On the Road from Dapaong to Lomé

Preventing Biothreats Through Sample Transport System Strengthening in Togo

The ability to move a clinical sample from the point of collection to a quality-assured testing facility quickly, safely, and securely can make a critical difference to patient outcomes and even prevent a disease outbreak from becoming a major epidemic. Sample transport is an essential and often overlooked part of a robust and sustainable tiered laboratory network. In addition to transferring the physical sample from a remote site to a central facility, laboratory systems must ensure correct chain of custody and timely return of test results. Good sample transport practices ensure sample integrity before testing, avert the accidental release of biological pathogens, and help prevent and detect outbreaks using trusted patient sample data (See Figure 1).

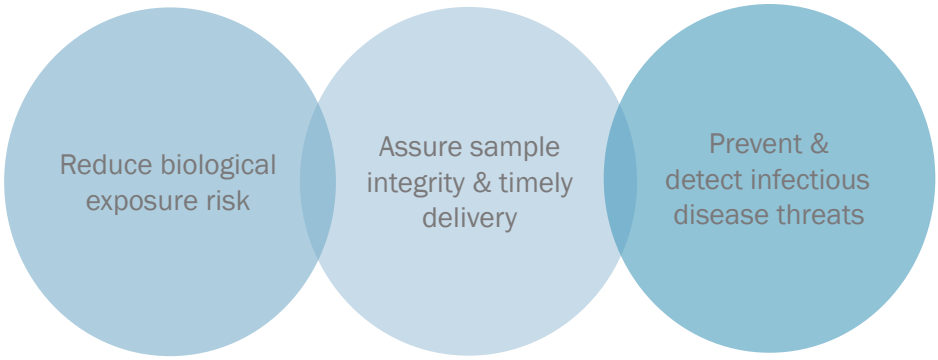

Figure 1. Direct and secondary benefits of good sample transport practices.

In Togo, regional laboratories play an essential role in disease diagnosis, arranging specimen transport to the central laboratory for testing. However, a small number of dedicated staff and limited stocks of packaging materials create gaps in sample transport practices and compromise integrity of the sample transport chain.

To address this challenge, **GSSHealth** has been collaborating with the Togolese Ministry of Health (MOH) and the US Centers for Disease Control and Prevention (CDC) in the context of the Global Health Security Agenda (GHSA). Together, GHSA stakeholders in Togo have been working to strengthen biological threat prevention, detection and response capabilities through investment in laboratory biosafety initiatives including specimen transport and management projects.

In March 2017, **GSSHealth** and CDC staff traveled to multiple laboratories in Togo to oversee the implementation of a hands-on patient sample transport exercise in collaboration with the MOH. One of the sites visited, Dapaong Regional Hospital Laboratory, Dapaong Regional Hospital Laboratory, is the farthest major laboratory from the Lomé-based Institut Nationale d'Hygiène (INH) central laboratory, a 385-mile trek requiring 9+ hours of car travel (See Figure 2).

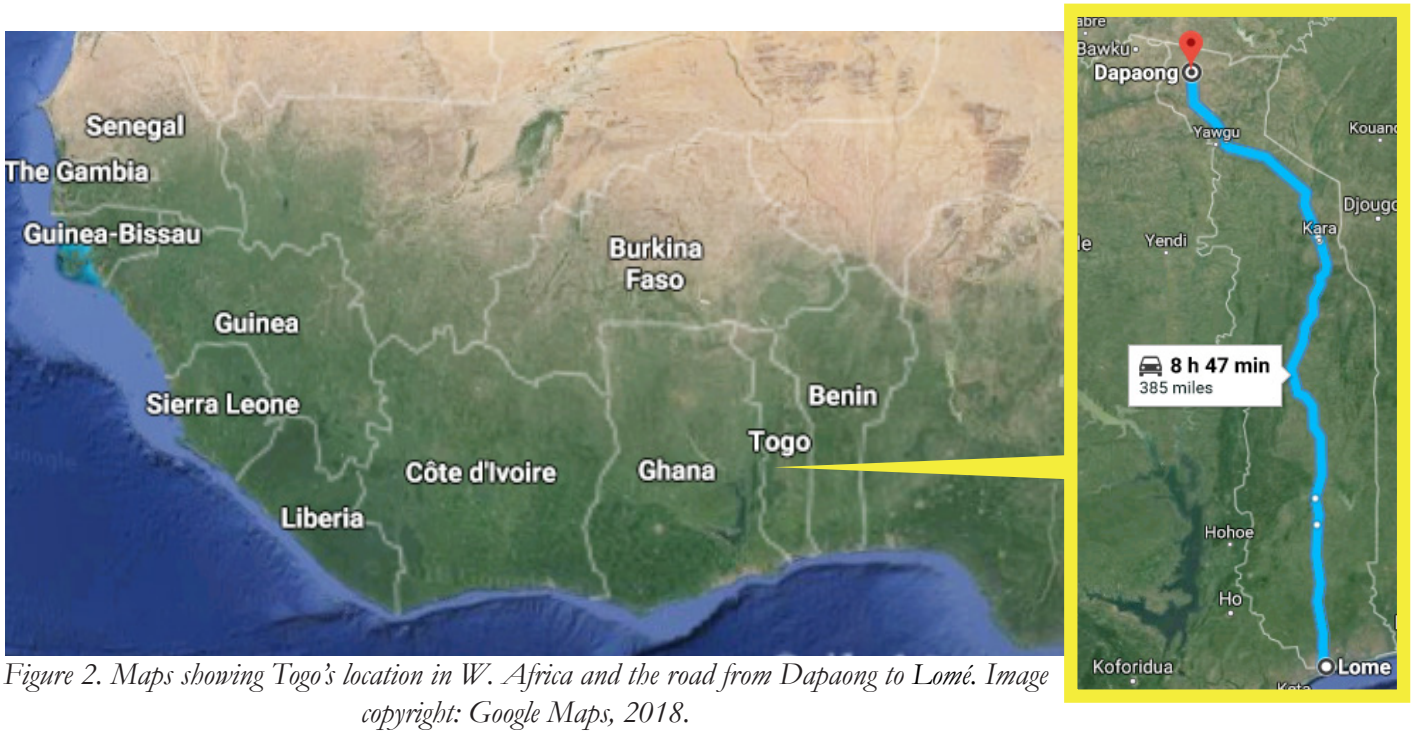

Figure 2. Maps showing Togo's location in W. Africa and the road from Dapaong to Lomé. Image copyright: Google Maps, 2018.

In Dapaong, both laboratory staff and the visiting **GSSHealth** and CDC team took turns packaging non-infectious imitation blood samples as they would in an outbreak situation, consistent with laboratory sample packaging process (laboratory staff) or according to international requirements (GHSA team). Electronic data temperature loggers were placed into each container for real-time temperature monitoring throughout the exercise, and both packages were transported by road to Lomé according to the prevailing MOH process for sample package transport (See Figure 3).

Figure 3. Adoption of international standards can reduce biorisks and ensure sample integrity. Top three images: Current laboratory sample packaging process. Bottom three images: Recommended sample packaging process in accordance with international standards.

Once in Lomé, the packages were received by the INH laboratory, where the exercise was completed with **GSSHealth** and CDC staff present. All aspects of sample receipt and decontamination were observed and documented. The temperature loggers were removed and the data revealed that both cooler systems are suitable to maintain a temperature of below 40°F.

Exercise participants identified several areas for improvement in sample packaging and transport, including:

- Selection of padding materials used in packaging to reduce biosecurity risk and increase sample integrity (replacement of difficult to decontaminate and biohazardous foam, improved cold storage).
- Use of an information sheet to provide the driver with appropriate contact details and guidance on actions to take in case of specimen leaks, delay in transportation, or other unanticipated problems.
- Development of a sample transport standard operating procedure (SOP) to ensure consistent packaging and standardized procedural steps in accordance with International Air Transport Association (IATA) regulations.

Exercise participants also identified post-activity recommendations, which are summarized in Figure 4.

Since the March 2017 sample transport exercise, **GSSHealth**, CDC, and MOH have continued working together in the context of GHSA to advance specimen transport systems through more in-depth examination of sample transport for routine versus outbreak situations, development of procedures, procurement of necessary supplies and training in regional laboratories.

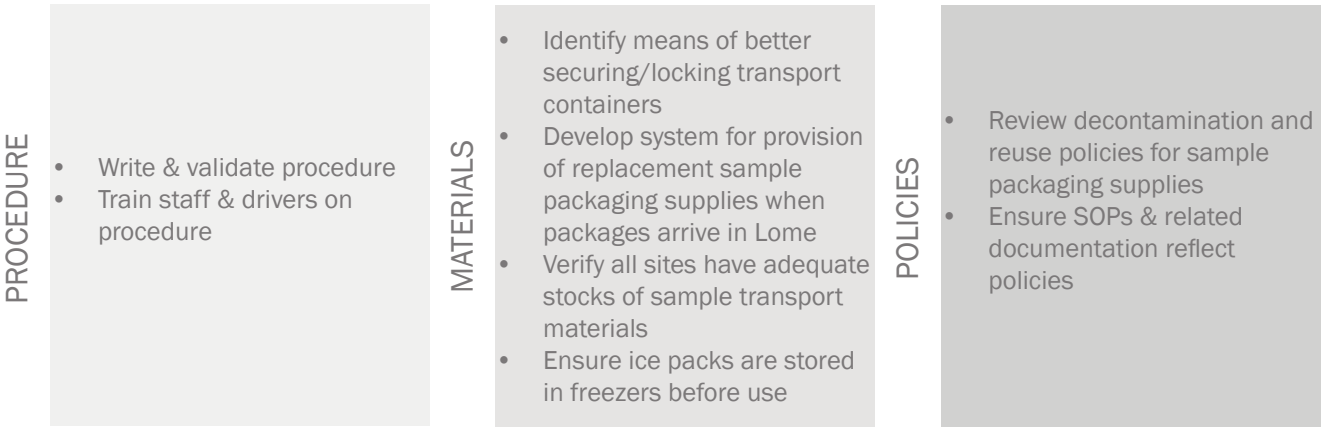

Figure 4. Recommendations stemming from the sample transport exercise in Togo.