

Guidance on the management of Ebola virus disease (EVD)

8 August 2014

Background

Ebola virus disease (EVD) is a viral haemorrhagic fever with a risk of progression to multi-organ failure. EVD is caused by *filoviridae*, and since the first documented outbreak of EVD in Congo in 1976, four human pathogen Ebola viruses have been identified: Zaïre, Sudan, Tai Forest and Bundibugyo. Bats are considered the natural reservoir. The mortality rate for the Zaïre Ebola virus is up to 90%.

Case no. 1-1210-151/1
Reference SBRO
T +45 7222 7400
E syb@sst.dk

In the following, we describe measures in the management of EVD, but the guidance may also be relevant for cases of other African haemorrhagic fevers like Marburg virus disease and Lassa fever¹.

Epidemiology

The incubation period for the Zaïre EVD is usually 4 to 10 days, but may vary from 2 to 21 days. The patient is not infectious during the incubation period, but will become infectious after the onset of symptoms and may be infectious for up to two months after the onset of symptoms. Ebola virus spreads through direct contact with blood, secretions and other bodily fluids from living or dead infected persons. Airborne infection is not described.

Most frequently, EVD outbreaks spread through human-to-human transmission, and healthcare professionals and relatives are most at risk of being infected. Presumably, burial ceremonies involving the handling of bodies also play a significant role for outbreaks. Sexual transmission is described 7 weeks after recovery from Marburg virus disease and the same is assumed for Ebola virus.

Ebola virus can survive for a couple of days in fluids or dry material. The virus can be easily inactivated with alcohol, chlorine, UV or gamma irradiation, by heating for an hour at 60°C, or by boiling for 5 minutes.

¹ This guidance replaces "Guidance for occurrence of viral haemorrhagic fever", the Danish Health and Medicines Authority 1991.

The risk of infection via contact with a patient infected by EVD can be summarised as follows:

TABLE 1

Risk of infection	Categorisation of contacts
No risk or very low risk	Casual contact with a febrile, ambulatory and self-reliant patient, for example by having shared a waiting room or public transportation, or as a receptionist.
Low risk	Close face-to-face contact (< 1 meter) with a febrile and ambulatory patient, for example in connection with a general clinical examination, temperature or blood pressure measurement.
High risk	Close face-to-face contact (< 1 meter) with a patient who is coughing, vomiting, having diarrhoea or bleeding from the skin, mucous membranes and bodily orifices. Contact with skin or mucous membranes or needlestick injury with exposure to infectious blood, bodily fluids, tissues or laboratory specimens from patients.

Other exposures may be taken into account when assessing the individual risk of infection after travels in affected areas, including participation in burial ceremonies, eating of bush meat, visits to bat caves etc.

Clinical perspective

Symptoms compatible with EVD in the early phase include influenza-like or malaria-like symptoms (fever, muscle pain, weakness, headache, sore throat), that may be followed by nausea, vomiting, diarrhoea, stomach ache, confusion, rash as well as bleeding from the skin, mucous membranes, eyes, nose, the gastrointestinal tract, the urinary tract, and finally resulting in multi-organ failure.

There are no licensed vaccines or medicinal products for the disease, and treatment is supportive.

EVD should be considered if a patient has a fever > 38°C and has returned from a country with a current outbreak of EVD (cf. WHO²) within 21 days from the onset of symptoms.

EVD is probable if the patient has had high-risk contact (see table 1) with a person strongly suspected to have EVD or with confirmed EVD.

The diagnosis is confirmed by PCR analysis for Ebola virus in a blood sample.

² <http://www.who.int/csr/disease/ebola/en/>

Management of patients by general practitioners, emergency out-patient clinics, hospital emergency rooms etc.

In general, all travellers returning from Africa with onset of a febrile disease during or after the travel are recommended to seek medical care. This is to rule out malaria or other serious infectious diseases.

When interviewing patients by phone to schedule appointments, that is symptomatic persons recently returned from areas with a current outbreak of EVD, information about the travel, symptoms and risk of infection (see table 1) should be obtained. Based on this initial risk assessment, examination by a general practitioner etc. can be scheduled in case of a low risk, and the patient can be referred directly to a department of infectious diseases in case of a high risk and relevant symptoms.

Febrile patients with a low risk of infection (see table 1) having visited a country with a current outbreak of EVD within 21 days from the onset of symptoms can generally be seen in general practice, emergency rooms etc. observing general hygienic precautions in connection with clinical examinations, blood sampling etc.

In case of a strong suspicion of EVD, the doctor responsible for the treatment must confer directly with the on-call consultant specialist in infectious diseases at either Hvidovre Hospital in Copenhagen or Aarhus University Hospital in Skejby. The department of infectious diseases will then offer advice about hospitalisation and transportation.

Management of patients arriving by commercial aircraft

If a person with suspected EVD arrives by commercial aircraft at Copenhagen Airport³, the airport's operations centre will contact the Copenhagen Police; they will alert the Capital Region of Denmark that will send an ambulance and emergency medical doctor to the airport. The on-site commander (Indsatsleder Sund (previously KOOL)) will then handle the healthcare coordination at the airport and inform the DHMA Public Health Medical Officers.

The Copenhagen Police collects information about the number of ill people, the travellers' history (stays: where, when, nationality) and symptoms (fever, vomiting, cough, bleeding, rash, unconsciousness). The Copenhagen Police will alert the DHMA Public Health Medical Officers that will make sure that a medical officer appears as required. The on-site commander and the medical officer, and if relevant in consultation with an infectious disease specialist, will decide whether the suspicion should be maintained.

In case of a strong suspicion of a person with EVD on the aircraft in question, the on-site commander will alert the department of infectious diseases at Hvidovre Hospital that will make sure that an infectious disease specialist appears as required. The on-site

³ See "Cooperation agreement for the preparedness at Copenhagen Airport in case of generally dangerous infectious diseases", 2008. Similar precautions can be used when an aircraft arrives in another Danish airport or on the arrival of a ship in a Danish port. See also "Appendix to the report: The international health regulation – structure and practice implemented in the Danish preparedness", the Danish Health and Medicines Authority, 2012.

commander and the infectious disease specialist will make a decision about the mode of transportation and protective measures in connection with hospitalisation.

When required, the police and medical officer may make a decision about isolation and quarantine measures on behalf of the epidemic commission and pursuant to the provisions of the Danish Epidemic Act.

Transportation by ambulance to a special ward at a department of infectious diseases

When transporting a patient suspected of EVD by ambulance, the patient should wear an ordinary surgical mask without an exhalation valve. A non-permeable disposable plastic base or the like should cover the stretcher. Linen and other textiles should be disposed of after use.

The ambulance crew should wear protective equipment such as gloves, a fluid-resistant disposable gown, FFP3 respirator, face visor and shoe cover. To the extent possible, the patient should be directly transferred from the ambulance to an isolation room.

After the transportation, the ambulance must be cleaned using water and soap and disinfected with a chlorine-based product (min. 1,000 ppm). Spillage of body fluids must be mopped up immediately with absorbent material and the area should then be disinfected with a chlorine-based product (min. 10,000 ppm). Waste should be disposed of as clinical risk waste⁴.

Management at a special ward at an infectious disease department

In case of a strong suspicion of or confirmed EVD, the patient must be hospitalised in a department of infectious diseases at Hvidovre Hospital in Copenhagen or Aarhus University Hospital in Skejby⁵.

The patient should be isolated and managed in accordance with the "National infection hygiene guidelines for the treatment of patients with infectious diseases, including isolation"⁶. Based on a precautionary principle, as a general rule the patient should be isolated in a negative pressure isolation room and be cared for by experienced and trained staff according to the local guidelines.

⁴ "Ambulance hygiene", Statens Serum Institut, 2005.

⁵ See the Danish Health and Medicines Authority's specialist guidance for internal medicine: anti-infection medicines: <http://sundhedsstyrelsen.dk/da/sundhed/planlaegning-og-beredskab/specialeplanlaegning/specialeplan-2010/intern-medicin-infektionsmedicin>

⁶ <http://www.ssi.dk/~media/Indhold/DK%20-%20dansk/Smitteberedskab/Infektionshygiejne/NIR/NIR%20Isolation%204%20udgave%202011%20web.ashx>

Laboratory diagnosis

PCR diagnostic of Ebola virus must only take place in case of a strong suspicion of EVD and following a specific assessment by an infectious disease specialist. Analysis for Ebola virus always requires prior agreement with Statens Serum Institut⁷.

The analysis is made immediately, and usually the sample is also tested for Lassa, Marburg and dengue viruses. The result of the analysis will be communicated as agreed with Statens Serum Institut and is generally available within six hours from receipt of the sample.

Blood sample for PCR diagnostic for Ebola virus must be collected in special vacuum EDTA plasma test tubes containing a deactivating medium. Test tubes are only available in special wards at departments of infectious diseases. Other types of test tube must not be used.

When transporting samples in such test tubes, the virus is deactivated, and a courier or taxi can therefore transport the sample. The sample is placed in a protection pipe made of hard plastic and is put into a plastic-lined envelope marked 'ALERT'. The envelope is sent to Statens Serum Institut, the Department of Microbiological Diagnostics and Virology. The orderer pays for the transportation.

Notification

Strong suspicion of EVD or confirmed EVD must be reported⁸. The doctor responsible for the treatment of the patient must immediately report the case by phone to the DHMA Public Health Medical Officers in the area where the patient is located⁹. Outside daytime, the DHMA 24-hour emergency service should be contacted¹⁰.

Subsequently, the case must be reported in writing to the Danish Health and Medicines Authority and Statens Serum Institut, the Department of Infectious Disease Epidemiology, by using form 1515.

Once the patient has been hospitalised, the admitting doctor is exempt from the notification duty. Notification by phone and in writing should be made by the treating doctor at the hospital.

⁷ Contact the on-call virologist at Statens Serum Institut on tel. +45 40 33 63 79 or the on-call infection epidemiologist on tel. +45 41 31 74 04. Outside daytime, only the on-call infection epidemiologist.

⁸ See the Danish Epidemic Act (<https://www.retsinformation.dk/Forms/R0710.aspx?id=126093>) and executive orders: <https://www.retsinformation.dk/Forms/R0710.aspx?id=46237>, <https://www.retsinformation.dk/Forms/R0710.aspx?id=21406> and guideline: <https://www.retsinformation.dk/Forms/R0710.aspx?id=21407>.

⁹ Contact the DHMA Public Health Medical Officers on tel. +45 72 22 74 50 (East), +45 72 22 79 50 (South) and +45 72 22 79 70 (North).

¹⁰ Call +45 70 22 02 68 east of the Great Belt, and +45 70 22 02 69 west of the Great Belt.

Management of contacts

The DHMA Public Health Medical Officers manage the contact to healthy close relatives of patients suspected to have EVD or with confirmed EVD. Table 1 may be useful for assessing the risk of infection¹¹.

In case of a high risk of infection (see table 1), the Public Health Medical Officers offer scientific advice to the affected person, including:

- Inform the person about EVD
- Establish passive monitoring for 21 days from exposure, this is to ensure that the person is alert to symptoms such as fever, for example by daily temperature measurement
- Inform the person to avoid or limit close contact with humans during this period. After an individual assessment depending on the nature of the exposure, working conditions, etc., voluntary home quarantine may be recommended
- Ask the person to call the department of infectious diseases immediately if symptoms start to develop. Hand out the telephone number of the infectious disease department to be contacted (Hvidovre Hospital in Copenhagen, Odense University Hospital, Aarhus University Hospital in Skejby or Aalborg University Hospital)

No special precautions apply to healthy people with a low risk of infection (see table 1) who are returning from countries hit by an outbreak of Ebola virus disease.

If a large number of people have been exposed to a high risk of infection, it may be considered whether to activate the regional quarantine plan.

¹¹ Contact information on fellow passengers on an aircraft with a patient strongly suspected to have EVD or with confirmed EVD must be obtained via passenger lists etc.; this applies to the following persons: Passengers and cabin crew with direct contact. Passengers who have been sitting next to the index patient in all directions, including on the other side of the aisle. Cabin crew who have served passengers in the section of the aircraft where the index patient has been seated. Cleaning staff who have cleaned the index patient's seat and toilet facilities used by the patient.