No Time to Lose

The return of Ebola
Is the world better prepared than 40 years ago?

Peter Piot

European Tribute to Stanley Falkow

Institut Pasteur
29 September 2016
“...vino che rosso avanti il focolare brilla, al fischiare della tramontana, che giunge come un fragrorno mare e s’allontana simile a sogno: quando su le strade volano foglie cui persegue il cuore...”

G. Piazzoli

BRUNELLO DI MONTALCINO

DENOMINAZIONE DI ORIGINE CONTROLLATA E GARANTITA

2011

Stanza e Lucy
Posto dove le 11.10.17
Preliminary Communications

ISOLATION AND PARTIAL CHARACTERISATION OF
A NEW VIRUS CAUSING ACUTE HÆMORRHAGIC FEVER IN ZAIRE

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An outbreak of hæmorrhagic fever with an exceptionally high mortality-rate occurred in southern Sudan during 1976. Zaire, with peak case-rates in September, caused a national Commission operated in October onward. Blood and tissues with hæmorrhagic disease in Belgium and England, and laboratories appear in the accompanied these specimens were being sen (Microbiological Research Down) sent an aliquot of an patient in Zaire (no. 718, Center for Disease Control, Aho,

Subsequent acute specimens, (African green monkey) cells. Distinct cytopathic change (focal) was evident, and an aliquot was removed for negative contrast
Age and sex distribution of Ebola cases, Zaire 1976

Infection and transmission routes
Distribution of bats suspected to reservoir Ebola

Hypsognathus monstrosus

Myonycteris torquata

Epomops franqueti
Bombali virus & Ebola in bats (Goldstein et al 2018)

- Complete genome of a new ebolavirus, Bombali virus (BOMV) detected in free-tailed bats in Sierra Leone (little free-tailed (Chaerephon pumilus) and Angolan free-tailed (Mops condylurus)).
- The bats were found roosting inside houses, indicating the potential for human transmission.
- Goldstein et al show that the viral glycoprotein can mediate entry into human cells. However, further studies are required to investigate whether exposure has actually occurred or if BOMV is pathogenic in humans.

- The government of Liberia, EcoHealth Alliance, Columbia University Mailman School identified Ebola virus in a bat in Liberia.
- Genetic material from the virus and ebolavirus antibodies against it in a Greater Long-fingered bat (Miniopterus inflatus) in Liberia’s northeastern Nimba District.
- Researchers are working to determine whether the strain found in the bat is exactly the same one associated with the 2013-2016 outbreak. The evidence so far, from about 20 percent of the virus’ genome, suggests that it is closely related.
- No human cases of Ebola are linked to this discovery.

The discovery of Bombali virus adds further support for bats as hosts of ebolaviruses

Ebola & Marburg Outbreaks in Africa

West Africa Ebola outbreak

- 23 March: WHO deployed multi-disciplinary international experts
- Mobile laboratory deployed through EDPLN
- 21 March: Laboratory confirmation
- 13 March: WHO was notified of an unknown disease in Guinea
- 31 March: Liberia declared outbreak of Ebola
- 26 May: Sierra Leone declared outbreak of Ebola
- 23 July: Nigeria declared outbreak of Ebola
- 23 August: Senegal declared outbreak of Ebola
- 23 October: Mali declared outbreak of Ebola
- 6 October: First secondary case of Ebola outside Africa: Spain
Community reactions

West Africa: Ebola Outbreak - Protection issues (as of 4 Oct)

Guinea:
- Freetown: 23 September: Six Red Cross volunteers were attacked while trying to collect the body of a person suspected to have died from Ebola. The same day, the Prefectural Dept of Health was racketed, causing many injuries.
- Bo: 11 October: A man died after setting himself on fire fearing he had infected his family with Ebola.
- Western Area: 21 October: A delegation sent to raise awareness about Ebola were killed by villagers. At least 21 people were wounded.

Sierra Leone:
- Bo: 20 September: The hospital was attacked.

Liberia:
- 3,921 Cases
- 2,199 Deaths

Cumulative Cases (4 Oct):
- Cumulative Cases: 2,727
- 831 Deaths

Movement Restrictions / Quarantine:
- Data from 10 Oct (approx.)
- Closed country / International boundaries
- Quarantined counties / movement restrictions in place

MapAction

ACAPS-Steering Note: Ebola Impact on Protection

Images by AP Images
Ebola's perfect storm

The devastating Ebola epidemic in West Africa is the result of a perfect storm: dysfunctional health services as the result of decades of war, low public trust in government and Western medicine, traditional beliefs and even denials about the cause or existence of the virus, and burial practices that involve contact with contagious Ebola-infected corpses. There are now five affected West African countries: Guinea, Liberia, Nigeria, Sierra Leone, and most recently, Senegal. Ebola has killed around 3,000 and infected more than 8,500, with over 40% of cases occurring within the past few weeks. The World Health Organization (WHO) predicts that 20,000 may become infected. This fast pace of Ebola’s spread is a grim reminder that epidemics are a global threat and that the only way to get this virus under control is through a rapid response at a massive global scale—much stronger than the current efforts.

West African governments and the international community have been slow to act in a way commensurate to a major threat to health, economics, and societal stability. It took nearly 4 months after the first patient died in December 2013 before the outbreak was confirmed as being caused by the Ebola virus. Despite multiple calls by Médecins Sans Frontières (MSF), WHO and the governments concerned only declared the epidemic a public health emergency in August 2014. Finally, national authorities populations in quarantine. This must be done while dealing with other endemic health challenges: Uninfected people are dying from treatable diseases because of closed or abandoned health facilities, the cancellation of international flights to the infected countries is creating an obstacle to international support, and there are growing concerns about sending medical help without a plan of treatment for these workers (around 150 doctors and nurses have died of Ebola, and 2,400 medical staff are infected).

This is an opportune time to accelerate clinical evaluation of experimental therapies, vaccines, and diagnostics, while respecting ethical and scientific standards for such trials. Human trials of Ebola vaccines and therapies are about to start. WHO has announced that compassionate use of experimental therapies is ethically justified, even if they have not been tested in humans. An exceptional crisis requires an exceptional response. One of the lessons from the AIDS response is that prevention has little credibility if treatment for those infected is not available. Let us hope that this is the last Ebola outbreak where all we have to offer is isolation and quarantine, instead of a vaccine and treatment.

“Let us hope that this is the last Ebola outbreak where all we have to offer is isolation and quarantine, instead of a vaccine and treatment.”

Fig. 3. Molecular dating of the 2014 outbreak. (A) BEAST dating of the six sequences: GN, Guinea; DRC, Democratic Republic of Congo; time of most recent common ancestor (MRCA): October 2002 to May 2006. (B) BEAST dating of the tMRCA of the 2014 West African epidemic: tMRCA of the Sierra Leone lineages (23 April; 95% HPD, 2 April to 13 May 2014). Posterior support for major nodes is shown.
Efficacy and effectiveness of an rVSV-vectored vaccine in preventing Ebola virus disease: final results from the Guinea ring vaccination, open-label, cluster-randomised trial (Ebola Ça Suffit!)

Dr Ana Maria Henao-Restrepo, PhD, Prof Ira M Longini, PhD, Conall H Watson, MFPH, Prof W John Edmunds, PhD, Prof Matthias Egger, PhD, Miles W Carroll, PhD, Natalie E Dean, PhD, Ibrahima Diatta, MSc, Moussa Doumbia, MD, Bertrand Draguez, MD, Sophie Duraffour, PhD, Godwin Enwere, FWACP, Rebecca Grals, PhD, Stephan Gunther, MD, Pierre-Stéphane Gsell, PhD, Stefanie Hossmann, MSc, Sara Viksmoen Watle, MD, Prof Mandy Kader Kondé, PhD, Sakoba Kéita, MD, Souleymane Kone, MSc, Eewa Kulisma, PhD, Prof Myron M Levine, MD, Sema Mandal, MD, Thomas Maugt, MBA, Gunnstein Norheim, PhD, Ximena Riveros, MSc, Aboubacar Soumah, MD, Sven Trelle, MD, Andrea S Vicari, PhD, Prof John-Arne Røttingen, MD, Marie-Paule Kieny, PhD


The NEW ENGLAND JOURNAL of MEDICINE

Evaluation of Convalescent Plasma for Ebola Virus Disease in Guinea

Johan van Griensven, M.D., Ph.D., Tanay Edwards, M.Sc., Xavier de Lamballerie, M.D., Ph.D., Malcolm G. Semple, M.D., Ph.D., Pierre Gallien, Ph.D., Sylvain Balze, Ph.D., Peter W. Horby, M.D., Ph.D., Hervé Raoul, Ph.D., F.N.F. Magassouba, Ph.D., Annick Antierens, M.D., Carolyn Lomas, M.D., Ousmane Faye, Ph.D., Amandou A. Sall, Ph.D., Katrien Fransen, M.Sc., Jozefien Buyse, Ph.D., Raffaella Ravinetto, Pharm.D., Pierre Therichon, M.D., Ph.D., Yves Cloeys, M.Sc., Maëlle De Croo, M.D., Thérèse Germain, M.D., Jean-Claude Desmonts, M.D., Ph.D., Ph.D., and the ECLAT Trial Group

A Randomized, Controlled Trial of ZMapp for Ebola Virus Infection

The PREVAIL II Writing Group, for the Multi-National PREVAIL II Study Team

A time-scaled phylogenetic tree of 262 EBOV genomes from Guinea, Sierra Leone, Liberia and Mali.
Geographic Dispersion of a Single Genetic Lineage in Sierra Leone

Source: Gire et al, Science 2014,345:6202
Early transmission and case fatality of Ebola virus at the index site of the 2013–16 west African Ebola outbreak: a cross-sectional seroprevalence survey

Joseph W S Timothy, Yper Hall, Joseph Akoï-Boré, Boubacar Diallo, Thomas R W Tipton, Hilary Bower, Thomas Strecker, Judith R Glynn*, Miles W Carroll*

- 237 participants from 27 households
- Ebola virus infection was more widespread in this spillover population than previously recognised (21 vs 11 cases) and that case fatality was lower than previously reported (55.6% vs 100% in adults)
- Their findings suggest minimally symptomatic infections were common in the West African Ebola epidemic and that a substantial portion of cases might have been undetected during the outbreak

Asymptomatic infection and unrecognised Ebola virus disease in Ebola-affected households in Sierra Leone: a cross-sectional study using a new non-invasive assay for antibodies to Ebola virus

Judith R Glynn, Hilary Bower, Sembia Johnson, Catherine F Houlihan, Carla Montesano, Janet T Scott, Malcolm G Semple, Mohammed S Bangura, Aliu Joshua Kamara, Osman Kamara, Saidu H Mansaray, Daniel Sesay, Cecilia Turay, Steven Dicks, Raoul E Guetiya Wadoum, Vittorio Colizzi, Francesco Checchi, Dhan Samuel*, Richard S Tedder

Summary

Background The frequency of asymptomatic infection with Ebola virus is unclear: previous estimates vary and there is no standard test. Asymptomatic infection with Ebola virus could contribute to population immunity, reducing spread. If people with asymptomatic infection are infectious it could explain re-emergences of Ebola virus disease (EVD) without known contact.

Methods We validated a new oral fluid anti-glycoprotein IgG capture assay among survivors from Kerry Town Ebola Treatment Centre and controls from communities unaffected by EVD in Sierra Leone. We then assessed the seroprevalence of recent Ebola virus infection using the assay in a cohort of 247 Ebola survivors and 202 controls.
Ebola Survivors

• PREVAIL study of 966 survivors of EVD and close contacts (2,350).
• Survivors of EVD had a higher prevalence of health issues:
  • more survivors than controls had abnormal abdominal, chest, neurologic, and musculoskeletal findings and uveitis.
  • Other than uveitis (prevalence at enrolment, 26.4% vs. 12.1%; at year 1, 33.3% vs. 15.4%), the prevalence of these conditions declined during follow-up in both groups.
• EBOV RNA was detected in semen samples from 30% of the survivors tested, with a maximum time from illness to detection of 40 months.
Will Ebola change the game? Ten essential reforms before the next pandemic. The report of the Harvard-LSHTM Independent Panel on the Global Response to Ebola

Suerie Moon, Devi Sridhar, Muhammad A Pate, Ashish K Jha, Chelsea Clinton, Sophie Delaunoy, Valnora Edwin, Mosoka Fallah, David P Fidler, Laurie Garrett, Eric Goosby, Lawrence O Gostin, David L Heymann, Kelley Lee, Gabriel M Leung, J Stephen Morrison, Jorge Saiavedra, Marcel Tanner, Jennifer A Leigh, Benjamin Hawkins, Liisa R Woskle, Peter Piot

Second Report of the Advisory Group on Reform of WHO’s Work in Outbreaks and Emergencies

Advisory Group on Reform of WHO’s Work in Outbreaks and Emergencies
Second Report | January 18th 2016

United Nations

General Assembly

Seventieth session
Agenda item 125
Global health and foreign policy

Protecting humanity from future health crises
Recommendations of post-Ebola panels

• Strengthening of epidemic preparedness and public health systems in countries
• Need for reform of WHO and global health governance, incl IHR
• More engagement with communities, NGOs and private sector
• Timely sharing of data and samples
• R&D systems where no market incentives
Global coalition aims to outpace epidemics with new vaccines

Lassa Fever

MERS

Nipah
10th epidemic of Ebola Virus in DR Congo

Figure 2: Distribution des cas confirmés/probables de la maladie à virus Ebola par zone de santé, du 1 mai 2018 au 24 mai 2019 et selon la date de confirmation.
As of May 25, 2019:
1903 cases
- 1809 confirmed
- 94 probable
- 1270 deaths (CFR 67%)
Destroyed Ebola Treatment Units in Katwa
Ebola Treatment Centers

rVSV (Merck): ring vaccination, exposed health care workers

Ad26/MVA (Janssen): vaccination of people at risk of Ebola virus infection, HCW/FLW, support staff, military personnel, aid workers

Vaccination of general population in “hot zones”? 
Yambuku Hospital Lab, DRC 2014
NO TIME TO LOSE
A LIFE IN PURSUIT OF DEADLY VIRUSES

Peter Piot

Peter Piot

Une course contre la montre
Mes combats contre les virus mortels, Sida et Ebola

Odile Jacob sciences