POLICY BRIEF

SUA/003/2017

Use of information and communication technologies to support specific disease surveillance: using cholera as an exemplar disease

Key messages

- National public health disease surveillance in Tanzania is currently based on the Integrated Disease Surveillance and Response strategy which is largely paper-based.
- Emergency of powerful Information and Communication Technologies (ICT) including use of mobile technologies offers opportunities to improve timely communication and sharing of information between key stakeholders involved in the prevention and control of specific disease outbreaks.
- Currently, monitoring and reporting of specific diseases including those that need prompt response and contact tracing such as cholera is still paper-based. This contributes to delayed detection and confirmation of suspected cases that consequently contributes to sub-optimal management and control of cholera in the country.
- Utilization of ICT in reporting, registration and managing cholera cases has potential to reduce costs while ensuring timely information sharing between key stakeholders.
- This policy brief recommends adoption and utilization of ICT and mobile technologies in supporting national efforts to control and eradicate cholera in Tanzania. This innovation that can also be expanded to prevent and control other infectious disease in human and animal populations.

Executive summary

Cholera is an enteric infection caused by a bacterium known as Vibrio cholerae. It is characterized by an acute watery diarrhoea with or without vomiting which causes severe dehydration and death if not promptly managed. It is an important public health problem worldwide but high-risk countries being those in Africa and Asia. Since the outbreak of cholera in August 2015, a total number of 25,157 cases and 390 deaths (case fatality rate of 1.6%) have been recorded in Tanzania by 30th April 2017. The hardest-hit regions are Dar es Salaam, Morogoro, Mwanza and Mara. The overall trend of cholera cases has been fluctuating with significant reduction during June to October 2016 which was followed by sudden increase of new cases. A number of factors including limited access to safe water and sanitation have contributed to transmission and spread of the disease in the country. Optimal surveillance and timely reporting; diagnosis and management of clinical cases are factors that contribute to effective control and reduction of cholera-associated mortalities in many countries. Appropriate control measures and eradication efforts need to be supported with timely information of the status of the disease in the country.

The Problem

The current National Guidelines for Prevention and Control of cholera recommend establishment of Cholera Treatment Camps

(CTCs) to manage all cholera cases in affected areas. The suspected cases are either referred to CTC by health facilities or can come directly from affected households in the community. Once received by CTC, a suspected patient is registered and managed according to severity of disease (plan A, B or C). While initial case management can start immediately at CTC, rectal swabs have to be collected and submitted to a laboratory for confirmation. The District Medical Office (DMO) is usually notified by CTCs on all cases managed by the facility and the district cholera focal person is required to record patient details including contact tracing for further actions such as public education and decontamination of affected household premises. Currently, the majority of all these activities are recorded and reported using a paper-based system and require physical movements of responsible person(s) between DMO, CTC and diagnostic laboratory (Figure 1). However, it is estimated that the officially reported cases represent only 5–10% of the actual number occurring annually worldwide (Ali et al., 2012).

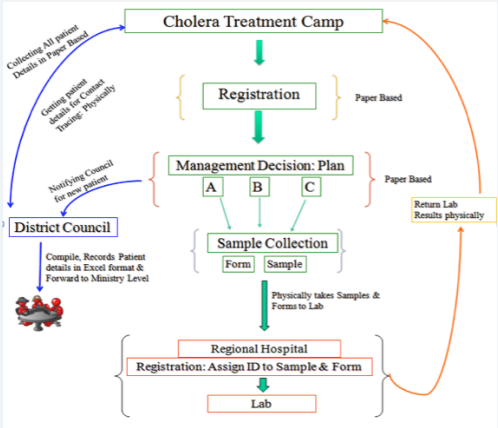

Figure 1: The current plan used to manage cholera cases in Tanzania

Utilization of mobile technology has potential to significantly reduce time and costs associated with such movements (Karimuribo et al., 2017). Furthermore, employment of a bar-coded sampling approach has potential of eliminating double counting and other human errors associated with manual registration and recording of cases, samples and laboratory results sent back to CTCs. In addition, using community-based health reporters, risk behaviours occurring in the community can be detected, recorded and reported to the district cholera response team based at DMO using mobile technologies which will ensure timely response to the reported events (Freifeld et al., 2010). Use of mobile phones in reporting diseases that require emergency response has been adopted elsewhere (Gebru, 2008; Yang et al., 2009; Stone et al., 2016).

Policy options

Utilisation of mobile technologies coupled with community engagement have potential role in timely capture of suspected cholera cases and risk events contributing to the occurrence and spread of the disease in the community. In addition, mobile technologies have potential to reduce time and costs associated with paper-based registration and recording of cases as well as physical movements of personnel involved with contact tracing, laboratory result collection and sharing of updates on cholera cases between CTCs, DMOs and diagnostic laboratories. Recruitment and training of Community Health Reporters will assist to capture data on risk behaviours and events occurring at the community level while at the same time ensuring that the cholera response team is timely informed and responds to these events.

The role of mobile technologies in ensuring timely information sharing between key units involved in registration, diagnosis, management and reporting of cholera

cases to higher authorities at the district, regional and national levels is of paramount importance (Figure 2). This policy brief is expected to contribute to the improvement of the Public Health Act No. 1 of 2009 (URT, 2009) through adoption of use of ICT and mobile technologies in disease notification, management, prevention and control using cholera as an exemplar disease as recommended in the national eHealth strategy (URT, 2013).

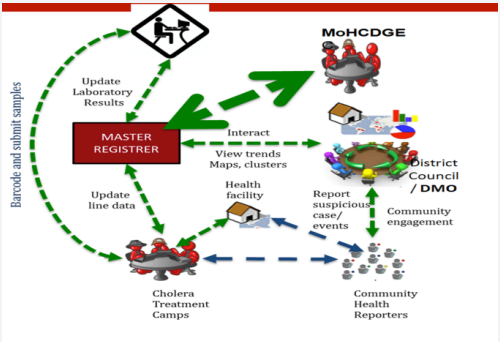

Figure 2: Proposed model to support cholera control using mobile technologies

Implementation considerations

It is recommended that the use of ICT and mobile technologies as well as community-engagement be adopted to support:

- Timely detection and reporting of suspected cholera cases using community health reporters (CHRs) empowered with mobile technologies.
- Capture and timely report risk behaviours and other events occurring at the community level to the District Cholera Response Team.
- Managing records and information of patients at CTCs as well as specimens submitted to the diagnostic laboratories.
- Sharing information on cholera cases by authorized personnel at CTC, laboratory, District, Regional and National levels.

Competing interests

The authors declare that they have no competing interests.

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About the Institutions

Sokoine University of Agriculture is a public university that was established by Parliamentary Act No. 6 of 1984 of the United Republic of Tanzania which was subsequently repealed in 2005 by the Universities Act No. 7 of 2005. Following the enactment of the Universities Act, SUA was granted the SUA Charter of 2007.

Southern African Centre for Infectious Disease Surveillance is a One Health consortium of southern African medical and veterinary, academic and research institutions involved with infectious diseases of humans and animals in the Democratic Republic of Congo, Mozambique, South Africa, Zambia and Tanzania, in an innovative partnership with world-renowned centres of research in industrialised countries.

National Institute for Medical Research is a public health research institution established by the Act of Parliament No. 23 of 1979 with the mandate to carry out, co-ordinate, monitor and control health research in the United Republic of Tanzania