RAPID RISK ASSESSMENT

Ebola virus disease outbreak in North Kivu and Ituri Provinces, Democratic Republic of the Congo – fourth update

16 April 2019

Main conclusions

As of 10 April 2019, the Ministry of Health of the Democratic Republic of the Congo (DRC) has reported 1 206 Ebola virus disease (EVD) cases, including 1 140 confirmed and 66 probable cases. This epidemic in North Kivu and Ituri Provinces is the largest ever recorded in the DRC and the second largest worldwide. A total of 764 deaths occurred during the reporting period. As of 11 April 2019, 87 healthcare workers have been reported among the confirmed cases, including 31 deaths. As of 10 April 2019, the overall case fatality was 63%. Since week 12 of 2019, the weekly number of cases has increased to more than 50, ranging from 52–73 cases per week. Viral circulation in the community is persistent, but the epidemiological situation varies among affected health zones. From 21 March–10 April 2019, 12 different health zones reported confirmed or probable EVD cases. While the majority of the cases have been reported in urban settings, cases have also been reported in rural health zones surrounding urban centres. This suggests that transmission is also ongoing in rural areas.

Despite the impressive mobilisation of EVD response actors, significant challenges remain in this complex setting, marked by a long-term humanitarian crisis and an unstable security context. According to WHO, the combination of several factors is responsible for the continued increase in cases during recent weeks, notably persistent community reluctance and resistance to Ebola response activities, suboptimal infection prevention and control (IPC) practices in primary healthcare, incomplete contact tracing and follow-up, continuing nosocomial infections, including those among healthcare workers, delays in detection and isolation of new cases and community deaths leading to potential exposure of relatives to EVD. Efforts are on-going to strengthen community-led efforts to support key EVD prevention and control interventions. Outbreak response activities continue in order to offer high-quality case management, perform ring vaccination campaigns, provide the community with safe and dignified burials, ensure points of entry screening, promote strategies to increase engagement and ownership by affected communities and reduce the dissemination of misinformation surrounding EVD and the ongoing response efforts. It is expected that new EVD cases will be reported in the coming weeks and a wider geographical extension is still possible given the prolonged humanitarian crisis in the region, important cross-border population flows to and from neighbouring provinces and countries and adverse impact of security incidents and persistence of community reluctance and resistance that hinders the implementation of EVD prevention and control measures.

The probability that EU/EEA citizens living or travelling in EVD-affected areas of the DRC will be exposed to the virus is low provided they adhere to recommended precautionary measures.

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There are no international airports in the affected areas of the DRC that offer direct flights to EU/EEA Member States, which limits the risk of the virus being introduced into the EU/EEA. The overall risk of introduction and further spread of the Ebola virus within the EU/EEA remains very low. However, the risk can only be eliminated by stopping transmission at the local level in the DRC.

Options for response

EU/EEA visitors and residents of affected areas

EU/EEA visitors and residents in EVD-affected areas are at low risk of becoming infected in the community if the precautionary measures below are followed:

- avoid contact with symptomatic patients/their bodily fluids, corpses and/or bodily fluids from deceased patients
- avoid consumption of bush meat and contact with wild animals, both alive and dead
- wash and peel fruit and vegetables before consumption
- wash hands regularly using soap or antiseptics; and
- ensure safe sexual practices.

Screening of travellers

To reduce the likelihood of EVD being introduced into the EU/EEA, the following options for response can be considered:

- Where exit screening is implemented at an airport, a traveller presenting with symptoms (e.g. fever >38°C) should not be allowed to board a flight.
- A passenger who develops EVD-compatible symptoms while on board a commercial flight should be isolated and his/her condition ascertained upon arrival. Should the passenger be confirmed as having EVD, contact tracing of passengers should be initiated in accordance with the recommendations for aircraft contact tracing set out in the RAGIDA guidelines[1].
- Travellers who have stayed in a recently affected area should be made aware that if they develop symptoms compatible with EVD within 21 days after arrival in an EU/EEA Member State, they should self-isolate, contact health services and mention potential exposure to the Ebola virus. Secondary transmission to caregivers in the family and in healthcare facilities cannot be ruled out if no measures are taken for infection prevention and control.

Options for information and communication

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

- the possibility of exposure to Ebola while in 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; and
- how to contact public health authorities for support if infection is suspected.

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

- the possibility of EVD among returning travellers from affected areas
- the clinical presentation of the disease and need to enquire 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; and
- 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 EVD cases.

[1] *ECDC risk assessment guidelines for diseases transmitted on aircraft. Available at: http://ecdc.europa.eu/en/infectious-diseases-public-health/travellers-health/infectious-diseases-aircraft*

Source and date of request

ECDC round table request, 11 April 2019.

Public health issue

This is the fourth update of a rapid risk assessment originally produced on 9 August 2018 [1]. This rapid risk assessment addresses the public health risk associated with the current Ebola virus outbreak in the DRC and its implications for EU/EEA citizens. This update was triggered by an increase of EVD transmission in the affected areas over recent weeks, the persistent occurrence of new cases among contacts unknown at the time of EVD diagnosis, the occurrence of a substantial number of cases outside of the ring vaccination contacts and current challenges for the prevention and control of EVD.

Consulted experts

ECDC experts: Tamas Bakonyi, Olivier Briet, Sergio Brusin, Dragoslav Domanovic, Laura Espinosa, Josep Jansa, Kari Johansen, Teymur Noori and Johanna Young.

Directorate-General for European Civil Protection and Humanitarian Aid Operations (ECHO) expert: Ian Van Engelgem (ECHO DAKAR).

Experts from WHO reviewed the risk assessment, but the views expressed in this document do not necessarily represent the views of WHO.

Disease background information

Infections with Ebola viruses cause a severe disease in humans called Ebola virus disease (EVD). Ebola viruses are highly transmissible through direct contact (e.g. through mucous membranes or broken skin) with organs, blood or other bodily fluids (e.g. saliva, urine, vomit) of living or dead infected persons or any surfaces and materials soiled by infectious fluids. The principal mode of transmission in outbreaks among humans is person-to-person through direct contact with symptomatic or dead cases, as well as indirect contact via their infectious body fluids. Further information on EVD is available in the previous risk assessments [1–3], the ECDC factsheet about Ebola and Marburg fevers [4], the WHO fact sheets on Ebola virus disease [5], the ECDC technical reports on 'Public health management of persons having had contact with Ebola virus disease cases in the EU' [6] and on 'Infection prevention and control measures for Ebola virus disease, management of healthcare workers returning from Ebola-affected areas' [7]. Additional information regarding therapy and vaccines can be found in the ECDC update on treatment and vaccines for Ebola virus disease and in the WHO FAQs on EVD vaccine [8–10]. No vaccine is currently available for tourists visiting the DRC [8].

Event background information

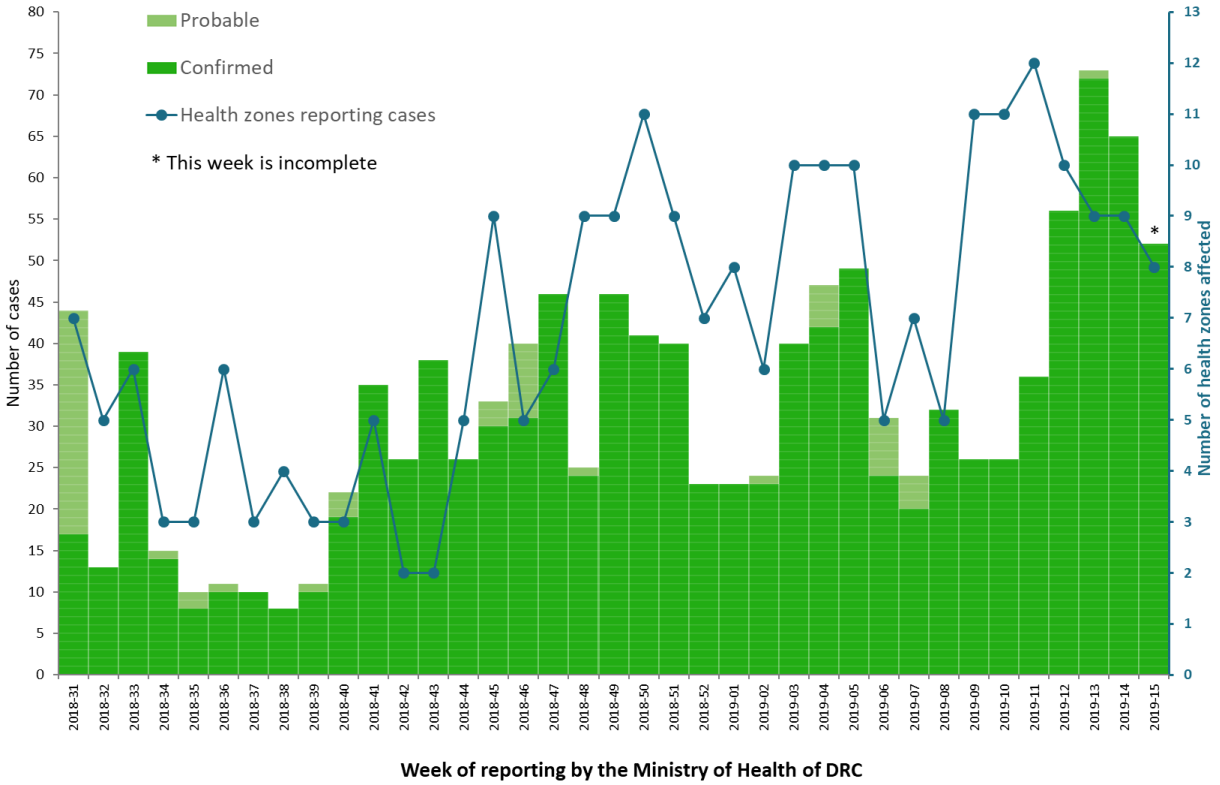
On 1 August 2018, the Ministry of Health of the Democratic Republic of the Congo (DRC) reported to WHO an EVD outbreak in North Kivu Province with four laboratory-confirmed cases [11]. This report was triggered by the identification the previous week, on 28 July 2018, of a cluster of 26 cases of acute haemorrhagic fever (with 20 deaths) in Mabalako Health Zone in North Kivu. Further retrospective investigation identified sporadic cases and deaths compatible with EVD since May 2018 [12].

This is the 10th EVD outbreak in the DRC since the discovery of the virus in 1976. The results of the phylogenetic analysis of the causative *Zaire ebolavirus* species (ZEBOV) in the North Kivu outbreak revealed that there is no link between the current outbreak and the earlier outbreak in Équateur Province in 2018 [13,14].

The epidemic in North Kivu and Ituri Provinces is the largest ever recorded in DRC and the second largest worldwide. Since 11 May 2018 and as of 10 April 2019, the Ministry of Health of the DRC has reported 1 206 cases of EVD, including 1 140 confirmed and 66 probable [15]. A total of 764 deaths have occurred during the reporting period (overall case-fatality ratio of 63%). As of 9 April 2019, of the 1 186 cases with reported age and gender, 57% were female and 29% were under 18 years old [16]. Among the reported cases, 87 were healthcare workers, of which 31 died [16].

The epidemic curve of confirmed and probable EVD cases is presented by date of reporting in Figure 1. It shows cases reported until 10 April 2019. It is worth noting that data for week 15 of 2019 in Figure 1 is incomplete, which is probably why the number of reported cases appears to have decreased in the last week. Nevertheless, the epidemic curve by date of reporting, presented in Figure 1, shows an increase in the occurrence of EVD cases during recent weeks.

Figure 1. Distribution of confirmed and probable EVD cases and health zones reporting cases by week of reporting in North Kivu and Ituri Provinces, DRC, as of 10 April 2019



Note: As the Ministry of Health of the DRC is regularly curating data, these figures are likely to change in the coming days.
Source: Adapted from the Ministry of Health of DRC [17].

Since the start of the outbreak, 21 health zones in two provinces have reported confirmed or probable EVD cases:, Beni, Biena, Butembo, Lubero, Mabalako, Manguredjipa, Masereka, Mutwanga, Musienene, Oicha, Kalunguta, Katwa, Kayna, Kyondo and Vuhovi health zones in North Kivu Province and Bunia, Nyankunde, Komanda, Mandima, Rwampara and Tchomia health zones in Ituri Province (Table 1, Figure 2). Table 1 presents the number of EVD cases per health zone in the affected provinces.

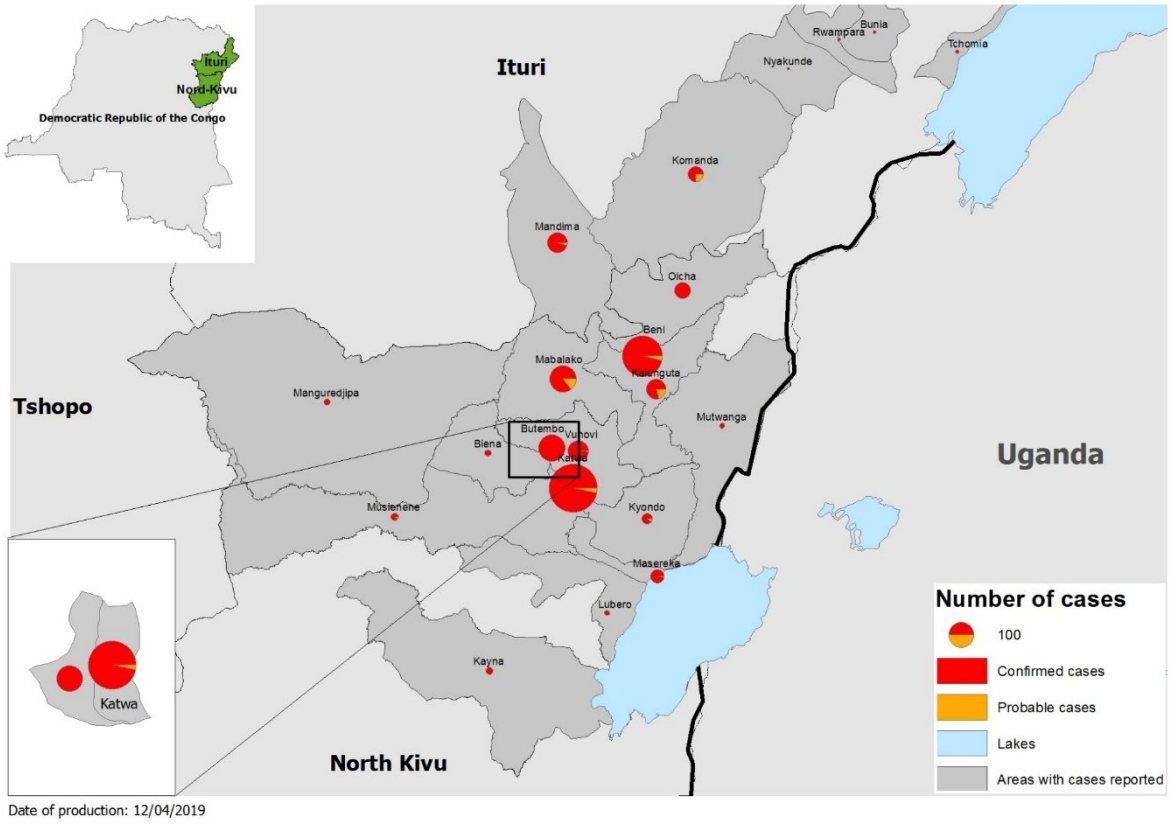
Table 1. Number of EVD cases by health district, 11 May 2018–10 April 2019

Health district	Number of confirmed cases	Number of probable cases	Confirmed and probable cases		Number of deaths	
			Sum	%	Sum	%
North Kivu	**1 046**	**54**	**1 100**	**91.2**	**696**	**91.1**
Katwa	359	11	370	30.7	250	32.7
Beni	249	9	258	21.4	138	18.1
Butembo	109	0	109	9.0	107	14.0
Mabalako	93	16	109	9.0	73	9.6
Vuhovi	67	1	68	5.6	25	3.3
Kalunguta	49	13	62	5.1	35	4.6
Oicha	40	0	40	3.3	20	2.6
Masereka	29	1	30	2.5	11	1.4
Kyondo	16	2	18	1.5	14	1.8
Kayna	8	0	8	0.7	3	0.4
Musienene	8	1	9	0.7	4	0.5
Biena	6	0	6	0.5	8	1.0
Manguredjipa	5	0	5	0.4	4	0.5
Lubero	4	0	4	0.3	1	0.1
Mutwanga	4	0	4	0.3	3	0.4
Ituri	**94**	**12**	**106**	**8.8**	**68**	**8.9**
Mandima	61	3	64	5.3	44	5.8
Komanda	28	9	37	3.1	19	2.5
Tchomia	2	0	2	0.2	2	0.3
Bunia	1	0	1	0.1	1	0.1
Nyakunde	1	0	1	0.1	1	0.1
Rwampara	1	0	1	0.1	1	0.1
Total	1 140	66	1 206	100	764	100

Source: Adapted from the Ministry of Health of the DRC [17].

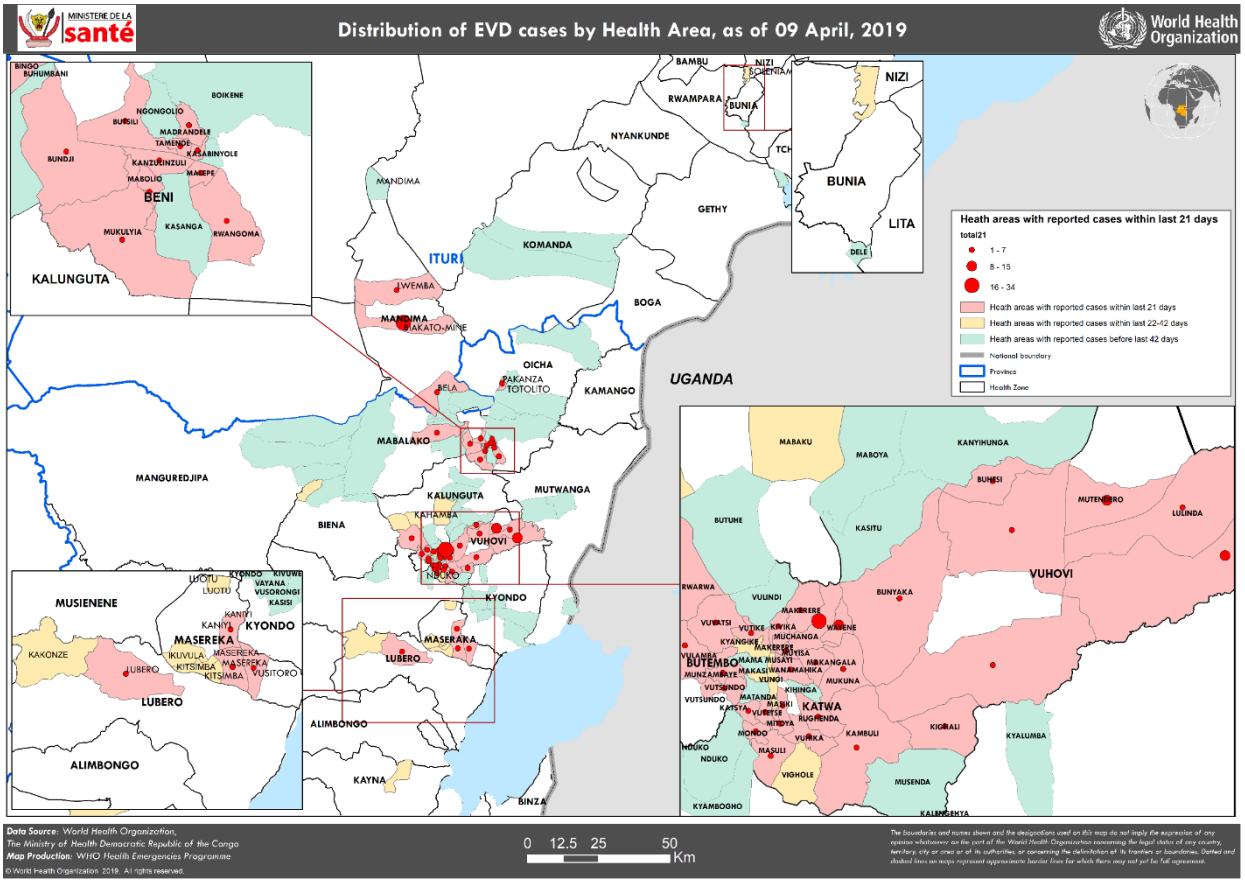
The most affected health zone since the beginning of the outbreak is Katwa, with 359 confirmed and 11 probable cases. In the last 21 days (21 March–10 April 2019), Katwa, Vuhovi and Mandima have reported the highest number of cases: 62% of the 214 confirmed cases reported. Within this same time period, Mandima reported 26 new confirmed cases and Beni reported 21 new confirmed cases. All previously affected health zones in North Kivu Province have reported new confirmed cases within the last 21 days apart from Biena, Kayna, Manguredjipa and Mutwanga. In addition, in Ituri Province, only Komanda and Mandima reported new confirmed cases in the last 21 days (Figures 2,3).

Figure 2. Geographical distribution of EVD cases by health zone, North Kivu and Ituri Provinces, DRC, since the beginning of the outbreak, as of 12 April 2019



Source: Adapted from the Ministry of Health of the DRC [17].

Figure 3. Detailed map on geographical distribution of EVD cases by health areas in the last 21 days, North Kivu and Ituri Provinces, DRC, as of 9 April 2019



Source: WHO Disease Outbreak News [16]

ECDC threat assessment for the EU

This is the first EVD outbreak of ZEBOV detected in North Kivu and Ituri Provinces. To date, this outbreak, which has now been ongoing for at least 10 months, is the largest outbreak of EVD ever recorded in the DRC and the second largest worldwide.

Since week 12 of 2019, the weekly number of cases has increased to more than 50, ranging from 52–73, demonstrating a persistence of the viral circulation in the community (Figure 1). While Katwa and Vuhovi health zones are now the main epicentres of the outbreak, 13 different health zones reported EVD cases in the last 21 days (21 March–10 April 2019; Figure 2). Since the previous risk assessment (with data as of 6 February 2019), the total number of affected health zones since the start of the outbreak has increased by three (Lubero, Bunia and Rwampara) from 18 to 21. Even though the majority of cases are reported in urban settings, EVD cases reported in surrounding rural health zones suggest ongoing transmission in several rural areas. Previously affected health zones remain under enhanced surveillance in order to promptly detect reintroductions from neighbouring health zones and local flare-ups of EVD cases.

WHO and EVD response partners, under the coordination of the DRC government, are supporting the implementation of EVD prevention and control measures. From 8 August 2018–6 April 2019, the EVD ring vaccination campaign successfully managed to vaccinate around 96 133 individuals and contacts of contacts in the DRC despite the volatile security context and logistical challenges [18]. According to the preliminary results of the EVD vaccine study, the estimated efficacy was 97.5%, 95% CI [95.8–98.5%]. The estimated vaccine efficacy for those with onset of illness 10 days or more post-vaccination is 97.5%, 95% CI [92.4–99.1%] and those with EVD regardless of illness onset timing 88.1%, 95% CI [79.9–92.9%] [19]. The ring vaccination strategy has probably countered a wider spread of the disease in the community and is a major asset for the control of this long-lasting EVD outbreak. However, the success of ring vaccination depends on vaccination coverage of the entire contact network (contacts and contacts of contacts) and local healthcare workers [20,21]. The recent increase in cases has put an additional strain on vaccination teams. Several rings could not be fully vaccinated because of community resistance and security concerns. The Strategic Advisory Group of Experts (SAGE) revisited the possible vaccination strategies and concluded that ring vaccination currently remains the most effective strategy in this DRC Ebola

outbreak. In addition, epidemiological data from North Kivu for infants under 1 year of age and lactating women was reviewed. Although clinical data on the safety and efficacy of the live attenuated recombinant VSV-ZEBOV-GP Ebola vaccine for these two specific groups are absent, SAGE determined at its April 2019 meeting that the reported high attack rates and case fatality in these two groups and increasing data on vaccine safety and efficacy for other groups justify inclusion of children who are above the age of 6 months and breastfeeding women in ongoing ring vaccination efforts in North Kivu [22]. Finally, WHO SAGE strongly urged the implementation of studies to evaluate additional Ebola candidate vaccines, including where possible their use in pregnant and lactating women as well as infants. CEPI (Coalition for epidemic preparedness innovations) is currently coordinating several stakeholders in support of clinical trials to be conducted with additional Ebola candidate vaccines [23].

Further efforts of the EVD response include the Points of Entry programme, case management with investigational therapeutics as part of a randomised controlled trial available in the Ebola treatment centres and a revised IPC strategy endorsed by the Ministry of Health [24]. In addition, the recent shift in the response strategy to promote greater engagement and ownership by affected communities aims to achieve positive effects. According to WHO, this may help slow the spread of EVD in outbreak areas in the coming weeks [24].

Despite the impressive mobilisation of EVD response actors, significant challenges remain in this complex setting marked by a long-term humanitarian crisis and unstable security context with attacks on Ebola treatment centres targeted directly at the Ebola response. According to WHO, the combination of several factors has driven the persistence of Ebola virus circulation in the community during recent weeks, notably [16]:

- An increase of population movement and mistrust of Ebola response teams and activities in several areas is resulting in a recurrent temporary suspension and delays of case investigation and response activities in affected areas, hampering a comprehensive contact listing and follow-up of all EVD contacts. Complete contact tracing, defined by WHO as the identification and follow-up of persons who may have come into contact with a person infected with the Ebola virus, is essential because it allows timely and comprehensive implementation of both ring vaccination and early isolation of symptomatic individuals. However, population mistrust and movement, limited access to areas with volatile security and, to a certain extent, vaccination hesitancy result in an incomplete inventory of contacts. These factors therefore challenge critical EVD response pillars based on the early isolation of EVD cases and ring vaccination strategy. As a consequence, the majority of new cases occur among contacts unknown at the time of EVD diagnostics, hampering the comprehensive mapping of active chains of EVD transmission and a complete coverage of the ring vaccination strategy.
- Recently reported persistence in community deaths and long delays between the onset of symptoms and isolation. These significantly increase the risk of transmission in the community by extending the period of infectious individuals staying in contact with their family and community networks. Intensification of active case finding in health facilities and communities together with activities to build and maintain a trusting relationship between communities and Ebola response teams are ongoing to gain community confidence in EVD response activities, improve the coverage of contact follow-up and favour early referral of suspected cases from the community.
- Recurrent instances of EVD cases observed among health workers from primary healthcare facilities and hospitals (around 7% of all EVD cases since the start of the outbreak) and symptomatic cases seeking care at several healthcare facilities prior to isolation in specialised Ebola treatment centres. The resulting increased probability of nosocomial EVD transmission may have amplified the outbreak in association with primary healthcare. This emphasises the need to continuously enhance IPC programmes focussing on healthcare professionals (including those working in private and informal capacities) at all primary care facilities and hospitals in the affected and surrounding health zones.

According to Médecins Sans Frontières and WHO, determining the evolution of the outbreak has been made difficult by the fact that many new cases are not linked to any previously known chain of transmission at the time of initial investigation/diagnostics [25,26]. However, upon further investigation, many of those cases are eventually linked through subsequent investigation to a previous EVD case. The occurrence of EVD case clusters in conflict zones with limited healthcare infrastructure and in geographically difficult areas with a highly fluid population is of major concern for the prompt control of the outbreak. Furthermore, other outbreak-prone diseases could potentially jeopardise the availability of resources for the prevention and control of the EVD epidemic.

It is expected that new EVD cases will continue to be reported in the coming weeks and a wider geographical extension is still possible given the prolonged humanitarian crisis in the region, intensive cross-border population flows to and from neighbouring provinces and countries and observed adverse impact of security incidents and community resistance, hindering the implementation of EVD prevention and control measures.

On 28 September 2018, WHO upgraded the assessment of the public health risk to very high at national and regional levels in relation to the security context and significant population movements within the region, including those between neighbouring countries. However, the global risk was assessed as low [16]. On 12 April 2019, the International Health Regulations (IHR 2005) Emergency Committee advised for the second time not to declare this outbreak as a Public Health Emergency of International Concern but advised that 'special emphasis should be placed on addressing the rise in case numbers in the remaining epicentres', 'to identify, target, and scale up community

dialogue and participation, engagement of traditional healers, and other community engagement tactics to strengthen and broaden community acceptance' and 'the need to follow the recommendations of SAGE with regards to the vaccination strategy provided at its latest meeting' [27]. As of 11 April 2019, WHO still advises against any restriction of travel to and trade with the DRC based on currently available information and the WHO risk assessment remains valid [16,24,28].

Risk to EU/EEA citizens living or travelling in DRC

The probability that EU/EEA citizens living or travelling in EVD-affected areas of the DRC will be exposed to the virus remains low provided they adhere to the recommended precautionary measures outlined above under 'Options for response'. To date, no travel-associated EVD cases have been reported among travellers returning to Europe from the DRC in 2018 and 2019. The risk may increase with the upward trend if the number of cases and difficulties in applying control measures persist or worsen.

Staff members of humanitarian, religious and other organisations and healthcare workers in particular who are in direct contact with patients and/or local communities in the affected areas are more likely to be exposed to the virus. EU/EEA citizens working for humanitarian aid organisations remain at low risk provided they strictly adhere to recommended precautionary measures. Training on occupational health and safety in EVD-affected areas can be found on the WHO ePROTECT webpage and in ECDC's tutorial aiming to provide trainers with practical information on different options for the use of personal protective equipment in healthcare settings in Europe [29,30].

Risk of introduction and spread within EU/EEA

The most likely route by which the virus could be introduced into the EU/EEA is through infected travellers from affected areas travelling to Europe. Since the number of people from the affected areas travelling to the EU/EEA is small, there are no international airports in the affected areas with direct flights to EU/EEA Member States and exit screening is in place at Goma airport, the risk of EVD-infected individuals arriving in the EU/EEA is very low.

An EVD-infected traveller or medical evacuee arriving in the EU/EEA would pose a very low risk of further spread because the majority of the EU/EEA Member States have the capacity to detect and manage imported EVD cases at a very early stage. However, the risk can only be eliminated by stopping transmission at the local level in the DRC.

During the substantially larger EVD outbreak in West Africa in 2014 (approximately 28 600 cases and 11 300 deaths), only one local transmission occurred in the EU/EEA (in Spain): a healthcare worker attending to an evacuated EVD-infected patient [31].

Specific risks related to transmission through substances of human origin

A full assessment of the risk of EVD transmission through substances of human origin was published in May 2018 [32,33].

Disclaimer

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