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# Making sense of communication interventions in public health emergencies – an evaluation framework for risk communication

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## Abstract

Communication interventions during public health emergencies (e.g. infectious disease outbreaks) are increasingly acknowledged as a determinant of success in preparedness, response and recovery. Challenges related to the current outbreak of Ebola virus in West Africa once again reveal the need to strengthen our understanding of the central importance and complexity of risk communication and social mobilisation strategies. There is little hard evidence, however, on the impact of various communication interventions upon the dynamics of public health emergencies to guide our capacity development. This article proposes a new evaluative framework which builds on an understanding of risk communication as an interactive, holistic, continuous and engaging activity that focuses on dialogue, intelligence gathering, building relationships over time with a knowledge base informed by new and accessible communication technologies (e.g. social media and networks) and supportive environments. Our hypothesis is that impact is measureable through the evaluation of identifiable performance parameters related to the dynamics of an outbreak. Our assumption is that risk communication interventions that lead to earlier detection, faster response, smoother coordination and a smarter legacy (ability to use processes and outcomes to improve current and future performance) lead to

lower morbidity and mortality (reduced AUC<sub>epidemic curve</sub>). This new evaluation framework for risk communication measures the relation between a baseline dynamic of epidemic and communication activities and the changed dynamic resulting from risk communication activities (e.g. earlier detection, faster response, smoother coordination and smarter legacy). We believe that a better understanding of how the two dynamics relate can lead to a better management of future public health emergencies.

**Keywords:** Risk communication, Measurement, Evaluation, Infectious diseases, Preparedness planning, Infectious disease management, Public health interventions

## Introduction

The public health imperative during an outbreak of an infectious disease is to control the event as quickly as possible in order to protect health and minimise the loss of life and disruption caused by an epidemic.<sup>1</sup> The opportunity for rapid control of outbreaks is most effective if the outbreak is detected early and appropriate responses are initiated quickly.<sup>2</sup> Communication, social mobilisation and the early sharing of information have been found to

play a critical role in prevention and preparedness, outbreak control and recovery.<sup>3</sup> Infectious disease prevention and control need to be fast, flexible and effective. Delays in information-sharing, miscommunication and/or misinterpretation between those affected, response staff and volunteers, public health officials, policy-makers and businesses can affect health, livelihoods and economic stability.<sup>4,5</sup> The current outbreak of Ebola virus in West Africa underlines the importance and complexities of communicating at all levels: between international and national agencies, national and local health authorities and community-based organisations, front line health workers and affected population, and affected communities themselves.<sup>6</sup> Slow and poorly coordinated international and national responses, weak surveillance and reporting systems, low provider knowledge and capacity, lack of sensitivity to local beliefs, norms and values, poor engagement with affected populations, and low levels of trust in authorities and experts are some of the communication-related difficulties identified.<sup>7,8</sup>

Communication activities related to epidemic outbreaks work best when they build on a comprehensive understanding of infectious disease risks among and between health officials, affected or vulnerable communities and the general public. Risk communication activities are aimed at identifying, describing, analysing, addressing and adopting the behavioural, knowledge and attitudinal factors that underpin the more efficient and effective management of infectious disease risks.<sup>9</sup> Those responsible for preparing, preventing and responding to an outbreak need to understand the socio-cultural perceptions, views and practices of those at risk of harm from the public health hazard and work in a way that builds and maintains trust. Trust is seen as a fundamental component of outbreak control across cultures.<sup>3</sup>

Institutionalised risk communication capacities and systems help prepare for crisis management and in so doing build capacity for needed understanding of infectious disease risks and related behaviours. This capacity building is vital both for peaks in demand and public health emergencies, and also for managing continuous health threats, such as measles outbreaks and antimicrobial resistance.<sup>10</sup>

However, while the importance of risk communication in public health interventions is increasingly acknowledged and embraced, for example, as a core capacity in the WHO IHR 2005, no standardised measurement tools have been agreed to evaluate the impact of risk communication activities upon unfolding infectious disease emergencies and continuous threats. Our measurement hypothesis aims to contribute to the development of an evaluation

framework that addresses a broader conceptualisation of risk communication activities, including planning, preparedness, response and recovery phases. Without tools to evaluate the impact of risk communication, it is not possible to make evidence-based recommendations for good practise or justify investments.<sup>11-13</sup>

## **A new approach to risk communication in public health**

Researchers have used before and after measures, various models and data sources to estimate how much difference in awareness, choice and behavioural patterns, a given risk communication intervention has made for a particular outbreak.<sup>14-16</sup> These measurements have been built on approaches to risk communication that mainly focussed on the need to find the right way to tell people what to do in times of a crisis. Such approaches are important, but do not reflect current thinking and concerns about the limitations of just focussing on uni-directional, hierarchical information conveyance from health officials to the public.<sup>9,17</sup> Risk communication is now understood as a more interactive, holistic, continuous and engaging activity that focuses on dialogue, intelligence gathering, building relationships over time, a knowledge base informed by new and accessible communication technologies (e.g. social media and networks), and supportive environments. Risk communication is now viewed more broadly and includes information, communication and coordination activities.<sup>10,18</sup>

### *A risk communication matrix*

To take account of this conceptual shift in the understanding of risk communication, a new measurement approach is proposed which has a broader activity focus than just information transfer and communication of risks. The new approach looks at three main activity areas of risk communication across the lifecycle of an epidemic. These activity areas include:

- Listening and gathering insights, assessing and sharing: for example, monitoring social media chats or performing formative research to better understand perceptions, attitudes, knowledge and behaviours of vulnerable and other populations.
- Communicating and engaging: for example, making reliable, up-to-date information available and accessible; selecting appropriate trust-worthy communicators, platforms and channels for distribution of information; integrating key stakeholders into planning and dissemination activities.

Risk communication matrix

Risk communication activities		BEFORE a public health emergency	BEGINNING a public health emergency	DURING a public health emergency	AFTER a public health emergency
		PREPAREDNESS	DETECTION/ALERT	RESPONSE	RECOVERY
Informing  Listening	Gathering				
	Assessing				
	Sharing				
Communicating  Relationship building	Communications (actions: flyer, website, etc.)			Crisis communication	
	Key messages / Content				
	Strategy / Methods				
Coordinating  Supportive environments	District				
	Regional				
	National				
	International				

Figure 1 Matrix of risk communication typology [adopted from<sup>10</sup>].

- Coordinating, supporting and reviewing: for example, building and supporting on-going relationships with stakeholders and partners; monitoring and evaluating performance parameters and adjusting practise based on learning.

Figure 1 creates a matrix of risk communication typology that focuses on these three activity areas and can be used to help structure evaluative thinking related to these activities during the key phases of public health emergencies and could serve as a template or resource for planning. It also places crisis communication within the matrix of risk communication activities and helps identify the more limited focus of crisis communication and its positioning in the spectrum of risk communication activities (Box 1).<sup>10</sup>

**Box 1 Risk communication – key terms and their working definitions**

*Information*

Information activities include but are not limited to intelligence gathering, assessing and sharing. Importantly, this also includes listening capacity through formative research (focus groups, interviews and questionnaires), media monitoring, public opinion polls, networking, use of media – traditional and social, surveillance and laboratory diagnostic systems.

*Communication*

Communication activities include but are not limited to content development (key messages), segmentation approaches (strategy) and delivery methods (channels and spokespeople). This also includes relationship building, dealing with

uncertainty, building trust, transparency, engagement strategies and consultation.

*Coordination*

Coordination activities include but are not limited to partnership and inter-sectoral working, ensuring congruent messaging, internal communications and collective endorsements. Coordination takes place on different geographical and organisational levels and includes developing supportive environments, for example, developing health literacy friendly organisations and communities; – aligning literacy demands with skills of users; providing navigational assistance in complex systems; and use of community champions.

**An evaluation hypothesis**

Building on this activity matrix, it is hypothesised that an effective measurement approach should help to better understand if and how risk communication interventions affect the dynamic of a public health infectious disease emergency; for example, an outbreak.

*The epidemic and communication curves*

To understand how this might work, it is useful to compare typical epidemic and communication-related curves in the lifecycle of an epidemic (see Figure 2 where the curves are used as models for illustration purposes).

Communication interventions usually come in when the epidemic outbreak is detected by surveillance and response interventions and outbreak control measures are triggered and implemented.

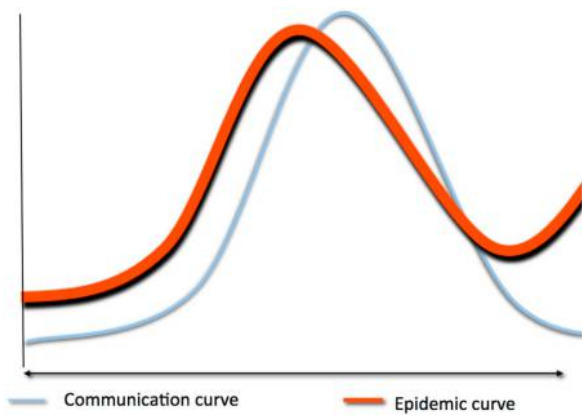


Figure 2 Normal distribution of epidemic curve and communication curve.

Four key performance parameters are identified (Figure 3).

First, in the routine epidemic situation, there is a time lag between the onset of the outbreak and its detection (1) and the activation of communication activities for response (2). Thirdly, it usually takes a while until the outbreak is reported to national and international level (e.g. WHO under IHR or ECDC under EU legislation) in order to comply with national and international health regulations, request further assistance in the management of an epidemic outbreak and/or coordinate the national and international response (3). The post-epidemic recovery period provides another key performance parameter. In this period, lessons, often neglected, could be learned that lead to better preparedness and improved response for future epidemic outbreaks. We call this leaving a 'legacy' because we see this as a process that uses learning to build knowledge and response capacity in the community and health systems to improve performance. This is the fourth performance

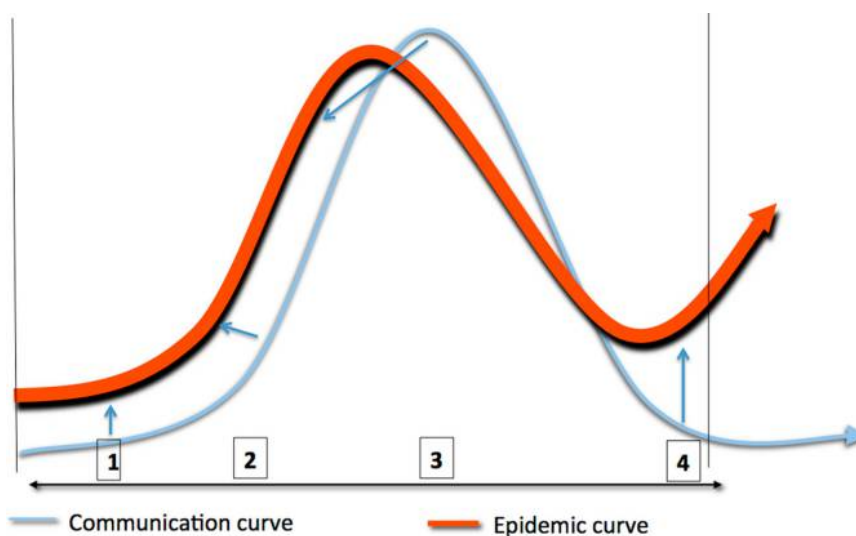


Figure 3 Key performance areas.

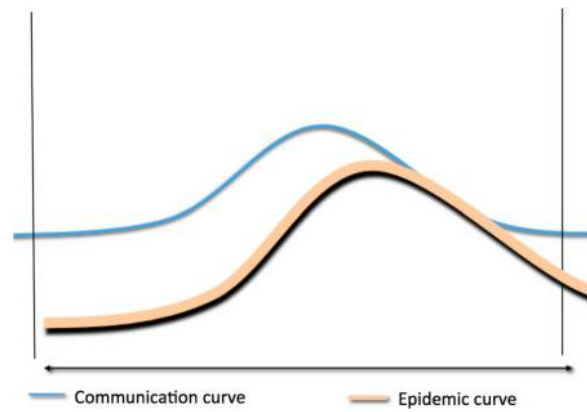


Figure 4 Improved communication may have a positive impact on the course of the epidemic (hypothesised).

parameter (3). This could, for example, refer to new and or improved processes and systems that may be established by specific teams in managing epidemics and emerging diseases outbreaks that consequently become sustainable, institutionalised and used by subsequent/future teams.

#### Hypothesis

The proposed measurement approach focuses on the relation between a baseline dynamic of epidemic activities and communication activities and the changed dynamic resulting from risk communication activities. Performance parameters are identified that could eventually be measured by their impact on better case management, lower infection attack rate, fewer cases, fewer deaths, increased compliance, etc. The overall goal and long-term outcome is that improved communication interventions will lead to improved management of public health events and a reduction of morbidity and mortality (reduced  $AUC_{epidemic}$ ) (Figure 4).



## Evaluating communication activities: four key performance parameters

This proposed approach to the evaluation of risk communication activities draws on a new understanding of risk communication and measures the relationship(s) between the dynamic of the epidemic or incident and the dynamic of communication and social mobilisation interventions that reflect risk communication response capacity.

For an initial core conceptual framework, we focus on four key performance parameters that can be described as:

- EARLIER (1): reducing the time lag between onset of outbreak and its detection by getting closer to and more engaged with the community and the infectious activities on the ground.
- FASTER (2): reducing the time lag between detection and response activities.
- SMOOTHER (3): better coordination of national and international response activities.
- SMARTER (4): feeding back to improve decision-making and response in the current event and leaving a legacy to improve preparedness, control, response and recovery for future outbreaks (Figure 5).

### Measurement approach: process and outcome measurement

Aiming to assess impact, researchers in the fields of social sciences (e.g. communication interventions) are often faced with the attribution problem: a positive impact, for example, fewer death or a lower mortality, cannot be attributed to – for example – a specific communication intervention programme that promotes the adoption of risk-reducing behaviour, because of confounding factors that may have contributed to the desired impact.

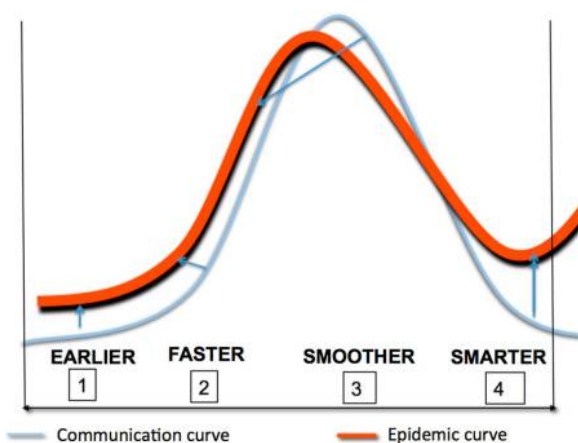


Figure 5 Key performance areas EARLIER, FASTER, SMOOTHER and SMARTER.

This measurement framework suggests a different approach: it can be used for process and outcome measurement. The four key performance areas can be used in a *process* evaluation to monitor and assess how risk activities (see Figure 1) have changed. Risk communication process measurement, for example, could focus on the ‘how’ of risk communication interventions, for example, how the risk communication is being performed. Key questions here could include: is this risk communication activity aimed at getting closer to communities; how does it do it? (The ‘how’ question elucidates context-sensitive indicators to be used in the measurement).

This conceptual framework can also be used to measure *outcomes* of risk communication interventions and their impact on performance (‘EARLIER’, ‘FASTER’, ‘SMOOTHER’ and ‘SMARTER’) in the activity areas of information, communication and coordination (Figure 1). For example, in the performance area of ‘EARLIER’ and ‘FASTER’, risk communication information gathering interventions could be aimed at creating a new or better link with a community group that shares information related to its ‘listening’ to community concerns and beliefs on a regular basis. Better engagement with such community groups could result in earlier recognition of an event and faster reporting. Earlier detection and faster reporting could be facilitated because people are more aware, comfortable to report and know better whom to contact in case they detect anything unusual. An outcome measurement using the key performance areas could measure a change in outcome before and after a risk communication intervention programme. This is why this measurement framework uses comparatives for its performance areas (‘EARLIER’, etc.). These changed outcomes can indicate how they contribute to the desired impact.

Similarly ‘SMOOTHER’ could relate to better coordination between sectoral departments and ‘SMARTER’ to evidence showing that relevant processes and systems have been changed based on learning.

### Modelling – understanding the relation between the two dynamics

While the measurement of changes in the relation between two dynamics seems rational, the key challenge in this approach is how to translate risk communication activities into measurable data. For this purpose, historic events, such as past outbreak data (e.g. Cholera outbreak in Sierra Leone 2012), can be used to pilot a first categorisation of risk communication activities (outputs), for example, number of household visits, information campaigns, number of

volunteers, on-going and ad hoc activities in the countries, etc. into the typology of risk communication activities (Figure 1) and understand how these activities lead to changed outcomes: earlier detection, faster response, smoother coordination and a smarter legacy. These historic events are well documented by international aid agencies and could form a starting point to look at risk communication activities in the context of different disease outbreaks (such as Cholera and Ebola) in different geographic settings. Risk communication could then be combined with formal mathematical models of infectious disease outbreaks to better understand the two dynamics. A variety of other, equally well-documented outbreaks (e.g. current Ebola outbreak in West Africa) could be used to develop the tools for this measurement approach as well (Box 2).

### **Box 2 Key performance areas – key terms and working definitions**

#### **EARLIER**

All activities, conditions and factors in the areas of information, communication and coordination that lead to earlier detection, such as closer relationship with communities, improved first detector capacity, trust in reporting cases and listening to rumours.

#### **FASTER**

All activities, conditions and factors in the areas of information, communication and coordination that lead to faster response, such as reducing the time from realisation of an outbreak to initiating response by having trusted information and communication networks, trained and knowledgeable workforce, existing communication between communities and health professionals.

#### **SMOOTHER**

All activities, conditions and factors in the areas of information, communication and coordination that lead to smoother coordination, such as better collaboration between sectors, trusted information-sharing and communication between different administrative levels, better link between national and international response approaches.

#### **SMARTER**

All activities, conditions and factors in the areas of information, communication and coordination that lead to smarter legacy, such as a feedback mechanism to enable and encourage learning from previous events, improved information-sharing and communication for better decision-making and more resilient communities.

## **Perspective**

There is no internationally agreed approach to the measurement of public health communication interventions in the context of infectious disease emergencies. Researchers and practitioners work hard to improve emergency response and justify investments.

If and how public health communication interventions affect the epidemic course is still under-researched and how approaches are selected still tends to be somewhat intuitive. In order to move towards the ability to reliably measure the impact of risk communication interventions, our proposed framework provides a system that can contribute to a better understanding on how risk communication interventions contribute to changing key performance parameters that can be associated with reductions in deaths and illness.

We believe that the key performance area 'SMARTER' deserves more attention as it is often neglected in processes that predominantly focus on improving detection and response. 'SMARTER' performance includes both the capacity to feedback, in real-time; lessons being learned from an ongoing outbreak to improve decision-making and communication; and inform and improve, based on new knowledge and experience gained, future preparedness, prevention, response and recovery from other health events. Such 'SMARTER' processes and outcomes leave a 'legacy' that can give communities a greater ability to cope and strengthen their resilience for future health risk.

The analytical approach now being proposed has been developed to better understand the dynamics of public health interventions in different socio-cultural settings. Research has now to focus on gaining a better understanding of this contextual relationship. We believe that applying our measurement approach will be helpful to such research endeavours. We recommend the use of this framework in any analytic research setting exploring the impact of risk communication interventions. The recent Ebola outbreak seems like an obvious starting point, as the learning curve about the importance of communication and community engagement seems very steep.

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the Rockefeller Foundation; and in the context of an European Centre for Disease Prevention and Control (ECDC) project to develop an 'Evaluation Framework for Risk Communication' (06/2013–01/2014). The outcomes of Bellagio training (templates and scenarios for evaluating risk communication activities) will be published shortly. The ECDC work applied the original measurement idea on a multi-country risk communication mapping and a pre- and post-training assessment in risk communication (four Baltic countries plus Sweden, Tallinn October 2013) in an effort to elaborate an evaluation framework to benchmark risk communication performance. Outcomes of this project, including mapping questionnaires, training assessments and the evaluation framework to benchmark risk communication, will be published shortly.

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