

A stakeholder-informed causal loop diagram of the dynamics in Ebola outbreak response and understanding the potential impact of rapid diagnostic testing

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Abstract

Introduction

Ebola Virus Disease (EVD) remains a pandemic potential, high impact threat to public health and especially in some of the most vulnerable populations in the world. The disease remains difficult to identify and diagnose, particularly in its early phases, and opportunities exist for the development of a rapid diagnostic test (RDT). Past RDTs have not achieved uptake because of fundamental design failures.

Approach

This study uses system dynamics to understand the necessary features and potential impact of the development of a RDT for EVD from the user perspective. We use in-depth interviews with high-level stakeholders and national outbreak response teams (n=23) and focus group discussions with community members in EVD affected areas (n=20) to develop a causal loop diagram that describes the dynamics, design need, and potential entry points for an RDT.

Results

Stakeholders and community members most valued a high level of specificity and sensitivity for an RDT as well as its mobility. The uncertainty regarding EVD risk areas and poor health system are part of reinforcing loops that undermine the diagnostic capacity during outbreaks. This could be alleviated by an RDT, but it must fit the needs of the users. Challenges in the way the community perceive and respond to outbreaks remain and could present a barrier to RDT uptake.

Discussion

Past RDT development has failed to meet the basic needs identified by the multi-level stakeholder consultation in this study. Applying this human-centered approach could improve uptake and use of any RDT, although many uncertainties remain in part because much is still unknown about EVD. RDT development and use must include a whole-system approach to ensuring it is fit for purpose.