



RAPID RISK ASSESSMENT

Outbreak of Ebola virus disease in West Africa

12th update, 30 June 2015

Developments since the 11th update

As of 27 June 2015, WHO has reported 27 541 cases, including 11 235 deaths, linked to the West African epidemic of Ebola virus disease (EVD) that began in December 2013. Ten countries reported EVD cases. Guinea, Liberia and Sierra Leone experienced widespread and intense transmission between July 2014 and April 2015. Mali, Nigeria, Senegal, Spain, the United Kingdom, USA and Italy reported imported cases or import-related local transmission linked to the epidemic in West Africa. Liberia was declared Ebola-free on 9 May 2015, however a new confirmed case was reported on Monday 29 June. This case has not yet been acknowledged by WHO.

The 20 new confirmed cases reported in the week from 14 to 21 June indicate that the weekly incidence of new cases, which has levelled off over the last 10 weeks, remains unchanged. Low intensity transmission continues due to incomplete contact tracing, inadequate case detection and management of new infections. The area of transmission has expanded slightly in recent weeks and, for the first time in several months, two healthcare workers were reported to have become infected. Cases continue to be reported from the capital cities of both Guinea and Sierra Leone. Cases are still occurring outside known transmission chains. The risk of EVD spreading to countries that share borders with Guinea and Sierra Leone remains high due to frequent cross-border movement of people and insufficient Ebola surveillance in the border areas. There are particular concerns about the current transmission in Boke prefecture in north-western Guinea and the risk of spread to Guinea-Bissau.

The rainy season, which started in April and usually lasts until November, makes transportation of staff and equipment difficult, and could further impair outbreak control efforts, particularly in hard-to-reach areas. The rains also increase the risk of outbreaks of other communicable diseases, such as malaria, cholera or infectious diarrhoea, which may mask symptoms of EVD and delay testing for Ebola. Resurgence of the Ebola outbreak remains a possibility until all contacts of all cases have been identified and monitored for 21 days without developing symptoms.

There is a risk that Ebola virus may be reintroduced and transmission re-established in areas that have been declared Ebola-free. Failing to achieve zero cases in all regions of the two countries within the next few months could result in a low-intensity, persistent human-to-human epidemic in West Africa, with recurrent surges of intensified transmission.

The re-emergence of EVD transmission in countries where intense, widespread transmission has occurred and subsequently declined remains possible as a result of new transmission from the animal reservoir or reintroduction through the importation of an infectious case. Transmission is also possible from a recovered case still hosting the Ebola virus (through sexual or other contact involving immune-privileged^{*} bodily fluids.)

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^{*} https://en.wikipedia.org/wiki/Immune_privilege

Options for risk reduction

In view of the slow progress in controlling the outbreak in Guinea and Sierra Leone, and the risk of EVD transmission re-emerging in areas and countries that have managed to control the disease, the focus should remain on reaching zero cases in all affected areas as soon as possible, and detecting and responding to reintroductions in a timely manner. All EVD cases detected in Ebola-free areas must be extensively investigated and the circumstances leading up to the infection must be fully elucidated. The identification of a new confirmed case in Liberia highlights the importance of maintaining active surveillance in previously affected areas to ensure the timely detection of a possible re-emergence of cases at the tail-end of the epidemic.

Clinicians must be vigilant when dealing with recovered Ebola patients, particularly when handling fluids and tissues from immune-privileged sites in the body where the viable virus may 'hide' long after the patient has recovered from the acute illness and blood samples are considered free of virus.

There is an urgent need for studies that can generate information about the longer term health effects of EVD and further evidence on the risk of virus transmission via sexual contact and exposure to human substances in which the virus has escaped the immune system.

Countries neighbouring Guinea, Liberia and Sierra Leone continue to require support to strengthen their surveillance for viral haemorrhagic fevers. They also need assistance to develop and exercise their response plans for outbreaks of EVD and other haemorrhagic fevers.

The risk reduction measures for individual protection and the options for mitigating the risk of importation and spread in the EU, as recommended in previous risk assessments, remain valid. These measures can be consulted in the 11^{th} update of the Rapid Risk Assessment.

Source and date of request

Internal decision, 22 June 2015.

Public health issue

Re-assessment of the risk of importation of Ebola virus to the EU and the risk of onward transmission following importation in the wake of the decline of the outbreak observed in Guinea and Sierra Leone.

The EVD outbreak in West Africa was first assessed in an ECDC rapid risk assessment entitled 'Outbreak of Ebola haemorrhagic fever in Guinea' dated 23 March 2014 [1]. Detailed information about the Ebola virus and the epidemiology of EVD outbreak in West Africa can be found in the ECDC Rapid Risk Assessments on the ECDC website [1–12].

Consulted experts

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Disease background information

Infections with African Ebola viruses cause a severe disease in humans called Ebola virus disease. There are five species of the genus *Ebolavirus* (*Filoviridae* family): *Zaïre ebolavirus, Sudan ebolavirus, Reston ebolavirus, Taï Forest ebolavirus and Bundibugyo ebolavirus.* The current outbreak in West Africa is caused by *Zaïre ebolavirus.* More information on Ebola virus disease can be found in the ECDC factsheet for health professionals [13].

Epidemiological update

As of 27 June 2015 (week 25), WHO has reported 27 541 confirmed, probable and suspected cases of Ebola virus disease (EVD), including 11 235 deaths, from 10 countries affected by the Ebola outbreak in West Africa. Two of the three countries with widespread and intense transmission, Guinea and Sierra Leone, continue to report low level transmission while Liberia, which was declared Ebola free on 9 May 2015, detected a laboratory-confirmed case on 29 June in a young male who died on 24 June. The seven countries that have reported imported cases, with or without local transmission, are: Italy, Mali, Nigeria, Senegal, Spain, the United Kingdom and USA.

Guinea: In the week 14 to 21 June, 12 new confirmed cases were reported: six were registered contacts of confirmed EVD cases and three were community deaths that tested positive on post-mortem samples. Transmission was centred in the four prefectures of Forecariah (n=5), Boke (n=5), Conakry (n=1) and Dubreka (n=1) (Figure 1). All cases reported by WHO in Guinea during the past three weeks have originated from these four prefectures, but the number of affected sub-prefectures has increased during the past week. In Boke prefecture, transmission shifted from Kamsar to the urban sub-prefecture in Boke Centre. In Forecariah, the area of infection expanded in the week up to 21 June, as the sub-prefecture of Benty reported its first confirmed cases in three months. A single case was reported from Conakry and it is of particular concern that this case arose from an unknown chain of transmission. WHO reported 15 unsafe burials in the week up to 21 June, representing 3% of the 459 community deaths.

Sierra Leone: In the week up to 21 June, WHO reported eight new confirmed cases from Port Loko (n=4), Kambia (n=2) and Western Area Urban which includes the capital Freetown (n=2). Of the four cases in Port Loko, one is a healthcare worker who had been quarantined because of contact with a previously confirmed case, one originated from an unknown chain of transmission and two cases were reported from the Marampa chiefdom, an area of the district that had been Ebola-free since March 2015. The two cases in Freetown are the first confirmed cases after two weeks without active transmission.

Only four of the eight new cases in Sierra Leone were among registered contacts and two were community deaths confirmed post-mortem. WHO did not report updated figures on the number or proportion of unsafe burials in Sierra Leone.

Liberia: The country was declared Ebola free on 9 May 2015 [14] 42 days after the latest confirmed case on 27 March. Heightened vigilance for new cases has been maintained throughout the country since transmission was interrupted. In the week up to 21 June, WHO reported an average of 33 samples being tested daily for Ebola virus without any EVD cases being detected.

On 29 June, the Global Public Health Intelligence Network (GPHIN), quoting a representative of the Liberian government, reported a confirmed case of Ebola infection in a 17-year-old male resident of the village of Nedowian in Margibi County. He is reported to have fallen ill on 21 June and died on 24 June. A sample was taken from the body as part of the routine investigation of community deaths and tested positive twice for Ebola. This information has not yet been confirmed by WHO but has been published on the website of the Liberian Ministry of Health [15].

Distribution of cases in countries with widespread and intense transmission, as of 27 June 2015

- Guinea: 3 724 cases, 3 268 of which are confirmed, and 2 482 deaths;
- Sierra Leone: 13 115 cases, of which 8 664 are confirmed, and 3 932 deaths.

Countries with previously widespread and intense transmission

 Liberia: 10 564 cases, of which 3 151 are confirmed, and 4 716 deaths. Liberia was declared Ebola free by WHO on 9 May 2015 [14]. One confirmed case was reported through the media on 29 June 2015, but has not yet been acknowledged by WHO.

Countries with imported cases, with or without local transmission

These cases represent patients that have developed illness in the country under which they are listed, whether they have been exposed in a third country (imported cases) or in the country under which they are listed (local transmission).

- United Kingdom: one confirmed case;
- Spain: one case, no deaths;
- United States: four cases including one death;
- Mali: eight cases, six deaths;
- Nigeria: 20 cases and eight deaths;
- Senegal: one confirmed imported case;
- Italy: one confirmed case.



Figure 1. Distribution of confirmed cases of EVD by week of reporting, Guinea, Sierra Leone and Liberia, weeks 46/2014 to 26/2015

Note: data for week 26 are incomplete





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Figure 3. Distribution of EVD cases in Guinea and Sierra Leone by week of reporting, as of week 26/2015

Source: Data from ministries of health reports.

Healthcare workers

After two months without new infections among healthcare workers, two healthcare workers have been reported infected in Boke, Guinea and one in Sierra Leone. As of 21 June 2015, 872 confirmed cases among healthcare workers had been reported in Guinea, Liberia and Sierra Leone since the start of the outbreak, 507 of which (58%) were fatal.

Outside of the three most-affected countries, infected healthcare workers have been reported from Mali (two), Nigeria (11), Spain (one, infected while caring for an evacuated EVD patient), UK (two, infected in Sierra Leone), USA (two infected in Sierra Leone, two in Liberia and two while caring for a confirmed EVD case in a Texas hospital), and Italy (one, infected in Sierra Leone).

Table 1. Number of EVD cases and deaths among healthcare workers^{*}, as of 21 June 2015

Country	Cases	Deaths
Guinea	189	94
Liberia	378	192
Mali	2	2
Nigeria	11	5
Sierra Leone	305	221**
Spain	1	0
United Kingdom	2	0
United States	6	1
Italy	1	0
Total	895	515

* Listed by country of origin

** Data as of 17 February 2015

Source: data are based on official information reported by ministries of health and WHO.

Medical evacuations and repatriations from EVD-affected countries

Since the beginning of the epidemic and as of 24 June 2015, 65 individuals have been evacuated or repatriated from the EVD-affected countries. Of these, 38 were transported to Europe. Thirteen were medical evacuations of confirmed EVD-infected patients (regardless of their country of citizenship) to Germany (3), Spain (2), France (2), UK (2), Norway (1), Italy (1), the Netherlands (1) and Switzerland (1). Twenty-five asymptomatic persons were repatriated as a result of exposure to Ebola in West Africa to the following European countries: UK (13), Denmark (4), Sweden (3), the Netherlands (2), Germany (1), Spain (1) and Switzerland (1). Twenty-seven persons have been evacuated to the United States.

Figure 4. Medical evacuations and repatriations due to infection by or exposure to Ebola virus, as of 24 June 2015

Developments

There are concerns regarding delayed secondary transmission through sexual contact with recovered EVD patients. On 5 May 2015, ECDC published a public health development [16] following new evidence of possible sexual transmission [17] of Ebola virus several months after recovery from acute disease, and on 8 May WHO published `Interim advice on the sexual transmission of the Ebola virus disease' [18].

Authors from the Emory University School of Medicine published a case report concerning a confirmed case of EVD in a person who developed severe unilateral uveitis during convalescence. Viable *Zaire ebolavirus* (EBOV) was detected in the aqueous humour, the gelatinous fluid filling the space between the lens and the cornea, 14 weeks after the onset of EVD symptoms and nine weeks after the clearance of viraemia. The long-term consequences of EVD infections are poorly documented but this case report suggests that complications may appear weeks after recovery from the acute phase of the disease. Other reported complications include polyarthralgia, anaemia, skin problems and hair loss. A survey conducted by Medecins Sans Frontieres (MSF) among survivors of EVD reported that 55% (n=48) of the patients with diagnosed eye conditions had uveitis [33].

On 18 June, The New England Journal of Medicine published a case report concerning a woman in the late stage of her fifth pregnancy who presented at the hospital with acute symptoms that were interpreted as pregnancy-related. However, a routine test upon admission was positive for EBOV infection [19].

A recent study showed that blood collected from the cadaver of a primate contained viable EBOV for up to seven days after the animal's death [20]. The study by Fischer et al [21] confirmed this observation by demonstrating that EBOV remains viable for up to eight days in liquid blood at 27°C temperature under experimental conditions. The same study also demonstrated that EBOV can remain viable for up to five days in drying blood on surfaces in hospital environments [21].

The new confirmed case in Liberia reported on 30 June requires in-depth investigations in order to understand the circumstances leading to the infection of the case.

Possible scenarios include transmission from an exposure:

- to the animal reservoir;
- in a country with current transmission (e.g. having visited Guinea);
- to an unrecognised imported case in Liberia;
- to an unrecognised chain of transmission that had persisted in Liberia;
- through sexual contact with a recovered EVD patient.

Molecular characteristics of the virus should allow better understanding of the route of transmission for this case.

ECDC threat assessment

The 20 new confirmed cases reported in the week from 14 to 21 June indicate that the weekly incidence of new cases, which has levelled off over the last 10 weeks, remains unchanged. Low intensity transmission continues due to incomplete contact tracing, inadequate case detection and management of new infections. The area of transmission has expanded slightly in recent weeks and, for the first time in several months, two healthcare workers were reported to have become infected. Cases continue to be reported from the capital cities of both Guinea and Sierra Leone. Cases are still occurring outside known transmission chains. The risk of EVD spreading to countries that share borders with Guinea and Sierra Leone remains high due to frequent cross-border movement of people and insufficient Ebola surveillance in the border areas. There are particular concerns about the current transmission in Boke prefecture in north-western Guinea and the risk of spread to Guinea-Bissau.

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Risk of exposure to EVD for EU citizens and travellers in affected West African countries

Exposure in the community

• As stated in earlier risk assessments [9], the risk of infection through daily interaction in the community is low if visitors and long-term residents adhere to the recommended precautions. The decline in the number of new EVD cases in recent months has further reduced the already low risk of exposure to people infected with Ebola. Those who visit friends and relatives in the affected countries are at higher risk of exposure to Ebola-infected people because they are likely to have more and closer contacts in the community and to participate in activities known to be associated with Ebola virus transmission.

Exposure in healthcare settings

- The risk of exposure to EVD in healthcare facilities remains critical. The level of risk is related to how well
 infection control measures are implemented and the nature of the care provided. The risk is not limited to
 centres dedicated to the care of EVD patients, nor is it limited to geographical areas with ongoing
 transmission.
- The risk of exposure to Ebola virus is obviously higher for healthcare workers and volunteers who provide assistance in settings where infection control measures are not fully or correctly implemented. The risk is extremely high for healthcare workers who carry out invasive medical procedures or provide care to EVD patients without proper infection control measures [22].

Risk of importation to the EU

The risk of EVD being imported into the EU and the risk of transmission occurring within the EU following an importation remains very low because of the range of risk reduction measures that have been put in place by Member States and affected countries.

The likelihood of EVD-infected individuals arriving in the EU is minimal with the current low intensity of transmission in Guinea and Sierra Leone. However, as long as the epidemic continues, the possibility that EVD-infected people arriving in the EU by direct or indirect flights from affected countries or on board freighters or passenger ships remains.

Exit-screening at the point of departure from an Ebola-affected area is more efficient for the identification of travellers with possible Ebola infection than screening of passengers who arrive in the EU. However, screening for symptoms at the point of departure will not stop asymptomatic, infected people from boarding an international flight and later developing symptoms during the flight or after arrival in the EU.

The World Health Organization Emergency Committee that met on 9 April strongly reiterated the need for continued exit screening in the affected countries. Such exit screening must be maintained for at least 42 days after the last case has twice tested negative for Ebola. Countries are encouraged to maintain exit screening until human-to-human transmission has stopped in the entire sub region [23].

Almost all EU/EEA countries have issued temporary travel advice against non-essential travel to EVD-affected countries. However, a substantial number of EU professionals are involved in the international response to the Ebola outbreak [24]. ECDC has removed Liberia from the list of affected countries considered in the EU case definition of EVD [25] as an epidemiological criterion.

International travel to the affected countries is expected to increase over time, which in turn implies an increase in the number of returning travellers. However, this will not necessarily result in an increased risk of EVD importation into the EU because of the decreasing number of new EVD cases in the affected countries.

It is likely that the need for repatriations and medical evacuations will decrease with fewer international staff engaged in the response. The probability that a person who has returned from an affected country and develops a fever within 21 days has actually contracted EVD is very low. Investigations must take into account diseases other than EVD to determine the cause of the fever (for example, Lassa or dengue fever, malaria or influenza). In this context, it is important to keep in mind that the affected countries are at high risk of malaria [5]. Previously, ECDC considered the risk of importation to Europe via routes used by undocumented migrants from West Africa who arrive at the southern coast of the Mediterranean as a remote possibility. As the epidemic slows down, this possibility is also diminishing.

Several other risks are reduced but cannot be excluded – e.g. risks related to travel and transportation, risks related to biosafety and transmission through substances of human origin and risks from infected individuals seeking medical care in the EU/EEA.

Options for risk reduction

In view of the slow progress in controlling the outbreak in Guinea and Sierra Leone, and the risk of EVD transmission re-emerging in areas and countries that have managed to control the disease, the focus should remain on reaching zero cases in all affected areas as soon as possible and detecting and responding to reintroductions in a timely manner. All EVD cases detected in Ebola-free areas must be extensively investigated and the circumstances leading up to the infection fully elucidated. The identification of a new confirmed case in Liberia highlights the importance of maintaining active surveillance in previously affected areas to ensure timely detection of a possible re-emergence of cases at the tail-end of the epidemic.

Clinicians must be vigilant when dealing with recovered Ebola patients, particularly when handling fluids and tissues from immune-privileged sites in the body where the viable virus may 'hide' long after the patient has recovered from the acute illness and blood samples are considered free of virus.

There is an urgent need for studies that can generate information about the longer-term health effects of EVD and further evidence on the risk of virus transmission via sexual contact and exposure to human substances in which the virus has escaped the immune system.

Countries neighbouring Guinea, Liberia and Sierra Leone continue to require support to strengthen their surveillance for viral haemorrhagic fevers. They also need assistance to develop and exercise their response plans for outbreaks of EVD and other haemorrhagic fevers.

The risk reduction measures for individual protection and the options for mitigating the risk of importation and spread in the EU, as recommended in previous risk assessments, remain valid [9]. These measures can be consulted in the 11th update of the Rapid Risk Assessment.

ECDC resources

- Ebola and Marburg fevers factsheet for health professionals [13]
- ECDC Rapid Risk Assessment: Outbreak of Ebola virus disease in West Africa, Eighth update, 18 November 2014 [9]
- ECDC Rapid Risk Assessment: Outbreak of Ebola virus disease in West Africa, Ninth update, 30 January 2015
 [10]
- ECDC Rapid Risk Assessment: Outbreak of Ebola virus disease in West Africa, Tenth update, 14 April 2015 [11]
- ECDC Rapid Risk Assessment: Outbreak of Ebola virus disease in West Africa, 11th update, 11 May 2015 [12]
- Assessing and planning medical evacuation by air to the EU for patients with Ebola virus disease and people exposed to Ebola virus [26]
- Case definitions for Ebola patients in the EU [27]
- Algorithm for the laboratory diagnosis of Ebola virus disease [28]
- Public health management of healthcare workers returning from Ebola-affected areas [29]
- Public health management of persons having had contact with Ebola virus disease cases in the EU update [<u>30</u>]
- Options for preparing for gatherings in the EU in the context of the current outbreak of EVD in West Africa
 [<u>31</u>].
- Treatment and vaccine development [<u>32</u>]

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