

The Institut Pasteur network: a crucial partner against Ebola

After months of confusion and a slow response, the international community has finally been galvanised to respond to the outbreak of Ebola in west Africa, which could become one of the worst infectious-disease-driven humanitarian crises of recent times. With five countries affected (Guinea, Sierra Leone, Liberia, Nigeria, and Senegal), more than 6500 cases of probable, confirmed, and suspected Ebola reported, and over 3000 deaths,¹ this Ebola outbreak is the largest ever seen. Latest projections are alarming—the US Centers for Disease Control and Prevention (CDC) has estimated that Liberia and Sierra Leone could see up to 1·4 million cases of Ebola infection by January, 2015.²

Although Médecins sans Frontières (MSF) made early calls for strong, coordinated international action to address this public health crisis, WHO and donors have been criticised for being slow to coordinate a response and mobilise adequate capacity to control this outbreak.³ The truth about how the international community has responded will need to be assessed independently at a later date to ensure that lessons are learned. Meanwhile, the complexity of dealing with this Ebola outbreak has highlighted the need for traditional actors, such as WHO and the CDC, to embrace the wider health and humanitarian community. Indeed, this outbreak has shown how important scientific networks, such as the Institut Pasteur, can be for adding urgent capacity when a surge response is needed. It is important to understand how these networks operate, their comparative advantages, and their added value in times of crisis.

The Institut Pasteur, a not-for-profit foundation with its headquarters in Paris, was founded by the French chemist and biologist Louis Pasteur in 1887. A further Institut Pasteur was created in Saigon (Ho Chi Minh City, Vietnam) in 1891. “Science knows no countries”, said Louis Pasteur. Today, his inspiring message has led to the creation of 32 Institut Pasteur centres across 25 nations. Each centre has its own network, strategy, and collaborations locally, within the Pasteur network, as well as with other foundations—eg, the French National Agency for Research on AIDS and Viral Hepatitis and the French National Institute of Health and Medical Research. With epidemiologists, entomologists, clinicians, microbiologists, and other specialties represented among

its staff, the Institut Pasteur is a multisite and multidisciplinary organisation. The institute’s mission covers the prevention and treatment of diseases through biomedical research, education, and public health action, including surveillance and outbreak intervention. The Institut Pasteur International Network deals with major infectious and neglected diseases, such as chikungunya, dengue, leishmaniasis, malaria, tuberculosis, HIV, hepatitis B and C, human papillomavirus, cholera, and Ebola.

On Sept 10–13, 2014, under the leadership of Christian Bréchet, the President of Institut Pasteur, “Pasteurians” gathered at the Institut Pasteur in Paris, France, for their first Institut Pasteur International Network Symposium. The aim of the meeting was to pave “the way for research on Global Health and One Health” and to stimulate, catalyse, and support collaborations between the network’s diverse group of institutes. The unfolding Ebola outbreak gave the event an additional dimension by highlighting the importance and potential of such a network of institutes through in-house expertise and on-the-ground knowledge and presence. In March, 2014, Sylvain Baize and colleagues at the Institut Pasteur’s National Reference Centre for Viral Hemorrhagic Fevers in Lyon were the first to identify the Ebola strain responsible for the west African Ebola outbreak.⁴ Amadou Sall and his group at Institut Pasteur of Dakar in Senegal, a WHO Collaborating Centre on Arboviruses and Viral Haemorrhagic Fevers,



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confirmed the first case of Ebola in Conakry, Guinea. Scientists from the Institut Pasteur Dakar and Paris quickly set up laboratory diagnostic facilities, including a mobile unit in Conakry (the first African laboratory deployed in Guinea), and worked closely with MSF to provide validated analyses of samples of suspected cases of Ebola from Guinea, and also from Angola, Gambia, Ghana, Mali, and Senegal. With no cure or vaccine yet available for Ebola, this work underlines the crucial role of Institut Pasteur laboratory infrastructure and expertise, which offers not only diagnostic support and epidemiological surveillance, but also case management, capacity building to support and train local staff and ensure the sustainability of expertise and capacities, and research—eg, on diagnostics and transmission dynamics.

Given the scale of the Ebola outbreak and the extensive resources of Institut Pasteur, at the symposium Kathleen Victoir, of the International Division, Paris, and Felix Rey, of the Structural Virology Unit, presented Institut Pasteur's recently created Ebola task force to strengthen and coordinate efforts, locally and globally. This task force will enable better coordinated support from all Instituts Pasteur to those in west and central Africa, such as in Dakar, Cameroon, Central African Republic, Côte d'Ivoire, and Niger, and assist ministries

of health for preparedness and response. The task force's main objectives are to provide support for timely and accurate laboratory diagnosis, training of local personnel, deployment of mobile biosafety level 4 laboratories, strain identification and genome analysis, and participation in clinical trials. In the medium term, the objectives are the development of more rapid diagnostics, field evaluation of new diagnostic tools, screening of compound libraries, capacity building, and research on vaccine development and treatments.

The contributions of MSF and the CDC have been vital in this Ebola outbreak, but the part played by many other partners should not be overlooked. Institut Pasteur's work shows the importance of placing biomedical research at the forefront of this global public health effort.

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- 2 Meltzer MI, Atkins CY, Santibanez S, et al. Estimating the future number of cases in the Ebola epidemic—Liberia and Sierra Leone, 2014–2015. *MMWR Surveill Summ* 2014; **63**: 1–14.
- 3 The Lancet. Ebola: a failure of international collective action. *Lancet* 2014; **384**: 637.
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Continuous subcutaneous insulin infusion for type 2 diabetes

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With the dual onslaught of progressive β -cell failure and insulin resistance, many patients with diabetes struggle to achieve adequate glucose control despite escalation of treatment, including insulin.¹ More than a third of patients who start basal insulin need more than 60 units per day to achieve target control² but, at these doses, insulin absorption is slow and bioavailability is reduced.³ As endogenous insulin production decreases, the risk of hypoglycaemia increases,⁴ compounding difficulties in achieving glycaemic targets. Patients who struggle to control their diabetes despite taking high doses of insulin (up to a third of those with type 2 diabetes) have three potential options to achieve control: treatment with glucagon-like peptide-1 receptor agonists, bariatric surgery, or continuation with increasing doses of insulin.

Glucagon-like peptide-1 receptor agonists could help to improve glucose control with mild reductions in weight

and insulin dose. A UK-wide audit of 1257 patients who continued insulin after starting treatment with glucagon-like peptide-1 receptor agonists, showed that mean total daily insulin requirements fell from 120 units per day (SD 99) to 78 units per day (SD 85) after 1 year. However, 31% of these patients discontinued glucagon-like peptide-1 receptor agonists, because of lack of efficacy or gastrointestinal side-effects.⁵ Bariatric surgery offers greater benefits in terms of weight loss and remission from diabetes,⁶ but not all patients are willing or able to undergo surgery; also, for older patients with established diabetes and related comorbidities, the chance of remission from diabetes is lower with a higher risk of complications and less weight loss.⁷ The third option is pushing the insulin doses even higher, or using alternative modes of insulin delivery. To date, a small number of before-and-after studies have been done of