

Multi-site pilot study on the deployment of cholera rapid diagnostic tests in the Democratic Republic of Congo and Niger

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Introduction

Integrating rapid diagnostic tests (RDT) into surveillance systems could improve early detection of cholera, strengthen monitoring and guide vaccination decision-making. This study investigated different aspects of the integration of RDTs into routine surveillance.

Methods

In six health zones in DRC, consenting, over one-year suspect cholera cases admitted to CTCs were asked to provide stool samples, which were analyzed with direct and enriched RDTs (Crystal VC O1/O139 and for a subset SD Bioline and Crystal VCO1), cultures, and qPCR. The RDT-positive incidence based on different sampling schemes were computed and statistically compared with the incidence based on exhaustive RDT data. In two health zones in DRC and Niger, the integration of RDTs into the surveillance system according to new Global Taskforce on Cholera Control (GTFCC) surveillance guidelines (threshold of a probable cholera outbreak and sampling scheme) was evaluated under real-world conditions.

Results

All RDTs reached similar sensitivity (76%-81%) and SD Bioline highest specificity (87%, 95% CI, 80%-92%), which was significantly higher compared to Crystal VCO1. Enrichment reduced sensitivity significantly (SD Bioline and Crystal VCO1) and increased specificity (significantly only for Crystal VCO1). In high-incidence areas, applying the best performing sampling scheme (testing the first 3 cases per day per CTC), provides accurate incidence estimates and conserves up to half the RDTs. In a surveillance unit with minimal study team involvement in DRC and Niger, a probable cholera outbreak was correctly identified using the GTFCC threshold.

Conclusion

RDTs are an essential tool to improve cholera surveillance, particularly for rapid outbreak detection and monitoring. The new RDT based threshold proved to be a valuable tool for independent detection and for monitoring, a sampling scheme saves RDTs and still provides robust incidence estimates. However, providing RDTs to cholera affected countries is not enough, only with regular training and supervision, solid RDT data can be obtained.

The integration of RDTs into cholera surveillance systems improved rapid outbreak detection and accurate outbreak. For a successful integration, regular training and supervision is needed to obtain correct RDT data.

