HOSPITAL AUTHORITY

CICO's Biweekly Update

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Latest Epidemiology: Ebola Virus Disease (EVD) Outbreak in the Democratic Republic of the Congo

The Democratic Republic of the Congo (DRC) declared a new outbreak of Ebola Virus Disease (EVD) in Bikoro, Equateur Province on 8 May 2018. From 4 April – 15 May 2018, a total of 44 EVD cases, including 23 deaths and three healthcare workers (case fatality rate = 52%) have been reported. All confirmed, probable and suspected cases were reported from the Bikoro, Iboko and Wangata health zone. This is the 9th EVD outbreak in DRC since the discovery of the virus in 1976. The previous EVD outbreak in DRC was in May 2017.

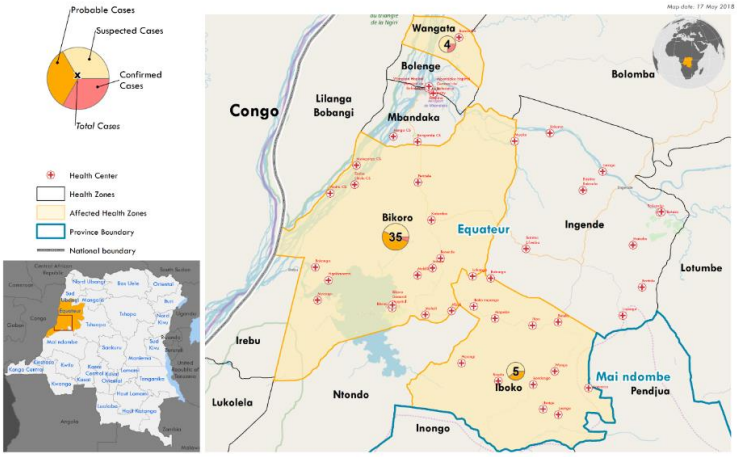


Figure 1: Geographic distributions of the EVD outbreak in DRC

Subsequent response actions have been taken by WHO, such as active surveillance, mobile laboratory and rapid diagnostic test deployment, onsite expert assessments and preposition of emergency kits. WHO currently considers the public health risk to be low at the international level.

HA has also prepared for the threat of EVD, including the 90-day stockpile of personal protective equipment (PPE) and its training, as well as essential laboratory testing. The updated communication kit for staff is now available on the EVD webpage.

Ebola virus disease vaccine

Recombinant Vesicular Stomatitis Virus-Zaire Ebola Virus, rVSV-ZEBOV, an experimental Ebola vaccine has shown to be highly protective against the Ebola virus. This product was studied in a trial involving over 11,000 volunteers in 2015 and has been deemed safe for use in humans based on available results that showed high efficacy among those vaccinated. This trial was conducted by WHO in collaboration with other international partners. WHO is working with the Ministry of Health to conduct ring vaccination for the outbreak in DRC.

The Ebola vaccine, with the technical name rVSVΔG-ZEBOV- GP, was developed by the Public Health Agency of Canada. It works by replacing a gene from a harmless virus known as the vesicular stomatitis virus (VSV) with a gene encoding an Ebola virus surface protein. The vaccine does not contain any live Ebola virus.

For further details: http://www.who.int/ebola/drc-2018/faq-vaccine/en/

SAVE LIVES - Clean Your Hands: Hand Hygiene Promotion in HA

On 3 May 2018, a hand hygiene promotion day was held in Kwai Chung Hospital. More than 200 staff joined the activities. A game-based learning platform named Kahoot, was adopted to create fun quiz games on hand hygiene. Staff were engaged to play multiple choice quizes using the mobile devices e.g. smartphone or iPad. This game-based approach made hand hygiene all the more attractive and engaging.

Photo 1: KCH hand hygiene promotion day on 3 may 2018

Photo 2: Staff enjoying the fun quiz game on iPad

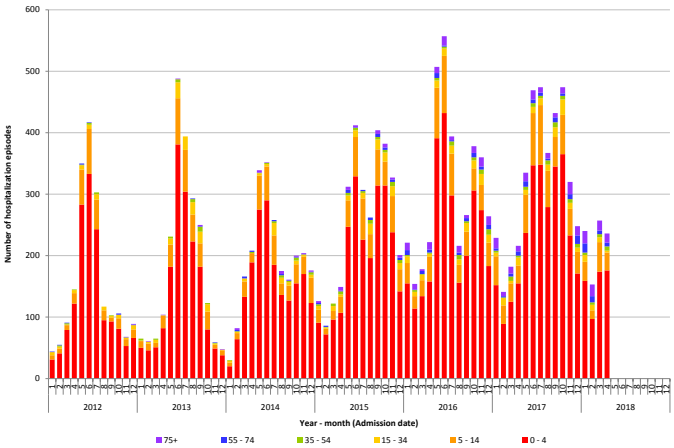
Figure 2: Hand hygiene quiz game 「潔手推廣日問答遊戲」 in Kahoot

Enterovirus activity increases to a moderate level

Enterovirus activity has been increasing for two months from approximately 150 inpatient episodes in February to 240-250 cases in the recent two months. (Figure 1) While the majority of cases (around 68% in 2018 (up to April)) were children 0-4 years old, and the percentage of elderly patients has been increasing in the recent years.

It is expected that enterovirus infection cases will progressively increase in the coming traditional peak season.

Figure 1: Hospitalization episodes with enterovirus infection by admission age (monthly by admission date)



Journal Update: Discovery on Malacidins against multidrug-resistant Gram-positive pathogens

Natural products made by cultured bacteria have been a major source of antibiotics. Recently, a class of antibiotics has been discovered from soil samples. The study provides evidence that a large untapped reservoir of antibiotics is out there in the environment. The authors also suggest that environmental mircobes are in a continuous antibiotic arms race leading to antibiotic variants capable of eluding existing resistance mechanisms.

A team of researchers undertook a sequence-guided screen of diverse soils for biosynthetic gene clusters that encode calcium binding motifs. They subsequently discovered a distinctive class of antibiotics that are commonly encoded in soil microbiomes, which they called malacidins. The malacidins were found to be active against multidrug-resistant Gram-positive bacteria (table 1).

As *Staphylococcus* infection commonly occurs on the skin, the researchers tested the in vivo efficacy of the malacidins using an animal wound model. Topical administration of malacidin A was successful in sterilizing Methicillin Resistant *Staphylococcus aureus* (MRSA) infected wounds in a rat model. At 24 hours and 72 hours post infection, malacidin A treatment resulted in no observed bacterial burdens in the wounds, which is significantly different from the vehicle-treated controls having an average of 5.5 log and 7.0 log of MRSA at 24 hours and 72 hours, respectively. Likewise, the malacidins showed no significant toxicity or haemolytic activity against mammalian cells at the highest concentrations tested (100–250 μ g ml−1, > 100 minimal inhibitory concentration, MIC).

Unlike daptomycin, which is unable to treat severe community acquired pneumonia due to loss of activity in the presence of pulmonary surfactants, malacidin A does not share this liability. After 20 days of exposure to sub-lethal levels of malacidin A, the researchers did not detect any malacidin-resistant *Staphylococcus aureus*.

Reference: Bradley MH et al. Culture-independent discovery of the malacidins as calcium-dependent antibiotics with activity against multidrug-resistant Gram-positive pathogens. Nature Microbiology. 2018, Vol 3. p. 415-422

Table 1 | Spectrum of activity of malacidin A

Organism	Acquired resistance	MIC (μg ml^{-1})	IC_{50} (μg ml^{-1})
S. aureus USA300	β-lactams (methicillin, oxacillin, penicillin)	0.2–0.8	
S. aureus USA300 + 10% serum	β-lactams (methicillin, oxacillin, penicillin)	0.2–0.8	
S. aureus COL	β-lactams	0.2–0.8	
S. aureus BAA-42	β-lactams	0.2–0.8	
S. aureus NRS100	β-lactams, tetracycline	0.2–0.8	
S. aureus NRS108	β-lactams, gentamicin, kanamycin	0.2–0.8	
S. aureus NRS140	β-lactams, erythromycin, spectinomycin	0.4–0.8	
S. aureus NRS146	β-lactams, vancomycin (VISA)	0.4–0.8	
E. faecium VRE	Vancomycin (VRE)	0.8–2.0	
E. faecium Com15		0.8–2.0	
S. pneumoniae		0.1–0.2	
S. mutans		0.1–0.2	
B. subtilis		0.2–0.4	
L. rhamnosus		0.1–0.2	
E. coli		>100	
C. albicans		>100	
C. neoformans		>100	
HEK293			>100
MRC5			>100

The data in the table are representative of the range of values determined in at least three independent experiments.