

Contextual data

Key question: Should health workers who have had EVD exposure other than high-risk be excluded versus not excluded from work?

We collected the contextual data in light of the following preliminary answers to the key question:

- *Key answer 1:* There is very limited data to support the practice of identifying health workers with low/intermediate risk of EVD infection from a checklist of EVD exposure based upon patient care activities. As such, one cannot choose between letting these health workers continue working or excluding them from work using the existing evidence.
- *Key answer 2:* As requested, we considered EVD vaccine as a potential effect modifier in answering the key question. It turned out that the RING vaccination approach can *eliminate* the risk of EVD acquisition among health workers (under controlled conditions in randomized controlled trials, for example), even with a reasonably long delay of vaccination after EVD exposure (e.g., 3 weeks). As such, the RING vaccination approach is suggested as the evidence-based intervention for this key question.

Summary

Contextual data pertaining to key answer 1 are displayed in the table below; key findings are summarized below. (N.B. contextual data pertaining to key answer 2 will be provided subsequently, on Thursday April 21, 2022).

Implementation:

Consider the practicality of implementing the risk assessment of list of patient care activities with many items without the supporting evidence. The review team found it was challenging matching the risk assessment data (e.g., odds ratio estimate of seropositivity) with the prescribed care activities.

Health workers had numerous risk factors for virus exposure in ETUs, other areas of the hospital, and in the community, making it difficult to ascertain where Ebola infection occurred.[1] As such, comprehensive assessment of EVD exposure may be challenging and the sensitivity of the prescribed care activities for the detection of Ebola infection is uncertain.

An important feature of the Kikwit outbreak was that health care facility workers with jobs that in most settings do not usually involve patient contact appear to have had broader job descriptions, including patient contact.[2]

Health workers with low/intermediate EVD exposure were active monitored and those with high-risk exposure quarantine, with considerations regarding whether all contacts accepted these measures.[3]

Resources/costs:

Health workers with EVD exposure signifies basic deficiencies in implementation of and adherence to core IPC practices. Building IPC capacity will generally be of great benefit to the safety of patients and health workers.[4]

Appropriate infection control precautions and personal protective equipment should be available.[5]

Impact on health equity:

As observed in previously reported outbreaks from other African countries, including the concurrent outbreak in West Africa sub region, females were the most affected. This may be explained by the role that the female gender plays in care giving and nursing in our society, thereby exposing them to infection.[6]

Social and legal implications:

Recent EVD outbreaks had a huge psychological impact on both the members of affected communities and those caring for infected individuals. This suggests the necessity for relief care providers to be mentally prepared to respond to such disasters and for them to be taken care of while in the field. “When we left for Monrovia we had made our wills; I made it three times and tore it up three times and the fourth one went through. As you approach Monrovia, you pray and you pray, and as the planes arrive, you wonder what to expect.”[7]

The WHO and International Labor Organization recommend that HWs with EVD and MVD resulting from work activities should have the right to compensation, as well as free rehabilitation and access to curative services.[8]

Acceptability:

Acceptability of the risk assessment using the list of patient care activities may be important since the risk assessment may rely on self-reporting. We however could not identify any contextual data relevant to the acceptability of elements of the risk assessment (see Table).

RefID	Year	Study methods	Findings relevant to the extraction of contextual data	Data type	Contextual data
[4]	2015	Retrospective descriptive study of HCW with confirmed/suspected Ebola	<p>Over half of infected HCWs (153) were nurses; others included laboratory staff (19, 6.5 %), doctors (9, 3.1 %), cleaners and porters (9, 3.1 %), Community Health Officers (8, 2.7 %), and pharmacists (2, 0.7 %). HCW infections were mainly reported from the Western Area (24.9 %), Kailahun (18.4 %), Kenema (17.7 %), and Bombali (13.3 %) districts. Almost half of the infected HCWs (120, 47.4 %) believed that their exposure occurred in a hospital setting. Others believed that they were exposed in the home (48, 19 %), at health centres (45, 17.8 %), or at other types of health facilities (13, 5.1 %). Only 27 (10.7 %) of all HCW infections were associated with Ebola virus disease (EVD) isolation units. Over half (60 %, 150) of infected HCWs said they had been trained in infection prevention and control prior to their infection, whereas 34 % (85) reported that they had not been so trained.</p>	Implementation	The interviewees perceived common factors contributing to HCW infection in their districts to be the following: “negligence” (defined as non-adherence to basic IPC rules) and “overconfidence” (defined as a feeling of knowing the rules despite the opposite being true) of HCWs, both often resulting in breaches in IPC protocol; inadequate supervision; delayed and inadequate IPC training; inadequate supplies of IPC materials; poor triage systems at their health facilities.
				Implementation	Concerning mode of exposure, 55 % of respondents said that exposure was through general medical and nursing care of infected persons. Other modes of infection were direct body contact with an EVD patient, contact with a contaminated surface, transport of an EVD patient, or during removal of personal protective equipment (PPE) (Table 3). The most common types of exposure were parenteral (e.g., needle stick injury) and direct contact of mucous membranes with infectious material (Table 3). Blood and body fluid containing visible blood were the two most common types of infectious materials involved, and most respondents identified their hands as the body part that had been contaminated (Table 3).
				Implementation	The level of awareness among infected HCWs about IPC and the availability of IPC facilities and policies in the health facilities where they worked at the time of their infection provide insight into the factors contributing to the occurrence of EVD infection among HCWs. A significant percentage of infected HCWs reported having been trained in IPC prior to their infection (Table 5). Of those who were trained, 69 % had received only basic IPC training and 31 % were trained as part of their general medical or nursing education. Furthermore, 60 % of the trained HCWs said they had been trained during the outbreak. Many respondents reported an IPC policy in place at their workplace at the time of their infection, and a large percentage reported available hygiene stations or facilities. A few respondents reported a functional triage system at their facility. However, several of the infected HCWs working in a hospital setting said that there were no IPC policies at their workplace (Table 5).
			Most HCW infections are associated with general health care and home settings but not with dedicated EVD settings.	Acceptability	This result may also help alleviate the significant stigmatisation of HCWs working in such EVD facilities in Sierra Leone, which includes family and community rejection, isolation, and violence
			A sizable percentage (34 %) of infected HCWs interviewed had not been trained in basic IPC at the time of their infection.	Resources/Costs	HCW acquisition of EVD signifies basic deficiencies in implementation of and adherence to core IPC practices. Building IPC capacity will generally be of great benefit to the safety of patients and HCWs.

[6]	2015	Field investigation. Study included all confirmed and probable cases	The most frequent exposure type was direct physical contact in 70% of all cases and 73% among health care workers. The total case-fatality was 40%; higher among healthcare workers (46%) compared with non-healthcare workers (22%).	Health equity	As observed in previously reported outbreaks from other African countries, including the concurrent outbreak in West Africa sub region, females were the most affected [3-5, 7, 12-15]. This may be explained by the role that the female gender plays in care giving and nursing in our society, thereby exposing them to infection. [1-5].
[5]	2014	CDC Mortality Morbidity Weekly Report of a rapid evaluation of Ebola outbreak	Five cases of Ebola among HCWs at an ETU and an adjacent hospital in Monrovia, Liberia, did not have an identifiable common source of exposure or chain of transmission. However, opportunities existed for transmission of Ebola virus to HCWs in this cluster, including HCW exposure to unrecognized, infected patients outside of the ETU, inadequate use of personal protective equipment during cleaning and disinfection of environmental surfaces in hospital A, and potential transmission from an ill HCW to another HCW in the ETU or hospital A. No evidence was found of any previously unrecognized mode of transmission.	Implementation	Health care workers in ETUs who have clinical, cleaning, or disinfection responsibilities in other settings might be exposed to infected persons or contaminated surfaces in those settings. Hospital emergency departments should be alert to quickly recognize and isolate persons with suspected Ebola. Appropriate infection control precautions and personal protective equipment should be available.
[1]	2016	Analyzed data from the Sierra Leone National Viral Hemorrhagic Fever Database, contact tracing records, Kenema Government Hospital (KGH) staff and Ebola Treatment Unit (ETU) rosters, and burial logs.	600 cases of EVD originated in Kenema District, including 92 (15%) HWs, 66 (72%) of whom worked at KGH. Among KGH medical staff and international volunteers, 18 of 62 (29%) who worked in the ETU developed EVD, compared with 48 of 83 (58%) who worked elsewhere in the hospital. Thirteen percent of HWs with EVD reported contact with EVD patients, while 27% reported contact with other infected HWs. The number of HW EVD cases at KGH declined roughly 1 month after implementation of a new triage system at KGH and the opening of a second ETU within the district. The case fatality ratio for HWs and non-HWs with EVD was 69% and 74%, respectively.	Resources/Costs	Appropriate infection control precautions and personal protective equipment should be available.
				Implementation	Most HWs with EVD in Kenema had numerous risk factors for virus exposure in ETUs, other areas of the hospital, and in the community, making it difficult to ascertain where Ebola infection occurred.
				Implementation	Most HWs with EVD in Kenema had numerous risk factors for virus exposure in ETUs, other areas of the hospital, and in the community, making it difficult to ascertain where Ebola infection occurred. Furthermore, informal discussions with many of the KGH HWs with EVD revealed no discrete infecting events, such as needle-sticks or fluid splashes to mucous membranes, suggesting that such events were not central to the high attack rates in this group.
[7]	2017	A literature review and field experiences	Occupational exposure to blood and other body fluids due to inadequate use of personal protective equipment and needle stick or sharp injuries are among factors that contribute to the occurrence of OEVD.	Resources/Costs	It is critical to strengthen the general health care system and improve occupational safety in medical settings of countries at risk.
				Social/Legal Implications	Recent EVD outbreaks had a huge psychological impact on both the members of affected communities and those caring for infected individuals. This suggests the necessity for relief care providers to be mentally prepared to respond to such disasters and for them to be taken care of while in the field. "... When we left for Monrovia we had made our wills; I made it three times and tore it up three times and the fourth one went through. As you approach Monrovia, you pray and you pray, and as the planes arrive, you wonder what to expect. ..."
				Implementation	Occupational safety and health in the Sub-Saharan African countries is still a neglected concept, and percutaneous exposure to blood or other body fluids, as well as rates of occupational needle stick and sharp injuries among HCWs are high.

[9]	2018	Systematic review	Ninety-four articles related to 22 outbreaks were included. HW infections composed 2%–100% of cases in EVD and 5%–50% of cases in MVD outbreaks. Among exposed HWs, 0.6%–92% developed EVD, and 1%–10% developed MVD. HW infection rates were consistent through outbreaks. The most common exposure risk situations were inadequate personal protective equipment and exposure to patients with unrecognized EVD/MVD.	Social/Legal Implications	The WHO and ILO recommend that HWs with EVD and MVD resulting from work activities should have the right to compensation, as well as free rehabilitation and access to curative services
[10]	2017	Observational study of transmission chain	All 142 confirmed and probable EVD cases registered were fully resolved in the transmission chain. 72.5% of all the EVD cases in the district were exposed in the community, 26.1% exposed during funerals, and 1.4% exposed in the health facility setting. Health-care workers contributed little to the EVD outbreak. 71.1% of EVD transmission occurred among family members. Female EVD cases generated more secondary cases than their male counterparts did (P = 0.03).	Health equity	Female EVD cases generated more secondary cases than their male counterparts did (P = 0.03).
[11]	2016	Contact tracing and risk factors assessment	Eighty-two contacts were identified: 64 health care workers, 7 caregivers, 4 patients, 4 newborns, and 3 children of patients. Seven contacts became symptomatic and tested positive for EVD: 2 health care workers (1 nurse and 1 hospital cleaner), 2 caregivers, 2 newborns, and 1 patient. The infected nurse placed an intravenous catheter in the pediatric index patient with only short gloves PPE and the hospital cleaner cleaned the operating room of the maternity ward index patient wearing short gloves PPE. Delayed recognition of EVD and inadequate PPE likely led to exposures and secondary infections.	Implementation	Aggregate exposure data from both outbreaks demonstrate that high-risk exposures that increase the likelihood for contact with body fluids (eg, performing exams, taking vital signs, cleaning body fluid spills or other potentially contaminated surfaces, and performing invasive procedures) in the absence of recommended PPE were commonly reported by health care workers in these facilities.
[12]	2014	CDC Mortality Morbidity Weekly Report of EVD Cases Among Health Care Workers Not Working in Ebola Treatment Units	Ninety-seven cases of Ebola (12% of the estimated total) were identified among HCWs; 62 HCW cases (64%) were part of 10 distinct clusters in non-ETU health care facilities, primarily hospitals. Early recognition and diagnosis of Ebola in patients who were the likely source of introduction to the HCWs (i.e., source patients)* was missed in four clusters.	Implementation	Inconsistent recognition and triage of cases of Ebola, overcrowding, limitations in layout of physical spaces, lack of training in the use of and adequate supply of personal protective equipment (PPE), and limited supervision to ensure consistent adherence to infection control practices all were observed.
[13]	2020	Aerosurvey among HCW	We conducted a serosurvey among HCW in Boende, Tshuapa Province, Democratic Republic of Congo. Human anti-EBOV glycoprotein IgG titers were measured using a commercially available ELISA kit. We assessed associations between anti-EBOV IgG seroreactivity, defined as ≥ 2.5 units/mL, and risk factors using univariable and multivariable logistic regression. Results. Overall, 22.5% of HCWs were seroreactive for EBOV. In multivariable analyses, using any form of personal protective equipment when interacting with a confirmed, probable, or suspect EVD case was negatively associated with seroreactivity (adjusted odds ratio, 0.23; 95% confidence interval, .07–.73).	Implementation	While it is likely that some of the participants were exposed to EBOV while working during the outbreak, we cannot confirm when and where exposure may have occurred.
[2]	1999	Serologic Survey among Hospital and Health Center Workers	From May to July 1995, a serologic and interview survey was conducted to describe Ebola hemorrhagic fever (EHF) among personnel working in 5 hospitals and 26 health care centers in and around Kikwit, Democratic Republic of the Congo. Job-specific attack rates estimated for Kikwit General Hospital, the epicenter of the EHF epidemic, were 31% for physicians, 11% for technicians/room attendants, 10% for nurses, and 4% for other workers.	Implementation	An important feature of the Kikwit outbreak was that health care facility workers with jobs that in most settings do not usually involve patient contact appear to have had broader job descriptions, including patient contact. Whether this phenomenon predated the epidemic or whether it occurred in response to the epidemic is not clear; however, it does emphasize the need for prompt recognition and confirmation of EHF outbreaks and implementation of appropriate infection control measures detection and prevention of Ebola hemorrhagic fever by everyone in contact with patients.

[3]	2015	First secondary case of Ebola outside Africa: epidemiological characteristics and contact monitoring, Spain	On 6 October 2014, a case of Ebola virus disease (EVD) acquired outside Africa was detected in Madrid in a healthcare worker who had attended to a repatriated Spanish missionary and used proper personal protective equipment. The patient presented with fever <38.6 °C without other EVD-compatible symptoms in the days before diagnosis. No case of EVD was identified in the 232 contacts investigated. The experience has led to the modification of national protocols.	Implementation	The public health measures applied immediately to the contacts of the secondary case in Madrid included active monitoring of low-risk contacts and quarantine for high-risk contacts. All contacts accepted these measures. However, in the future it may be necessary to apply the quarantine to more people or to contacts who refuse to be quarantined. In our opinion, it is necessary to develop procedures and laws, which would establish and help apply the quarantine.
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