

# Joint UKBTS Professional Advisory Committee (¹)

## Position Statement

Ebola virus

July 2021

**Approved by:** Standing Advisory Committee on Transfusion Transmitted Infections

***July 2021- The contents of this document are believed to be current. Please continue to refer to the website for in-date versions.***

## **Background**

Ebola viruses (EBOV) are members of a group (or genus) of viruses that cause Ebola disease (EBOD), of which the most well-known is *Ebolavirus* (EBOV; formerly *Zaire ebola virus*). EBOV was first identified in 1976 in what is now the Democratic Republic of the Congo. The associated illness is referred to as Ebola virus disease (EVD).

EVD is a serious acute illness. The average case fatality rate is approximately 50%, but may vary from 25-90% depending on the level of available supportive care, the patient's immune response.

EVD is a zoonosis. Although not yet proven, fruit bats are thought to be the natural Ebola virus hosts with non-human primates and other animals serving as intermediate hosts. Transmission of Ebola virus from animal reservoirs to humans was previously uncommon, and the increase in the number of outbreaks of EVD in the last 20 years is likely due to the closer proximity of human habitats to Ebola reservoirs as well as deforestation and climate change. The exact mechanism of EBOV spill over from animals to humans has not been elucidated, but once this has occurred inter-human transmission is through direct (or indirect e.g. soiled bedding) contact with the blood and body fluids of an infected individual. The virus is geographically restricted to the endemic areas where its host species reside. Occasional cases have been reported outside Africa – these are usually healthcare/laboratory acquired or associated infections.

Since 1976 there have been over 20 recorded outbreaks of EVD, mainly in Central Africa (Democratic Republic of the Congo 2021, 2018-2020, 2017, 2014, 2012), Uganda (2011, 2012), Republic of Congo (2005), Sudan (2004). The most recent outbreak in the DRC was declared on February 7<sup>th</sup> 2021 in the North Kivu region, which was the area afflicted with the largest ever DRC outbreak from 2018 to 2020.

Outbreaks generally occur sporadically and irregularly, and cannot be predicted. Earlier outbreaks were largely contained and controlled because they occurred either in less populated areas where isolation of infected individuals was possible or for individual cases imported into countries with developed healthcare systems, full isolation of the patients was possible. The West African EVD outbreak in 2013-16 however, which centred on Sierra Leone, Guinea and Liberia, has been the largest outbreak to date, with 28 000 cases and 11 000 deaths. The global response, providing multi-national support and intervention ultimately brought an end to the epidemic and provided further insights into EVD but unfortunately another EVD outbreak was declared in Guinea on February 14<sup>th</sup> 2021 (and declared over June 19<sup>th</sup> 2021).

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## Modes of Transmission

Although transfusion-transmission is theoretically possible, at this time there have not been any reports of cases in affected countries. It is assumed an infected and infectious donor would be symptomatic and thus unlikely to donate, however, asymptomatic infections have been described. Depending on the assay used and the extent of exposure EBOV IgG has been detected in 2.5% - 45.9% of contacts in seroprevalence studies. Transmission is seen frequently within families, within hospitals, and during some mortuary rituals where contact among individuals becomes more likely. Exposure to infected patients and their body fluids puts healthcare workers at a high risk of infection unless appropriate procedures are followed. As data emerges on the use of e.g. monoclonal therapies and vaccines for both pre- and post-exposure prophylaxis the burden of EVD in HCW will hopefully decline in the future. Although only a few cases of sexual transmission have been reported, Ebola virus nucleic acid has been found to persist in semen for over a year after recovery from EVD, and is an important mode of transmission in the convalescent period. Indeed, transmission of EBOV due to persistence in body fluids such as semen, has recently been described as a cause of 'flare-ups' and clusters of EVD in regions where active transmission was thought to have ceased. Of importance, recrudescence and relapse of infection due to persistence of EBOV RNA at immune-privileged sites (e.g. the central nervous system) has been described. Furthermore, recent studies have shown serological evidence of reactivation in one-third to one-half of recovered individuals. The implication for onward transmission under these circumstances is unclear. Transmission through food (with the possible exception of bush meat) and water does not occur. Outside of controlled laboratory experiments, spread of Ebola via aerosols is very rare.

## Management of EVD

EVD is mostly managed with good supportive care. The major antigenic target of EBOV vaccines is the glycoprotein GP. 'Ervebo® or rVSVΔG-ZEBOV-GP (live-attenuated recombinant vesiculo stomatitis virus)' vaccine when utilised in a 'ring' vaccination strategy resulted in complete protection against EVD 10 days (or more) after vaccination if contacts of EVD cases were vaccinated 'immediately'. The vaccine was approved by the FDA and European Commission for use in the 2018 DRC EVD outbreak, again contacts and secondary contacts were vaccinated with promising results. ZMapp has been used in the management of EVD. However, the PALM and MEURI studies which commenced in the DRC August 2018 demonstrated a statistically higher probability of survival in the mAb114 (monoclonal antibody from an EVD survivor) and/or REGN-EB3 (a triple murine monoclonal antibody cocktail) arms compared to the ZMapp or Remdesivir arms. Potential EVD therapies are still the subject of on-going research.

Although countries with Ebola virus outbreaks are generally not major tourist destinations, travel to and within these countries does occur, and there may be some migration to the UK and other European countries. Ebola virus outbreaks, excepting any potential person to

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person transmission in a healthcare setting when an infected individual has been moved to a non-affected country for treatment, have been identified only in countries that are also malarious. Therefore, all individuals who have been in affected areas will be excluded from blood or tissue donation for four months after their return to the UK under current UK donor/donation malaria guidelines. Individuals who have ever been infected with Ebola virus are permanently excluded from donating, with the exception of those who are donating immune (convalescent) plasma for therapeutic use on patients with EVD. Potential blood donors who are contacts of those who have been infected with Ebola will be excluded for six months from last contact. Data to suggest that EBOV can be found in privileged sites in survivors and which could potentially lead to EVD transmission resulted in the Advisory Committee for Dangerous Pathogens (ACDP) updating their EBOV guidance. In response SaBTO updated guidance for deferral of potential tissue and cell donors who had been in contact with an infected individual, was under investigation for EBOV or who has been in contact with an individual that was present in an area during an active outbreak, implementing a precautionary permanent deferral. Similarly, a permanent deferral of blood donors who have ever been a sexual contact of an EVD survivor is advised, because relapsed EVD in the survivor creates a risk of onward transmission even after a significant interval of recovery.

Ebola serology could be useful to identify risk (asymptomatic individuals who could present as donors and sexual contacts of asymptomatic individuals) although the current issue is finding reliable CE-marked Ebola serology assays. Only infected individuals who had been viraemic (symptomatic or asymptomatic) would have virus in immune-privileged sites, and if viraemic the individual would become sero-positive. Due to the introduction of vaccines in high-risk populations, serological assays would need to distinguish vaccinated from naturally immune individuals.

### **Convalescent (immune) plasma**

As with many viral infections, those who recover from EVD develop antibodies which then may confer a degree of protection against further exposure to Ebola virus. One of the Ebola treatment approaches has been the infusion of plasma from recently infected and recovered individuals: convalescent or immune plasma. In theory, the antibodies present in the plasma would neutralise virus circulating in an infected individual, helping to reduce viral load and consequently reduce the load on the individual's immune system, with the overall aim of helping to ensure recovery.

The use of convalescent plasma from survivors has long been instituted in EVD outbreaks. However, a large study in Guinea in 2015 did not demonstrate a difference in mortality between treated and untreated patients regardless of the estimated dose of neutralising antibody.

Countries affected by Ebola virus are shown in the Geographical Disease Risk Index (GDRI) and any associated Change Notifications.

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