

# TRACnet: A National Phone-based and Web-based Tool for the Timely Integrated Disease Surveillance and Response in Rwanda

Kayumba Kizito\*<sup>1</sup>, Kabeja Adeline<sup>2</sup>, Koama Jean Baptiste<sup>3</sup>, Asiimwe Anita<sup>2</sup>, Binagwaho Agnes<sup>4</sup>, Pamela Johnson<sup>5</sup> and Nyatanyi Thierry<sup>2</sup>

<sup>1</sup>Voxiva SARL, Kigali, Rwanda; <sup>2</sup>Rwanda Biomedical Center, Kigali, Rwanda; <sup>3</sup>CDC Rwanda, Kigali, Rwanda; <sup>4</sup>Ministry of Health, Kigali, Rwanda; <sup>5</sup>Voxiva Inc, Washington, WA, USA

## Objective

(1) To describe the implementation of the electronic system for integrated disease surveillance in Rwanda. (2) To present the sensitivity and specificity of the electronic reporting system to detect potential outbreaks

## Introduction

In Rwanda, communicable diseases are the mostly predominant representing 90% of all reported medical consultations in health centers. The country has often faced epidemics including emerging and re-emerging infectious diseases. To enhance its preparedness to identify and respond to outbreaks and prevent epidemics, the Government of Rwanda has developed and deployed an electronic Integrated Disease Surveillance and Response (eIDSR) working with Voxiva with funding from the U.S. Centers for Disease Control and Prevention (CDC).

## Methods

The eIDSR is built on Rwanda's existing national phone and web-based HIV-reporting system, "TRACnet" that has been operating nationwide since 2004. Data is collected for 23 communicable diseases under surveillance in Rwanda categorized into immediately and weekly reportable. If a lab test is required, the sample is taken and sent to laboratory for testing. Immediate, Weekly, Lab request and lab results forms are completed before submitting data in the system. Data is entered using phone or web based application and is stored in the central database.

## Results

The design of eIDSR module was completed in November 2011. As of September 2012, 252 out of 457 health facilities in Rwanda have been trained and are using the electronic system (over 50% of coverage); the national roll out is still going on with complete coverage planned for December 2012. The system sends SMS reminders for due and overdue reports. The timeliness and completeness of reporting are 98% and 100% respectively. Notifications are sent to the concerned personnel when the threshold for outbreak detection is reached. When lab results are available and entered in the system, the results are automatically communicated to the health centers originating samples. Data is automatically summarized in predefined tables, graphs, dashboards and maps.

As of September 3rd, 2012, a total of 5813 reports including 1325 immediate reports and 4488 weekly reports were submitted elec-

tronically. Out of 1325 immediate reports submitted, 406 potential outbreaks were detected and immediately notified and 7 of them were confirmed for cholera, rubella, Influenza-like illness (H1N1), measles and food poisoning. From these data, the eIDSR system shows a sensitivity of 100% and a specificity of 70% for outbreak detection. The early notification of probable outbreaks stimulated the early investigations and the quick response to outbreaks within the country and across the borders.

## Conclusions

The electronic disease surveillance system has improved timeliness and completeness of reporting and extremely supports early detection and notification of outbreaks for timely response. This system should be a model for the East African region as it has demonstrated advantages in the cross-border disease surveillance.

## Keywords

Disease Surveillance; Informatics; m-Health

## Acknowledgments

The government of Rwanda for having adopted ICT as pivotal for Development.

MoH/ Rwanda Biomedical Center for promoting innovations in Health sector including m Health technology. The US Centers for Disease Control and Prevention (CDC) for funding TRACnet under the Cooperative Agreement. Voxiva & other stakeholders who worked to implement TRACnet: NRL, HIV Division, EID Division, SPH, ICAP, KIST, MTN. All partners in ICT: Rapid SMS, JEMBI, PIH.

## References

1. KABEJA: eIDSR in Rwanda. East Africa Public Health Laboratory Network Project workshop, Kigali, Rwanda (April 2012).
2. BOX, G. E. P.; JENKINS, G. M.; and REINSEL, G. C. (1994). Time Series Analysis, Forecasting and Control. Prentice-Hall, Englewood Cliffs, NJ.
3. Harris, T.J. and Ross, W.H.: Statistical process control procedures for correlated observations. The Canadian Journal of Chemical Engineering, 69, 48-57. (1991)

\*Kayumba Kizito

E-mail: [kkayumba@voxiva.com](mailto:kkayumba@voxiva.com)

