographically restricted to the areas where their host species live.
- Humans are not the natural reservoir for any of these viruses.
- Human cases occur sporadically.
- They can cause severe life-threatening disease.

Most of these viruses are endemic in a number of parts of the world: Africa, South America, the Middle East and Eastern Europe. While for most European countries, including Ireland, the risk of epidemic spread in the general population is negligible, cases of VHF are occasionally imported into Europe. Because of the increase in international travel, outbreaks of these diseases are becoming an increasing threat in areas where they rarely have been seen.

Ebola, Lassa, Marburg and Crimean-Congo haemorrhagic fever are four VHF agents that are of particular concern because of potential person-to-person spread.

1.1 Ebola haemorrhagic fever

Ebola was first recognised in 1976 in the Democratic Republic of Congo. It is a severe, often fatal disease in humans and non-human primates. Ebola typically appears in sporadic outbreaks usually within a health-care setting.

The exact location, origin and natural reservoir of Ebola remains unknown but researchers believe that the virus is zoonotic, native to the African continent. The exact mode of transmission to humans is unknown.

Confirmed cases of Ebola have been reported in the Democratic Republic of Congo, Gabon, Sudan, the Ivory Coast and Uganda (Appendix 4). In 1976 a laboratory worker in the UK became ill as a result of a needle stick injury.

If a case presented in Ireland, nosocomial transmission is most likely to occur through either direct or indirect contact with the blood and/or secretions of an infected patient. Ebola has also displayed the ability to be spread through airborne particles under research conditions but this type of spread has not been documented among humans.

Mortality is high. The mortality rate in an outbreak in the Democratic Republic of Congo in 1995 was 77%. The most recent outbreak in Uganda in 2000/01 killed 273 people.

1.2 Lassa fever

Lassa fever is an acute viral illness that occurs in West Africa. The illness was first reported in 1969 when two missionary nurses died in Nigeria. Lassa fever is endemic in parts of West Africa including Guinea, Liberia, Sierra Leone and Nigeria (Appendix 5). The reservoir of Lassa virus is the multimammate rat.

Humans can be infected in several ways. Rats shed the virus in urine and droppings and therefore primary transmission is likely to be through direct contact with these materials. Infection can also occur following airborne transmission. Secondary transmission can also occur through person-to-person contact. In Ireland, such secondary transmission is most likely to occur in a healthcare setting by either coming into contact with the virus in blood, tissue or secretions of a case or by breathing in airborne particles which the patient can produce by coughing. It is the potential transmission by aerosol that makes Lassa particularly dangerous. Approximately 15-20% of patients hospitalised for Lassa fever die. The death rates are particularly high for women in the third trimester of pregnancy and for foetuses, about 95% of which die in the uterus of infected expectant mothers. Following recovery, the most common complication is deafness, which occurs in approximately 33% of cases.

There were four imported cases of Lassa fever in Europe in 2000. The first, an imported case to Germany, involved a 23-year-old female student who had been travelling in the Ivory Coast, Ghana and Burkina Faso during the months of November and December 1999. Of note, these countries have not been considered up until now to be endemic for Lassa Fever. The patient died in January 2000. The second case was an imported case to England, the fifth such imported case to the United Kingdom, in a 50 year old aid worker who had been based in Sierra Leone. The third, an African businessman was diagnosed following referral to a hospital in Wiesbaden, Germany. The patient died from complications unrelated to his Lassa fever. The fourth patient, a 48-year-old surgeon who had been working in Sierra Leone, died in the Netherlands.

1.3 Marburg haemorrhagic fever

Marburg virus was first recognised in 1967 when outbreaks of haemorrhagic fever occurred simultaneously in Marburg and Frankfurt in Germany and in Belgrade in the former Yugoslavia. A total of 37 people were infected as a result of those first affected having been exposed to African green monkeys.

Marburg virus is indigenous to Africa and while the geographic areas in which it is endemic are unknown, they do appear to include at least parts of Uganda, Western Kenya and perhaps Zimbabwe (Appendix 6). As with Ebola, the animal reservoirs for Marburg virus remain unknown.

While the 1967 outbreak occurred in Europe, the virus had arrived with imported monkeys from Uganda. The next case did not occur until 1975 in Johannesburg and the patient had most likely been exposed while travelling in Uganda. A travelling companion and a nurse were subsequently infected. In 1980, there were two further cases, one in Western Kenya and the second in Nairobi. In 1987, another case was reported in an individual who had travelled extensively in Kenya. How the virus is transmitted from animals to humans is unknown.

If a case were to occur in Ireland those most at risk would be hospital staff and also family members or other individuals who had cared for the patient prior to their diagnosis.

While the case fatality rate was initially thought to be significantly lower than that of Ebola, analysis of recent outbreaks in the Democratic Republic of Congo have shown that this is also greater than 70%. Recovery from Marburg can be slow and known sequelae include orchitis, recurrent hepatitis, transverse myelitis and uveitis.

1.4 Crimean-Congo haemorrhagic fever

Crimean-Congo haemorrhagic fever (CCHF) was first described in the Crimea in 1944. In 1969, it was recognised that the virus causing Crimean haemorrhagic fever was the same as that responsible for an illness identified in 1956 in the Congo and hence the linkage of the two names.

The geographical distribution of the virus is widespread. Evidence of CCHF has been found in Africa, Asia, the Middle East and Eastern Europe. CCHF is a severe illness in humans with a high mortality but fortunately human illness occurs infrequently. Animal infection is more common. Animals become infected with CCHF from the bite of infected ticks. Humans who become infected usually do so from direct contact with blood or other tissues from infected animals or directly from a tick bite. The majority of cases have occurred in those involved with the livestock industry such as agricultural workers, slaughterhouse workers and vets.

2. Diagnosis of VHF

The diagnosis of VHF is confirmed by isolating the virus, by antigen detection employing enzyme linked immunosorbent assay (ELISA), viral genome detection by polymerase chain reaction (PCR), by the demonstration of IgM antibody or by a fourfold rise in IgG antibody in serum. Antibody may not appear in the blood until the second week of illness. Moreover, it is becoming apparent that in some instances infection may involve virus variants that may not sero-react in currently employed assays. Virus is usually recovered from blood, although the Lassa virus may also be isolated from throat secretions or urine.

3. Treatment of VHF

The treatment of the VHF patient is primarily supportive, the same as that provided to any other critically ill patient. Careful fluid management of patients is important to minimise the risks of pulmonary congestion and oedema. Central pressure monitoring may be a useful aid in the medical management of these patients but with invasive procedures there are potential risks to medical staff that require consideration.

The anti-viral drug ribavirin should be used intravenously to treat all confirmed cases of Lassa fever. It is most effective when given early in the course of the disease. Ribavirin also has some effect in the treatment of Crimean-Congo VHF and its' use in patients with confirmed Crimean-Congo VHF should be considered. Ribavirin does not appear to be indicated for filovirus infections i.e. Marburg and Ebola VHF. If a non-filovirus VHF is strongly suspected, treatment with ribavirin may begin while confirmation of the diagnosis is pending. The dose and route of administration are as follows:

Ribavirin 30mg/kg loading dose intravenously, then

16mg/kg intravenously every 6 hours for 4 days and then

8mg/kg intravenously every 8 hours for 6 days.

Total treatment duration is 10 days.

4. The Risk to Ireland

The speed and volume of international travel and commerce have increased the risk that persons incubating any disease - including VHFs - may present in Ireland. For this reason the following guidelines have been drawn up to ensure the Irish healthcare system is ready to deal with a suspected case.

While many VHFs were initially considered to be highly communicable between humans, this concept has not been substantiated. Although nososcomial transmission has occurred in areas with endemic disease, accumulated evidence shows that transmission of these viruses does not commonly occur through casual or remote contact.[123] Several importations to non-endemic countries have occurred without subsequent disease outbreaks. While secondary cases of Marburg have been documented, only one secondary case of Lassa fever has been identified following an importation episode. This involved the physician treating the aforementioned German female student. He seroconverted but remained asymptomatic which was almost certainly due to prompt institution of ribavirin therapy.

Body secretions and excretions, blood, semen and tissue specimens from infected patients contain infectious virus. Evidence is accumulating to suggest that the risk of infection increases with the clinical progression of the disease. Persons at highest risk of secondary infection are those who are in closest contact with an infected person or his/her body fluids during the period of incubation and acute illness. Such persons include those with prolonged or close contact with patients, those providing direct medical and nursing care and laboratory workers handling blood, tissue or other specimens.[4]

5. Patient Risk Assessment and Categorisation

The purpose of risk assessment and patient categorisation in relation to VHF is to provide efficient and timely management of patients, while affording maximum protection to the laboratory and clinical staff involved. For this purpose, patients are assigned to one of two risk categories: **At Risk** and **High Risk.**

5.1 At Risk

This category applies to:

Febrile patients who have within 3 weeks before the onset of fever travelled in the specific local area of a country where VHF is endemic but who have no additional risk factors that would place them in the high-risk category.

5.2 High Risk

This category applies to:

Febrile patients who have within 3 weeks before the onset of fever travelled in the specific local area of a country where VHF is endemic AND

- Lived in a house or stayed in a house for more than 4 hours where there were ill, feverish persons known or strongly suspected to have a VHF **or**
- Took part in nursing or caring for ill, feverish patients known or strongly suspected to have a VHF, or had contact with the body fluids, tissue or the dead body of such a patient **or**
- Are a laboratory, health or other worker who has or has been likely to have come into contact with the body fluids, tissues or the body of a human or animal known or strongly suspected to have a VHF **or**
- Were previously diagnosed "At Risk" but who have developed organ failure and/or evidence of haemorrhage in the absence of any other diagnosis.

Febrile patients who have not been in an endemic area but who in the preceding 3 weeks

- Have cared for a patient or animal known or strongly suspected to have a VHF or came into contact with the body fluids, tissues or dead body of such a patient or animal **or**
- Handled clinical specimens, tissues or laboratory cultures known or strongly suspected to contain the agent of a VHF.

At Risk and **High Risk** patients must be managed as suspected VHF until proven otherwise.

6. Differential Diagnosis of Viral Haemorrhagic Fever

In the absence of hospital or laboratory exposure these diseases are acquired almost exclusively in rural areas (Appendix 4-6). The incubation period ranges from 3-21 days. Initial signs and symptoms are usually systemic and consistent with an “influenza-like” illness with symptoms of marked fever, dizziness, myalgia, arthralgia, fatigue and exhaustion. Pyrexia may last as long as 16 days with temperatures reaching 41°C. Such symptoms in a returning traveller who has a history of rural travel exposure, who has a history of contact with an ill individual or who has travelled to an endemic area, or one affected by an outbreak, could suggest a risk of VHF. However, a more likely diagnosis would be one of the more common infectious diseases summarised in the table below. Of these, malaria, followed by typhoid are the most likely.

Bacterial	Helminthic	Viral	Rickettsial	Protozoal
Typhoid	Schistosomiasis	Yellow fever	Typhus	Malaria
Pyelonephritis	Katayama syndrome	Rift Valley fever	Q fever abscess	Amoebic liver
Pneumonia		Infectious mononucleosis	Tick-borne rickettsiosis	
Sepsis		Dengue		
Meningococcal disease		Dengue shock syndrome		
Leptospirosis		Dengue haemorrhagic fever		
		Hepatitis A		
		HIV infection		

Conjunctivitis, petechiae, and in the case of filovirus infections (Marburg and Ebola) a morbilliform skin rash, appear later and are more suggestive of VHF. These symptoms do not occur until the second week of illness by which time a reasonable suspicion of VHF should exist in the presence of a compatible travel history, the absence of a history strongly suggestive of other illnesses and at least two negative blood smears for malaria.

Severe cases of VHF often show signs of bleeding under the skin, in internal organs or from body orifices such as the mouth, eyes or ears. Those severely ill may also develop shock, nervous system malfunction, coma, delirium and seizures.

7. Case Presentation and Lines of Communication

(a) The most likely site of presentation of a suspected or definite VHF case is in the Accident & Emergency Department of a hospital, either as a self-referral or as a referral from a general practitioner.

If the patient's illness is compatible with VHF it is incumbent upon the attending consultant to discuss the situation immediately with the VHF Regional Response Co-ordinator. The VHF Regional Response Co-ordinator should in turn notify the VHF National Response Co-ordinator. If it is the opinion of the attending clinician that a reasonable or strong suspicion of VHF or a disease requiring similar control measures exists, then the procedures described in the rest of this document should be followed.

(b) Imported unusual or emerging communicable diseases may also be identified or suspected at Irish ports of entry i.e. airports or harbour ports.

Suspected cases of VHF arising at or en-route to Irish ports of entry should be notified and discussed with the VHF Regional Response Co-ordinator who in turn should notify the VHF National Response Co-ordinator and consult with a consultant in infectious diseases. If it is agreed that a reasonable or strong suspicion of VHF or a disease requiring similar control measures exists, then the procedures described in the rest of this document should be followed.

In hospitalised patients where the diagnosis is suspected or in cases where a suspect case is being moved to a hospital, it is essential that the appropriate people be notified immediately. The Consultant Microbiologist, laboratory staff, the Infection Control Team of the receiving institution and the local Public Health Department should be notified immediately. Due to the nature of the situation, hospital management should also be notified, as should the Department of Health and Children. The Infection Control Team will be instrumental in establishing and monitoring isolation practices. In clinical situations, on site advice and assistance may be obtained from experts in infectious disease, intensive care, infection control and tropical medicine. Should a suspected case be confirmed as VHF an Emergency Incident Committee should be formed to re-examine and direct the future management of such a case. There should be ongoing and close communication between the attending physician(s), microbiologist, hospital laboratory, Virus Reference Laboratory, VHF Regional Response Co-ordinator and the VHF National Response Co-ordinator.

8. Protective Clothing and VHF

Standard Precautions apply to all patients regardless of their infectious status. Implementation of Standard Precautions is the primary strategy for successful nosocomial infection control. Standard Precautions interrupt the transmission of blood borne pathogens and when applied are intended to protect the healthcare worker and other patients. They apply to (a) blood (b) all body fluid secretions and excretions regardless of whether or not they contain visible blood (c) non-intact skin and (d) mucous membranes. They include hand hygiene, use of gloves and protective clothing, environmental hygiene, safe disposal of waste and precautions for the prevention of sharps injuries. Standard Precautions are designed to reduce the risk of transmission of microorganisms from both recognised and unrecognised sources of infection in hospitals. In conforming to these precautions healthcare workers are protecting themselves and their patients in the course of their work.

Once it becomes clear that one is dealing with a suspected case of VHF strict adherence to Standard Precautions and contact precautions apply.[5] Contact/airborne precautions apply on entering the room, and in all instances concerning the patient's management e.g. ambulance transport and thus **strict adherence** to the following precautions is paramount:

- *Hand washing*: Hands should be washed thoroughly and dried well, prior to donning gloves and after their removal. All staff and room visitors should wash their hands with an antiseptic based solution (e.g. chlorhexidine or iodine based products or unsoiled hands can be decontaminated with 70% isopropyl alcohol with chlorhexidine). This should be carried out after all patient contacts and on leaving the patient's room.

- *Gloves*: Gloves should be donned on entering the patient's room. Double gloves should be worn when handling any body substance, mucous membranes and non-intact skin of all suspected VHF patients and when handling any equipment or surfaces that have been contaminated with body secretions. Gloves should be disposed of into a designated 30/60 litre yellow rigid container with a black lid before leaving the patient's room. Hands should be washed thoroughly and dried well on removal of gloves. After glove removal and hand washing, ensure that hands do not touch potentially contaminated environmental surfaces or items in the patient's room to avoid transfer of microorganisms to other patients or environments.[5]

- *Masks*: A particulate filter respirator mask with fluid shield protection that can provide greater than 95% filtration efficiency of at least 0.3 micron particles should be worn on entering the room of a suspected VHF patient.[6] Masks are for single use only and should be disposed of in a designated 30/60 litre yellow rigid container with a black lid before leaving the patient's room. Masks should not be worn around the neck and should be removed carefully to avoid contamination. Masks must be replenished when they are contaminated and when moist. Hands must be washed thoroughly and dried well and gloves replaced after touching masks.

- *Gowns*: Long sleeved disposable liquid-proof gowns should be worn.[7] If liquid-proof gowns are unavailable, a large disposable PVC apron should be worn underneath the gown. Gowns and aprons should be disposed of into a designated 30/60 litre yellow rigid container with a black lid before leaving the patient's room. Hands should be washed thoroughly and dried well.

- *Goggles*: Disposable single use goggles should be available and worn when there is a danger of splashing. If disposable goggles are not available and goggles have been contaminated, they should be washed with detergent and water and wiped down with hypochlorite solution (10,000 ppm available free chlorine), left for 2-3 minutes, rinsed off and left to dry.

- *Footwear*: Disposable plastic overshoes should be worn to prevent contamination of footwear or designated footwear may be available.

After use, all protective clothing e.g. gloves, gowns, plastic overshoes, protective eye wear etc. should be placed in a designated 30/60 litre yellow rigid container with a black lid before leaving the patient's room.

9. Placement of the VHF Patient in a Hospital Setting

At Risk patient: A patient categorised as **at risk** should be admitted to a single room. Such patients should be managed with standard isolation/contact techniques/droplet techniques (i.e. Standard Precautions).[6] Over 90% of patients in this category will have malaria and symptoms will resolve with appropriate anti-malarial treatment.

The Infection Control Team must be actively consulted and included in all decisions regarding patient isolation requirements, use of personal protective clothing and patient transport requirements. Direct caregivers should be limited to a small number of highly trained individuals. Students should not be included in the care team.

High Risk patient: A patient categorised as **high risk** should be admitted immediately to a designated tertiary care facility. The subcommittee recommends 1 adult and 1 paediatric tertiary care facility nationally. The minimum criteria for such facilities include:

- Negative air pressure room
- ICU availability
- Infectious disease physician, anaesthetist (intensivist), microbiologist, haematologist and infection control team.
- Appropriate laboratory facilities/experience.

10. Transporting a Suspected VHF Patient

If the attending clinical team believes that a strong suspicion of VHF exists then transfer to a designated facility should be a priority. For inter- or intra-hospital transport, transportation should be done as early as possible in the course of the disease. A police escort should be arranged to facilitate ambulance transfer. The use of ambulance services for transportation should be based on the clinical condition of the patient in consultation with the ambulance service. The relevant Departments of Public Health should be kept informed. It may be more appropriate that the receiving hospital deploy staff and equipment from their own resources to accomplish the transfer of these patients.

Transport personnel must be informed of the patient's condition prior to moving. Because of the possible risk of the patient bleeding (e.g. from disconnected IVs, haemoptysis, scrapes etc.), the risk of aerosolisation of the virus from a blood spill and the close staff proximity to the patient, gloves, fluid-resistant gowns, fluid-resistant masks and goggles are considered minimal protective wear.

When a suspected VHF patient is being transferred by ambulance, appropriate preparation must take place. Having established the extent of the person's illness in terms of dependency, remove all unnecessary structural and medical equipment. Competent, responsible personnel should be designated for the transfer. Ensure the ample supply of protective clothing for transfer personnel, stored if possible in the front cabin to avoid possible contamination. Full protective clothing should be worn by all those travelling with the patient i.e. gloves, particulate respirator mask with fluid shield protection, goggles and liquid-proof gowns.

Once the patient is hospitalised, protective clothing should be removed, placed in a designated 30/60 litre yellow rigid container with a black lid before leaving the patient's room and left with the appropriate personnel in the designated hospital. Hands should be washed and a clean set of protective clothing put on. On return to the ambulance all disposable items should be placed in a designated 30/60 litre yellow rigid container with a black lid and left with the appropriate personnel in the admitting hospital for disposal. If there are items needing specialist decontamination (e.g. ventilators, IV infusion pumps) outer aspects of such equipment should be first washed with detergent and water and then wiped with hypochlorite solution (10,000 ppm available free chlorine). The exact type of decontamination will be determined by the piece of equipment in question and its intended use and the manufacturer's recommendations.

The ambulance should be washed out thoroughly, first with detergent and water and then wiped all over with hypochlorite solution (10,000 ppm available free chlorine). To prevent corrosion of metal parts, after 30 minutes these areas should again be wiped down with detergent and water. Protective clothing should be removed, disposed of in a designated 30/60 litre yellow rigid container with a black lid and left with the appropriate personnel in the hospital for disposal. Wash hands and shower if possible.

11. Clinical Waste Management for the Suspected VHF Patient

Waste generated from a suspected VHF patient that includes soiled linens and clothing needs to be handled appropriately and separately from the routine management of clinical/ healthcare risk waste in the hospital setting. Staff in the position of dealing with a suspected or confirmed VHF patient should liaise with their relevant waste managers and infection control colleagues at the earliest opportunity regarding the disposal of such waste.

All waste, other than sharps, generated in the course of caring for a suspected VHF patient, including soiled linens and clothing, should be placed in 30/60 litre yellow rigid container with a black lid labelled for incineration only. When three-quarters full, they should then be sealed attaching the black lid securely.

Sharps should be disposed of into a yellow sharps bin with a purple lid. When three-quarters full the bins should be sealed for transport and disposal. All bins must be tagged with a unique reference number, which is traceable to the point of production. Before removing any sealed bin from the patient's room it must be wiped down all over with hypochlorite solution (10,000 ppm available free chlorine).[8]

The transport, storage and arrangements for subsequent disposal need to be carried out by named persons. All such personnel involved in this process should be competent, specifically trained and wear full protective clothing.

If waste is generated in a hospital without the above designated disposal bins the waste can be contained within the patient's room in small clinical waste bags and small sharps bins until the appropriate bins become available. The 30/60 litre yellow rigid containers and purple-lid sharps bins should be obtained from appropriate authorities at the earliest possible time. The waste held can then be placed into the appropriate containers when available and the procedures outlined above followed.

Hypochlorite solution (10,000 ppm available free chlorine) should be liberally added to urine, faeces and body fluids for a minimum of 5 minutes prior to their subsequent discharge into the sewage system and decontamination of the bedpan in a bedpan washer.

12. Hospital Management of the Viral Haemorrhagic Fever Patient

12.1 The VHF patient's room

A patient categorised as **at risk** should be admitted to a single room. An anteroom stocked with supplies, with facilities for hand washing and an area for donning protective clothing is useful.

A patient categorised as **high risk** should be admitted to a single room with negative airflow in a tertiary care facility. An anteroom stocked with supplies, with facilities for hand washing and an area for donning protective clothing is essential.

Gowns, gloves, fluid-resistant masks and goggles or other eye protection are recommended for all persons who enter the room of at risk or high risk patient. Blood splashes and aerosolisation of blood can occur when starting an IV, taking blood for laboratory analysis or dropping a container containing blood. Extreme vigilance is required to prevent needle stick or other sharp injuries. **Parenteral exposure has been associated with a high risk of transmission, a short incubation period and severe disease**. Eliminate sharp instruments wherever possible and if feasible use a needle-free intravenous system. The likelihood of staff exposure to blood or other body fluids and the opportunities for virus aerosolisation increase with the deterioration of the patient's condition.

Patient care equipment e.g. thermometers, blood pressure cuffs, stethoscopes, commodes etc. should be dedicated to the patient. Use disposable supplies whenever possible.

12.2 Disinfection of the environment

VHF viruses are lipid enveloped RNA viruses and as such are inactivated by hypochlorite solution (10,000 ppm available free chlorine).

Personal protective clothing including gloves, disposable plastic overshoes, fluid-resistant masks with face shields/goggles and fluid-resistant gowns should be worn for cleaning up a spill of blood or other body fluid. Such spills should be covered with absorbent paper towels, liberally covered with hypochlorite solution (10,000 ppm available free chlorine) and left to soak for 30 minutes before being wiped up. Discard the towels into a designated 30/60 litre yellow rigid container with a black lid. Following the removal of the initial material the area of contamination should again be liberally covered with hypochlorite solution (10,000 ppm available free chlorine) and left for 30 minutes before rinsing.

12.3 Isolation procedures during convalescence

Virus may be excreted in a patient's urine for weeks after recovery has begun. Place 50-100mls* of household bleach in the toilet bowl prior to urinating and flushing. Wait 5 minutes and then flush. This should continue for at least 6 weeks of convalescence. Sexual intercourse should be avoided for the same period at a minimum.

*(*Suitable for average toilet that contains 4 litres of water in the toilet bowl prior to flushing.)*

12.4 Post-mortem

If the patient should die, handling of the body should be minimal. The corpse should be wrapped in a sealed leak-proof material, not embalmed and then cremated or buried promptly in a sealed casket. A post-mortem is not advised.
Relatives should not come into contact with the body after death due to the very high risk of transmission of the disease. The emotional trauma that will inevitably follow such a death should be addressed with the provision of bereavement counselling services.

Laboratory Samples, Processing and Testing

13.1 Collection of clinical specimens

Because of the potential risks associated with handling infectious materials, laboratory testing should be the minimum necessary for diagnostic evaluation and patient care. The following five principles should be observed in the collection and transport of all patient specimens:

1. Only specimens essential for diagnosis or monitoring should be obtained.

2. Staff experienced in phlebotomy should obtain the specimens, using a vacuum sampling system if at all feasible.

3. Glass containers should be avoided whenever possible. Disposable sharp objects such as scalpel blades should be placed in a yellow sharps bin with a purple lid immediately after use.

4. Blood samples must be collected with extreme care to avoid self-inoculation. Standard precautions should be strictly adhered to. Needles, if used, must not be bent, broken, removed from disposable syringes, recapped or otherwise handled. Dry cotton balls or gauze (not disposable alcohol swabs) should be used to apply pressure to the venepuncture wound.

5. A label, bearing the patient details, should be attached on the specimen container before collection of the specimen.

- Place the specimen into the appropriate container and ensure that the lid is tightly screwed on.
- Disinfect the entire outside surface of each specimen container with hypochlorite solution (10,000 ppm available free chlorine). Ensure that the patient details are still legible.
- Wrap the container in sufficient absorbent material to absorb the entire contents in case of leakage.
- The specimen should then be placed in a biohazard specimen bag and sealed. Disinfect the outside of the specimen bag with hypochlorite solution (10,000 ppm available free chlorine).
- Label the specimen bag with the patient details (patient label); patient name, hospital number, age, sex, specimen type, test required, ward, doctor's name and contact number.
- The specimen bag should be placed into a second container such as a screwcap metal or plastic container. Any empty space must be filled with bubble wrap. Screw on the lid and tighten firmly and seal in such a way as to make it leak-proof.
- This container should then be placed in a biohazard bag with the patient label and sealed. The outside of the bag must be labelled with an appropriate biohazard sticker, which includes information about the hazard identity.
- Each specimen should be packed separately so that each can be dealt with individually.
- If the journey to the laboratory is expected to be more than 1 hour, the specimens must be placed in a cold box with cold packs. The cold box must have a biohazard label and a warning that the box should not be opened except in the specified laboratory by a specified person.
- The laboratory must be notified that samples are on route so that the designated personnel can receive the samples. Responsible medical personnel must deliver specimens to the laboratory.

Upon presentation of a possible case of VHF the following tests should be performed immediately:

- A thick and thin blood smear to look for malaria parasites on at least two occasions. Blood smears are not infectious after fixation in solvents.
- Two sets of blood cultures, using routine blood culture bottles, from separate venepunctures taken at least 30 minutes apart with a total volume per set of 20 to 30 mls (smaller volumes, 5-10 mls are appropriate for children).
- White blood cell and differential and either haemoglobin or haematocrit.
- Urea & electrolytes.
- Urine culture, if urinalysis results suggest an infection.

All used sharps, needles, syringes etc. should be disposed of into a yellow sharps bin with a purple lid located in the patient's room. It should be clearly labelled with clinical details. When three-quarters full, the container should be sealed for transport and disposal. All bins must be tagged with a unique reference number, which is traceable to the point of production. Before removing any sealed bin from the patient's room it must be wiped down all over with hypochlorite solution (10,000 ppm available free chlorine).

The transport, storage and arrangements for disposal of waste bins need to be carried out by named persons. All such personnel involved in this process should be competent, specifically trained and wear full protective clothing as outlined previously.

13.2 Laboratory processing of routine clinical specimens

The hospital laboratory should be alerted to the potentially hazardous nature of the material being sent. Each laboratory should have a contingency plan for these situations, including out of hours. Laboratory staff dealing with specimens from patients with a suspected VHF must take, as a minimum, the same personal protective precautions as patient care staff i.e. disposable gloves, fluid-resistant surgical masks, impermeable gowns and protective eye wear should be worn. All protective clothing used should be disposed of in a designated 30/60 litre yellow rigid container with a black lid. Specimens in hospital laboratories should be handled in a Class I biological safety cabinet following Containment Level 3 practices.[9] Blood smears for malaria should be fixed in the appropriate solvent (methanol), which renders them non-infectious. Serum used in laboratory tests should be pre-treated with polyethylene glycol p-tert-octylphenyl ether (Triton X^{R}-100). Treatment with 10µL of 10% Triton X^{R}-100 per 1 ml of serum for 1 hour reduces the titre level of some of the VHF viruses in serum although 100% efficacy in inactivating these viruses should not be assumed.[10] Routine automated equipment should be used in the usual manner to prevent infections. Following use these should be disinfected as recommended by the manufacturer or with hypochlorite solution (10,000 ppm available free chlorine).

Specimens which can not be processed in closed automated systems such as urine, blood cultures (when manually processed), swabs etc. should be handled by experienced personnel in, at a minimum, Containment Level 3 facilities such as those laboratories which are normally used to process specimens for mycobacteria (TB). These laboratory facilities should be separate from other laboratory facilities, with restricted access maintained at an air pressure negative to the rest of the facility, capable of being sealed to permit disinfection and contain a Class I safety cabinet (BS 5726:1992) or equivalent that exhausts through a high efficiency particulate absorption (HEPA) filter (BS 5726 1992) or equivalent to the outside air or the laboratory air extract system.

Laboratory personnel accidentally exposed to potentially infected material through spills, splashes, injections, cuts or abrasions should take immediate action. Eyes if affected should be irrigated with water. Cuts or abrasions should be encouraged to bleed and then immediately wash the affected part with soap or detergent, apply an antiseptic solution e.g. chlorhexidine or iodine based products and

notify the Infection Control Team and Occupational Health Department. Such individuals as well as those with mucous membrane exposure to biologic fluids or unprotected inhalation of aerosolised material should then be considered as high-risk contacts and placed under surveillance (see Identification, surveillance and management of VHF patient contacts).

Accidental spills of potentially contaminated material should be covered with absorbent paper towels, liberally covered with hypochlorite solution (10,000 ppm available free chlorine) and left to soak for 30 minutes before being wiped up. The area should be evacuated and secured. Following the removal of the initial material, the process should be repeated once again. Individuals must wear protective clothing, in carrying out this task. All waste should be disposed of into a designated 30/60 litre yellow rigid container with a black lid. Protective clothing should also be disposed of into the designated 30/60 litre yellow rigid container.

13.3 Laboratory processing and transportation of diagnostic clinical specimens

In Ireland, diagnosis will be made primarily by viral genome detection using polymerase chain reaction (PCR) and secondly by the demonstration of IgM antibody. No attempts will be made at virus isolation. It is intended that all VHF diagnostic tests will be carried out in the Containment Level 3 facility, which will be constructed at NVRL in Dublin. It is anticipated that this facility will be functional in July 2002. If a diagnosis of VHF is required before this time appropriate materials should be sent to NVRL who will arrange their transfer to an appropriate diagnostic facility in the UK or Germany. **NVRL will provide advice on the packaging and transfer of specimens.**

Viral isolation of Hazard Group 4 agents such as Ebola and Marburg is not advised and should only be performed in a Containment Level 4 laboratory. No such laboratory is operational in Ireland.

While NVRL will not attempt virus isolation, samples should be retained for detailed characterisation in an appropriate specialised laboratory in Europe. This is extremely important as it is becoming increasingly clear that for some of the VHF viruses, there are genetic variants, which may be antigenically unique. Moreover, these studies will be essential for a comprehensive understanding of the epidemiology of infection.

The following procedures should be followed in collecting samples for VHF diagnostic tests that will be carried out at NVRL. Full protective clothing should be worn.

- 10ml of venous blood should be collected and submitted as is i.e. clotted and not separated
- A 20ml syringe should be used to transfer urine from a bedpan to a specimen container.
- Throat swabs should be collected using a dry swab, which should be placed in a viral transport medium.
- Tissue samples: A post-mortem examination on a person known to have died from VHF exposes staff to unwarranted risks and should not be performed.

14. Identification, Surveillance and Management of VHF Patient Contacts

A contact is defined as a person who has been exposed to an infected person or to an infected person's secretions, excretions or tissues within 3 weeks of the patient's onset of illness. Contacts may be subdivided into (a) Casual or **Low Risk Contacts** and (b) **High Risk Contacts.**

Low Risk Contacts: These are persons who have not had close personal contact with the ill patient. These include persons on the same aeroplane, in the same hotel, visitors to the patient's home etc. VHFs are not usually spread during this type of contact and no special surveillance of these contacts is indicated unless the index VHF patient had acute respiratory symptoms with intense sneezing and coughing. In such a situation a low risk contact should be placed under surveillance as for High Risk Contacts.

Occupational contact with patients in situations where the diagnosis has been considered and appropriate isolation precautions implemented are classified as Low Risk Contacts.

High Risk Contacts: These are persons who have had more than casual contact with the VHF patient. They include persons living with the patient, nursing or serving the patient. High risk contacts also include those who have kissed or had sexual intercourse with the patient, had direct contact with the patient's blood, urine or secretions or with clothing, bedding or other fomites soiled by the patient's blood, urine or secretions.

Occupational contact exposure, such as handling the patient's laboratory specimens before the recognition of the nature of the diagnosis or having had a needle stick or other penetrating injury involving contact with the patient's secretions, excretions, blood, tissues or other body fluids are classified as High Risk Contacts.

Management of contacts: All contact persons should be identified by a designated person in the Department of Public Health in the relevant health board under the direction of the VHF Regional Response Co-ordinator. Occupational contacts should be identified in collaboration with the hospital Occupational Health Department. The VHF National Response Co-ordinator should be informed of those placed under surveillance. The following advice should be given to contacts:

- **High Risk Contacts** should be placed under surveillance, once the diagnosis has been confirmed. These individuals should record their temperature twice daily and report any temperature above 38°C or any symptom of illness to the assigned person in the Department of Public Health responsible for surveillance. Surveillance should be continued for 21 days after the person's last contact with the index patient. During surveillance there need be no restriction on work or movement within Ireland unless they suffer a rise in temperature above 38°C at which time they should be immediately isolated and treated as a potential VHF patient.

- **Low risk Contacts** should be told that the risk of infection is minimal. There is no need to restrict work or movement. They should be advised to contact their own doctor/designated person in the Department of Public Health should they become unwell or develop a temperature >38°C within 21 days after their last possible exposure to infection.

15. Post-exposure Prophylaxis

Although experience is limited, post-exposure prophylaxis with ribavirin may be considered for high risk contacts of patients with Lassa fever or Crimean-Congo VHF. The prophylactic regimen is

Ribavirin 500mg by mouth every 6 hours for 7 days.

16. Information Transfer and Media Relations

The Director of NDSC will notify the European Communicable Disease Rapid Alert System of any VHF case. The Director of NVRL will liaise with the relevant parties in the World Health Organisation (WHO) in Geneva and the European Network for the Diagnosis of Imported Virus Infections (ENIVD) regarding the VHF diagnosis.

16.1 Media relations

It is anticipated that the diagnosis of VHF in Ireland will create significant publicity and considerable efforts will have to be made to ensure that the media and public obtain accurate, consistent and timely information.

It is suggested that a Media Information Committee should be formed and consist of nominated members of the Emergency Incident Committee, the hospital CEO, the VHF Regional Response Co-ordinator, the Director of NDSC and the Director of NVRL. The Media Information Committee will be responsible for all interactions with the media and public. The Information Committee should agree timely press statements. In addition, all statements will be posted on the websites of NDSC and of the health board/hospital involved.

There should be no release of information to, or discussions with, the media without the agreement of all members of the Information Committee.

Endeavours will be made to keep the public and media as fully informed as possible without compromising any statutory responsibilities, legal requirements or patient confidentiality.

Appendix 1: Identification and Roles of Key Players

VHF Regional Response Co-Coordinator

- The Director of Public Health in each health board to whom suspected cases should be initially notified
- A member of the Emergency Incident Committee
- A member of the Media Information Committee
- Identification and follow up of case contact(s)

VHF National Response Co-ordinator

- The Director of the National Disease Surveillance Centre
- To whom cases should be notified in accordance with Infectious Diseases (Amendment) Regulations, 2000 (SI No.151, 2000)
- A member of the Media Information Committee
- Liaison with Department of Health and Children
- Liaison with European Communicable Disease Rapid Alert Network
- Contact point for alerts of VHF cases from other countries

Emergency Incident Committee (EIC)

- Should be formed once a suspected VHF case is confirmed
- Multidisciplinary
    - Attending Physician/Infectious Disease Physician
    - Consultant Microbiologist
    - Consultant Anaesthetist
    - Consultant Haematologist
    - Nominated member of the Occupational Health Department
    - Nominated member of the Infection Control Team
    - VHF Regional Response Co-ordinator
    - Nominated member of Hospital Management Team
    - Communications Director
- Responsible for directing the future clinical and public health management of a VHF case
- Liaison with Directors of NDSC and NVRL

Media Information Committee

- Should be formed once a suspected VHF case is confirmed
- Multidisciplinary
    - Nominated member of Emergency Incident Committee who is part of the attending clinical team
    - Emergency Incident Committee Communications Director
    - Nominated member of Hospital Management Team
    - VHF Regional Response Co-ordinator
    - Director, NDSC
    - Director, NVRL
- Responsible for all interactions with the media and the public

National Virus Reference Laboratory

- All VHF diagnostic tests should be carried out in the Containment Level 3 facility at NVRL in Dublin (from July 2002).
- If a diagnosis of VHF is required before completion of this facility appropriate materials should be shipped to NVRL who will arrange their transfer to an appropriate diagnostic facility in the UK or Germany.
- NVRL will provide advice on the packaging and transfer of specimens.
- Director, NVRL
    - Member of the Media Information Committee
    - Liaison with European Network for the Diagnosis of Imported Virus Infections (ENIVD).

Infection Control Team

- Should be actively consulted and included in all decisions regarding:
    - Implementation of Standard Precautions
    - Patient isolation requirements
    - Use of personal protective clothing
    - Patient transport requirements

Appendix 2: VHF Regional Response Co-ordinators

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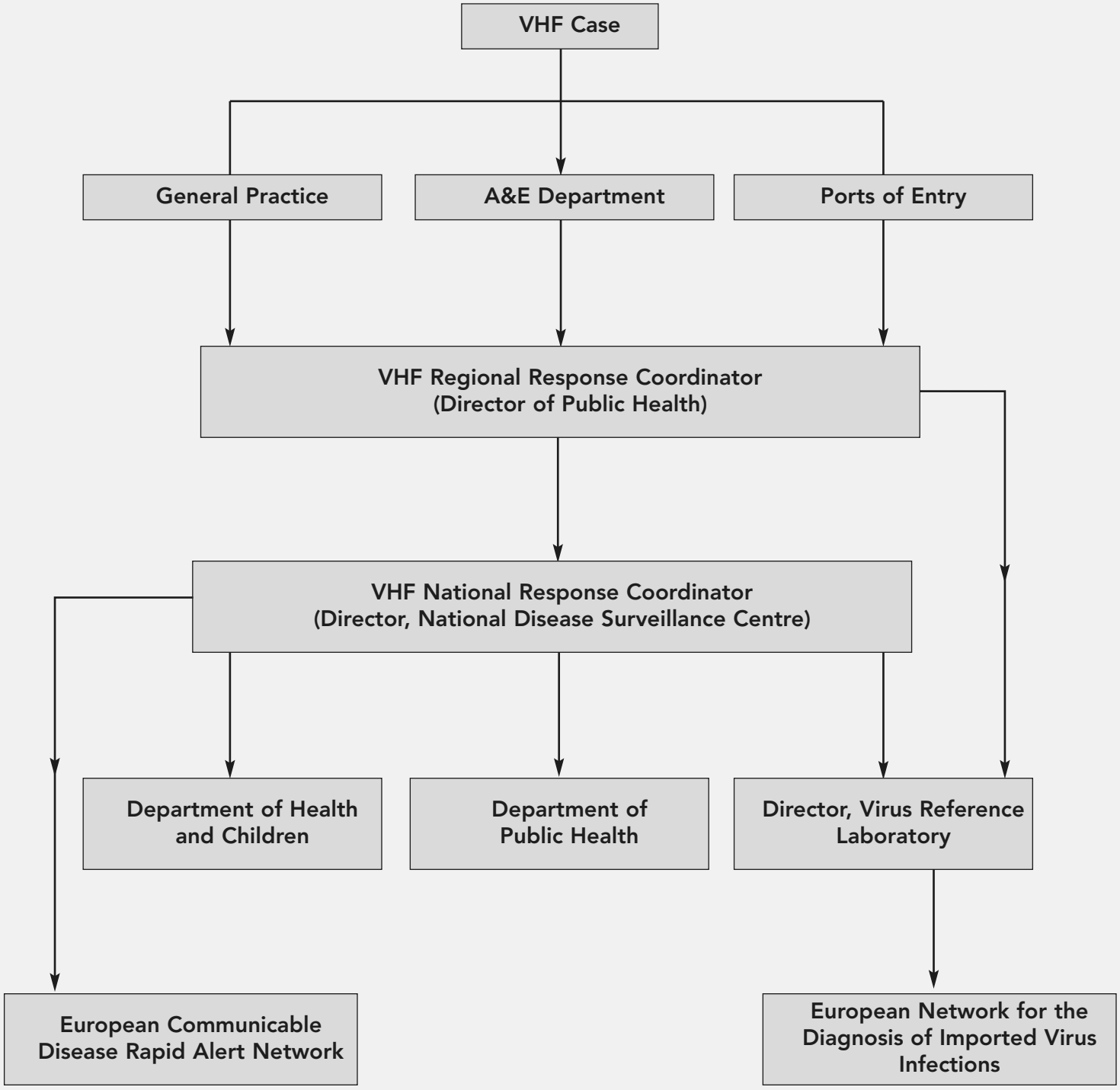
Appendix 3: Notification Pathway for a Suspected Case of VHF



Appendix 4: Countries with Reported Index Ebola VHF

Appendix 5: Countries with Reported Index Lassa Fever

Appendix 6: Countries with Reported Index Marburg VHF

Appendix 7: Patient Management Summary for General Practitioners

The diagnosis of VHF in a general practice setting in Ireland is an extremely unlikely event. If the situation presents itself the following management protocol should be followed:

1. Is the patient at risk of this disease? (see **Patient Risk Assessment and Categorisation**).

2. Are symptoms compatible with the diagnosis? (see **Differential Diagnosis of Viral Haemorrhagic Fever**).

   If you are of the opinion that this is a suspected case of VHF then proceed to 3.

3. Contact your VHF Regional Response Co-ordinator who will in turn liaise with the VHF National Response Co-ordinator (**Appendix 2**).

4. If it is agreed that a reasonable or strong suspicion of VHF exists then the patient should be transferred to a designated hospital. (see **Transporting a Suspected VHF Patient**).The VHF Regional Response Co-ordinator should arrange for the transfer of the patient.

5. If the patient is in your surgery, minimise contact with other people while awaiting transfer. Record the names of patients/staff who shared the waiting room with a suspected patient. If the diagnosis is confirmed this would be required for contact tracing. All such contacts are low risk contacts. (see **Identification, Surveillance and Management of Case Contacts).**

6. Do not take any clinical samples from the patient.

Appendix 8: Patient Management Summary for A&E NCHDs

The most likely site of presentation of a suspected or definite VHF case is in the Accident & Emergency Department of a hospital, either as a self-referral or as a referral from a general practitioner. However, it is likely to be an extremely rare event. If the situation presents itself the following management protocol should be followed:

1. Is the patient at risk of this disease? (see **Patient Risk Assessment and Categorisation).**

2. Are symptoms compatible with the diagnosis? (see **Differential Diagnosis of Viral Haemorrhagic Fever**).

3. Do not take any clinical specimens from the patient.

   If you are of the opinion that this is a suspected case of VHF then proceed to 4.

4. Alert your A&E Consultant/Senior Registrar and Consultant Microbiologist. If it is agreed that a reasonable or strong suspicion of VHF exists then the VHF Regional Response Co-ordinator should be contacted and further management discussed (**Appendix 2**).

5. Further management of the patient is the responsibility of the most senior A&E clinician available.

Appendix 9: Information for the General Public

Q. What is VHF?

A. Viral haemorrhagic fever or VHF is the term used to describe a group of illnesses caused by certain viruses. Ebola, Lassa fever and Marburg are three such VHFs.

Q. Are we at risk in Ireland from VHFs?

A. Thus far there has not been a notified case of VHF in Ireland. Most of these viruses are found in other parts of the world such as Africa, South America, the Middle East and Eastern Europe. Occasionally, imported cases of VHF to Europe have occurred from these parts of the world.

Q. Am I at risk if I travel to these parts of the world?

A. The most important fact to remember is that these diseases are rare. If you become unwell with a high temperature while abroad, seek medical attention. A diagnosis of VHF is very unlikely unless you fall into the **High Risk** category (see **Patient Risk Assessment and Categorisation**).

Q. What if I've been exposed to someone with VHF, say in a hotel or on an aeroplane or been in the same room with them?

A. VHFs are not usually spread during this type of contact. Your risk of infection is minimal. Transmission requires close physical contact with the patient (e.g. kissing, sexual intercourse, direct contact with the patient's blood, urine or secretions).

Q. But do I need to do anything in such a situation?

A. If NDSC is alerted that Irish residents may have been exposed to a VHF patient, health boards will be informed and Departments of Public Health will identify all contacts of this VHF patient.

Appendix 10: Packaging of VHF Patient Healthcare Risk

Under the Waste Management Act, 1996, anatomical, clinical or hospital waste is defined as hazardous if it has the properties of being toxic, carcinogenic or infectious. Infectious substances are defined as substances containing viable microorganisms or their toxins, which are known to cause disease. Primary containers are designed for the initial containment of waste. Depending on the type of waste produced two formats of primary containers will apply: bags and rigid containers.

VHF organisms are categorised as Group 4 biological agents and as such should be regarded as highly contagious. The waste generated in the course of managing a suspected VHF patient should be managed using only two types of container.[8]

1. **Yellow Sharps Boxes with purple lid**
   These should be used for all 'sharps waste' e.g. needles, syringes, sharp instruments, cartridges, broken glass etc. Free liquids should not be placed in these containers. These containers should be disposed of by incineration.

2. **Yellow rigid container with black lid**
   These should be used for all 'non-sharps waste' generated in the course of caring for a suspected VHF patient e.g. soiled linens, soiled clothing or other materials, gloves, gowns, plastic overshoes, protective eye-wear etc., blood or tissue suspected of being contaminated with VHF organisms. These containers should be disposed of by incineration.

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