



## Ebola: information for sewage and water handlers

This guidance is aimed at people concerned with risk of Ebola from any form of sewage. This should be read in conjunction with decontamination guidance for persons with Ebola and other viral haemorrhagic fevers produced by the Advisory Committee on Dangerous Pathogens (ACDP) and advice on working with sewage produced by the Health and Safety Executive (HSE).

### Key messages:

- Ebola is an RNA virus that is relatively labile and not able to persist for long in the environment, and is quite sensitive to inactivation by drying
- in the hospital setting, if the virus enters the sewage system, it will be diluted and would be likely to be degraded by a combination of factors such as disinfectants present in the hospital waste, pH, osmolality, temperature and the effects of fermentation processes
- in accordance with the ACDP guidance, patients with suspected or confirmed Ebola may use a toilet with waste passing into the sewer system as the risk of survival and transmission of the virus is negligible
- there are no cases in the literature linking Ebola virus transmission to environmental waters or drinking water and the risk of transmission through sewage and drinking water is considered to be negligible in the UK
- although water and sewage in the UK presents a minimal risk, the personal protective equipment (PPE) recommended by HSE would be adequate (see below) to protect a sewage worker against pathogens including viruses in the sewage
- it is important to remember that Ebola is contracted by exposure of mucous membranes or broken skin to contaminated body fluids, so risk assessments should be followed to minimise risk
- guidance from HSE entitled [Working with sewage, the health hazards: A guide for employers](#) advises that: Since micro-organisms are an inherent part of sewage, the hazard cannot be eliminated. However, a proper assessment of risk is required, but this should not include analysis of sewage for micro-organisms as they can constantly change

- exposure to the micro-organisms in sewage should be minimised or eliminated by the possible use of remote-controlled robotic cameras for sewer inspection; drying sludge before disposal; incineration of sludge; injection of sewage into land rather than spreading; damming and bypass pumping of sewer sections before reconstruction
- measures to reduce risk of infection and illness should include ensuring that employees and line management understand the risks through proper instruction, training, supervision and use of risk assessments
- personnel should be trained in handling sewage and provided with suitable personal protective equipment (PPE) that may include waterproof/abrasion-resistant gloves, footwear, eye and respiratory protection
- face visors are particularly effective against splashes
- equipment selection and a proper system for inspection and maintenance are important

The ACDP guidance on **Management of Hazard Group 4 viral haemorrhagic fevers and similar human infectious diseases of high consequence** is the principal source of guidance (including on PPE) on management of suspected Ebola cases in addition to HSE guidance.

## What is Ebola?

Ebola virus disease (EVD), a viral haemorrhagic fever (VHF), is a rare but severe infection caused by Ebola virus, which is classified as a Hazard Group 4 pathogen. Since March 2014, there has been a large outbreak of Ebola virus in West Africa, with widespread and intense transmission in Guinea, Liberia and Sierra Leone. This is the largest ever known outbreak of this disease, prompting the World Health Organization (WHO) to declare a Public Health Emergency of International Concern in August 2014. Cases have also occurred in Senegal, Nigeria, Mali, the US and Spain.

Ebola virus is not found in the UK. Although the risk of imported cases is low, it remains unlikely, but not impossible, that travellers or returning aid workers infected in one of the affected countries could arrive in the UK while incubating the disease, develop symptoms after their return and become infectious.

## Ebola transmission

Ebola virus is transmitted among humans through close and direct physical contact with infected body fluids. This means that the body fluids from an infected person (alive or dead) have touched someone's eyes, nose or mouth, or an open cut, wound or abrasion (eg through splashes of blood or other body fluids).

Infection can also occur if broken skin or mucous membranes of a healthy person come into contact with environments that have become contaminated with an Ebola patient's infectious fluids. Unlike infections such as flu or measles, which can be spread by virus particles that remain in the air after an infected person coughs or sneezes, there is no evidence that Ebola has been spread by the airborne route and so this is not considered to be a route of transmission.

There is no transmission of the virus from people who are asymptomatic, that is, those who are not exhibiting signs of illness. People infected with Ebola can only spread the virus to other people once they have developed symptoms. In the early symptomatic phase, virus is present in the blood, however it is important to understand that the level of virus in body fluids such as saliva is very low and unlikely to pose a transmission risk.

Ebola virus RNA levels in the blood have been shown to increase logarithmically during the acute or severe phase of illness and in the late symptomatic phase. In the late phase of the disease, when vomiting and diarrhoea are present, all body fluids (such as blood, urine, faeces, vomit, saliva and semen) should be considered infectious, with blood, faeces and vomit being the most infectious, and ACDP decontamination guidelines should be followed.

## General principles to be considered for Ebola

Ebola is an RNA virus that is relatively labile and not able to persist for long in the environment. It is quite sensitive to inactivation by drying. Higher temperatures (room temperature or above) are likely to increase the speed at which the virus dies off in the environment. To date, there is no evidence for transmission of Ebola viruses via drinking water contaminated by faeces or urine.

The Ebola virus is able to enter the body through broken skin and mucosal surfaces when in contact with bodily fluids or waste including faeces and urine from a symptomatic infected person, or from an environment contaminated with infected body fluids or splashes.

It is extremely important to adhere to good handwashing practices, both in the community and healthcare setting, to reduce the risk of becoming infected from a contaminated environment and to prevent human-to-human transmission of Ebola virus.

All direct human contact with excreta should be avoided and full PPE should be worn by all workers handling faeces.

## Information for sewage workers

For the purposes of this guidance, sewage is defined as consisting of raw sewage (excrement, effluent and debris), sewage sludge or septic tank waste.

Micro-organisms are an inherent part of sewage and the risks cannot be completely eliminated. It is advised that sewage workers wear the appropriate PPE when handling potentially contaminated sewage and are advised to refer for advice to the HSE guidelines [Working with sewage, the health hazards: A guide for employers](#). However, a proper assessment of risk is required, which should not include analysis of sewage for micro-organisms as they can constantly change.

Exposure to sewage should be eliminated or minimised by the use of remote-controlled robotic cameras for sewer inspection; drying sludge before disposal; incineration of sludge; injection of sewage into land rather than spreading; damming and bypass pumping of sewer sections before reconstruction.

Measures to reduce risk of infection and illness should include ensuring that employees and line management understand the risks through proper instruction, training and supervision.

Personnel should be trained in handling sewage and provided with suitable personal protective equipment that may include waterproof/abrasion-resistant gloves, footwear, eye and respiratory protection. Face visors are particularly effective against splashes. Equipment selection and a proper system for inspection and maintenance are important.

A risk assessment of waste systems should be carried out as recommended by [WHO](#), to ensure that wastewater is contained in the system and arrives without having leaked at a functioning treatment or disposal site. Allowing wastewater to be contained for a period of time allows for natural die-off of the Ebola virus, thus reducing the concentration of Ebola.

Ebola is likely to be inactivated significantly faster in the environment than enteric viruses with known waterborne transmission (eg norovirus, hepatitis A).

## Recommended action following accidental exposure to Ebola infected sewage

In the event that an individual is directly exposed to sewage from a breach in their PPE, it must be remembered that the risk of contracting Ebola virus is low. However, sewage remains a major source of bacteria, parasites and other viruses as sewage treatment removes water and debris, but may not necessarily remove all micro-organisms.

Individuals should follow their local policy for reporting incidents and isolate themselves at home immediately, ensuring they do not have contact with any other people. They should phone 111 or 999 and inform them of their exposure in order that they can be put in touch with local public health staff.

Their local PHE will:

- provide information and advice
- assess the risk
- ensure daily monitoring of symptoms
- advise self-monitoring of symptoms and temperature twice daily for 21 days and they will be actively followed up by public health experts

It is important to remember that illnesses other than Ebola are more likely to develop and individuals should monitor their symptoms, which may be similar in the early stages of disease, and that medical assessment is essential to ensure they receive the right diagnosis and treatment.

### Further guidance

- further information on Ebola virus disease can be found on the PHE website:  
[Ebola virus disease: clinical management and guidance](#)
- ACDP and HSE guidance (<https://www.gov.uk/government/publications/viral-haemorrhagic-fever-algorithm-and-guidance-on-management-of-patients>)
- [WHO guidance](#)

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