

## **Infection Control Recommendations for Ebola Virus Disease (EVD) in Healthcare Settings**

### **1 Introduction**

Viral haemorrhagic fever (VHF) refers to a group of systemic mild to life-threatening viral infection often complicated by haemorrhagic syndromes. The most concerned VHFs include Ebola, Marburg, Lassa, and Crimean-Congo haemorrhagic fever viruses because of known secondary human-to-human transmission.

Ebola virus disease (EVD) is caused by infection with Ebola virus which belongs to the family called Filoviridae. EVD in humans has a case fatality rate of up to 90%. Since the first report of the EVD outbreak in West Africa in March 2014, the cumulative numbers of cases attributed to EVD are continuously increasing, making this EVD outbreak the most extensive ever recorded in terms of geographical spread and overall number of cases and deaths reported.

EVD is transmitted to human through contact with blood, secretions, organs or other body fluids of infected animals including chimpanzees, gorillas, fruit bats, monkeys, forest antelopes and porcupines. Human-to-human transmission is possible through direct contact with blood, secretions, organs or other body fluids of infected people, and indirect contact with environment contaminated with such fluids<sup>1,2</sup>. Healthcare workers have frequently been infected through close contact with patients when infection control measures are not strictly practiced. The risk for person-to-person transmission of Ebola virus is highest during the latter stage of illness, when vomiting, diarrhoea and haemorrhage may lead to splash and droplet generation<sup>3</sup>.

This infection control recommendation of EVD in healthcare settings is prepared in light of the latest situation. This recommendation will be revised accordingly when there is update on the scientific evidence on the virus and associated infections.

### **2 Clinical features**

The incubation period of the disease is around 2 to 21 days. Patients may present with sudden onset of fever, intense weakness, muscle pain, headache, sore throat, vomiting, diarrhoea, rash, followed by impaired kidney and liver function. In some severe cases, internal and external bleeding may occur.

### **3 Reporting**

In Hong Kong, EVD has been made statutory notifiable since July 2008 under the disease group viral haemorrhagic fever. Medical practitioners managing returning travelers from visiting affected countries with compatible symptoms are advised to take into consideration the

possibility of EVD. For the updated list of affected countries/areas, please refer to the following website: [http://chp.gov.hk/files/pdf/evd\\_affected\\_area.pdf](http://chp.gov.hk/files/pdf/evd_affected_area.pdf)

Patient fulfilling the reporting criteria (available at <https://ceno.chp.gov.hk/casedef/casedef.pdf>) should be isolated immediately and notified the Central Notification Office (CENO) of Centre for Health Protection (CHP) via fax (2477 2770), phone (2477 2772) or CENO On-line (<http://ceno.chp.gov.hk>). Please also contact the Medical Control Officer of DH at Pager 7116 3300 call 9179 for prompt investigation and arrangement of patient to the Hospital Authority Infectious Disease Centre (HAIDC) in Princess Margaret Hospital (PMH) for isolation, testing and treatment. For details of notification procedures, please visit CHP website: <http://www.chp.gov.hk/en/static/24040.html>.

#### **4 Standard precautions**

It is not always possible to identify patients with EVD early because initial symptoms may be non-specific. Therefore, it is important that healthcare workers apply standard precautions consistently with all patients – regardless of their diagnosis – in all work practices at all times. These include hand hygiene, respiratory hygiene, use of personal protective equipment (according to the risk of splashes or other contact with infected materials), safe handling of sharp instruments, contaminated equipment and used linen, environmental decontamination and safe disposal of clinical waste<sup>4</sup>. On the other hand, standard precautions are in general sufficient for ill people who undergo evaluation in ambulatory settings in early stages of the diseases.

#### **5 Isolation precautions for suspected EVD cases before transferal**

In addition to stringent standard precautions, additional isolation precautions (contact, droplet, airborne\*\*) should be adopted when caring suspected or confirmed EVD cases with particular attention to avoid any exposure to the patient's blood and body fluids and unprotected contact with the contaminated environment.

*\*\*Initiate airborne isolation precaution if patient has cough, vomiting, diarrhoea or bleeding, or for aerosol-generating procedures such as endotracheal intubation or cardiopulmonary resuscitation.*

##### **5.1 Placement<sup>2,3,5</sup>**

- Patients should be cared in a single room (preferably an airborne infection isolation room (AIIR));
- AIIR is required for patients presented with cough, vomiting, diarrhoea or bleeding; or for aerosol-generating procedures such as endotracheal intubation or cardiopulmonary resuscitation.

## 5.2 Use of personal protective equipment (PPE) <sup>2,3,5</sup>

- Staff working in healthcare setting should wear surgical scrub or working clothes underneath the PPE.<sup>6</sup>
- All health workers should cover the whole body, including head and neck, with appropriate PPE while providing clinical care for patients with filovirus disease in order to prevent virus exposure<sup>7</sup>.
- Real time infection control supervision is recommended when handling the suspected cases of EVD
- Buddy system to supervise donning and doffing of PPE is preferable especially in inpatient settings
- Vigilance on hand hygiene and proper donning/ removing of PPE is essential.
- Doff and discard all disposable PPE as clinical waste before exiting doffing area. Non-disposable items e.g. used boots should be decontaminated in designated places. *(Please refer to the Guide to decontaminate used gumboots after handling suspected/ confirmed cases with Ebola Virus Disease (EVD))*
- Emergency shower is recommended after accidental unprotected exposure to blood and body fluid.
- The PPE recommendations<sup>7</sup> for healthcare workers in inpatient and outpatient settings are shown in Table 1 and 2 respectively.

**Table 1: PPE recommendation in health care setting (in-patient)**

Settings PPE	A&E triage	Providing clinical care for Suspected/confirmed case
Cap	Cap (optional)	head cover <sup>8</sup> /hood
Face or eye protection	Face shield /goggles/ visor	Face shield /goggles
Respiratory protection	Surgical mask	N95 respirator
Gown	Water-resistant gown <sup>^</sup>	Water-resistant gown <sup>^</sup>
Gloves	As indicated <sup>#</sup>	Double gloves*
Shoe cover/boots	Shoe covers (optional)	Full length shoe covers/gumboots
Footnote:		
<sup>^</sup> Wear a plastic apron over the disposable gown if water resistant gown is not available <sup>2</sup>		
<sup>#</sup> For example, when presence of skin lesions or contact with blood or body fluids anticipated		
*Prefer nitrile gloves		

**Table 2: PPE recommendation in health care setting (out-patient)**

<b>PPE</b>	<b>Settings</b>	OPD registration counter Private clinic Ambulatory care setting	When patient reports <b>positive TOCC</b> ( <i>Travel, Occupation, Contact, Cluster</i> )
Cap		/	/
Face or eye protection		/	Face shield /goggles
Respiratory protection		Surgical mask	Surgical mask**
Gown		/	Water-resistant gown ^
Gloves		/	Gloves <sup>D</sup>
boots		/	As indicated <sup>##</sup>
Footnote: **Use N95 respirator if suspected case presents with cough, vomiting, diarrhea or bleeding; or for aerosol-generating procedures (such as endotracheal intubation or cardiopulmonary resuscitation). ^ Wear a plastic apron over the disposable gown if water resistant gown is not available2 <sup>D</sup> Wear double gloves when handle cases with haemorrhagic symptoms. <sup>##</sup> Use gumboots if environment is grossly contaminated with blood or body fluid			

## 6 Other infection control measures

### 6.1 Specimen collection and handling

- Only essential investigation for immediate patient care should be done to decrease staff exposure.
- The specimen containers should be bagged in sealed plastic bags. They must be placed in a robust, clearly labelled container before transport.
- Laboratory staff should be informed prior to receipt of specimens.

### 6.2 Transfer of patients

- Transfer of patients with suspected EVD should be kept to minimum.
- Ambulance crew and staff for the transfer should be informed of the patient's clinical condition, and advised of appropriate precautions.
- Use appropriate PPE as specified in point 5.2 during the transfer. The used vehicle should be decontaminated after patient transportation. Contaminated items and equipment should be properly disinfected or discarded as specified in points 6.3-6.6.
- Inform the receiving parties prior to transfer of patients to facilitate appropriate arrangement.

### 6.3 Proper use, disinfection and disposal of healthcare equipment and instruments

- Ebola viruses have been known to survive for two weeks or even longer on

contaminated equipment and fabrics<sup>9</sup>.

- Disposable equipment and instruments are recommended where possible and should be disposed as clinical waste.
- Dedicate individual equipment and instruments.
- Clean and disinfect reusable equipment and instruments contaminated with patient's blood, secretions, vomitus or excretion by 10,000 ppm sodium hypochlorite solution (1 to 4 diluted 5.25% household bleach).
- Staff performing cleaning and disinfection procedures should wear appropriate PPE.

#### 6.4 Environmental cleaning and disinfection

- Cleaning staff should be equipped with appropriate PPE
- Stringent environmental cleaning and disinfection by 1,000 ppm sodium hypochlorite solution (1 to 49 diluted 5.25% household bleach) is recommended.
- Clean and disinfect environmental surfaces contaminated with patient's blood, secretions, vomitus or excretions by using 10,000 ppm sodium hypochlorite solution (1 to 4 diluted 5.25% household bleach)..
- Following discharge of patients, terminal disinfection should be conducted.

#### 6.5 Linen management

- Used linens should be classified as infected linen. They should be placed in clearly labeled leak-proof bags at the site of use with minimal manipulation or agitation. They should be tagged as "infected linen" and transported directly to the laundry area, and laundered following the recommended laundry procedures<sup>2</sup>.

#### 6.6 Clinical waste treatment and disposal

- Any contaminated disposable materials should be classified as clinical waste *Group 4 - Infectious Materials*. All clinical waste should be safely segregated, packed, labeled, transported, and stored in accordance with relevant Code of Practices by Environmental Protection Department<sup>10</sup>.

#### 6.7 Care of dead body

- The dead body which has died of EVD is listed under Category 3 and should be handled and disposed according to established guidelines<sup>11,12,13</sup>.
- The dead body should be tagged with a red color dead body category 3 tag.
- Handling of the body should be minimal.
- Autopsy is not recommended. If autopsy is to be carried out because of special reasons, it should be performed by a pathologist under stringent infection control precautions.

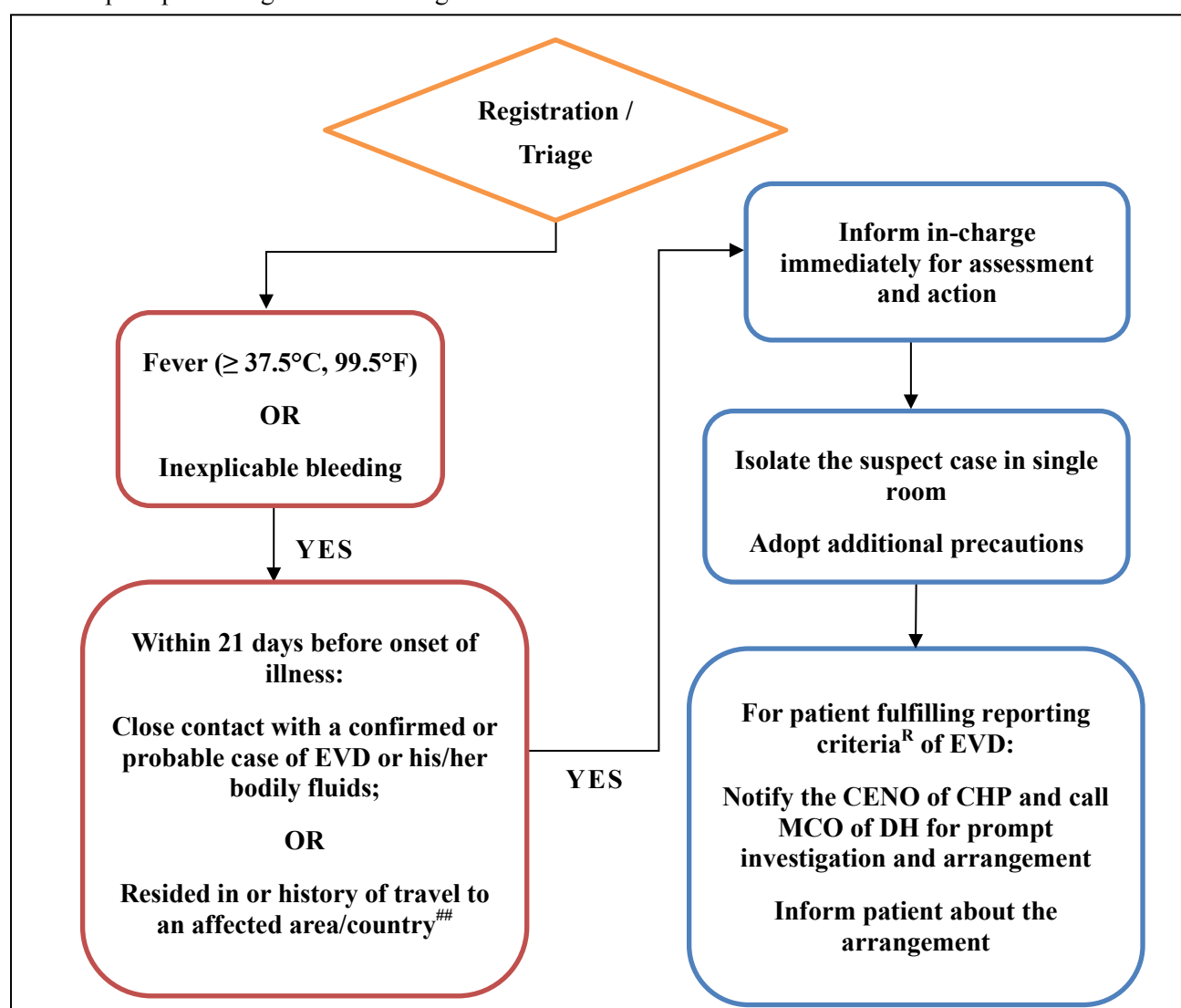
## 7 Recommended management procedure in Clinic Settings

### At Registration / Triage

- Identify any fever ( $\geq 37.5^{\circ}\text{C}$ ,  $99.5^{\circ}\text{F}$ ) OR inexplicable bleeding; AND any contact history OR travel history
- For suspected EVD case, inform in-charge of the clinic immediately for assessment and action
- Isolate the suspected EVD case in a single room, adopt additional precautions as specified in point 5

### Encountering suspected EVD cases

- All healthcare workers must use appropriate PPE as specified in point 5.2 when entering the room
- Notify the Central Notification Office (CENO) of CHP and call Medical Control Officer (MCO) of DH for prompt investigation and arrangement



## For the updated list of affected countries/areas, please refer to [http://chp.gov.hk/files/pdf/evd\\_affected\\_area.pdf](http://chp.gov.hk/files/pdf/evd_affected_area.pdf)

<sup>R</sup> For reporting criteria of EVD please refer to <https://ceno.chp.gov.hk/casedef/casedef.pdf>

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