

Liberia: New Ebola mobile lab speeds up diagnosis and improves care

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One of the challenges to bring the Ebola outbreak under control in Liberia has been lack of access locally to laboratories able to provide a quick and firm diagnosis of the disease. This month the United States Navy opened a new high-tech mobile laboratory near the Island Clinic, one of the Ebola treatment units in Monrovia, Liberia, that is supported by the WHO.



WHO/P. Desloovere

"The first thing we do with a blood sample is inactivate the Ebola virus, making the virus non-infectious and safer for testing", says US Navy Lieutenant Jose Garcia. As the blood sample might be contagious, this process happens in a very protective environment by using a portable biological safety hood to avoid any direct contact.

Until the new lab was up and running, health workers had to wait 2 to 5 days to have a preliminary Ebola diagnosis confirmed by sending blood samples to another lab facility in Monrovia. In the new lab, it takes just 3 to 5 hours to get results. Speeding up the time between taking a blood sample and knowing the results minimizes the time non-infected patients are exposed to infected patients and results in better care.

US Navy Lieutenant Jose Garcia, Dr Ketan Patel and US Navy Chief Petty Officer Jerrold Diederich – all from the US Naval Medical Research Center in Silver Spring, Maryland, USA – run the mobile laboratory. They have to dress in personal protective equipment to do their work. "Since we are dealing with blood samples, there is the risk of infection. Improper handling of these specimens will pose a serious risk to us. That's why we need to fully protect ourselves," Dr Patel says.

"The main goal of our job is to speed up the time between the arrival of the blood sample and the detection of the Ebola virus in the sample."

Dr Ketan Patel, US Naval Medical Research Center

Detecting Ebola virus

Every morning, blood samples from the nearby Island Clinic are brought to the mobile laboratory. The process of detecting the Ebola virus in blood samples consists of 3 steps.

"The first thing we do with a blood sample is inactivate the Ebola virus, making the virus non-infectious and safer for testing," Chief Petty Officer Diederich says. As samples may be able to transmit infection during the procedure it is completed in a portable biological safety hood so that lab workers avoid any direct contact with blood.



WHO/P. Desloovere

Dr Patel extracting genetic material from a blood sample.

The Ebola virus is built of ribonucleic acid (RNA), a form of genetic material. Once any Ebola virus present in the sample has been inactivated, the second

step is to extract all genetic material from the blood sample, explains Dr Patel. By identifying the RNA unique to the Ebola virus in a blood sample, lab workers can firmly diagnose the disease.

The final step is creating enough copies of the RNA – through a biochemical process called a polymerase chain reaction (PCR) – that presence of the virus in a sample can be confirmed.

The whole detection process of the Ebola virus takes about 3 hours with a maximum of 16 samples at a time.

Because the various steps are performed in different sections of the laboratory, samples need to be moved from one room to another in a safe manner. "We use small dunk tanks containing 10% chlorine bleach to avoid any direct contact," Dr Patel explains.

Since the beginning of October, when the laboratory began functioning, more than 500 blood samples have been tested. Half of the samples turn out to be Ebola-positive. "The main goal of our job is to speed up the time between the arrival of the blood sample and the detection of the Ebola virus in the sample," Dr Patel says.

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