



RAPID RISK ASSESSMENT

Outbreak of Ebola virus disease in West Africa

11th update, 11 May 2015

Developments since the tenth update

As of 8 May 2015, WHO has reported 26 683 cases, including 11 022 deaths, linked to the West African epidemic of Ebola virus disease (EVD) with onset in December 2013. Nine countries have reported EVD cases. Guinea, Liberia and Sierra Leone have experienced widespread and intense transmission. Mali, Nigeria, Senegal, Spain, the United Kingdom and the USA have at some point reported imported cases or import-related local transmission linked to the epidemic in West Africa, but all six countries have been declared Ebola-free.

Guinea and Sierra Leone still report cases whereas Liberia has not reported a confirmed case since 27 March and was declared Ebola-free by the World Health Organization (WHO) on 9 May 2015 after 42 days without confirmed cases [1]. Liberia's last case was a woman in the greater Monrovia area who developed symptoms on 20 March and died on 27 March.

However, the epidemic is not being controlled at the same pace in the two other countries, and there is a risk that transmission will be reintroduced to areas and countries that have been declared Ebola-free.

The latest WHO report indicates that the number of new cases continues to decrease. Eighteen cases were reported from Guinea and Sierra Leone for the week leading up to 6 May. This is the lowest weekly number of cases reported in 2015. Sierra Leone and Guinea have reported low number of cases for five consecutive weeks.

The geographical area of transmission is shrinking in both Guinea and Sierra Leone. In Guinea the affected area is still larger than in Sierra Leone. Transmission is now concentrated in districts along the Guinean-Sierra Leonean border.

ECDC published a public health development following new evidence related to possible sexual transmission of EVD [2]. WHO published 'Sexual transmission of the Ebola Virus: evidence and knowledge gaps' providing interim advice for the Ebola survivors [3].

The West African EVD epidemic was declared a Public Health Emergency of International Concern (PHEIC) by the Director General of WHO on 8 August 2014 on the recommendation of the Emergency Committee. The Committee met for the fifth time on 9 April 2015 and concluded that the event continues to constitute a PHEIC and recommended that all previous temporary recommendations should be extended. The Committee strongly reiterated the need for continued exit screening in the affected countries for at least 42 days after the last case has twice tested negative for Ebola.

There are now concerns about the risk of outbreaks of vaccine-preventable diseases in the Ebola-affected countries. The interruption of immunisation activities since the start of the epidemic has resulted in the accumulation of susceptible individuals in Guinea, Liberia and Sierra Leone. There is an ongoing outbreak of measles in Guinea, and there is a risk of vaccine-preventable diseases spreading in all three countries.

Main conclusions

The significant drop of EVD cases in West Africa will only continue if control efforts are maintained. A resurgence of the epidemic remains possible. Transmission may continue at low intensity due to incomplete contact tracing and the inadequate management of new infections. Failing to interrupt all chains of human-to-human transmission would have far-reaching consequences for the entire West African region. Surveillance, contact tracing and active case-finding should be strengthened, with the goal of reaching zero cases as soon as possible.

The risk of EVD spreading between affected countries and into the countries sharing borders with Guinea and Sierra Leone will remain as long as transmission continues in these countries because of frequent cross-border movement of people and insufficient Ebola surveillance at some border crossings.

It is expected that the need for repatriation and medical evacuation will decrease as the epidemic continues to decline, and fewer international staff will be engaged in caring for EVD patients. However, continued vigilance is essential in order to ensure that re-entry standards do not lapse.

The risk of EVD being imported into the EU and the risk of transmission from an imported case remains very low as a result of the range of risk reduction measures that have been put in place by the Member States and the affected countries. However, if a symptomatic case of EVD presents in an EU Member State, secondary transmission to caregivers in the family and in healthcare facilities cannot be excluded.

There is a need to consider conducting catch-up vaccination campaigns for measles and polio in order to promptly reduce the risk of outbreaks and re-establish routine childhood immunisation services. It is also urgent to restore public trust in the healthcare system and increase the utilisation of clinical and preventive health services.

Source and date of request

Internal decision, 4 May 2015.

Public health issue

Re-assessment of the risk of importation of Ebola virus to the EU and its potential transmission in the wake of Liberia becoming a non-affected country, confirmed by WHO on 9 May 2015, and 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 [4]. Detailed information about the Ebola virus and the epidemiology of EVD can be found in a series of ECDC publications available on the ECDC website [4-13].

Consulted experts

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Epidemiological update

As of 8 May 2015 (week 19), WHO reported 26 683 confirmed, probable and suspected cases of Ebola virus disease (EVD), including 11 022 deaths in two affected countries (Guinea and Sierra Leone) and seven previously affected countries (Mali, Nigeria, Senegal, Spain, the United Kingdom (UK), the United States of America (USA) and Liberia) [14,15].

Guinea: In the week from 27 April until 3 May 2015, transmission was centred in the prefecture of Forecariah, the only one that reported confirmed cases (nine). The nine reported cases over the last week are widely distributed over five sub-prefectures. Four out of nine cases were registered contacts. Of the five cases that were not previously registered contacts, none have so far been linked to known cases. Investigations are still ongoing. The five confirmed deaths in the community due to Ebola are still about half of the number of deaths due to Ebola. The 36 unsafe burials in seven different prefectures remains a high risk for further transmission.

According to the WHO Ebola situation report, it seems that the number of confirmed cases and of community deaths have been plateauing in the past five weeks. During the past week, 4% of the 374 samples tested were positive for Ebola, including repeated tests. The average time between the symptom onset and hospitalisation has been stable in the past months at around 3.2 days.

Sierra Leone: The decrease in case numbers continued, with nine new confirmed cases in the week from 27 April to 3 May. The chains of transmission are centred in the prefectures of Kambia (five cases) and Western Area Urban (four cases), including the capital Freetown. Three of the nine cases were identified post mortem during investigations of community deaths. Only two were registered contacts of a previous case and five were found to have an epidemiological link to a known transmission chain.

According to the WHO situation report, there was a dramatic decrease in the number of cases five weeks ago. Since then, the situation has been plateauing with around 10 cases reported per week. A similar trend can be seen in the number of community deaths. During the past week, 1 654 laboratory tests were performed of which 0.5 % were positive for Ebola. The average time between onset of symptoms and admission has decreased from four days in the previous months to 1.3 days in March.

Liberia: The country was declared Ebola free on Saturday 9 May 2015 [1]. Heightened vigilance is being maintained throughout the country. In the week up to 3 May, 319 new laboratory samples were tested for EVD, with no confirmed cases.

Overall: In the week from 27 April until 3 May the lowest weekly number of confirmed cases (18) yet in 2015 were reported from the affected countries. Vigilance is still needed to continue the response efforts. The focus of the response efforts is on the elimination of human-to-human transmission of the Ebola virus in the affected countries and ending the outbreak completely by tracking down every case and following-up every contact. As long as there are cases in any country, the risk of recurring outbreaks remains.

There are concerns regarding delayed secondary transmission through sexual contact with recovered patients. ECDC published a public health development [2] following new evidence of possible sexual transmission [6] of EVD several months after recovery of the potential transmitter. WHO has published 'Sexual transmission of the Ebola Virus: evidence and knowledge gaps'[3], providing interim advice for Ebola survivors.

In addition, authors from the Emory University School of Medicine published an article in the New England Journal of Medicine, reporting complications that include uveitis, developing during convalescence, although the incidence and pathogenesis of EVD-associated uveitis are unknown. They describe a patient who recovered from EVD and was subsequently found to have severe unilateral uveitis during convalescence. Viable Zaire ebolavirus (EBOV) was detected in aqueous humour 14 weeks after the onset of EVD and 9 weeks after the clearance of viraemia [17].

The rainy season started in West Africa in April, and could impair outbreak control efforts, particularly in remote and hard-to-reach areas. The start of the rainy season will increase the risk of outbreaks of other diseases, for example malaria or diarrhoea.

Distribution of cases in countries with widespread and intense transmission, as of 8 May 2015

- Guinea: 3 592 cases, of which 3 170 are confirmed, and 2 387 deaths
- Sierra Leone: 12 492 cases, of which 8 597 are confirmed, and 3 904 deaths

Countries with previously widespread and intense transmission

- Liberia: 10 564 cases, of which 3 151 confirmed, and 4 716 deaths. Liberia was declared Ebola free by WHO on 9 May 2015 [1].

Countries with an initial case (or cases), or with localised 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

All six countries have been declared Ebola-free.

Figure 1. Distribution of confirmed cases of EVD by week of reporting; Guinea, Sierra Leone and Liberia; weeks 46/2014 to 19/2015

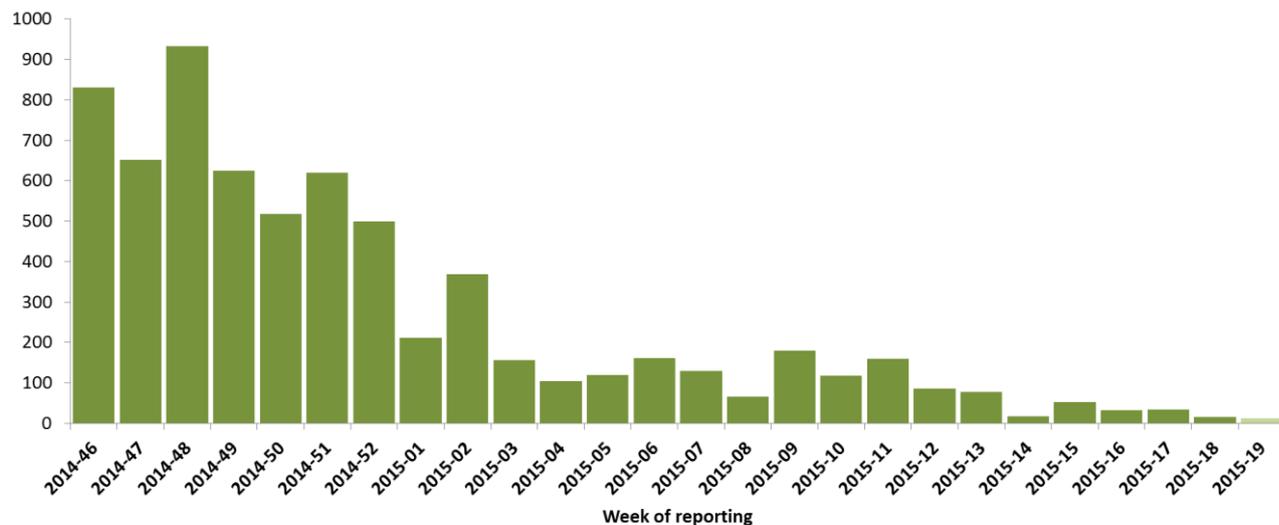


Figure 2. Distribution of confirmed cases of EVD by week of reporting; Guinea and Sierra Leone; weeks 46/2014 to 19/2015

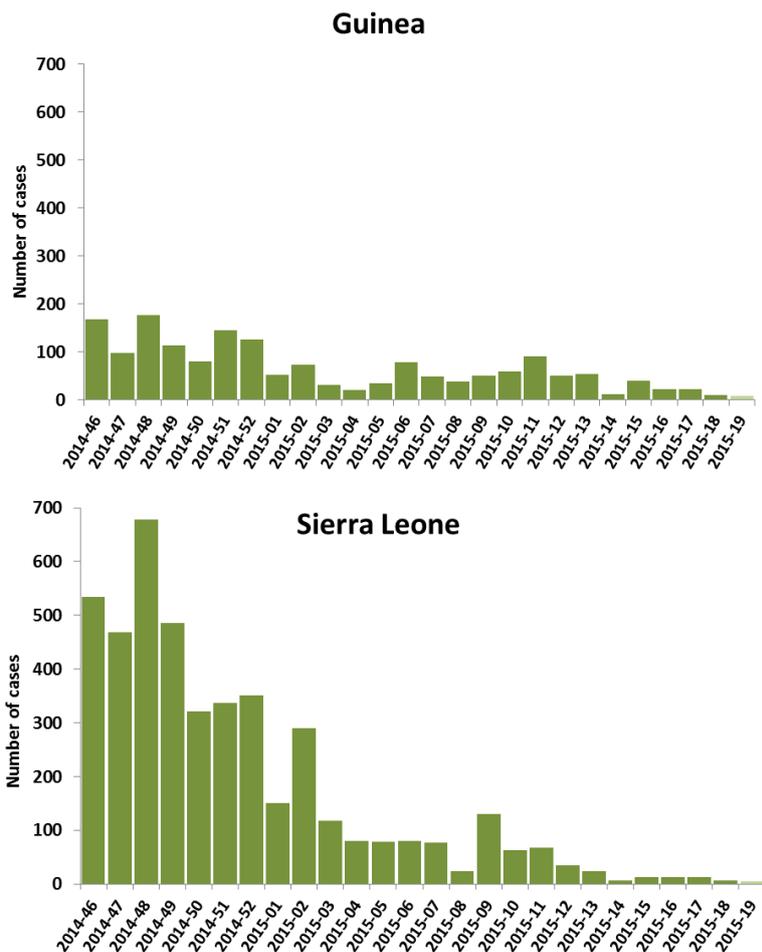
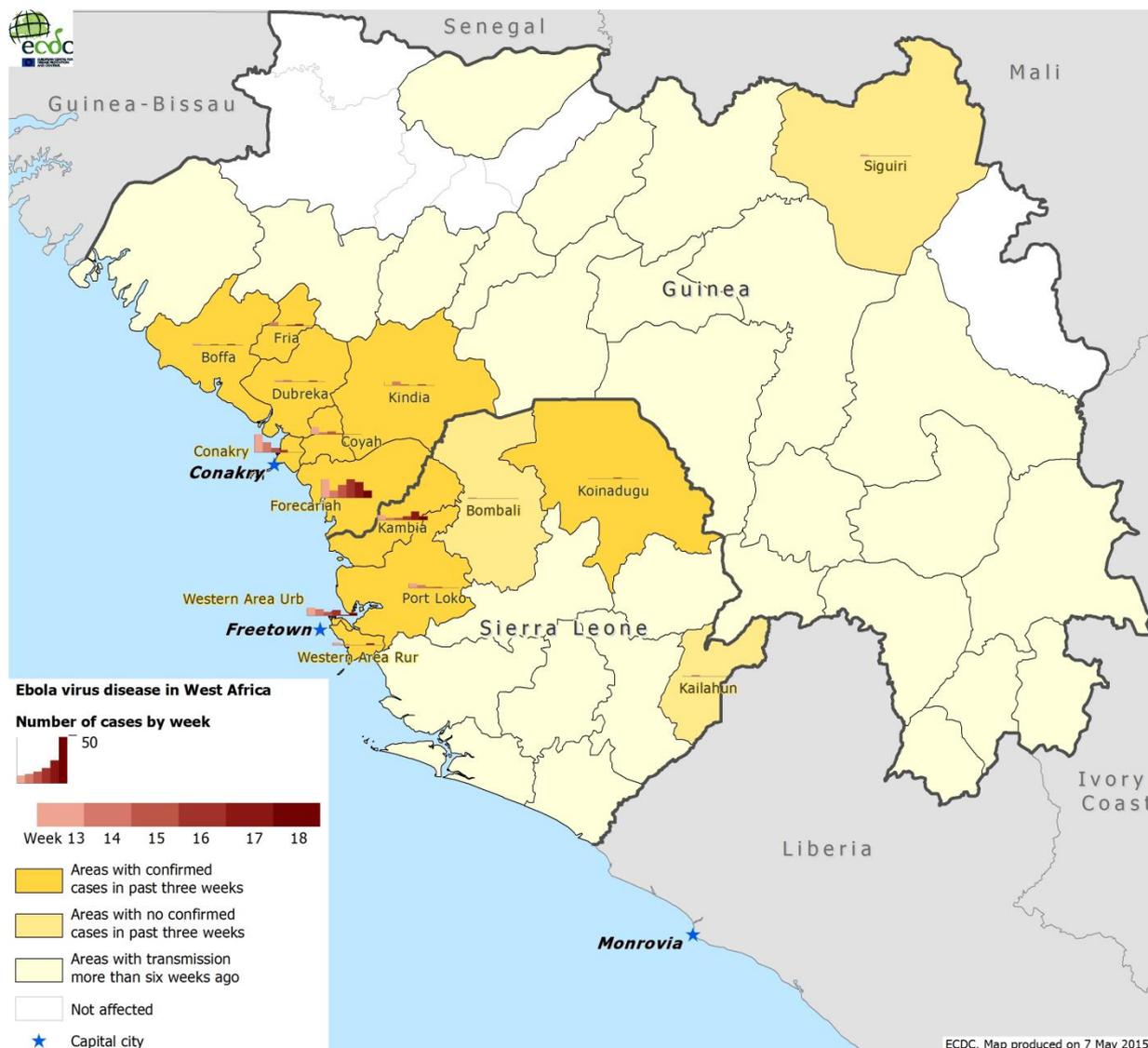


Figure 3. Distribution of cases of EVD, by week of reporting, Guinea and Sierra Leone, as of week 18/2015



Source: Data from ministries of health reports (only confirmed cases)

Healthcare workers

Up to 3 May 2015, 868 healthcare workers (HCWs) were reported to have been infected with EVD in Guinea (187), Liberia (378) and Sierra Leone (303); 507 of them succumbed to the disease.

Outside of the three most-affected countries, two Ebola-infected HCWs were reported in Mali, 11 in Nigeria, one in Spain (infected while caring for an evacuated EVD patient), two in the UK (both infected in Sierra Leone), and six in the USA (two infected in Sierra Leone, two in Liberia, and two infected while caring for a confirmed case in a Texas hospital).

Table 1. Number of Ebola cases and deaths among healthcare workers, as of 3 May 2015

Country	Cases	Deaths
Guinea	187	94
Liberia	378	192
Mali	2	2
Nigeria	11	5
Sierra Leone	303	221*
Spain	1	0
United Kingdom	2	0
United States	6	1
Total	890	515

* Data as of 17 February 2015

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

Risk for outbreaks of vaccine-preventable diseases

Routine surveillance and routine childhood vaccination services and planned catch-up vaccination campaigns have been interrupted in Guinea, Liberia and Sierra Leone as a result of the Ebola outbreak, and there is an increasing risk of outbreaks of vaccine-preventable diseases, particularly measles. Measles is highly transmissible and has the potential for explosive outbreaks. A recent study published in Science [18] estimates that there were approximately 778 000 unvaccinated children between nine months and five years in the three countries at the beginning of the Ebola epidemic. An additional 20 000 children became susceptible to measles every month that Ebola disrupted routine vaccinations. In the year before the outbreak, up to 127 000 cases of measles could have been expected in the region. An additional 100 000 cases, including 2 000 to 16 000 deaths, can now be expected due to the eighteen months during which routine immunisation services have been disrupted.

As of 29 April, 1 539 suspected cases and seven deaths were reported from current outbreaks of measles in Guinea [19]. In light of the decline in Ebola cases and due to the fact that the risk of vaccine-preventable disease outbreaks outweighs the risk of increased Ebola virus transmission, intensified routine vaccination activities and/or vaccination campaigns need to be conducted while at the same time maintaining all recommended infection prevention measures.

Medical evacuations and repatriations from EVD-affected countries

Since the beginning of the epidemic and as of 7 May 2015, 65 individuals were evacuated or repatriated worldwide from the EVD-affected countries. Of these, 38 individuals were evacuated or repatriated to Europe. Thirteen were medical evacuations of confirmed EVD-infected patients to Germany (3), Spain (2), France (2), the UK (2), Norway (1), Italy (1), the Netherlands (1), and Switzerland (1). Twenty-five asymptomatic persons were also repatriated to Europe as a result of exposure to Ebola in West Africa to the following countries: the UK (13), Denmark (4), Sweden (3), the Netherlands (2), Germany (1), Spain (1) and Switzerland (1).

Twenty-seven persons were evacuated to the United States.

Table 2. Medical evacuations by country of origin as of 7 May 2015

Evacuated to	Evacuated from			Status	
	Sierra Leone	Liberia	Mali	Confirmed	Exposed
Germany	3	1	0	3	1
Spain	1	1	1	2	1
France	1	1	0	2	0
United Kingdom	15	0	0	2	13
Norway	1	0	0	1	0
Italy	1	0	0	1	0
Netherlands	2	1	0	1	2
Switzerland	2	0	0	1	1
Denmark	4	0	0	0	4
Sweden	3	0	0	0	3
USA	22	5	0	7	20
Total	55	9	1	20	45

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 [20], the risk of infection through daily interaction in the community is low if visitors and long-term residents adhere to the recommended precautions. The declining number of new EVD cases over the past weeks has additionally reduced the already low probability of exposure to Ebola-infected persons. People who visit friends and relatives in the affected countries are at higher risk because they are likely to have more and closer contacts in the community and participate in activities known to be associated with Ebola virus transmission.

Exposure in healthcare settings

- The risk of exposure to EVD in healthcare facilities is still present. The level of risk is related to how well infection control measures are implemented and the nature of the care required. The risk is neither 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 HCWs and volunteers who provide assistance in settings where infection control measures are not fully or incorrectly implemented. The risk is extremely high for HCWs who carry out invasive medical procedures or provide care to EVD patients without proper infection control measures and personal protective equipment [21].

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.

If the downward trends continue in Guinea and Sierra Leone, the likelihood of EVD-infected individuals arriving in the EU is expected to decrease correspondingly. However, as long as the epidemic continues, the possibility of 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 likely to identify a traveller with possible Ebola infection than screening 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, who could develop symptoms during the flight or after arrival in the EU.

The WHO 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 [22].

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 [23]. Revisions on the travel advice for Liberia are likely to be given considering the country has been declared Ebola free [1]. ECDC has removed Liberia from the list of affected countries that are considered in the case definition of EVD in the EU [24], as an epidemiological criterium.

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

It is likely that the need for repatriations and medical evacuations will decrease as the epidemic continues to decline and fewer international staff are 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 small. Investigations must take into account other diseases than EVD to determine the cause of the fever, which could be caused by, 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 for 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 also diminishes.

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 the risks from infected individuals seeking medical care in the EU/EEA.

Options for risk reduction

The risk reduction measures for individual protection and the options for mitigating the risk of importation and spread in the EU recommended in previous risk assessments remain valid [20].

Reduction of the risk of infection in West Africa

To reduce the risks of EVD infection, non-essential travel to the affected areas should be avoided. WHO does not recommend any travel or trade restrictions to the affected countries [25].

Visitors and residents in EVD-affected areas should strictly follow precautionary measures:

- avoid contact with symptomatic patients and their bodily fluids
- avoid contact with corpses and/or bodily fluids from deceased patients
- avoid contact with wild animals (including primates, monkeys, forest antelopes, rodents and bats), both alive and dead, and consumption of bush meat
- wash hands regularly, using soap or antiseptics.

Generic precautions for travelling in West African countries also apply to the prevention of EVD infection or the mitigation of its consequences:

- wash and peel fruit and vegetables before consumption
- avoid unprotected sexual intercourse
- avoid habitats which might be populated by bats, such as caves, isolated shelters or mining sites
- identify appropriate in-country healthcare resources prior to travelling
- ensure that your travel insurance covers medical evacuation in the event of illness or accident in order to limit exposure to local health facilities.

Following the declaration of the Public Health Event of International Concern (PHEIC) on 8 August 2014, WHO recommended the following measures:

- Affected countries are requested to conduct exit screening of all persons at international airports, seaports and major land crossings for unexplained febrile illness consistent with potential Ebola infection. Exit screening would not detect an incubating passenger who has not yet developed fever [26]. The WHO 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.
- There should be no international travel of known Ebola cases or contacts of cases, unless the travel is part of an appropriate medical evacuation. To be fully effective, this measure should restrict asymptomatic contacts of EVD cases from leaving the EVD-affected country on an international flight until the 21-day incubation period has passed.

Screening of travellers

Some EU Member States implemented entry screening to complement the exit screening protocols in place in the affected countries. Complementing exit screening with entry screening may be considered:

- when there are doubts about the efficiency of exit screening
- to detect any individual who develops a fever between the time of departure and the time of arrival. This could be considered in particular for long-haul flights with multiple connections, extending beyond 12 hours.

Complementing temperature screening with a visual review and a health questionnaire may be considered:

- to increase the performance of screening relying only on temperature screening
- to identify possibly contagious travellers missed by temperature screening
- to identify travellers who had high-risk exposure so they can be monitored or quarantined.

Travel restrictions and passenger screening on arrival at sea ports, airports or ground crossings in non-affected countries that do not share borders with affected countries is currently not recommended by WHO [26]. In view of the decreasing risk of EVD-infected passengers arriving by air in the EU, entry screening measures implemented by the United Kingdom, Belgium and France should be reviewed.

Healthcare settings

To reduce the risk of transmission in the EU following importation of Ebola virus, the following options are available:

- Implementation of infection control measures for EVD during the treatment of cases. Transmission to healthcare workers can be prevented by the strict application of infection control measures as recommended by WHO. According to WHO guidelines [21], the following measures are essential for the safe medical care of EVD patients:
 - Isolation rooms with dedicated bathroom
 - Availability of personal protective equipment
 - Personnel adequately trained to use the equipment
 - HCWs returning from affected areas have a different probability of exposure than general travellers. They should be given pertinent information upon their return. In addition, they should undergo an individual exposure assessment as early as possible. ECDC published a document on the public health management of HCWs returning from Ebola-affected areas [27].
 - A document entitled 'Assessing and planning for medical evacuation flights to Europe for patients with EVD and people exposed to Ebola virus' provides decision-makers with additional information when there is a perceived need to medevac an infected or exposed person from an Ebola-affected country to an EU Member State [28].

Public health measures

- contact tracing and contact management of contacts of a case. ECDC has produced a document for the management of those who had contact with EVD cases [29].
- raising awareness and sensitising healthcare workers in the EU about EVD, and supporting them with resources that will help them identify and manage potential EVD patients.
- additional information and communication to travellers departing from EVD-affected countries.
- raising awareness among returning travellers from affected areas, or any person having had a contact with probable or confirmed cases, about disease symptoms and appropriate actions (self-isolation and seeking medical care mentioning potential exposure).

Options for information and communication

In order to minimise the time between onset of symptoms and isolation and diagnosis, people who return from Ebola-affected areas should be informed about:

- the possibility of exposure to Ebola while in the affected countries
- the clinical presentation of the disease and the need to seek immediate medical care if symptoms develop
- the need to immediately disclose their travel history when seeking medical care, and to preferably do so before arriving at a healthcare facility
- the need to indicate possible contact with sick individuals or wild animals while in the EVD-affected country
- how to contact public health authorities for support if infection is suspected (leaflets, phone numbers, telephone hotline).

In addition, healthcare providers in the EU should be informed of and sensitised about:

- the possibility of EVD among returning travellers from affected areas
- the clinical presentation of the disease and the need to inquire about travel history and contacts with family and friends visiting from EVD-affected countries
- the availability of protocols for the ascertainment of possible cases and procedures for referral to healthcare facilities
- the imperative need for strict implementation of barrier management, use of personal protective equipment and disinfection procedures, in accordance with specific guidelines and WHO infection control recommendations when providing care to suspected EVD cases [21,30].

Healthcare providers and support staff should be provided with training before caring for EVD patients (e.g. stress management). ECDC has developed guidance for supporting healthcare providers and public health authorities in the EU to identify and manage potential EVD patients.

ECDC resources

- Ebola and Marburg fevers – factsheet for health professionals [31]
- ECDC Rapid Risk Assessment: Outbreak of Ebola virus disease in West Africa, 8th update, 18 November 2014 [12]
- ECDC Rapid Risk Assessment: Outbreak of Ebola virus disease in West Africa, 9th update, 30 January 2015 [13]
- Assessing and planning medical evacuation by air to the EU for patients with Ebola virus disease and people exposed to Ebola virus [32]
- Case definitions for Ebola patients in the EU [33]
- Algorithm for the laboratory diagnosis of Ebola virus disease [34]
- Contact management algorithm [35]
- Public health management of healthcare workers returning from Ebola-affected areas [27]
- Public health management of persons having had contact with Ebola virus disease cases in the EU – update [29]
- Options for preparing for gatherings in the EU in the context of the current outbreak of EVD in West Africa [36].

Supporting information

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): *Zaire ebolavirus*, *Sudan ebolavirus*, *Reston ebolavirus*, *Tai Forest ebolavirus* and *Bundibugyo ebolavirus* [31, 37]. The current outbreak in West Africa is caused by *Zaire ebolavirus*.

Treatment and vaccine development

Supportive care, including rehydration with oral or intravenous fluids, and treatment of specific symptoms improves survival. There is as yet no proven treatment available for EVD. However, several potential treatments including blood products, immune therapies and drug therapies are currently being evaluated. No licensed vaccines are available yet, but potential vaccines are undergoing human safety and efficacy testing. Effectiveness trials to prevent Ebola virus infection were initiated in March 2015.

Additional information is available on the ECDC website

http://ecdc.europa.eu/en/healthtopics/ebola_marburg_fevers/Pages/treatment-vaccines.aspx

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