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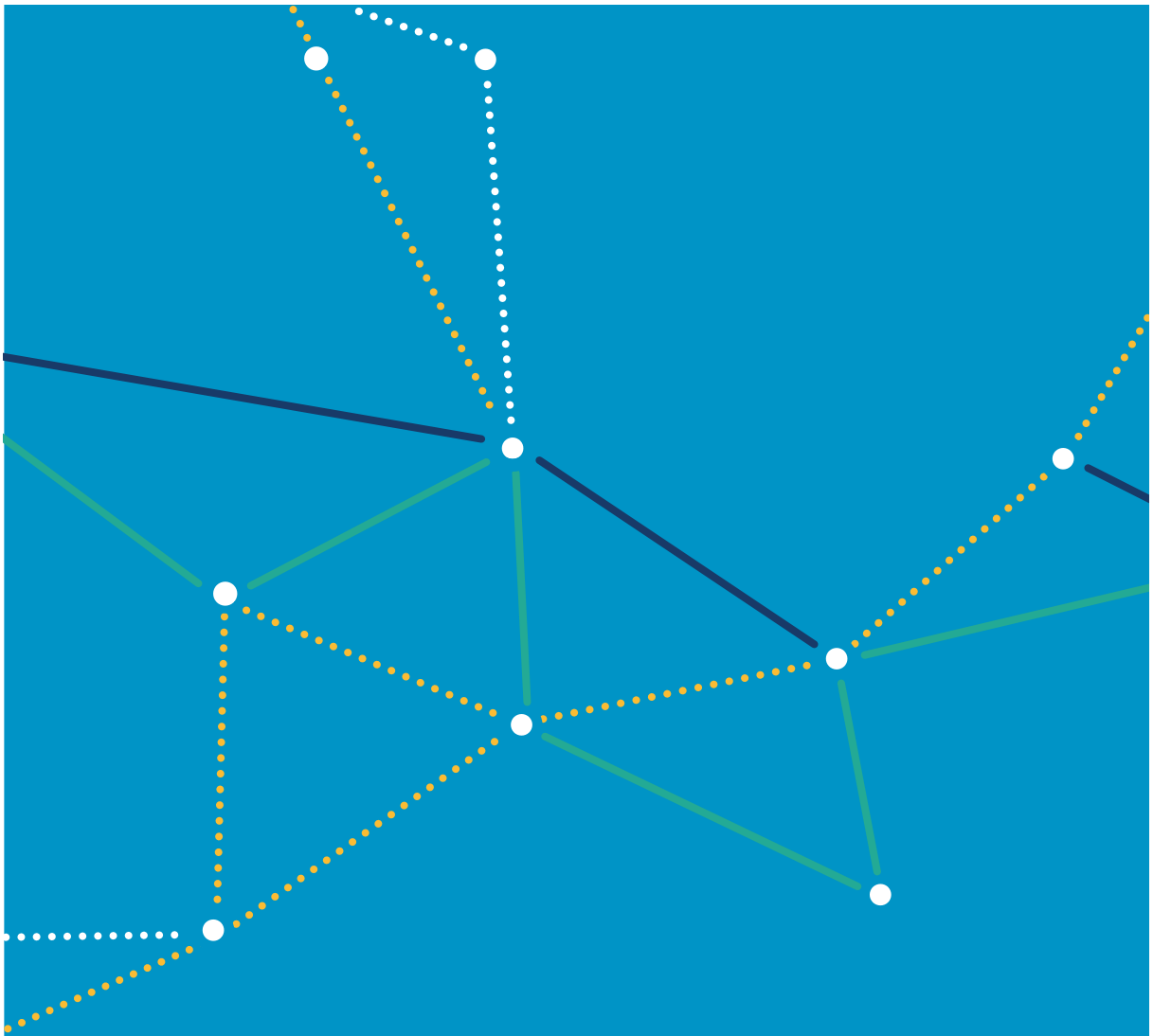
Review of R2HC-funded Ebola research projects

Executive Summary

LSTM LIVERPOOL SCHOOL OF TROPICAL MEDICINE



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ELRHA AND R2HC

The Research for Health in Humanitarian Crises (R2HC) programme reflects a strategic partnership between Elrha, the Department for International Development (DFID) and the Wellcome Trust. Through partnerships between research institutions and humanitarian organisations, the programme aims to increase the quality and quantity of research on recognised public health challenges in humanitarian crises, contributing to improved health outcomes.

To ensure research findings are translated into evidence-based practices, the R2HC plays a role in the dissemination and uptake of research findings within key communities and networks involved in humanitarian public health policy and practice.

In 2015, Elrha commissioned the Liverpool School of Tropical Medicine (LSTM) to conduct an independent review of the R2HC emergency Ebola Call for Proposals, with the objective of assessing the value of conducting research during a serious health epidemic. The review team comprised of Joanna Raven from LSTM, Haja Wurie and Mohamed Samai from the College of Medicine and Allied Health Sciences Sierra Leone, and Suzanne Fustukian from Queen Margaret's University Edinburgh.

R2HC Response to the Ebola Outbreak

Despite the growing severity of the Ebola Virus Disease (EVD) outbreak in West Africa, which had begun in December 2013 in Guinea, a "public health emergency of international concern" was not declared by the World Health Organisation (WHO) until August 2014.

The outbreak led to considerable morbidity and mortality in a very short space of time, exacerbated by weak health systems with inadequate numbers of health personnel, surveillance systems, diagnostic facilities, isolation wards and protective equipment. The health systems of the three main countries affected – Guinea, Liberia and Sierra Leone – were slow to recognise and respond to the crisis before becoming overwhelmed.

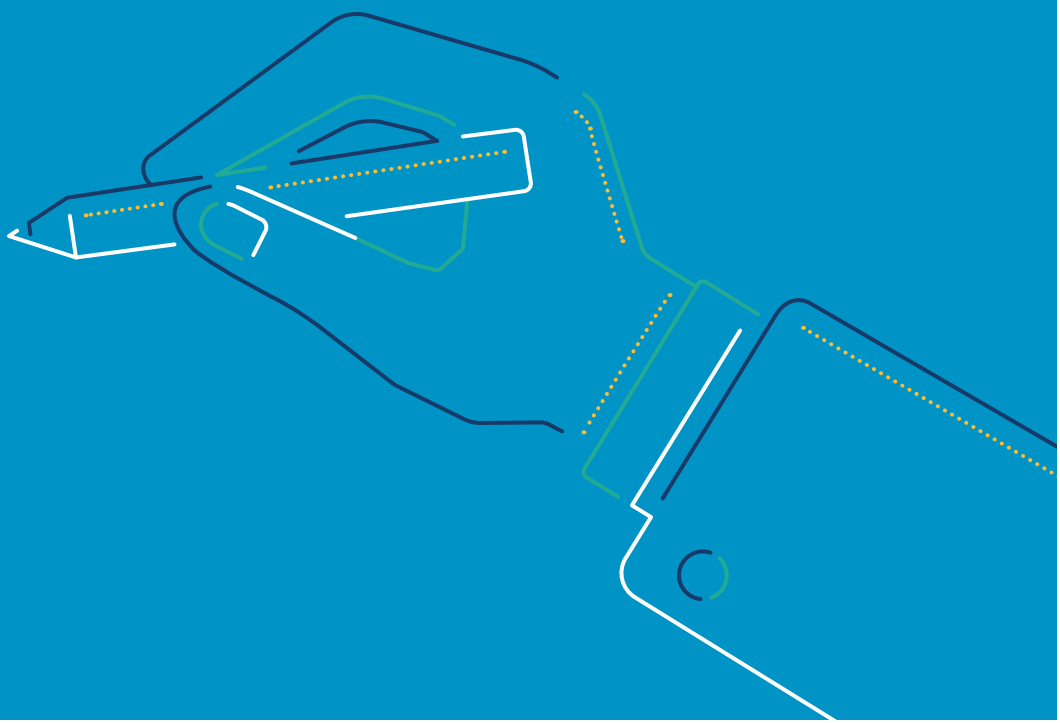
There was a lack of available evidence that could be used to inform the response to the Ebola outbreak. This was partially due to the fact that previous epidemics had not escalated to the same extent, nor demonstrated the same severity in terms of numbers, so there were limited lessons to be learnt from the past. In addition, minimal research was being conducted at that time and, whilst discussions about research at the global level had begun, there was little activity within the affected countries.

In response to the Ebola epidemic, R2HC launched an emergency call for short-term research in August 2014. The intention was to fund robust research designed to contribute to the effectiveness of the outbreak response and to draw lessons for dealing with future outbreaks of Ebola and other communicable diseases.

The call for proposals generated significant interest within the research and humanitarian communities with 208 expressions of interest received. The call resulted in the funding of eight institutions to undertake studies in support of addressing the Ebola crisis. Each of the projects worked with both in-country and international partners to deliver the research. Two were led by partners based in West African countries, and five had strong partnerships within at least one of the Ebola-affected countries that helped with conducting and disseminating the research. Two of the eight projects were led by non-governmental organisations (NGOs), whilst the rest were led by academic institutions. The funded studies covered a range of disciplines and included social science and participatory research approaches, anthropological expertise, epidemiological and mathematical modelling and diagnostics for Ebola.

	Title	Lead institution	Research approach	Partnerships	Public health emergency function
1	Messaging to promote Ebola treatment-seeking behaviour	Umeå University	Participatory approach using qualitative research	MRC Sierra Leone; Chart –Sierra Leone	Public engagement / Public information
2	Participatory behavioural change for infection prevention and control	International Rescue Committee	Participatory mixed methods approach	University of Sierra Leone; Charité – Universitätsmedizin Berlin; University of Durham	Operations-ready workers and volunteers
3	Predicting the spread of EVD	Oxford University	Modelling	Flowminder Foundation; WorldPop	Epidemiology
4	Modelling Ebola in West Africa	London School of Hygiene and Tropical Medicine (LSHTM)	Modelling	EPIcentre Paris; Save the Children; WHO; ProMED	Epidemiology
5	EbolaCheck – rapid point-of-need EVD diagnostics	University of Westminster	Diagnostics	BioGene; US Army Medical Research Institute of Infectious Diseases; Public Health England; Kwame Nkrumah University of Science and Technology	Laboratory functions
6	Ebola Response Anthropology Platform	LSHTM / University of Sussex	Anthropology	Institute of Development Studies; University of Sussex; University of Exeter; Njala University, Sierra Leone	Public engagement / Public information
7	Point-of-care diagnostic testing for EVD	Institut Pasteur de Dakar	Diagnostics	Public Health Institute of Guinea; University of Stirling; Robert Koch Institute, Germany; German Primate Centre; Twist – Dx, UK	Laboratory functions
8	How traditional healers understand and deal with EVD	Platform for Dialogue and Peace (P4DP)	Participatory action research	Ministry of Internal Affairs, Liberia; Secretariat on Natural Resources Management, Liberia; Inter-Religious Council of Liberia	Operations-ready workers and volunteers

THE EBOLA REVIEW



The Elrha-commissioned review, led by the Liverpool School of Tropical Medicine, had two objectives:

i) To document the incentives and challenges of undertaking research during the height of the 2014/2015 Ebola crisis in West Africa;

ii) To undertake a review of the outputs of the eight R2HC-funded research projects and document key achievements of the initiative, including the utility of the research both during the epidemic and beyond.

Methods

Thirty-one qualitative in-depth interviews were conducted with key informants: principal investigators of the funded projects, Elrha programme staff, funding partners and funding committee members, and end users of the research. Documents, which included the R2HC Ebola call for proposals guidelines, full proposals, reports and outputs, such as peer-reviewed publications and workshop presentations of the funded projects, were reviewed. A thematic analysis of the interviews and documents was undertaken.

CASE STUDIES

‘Real-time’ research usage during the outbreak

1. Messaging to promote Ebola treatment-seeking behaviour

This study was conducted in Sierra Leone and generated messages about Ebola and how these should be used within communities. The research team had good links with the National Ebola Response Centre (NERC) and was therefore able to share the findings with the government at various times during the research process. The messages were used as part of “house to house” activities, and during mass behaviour change events.

End users provided examples of the importance of these messages and the ways they were delivered in the context of communicating with communities, influencing attitudes and changing behaviour. It was found that in order to influence cultural and religious practices, messages needed to come from faith-based leaders who were well-respected within communities. The strategy of including such leaders in sharing information was adopted. This helped to involve communities more in controlling the outbreak.

The research also highlighted the need to target demographic groups with tailored messages and to consider the ways in which messages are delivered. Additionally, the messages played a role in the rapid control of a small-scale outbreak in Northern Sierra Leone that occurred during early 2015 and helped to reduce fear and empower people so that they knew what to do.

2. Participatory behavioural change for infection prevention and control

The research team collaborated with health workers and managers to identify the barriers and facilitators to infection prevention and control practices (IPC) in Sierra Leone, and to develop and implement strategies to improve practices. The participatory nature of the research enabled the findings to directly inform IPC practices in the study facilities.

The researchers had already worked with a consortium of NGOs prior to the Ebola outbreak, which facilitated the dissemination of the findings within the NGO community. This consortium was seen as a good catalyst for the translation of the research findings into practice. Additionally, the findings were shared with district-level managers and representatives from the Ministry of Health and Sanitation (MoHS) to ensure government staff were fully aware of the research and could support the facilities in implementing improved IPC practices.

The PI reflected that the research team needed to have a better understanding of how to package the research findings quickly and effectively so that they could influence policy at national level during the crisis. Shifting decision-making powers between the MoHS, the military and other agencies involved in the Ebola response made this task more difficult.

3. Modelling Ebola in West Africa

The analyses from this study were shared with key stakeholders such as DfID, MSF, WHO and in-country partners. The UK Department of Health used the findings, in conjunction with other data, to design intervention strategies and make decisions about resource allocation. This included decisions on staff deployment and the development of physical infrastructure.

A stakeholder described how information from the study was used to develop a weekly epidemiology brief which was shared across the British government and used to inform their strategy in Sierra Leone. He emphasised the value of epidemiological information being updated on a weekly basis so that the strategy could be adjusted to respond to the immediate situation.

An end user from Liberia, who was involved in Ebola vaccine trials and the management of the outbreak, explained that analysis from this research was used to support national decision-making about intervention strategies and policy approaches.

The research team had previous experience of working in epidemic situations which helped them to anticipate what research questions needed to be answered as the outbreak infolded. For example, they supported work on the role of vaccines in controlling the epidemic by providing information about the incidence of the outbreak, and making predictions for the future using real-time data, shared with people working on vaccine trials to help inform their design.

4. Ebola Response Anthropology Platform

This online portal was established for anthropologists from around the world to provide advice on how to design locally-appropriate interventions, and included synthesised information on how to engage with the socio-cultural and political dimensions of the Ebola outbreak. The Platform worked closely with DfID, the UK Ministry of Defence and several NGOs, and offered advice on a range of issues including identifying and diagnosing Ebola cases, management of the deceased, caring for the sick, clinical trials and research, as well as preparedness, communication and engagement.

In Sierra Leone, information from the Platform fed into high-level government meetings. One of the partners on the Platform was Njala University which served as a conduit to the President's Office, enabling information from the Platform to be used in the response, and for the Platform to understand what was needed for the response. The Platform was seen as crucial as there was no place for the rapid publication of social science and anthropological research, despite such studies being highly valued by people working in the response.

This was the first time that anthropologists had been engaged as a humanitarian disaster unfolded and to be actively involved in shaping policies rather than reflecting retrospectively on what had happened. The work has the potential to change how the role of anthropologists are seen in public health emergencies.

5. Point-of-care diagnostic testing for EVD

The 'lab-in-a-suitcase' rapid diagnostic tool developed in this study was used in Guinea. As part of the Ebola Control Strategy, the Government of Guinea wanted every fatality to be tested for Ebola. Teams were able to go into communities and use the rapid diagnostic tests on swabs. This enabled the results to be made available much faster, as well as quicker authorisation for either the family or a special team to proceed with the safe and dignified burial of those that had died from Ebola. This helped with community cooperation as funerals play such an important role in this cultural context.

Potential research usage in the future

6. Predicting the geographical spread of Ebola

This initiative aimed to develop and apply new mathematical models and software to quantify human movement patterns in the region to predict the risk of Ebola importation between and within countries in order to guide the targeting of surveillance and interventions. Such predictions are of greatest use during the growth phase of an epidemic when the disease's geographic extent is expanding. By the start of the research the Ebola outbreak had transitioned from the growth phase into a period of retraction as the outbreak was brought under control and so the need for regional predictive maps for the current outbreak lessened.

Importantly, the risk assessment software that was developed can also be used for future outbreaks. Although during the Ebola response the research team provided updated importation risk maps, much of their work focused also on developing the tools that can be implemented rapidly in the future. The outputs were also adapted to facilitate longer-term risk assessment and planning. This included ranking countries in Sub-Saharan Africa in terms of the probability of importation of the disease and capacity to manage the outbreak.

7. EbolaCheck – rapid point-of-need EVD diagnostics

In this research, diagnostic technology that could be used to test for Ebola was developed. Competition for blood samples, along with difficulty in obtaining information about the framework and process for accessing samples, prevented the technology from being tested during the outbreak. However, this technology can be used for future epidemics of Ebola. There has also been significant interest from other research groups to adapt the technology for use with other diseases, such as dengue fever and meningitis. Through presentations at international conferences and meetings the research team has disseminated knowledge within the large diagnostics industry, other viral disease experts, societies focusing on neglected tropical diseases and even oncology, radiology and molecular therapeutics scientists, who recognise the longer term potential utility of this technology in their specific areas of focus.

8. How traditional healers understand and deal with Ebola

This research raised awareness of the importance of the role of traditional healers in response to the Ebola outbreak in Liberia. The project developed strategic links with key stakeholders such as the Ministry of Health and Social Welfare, the Ministry of Internal Affairs and the Inter-Religious Council, in order to facilitate effective research uptake.

An end user within the Ministry of Health explained that the preliminary findings have been fed into the Government of Liberia's Strategic Plan on Traditional Healers, which details how they can support health interventions at the primary and secondary levels of the health system, and how this will help to build a resilient health sector. A representative from the Inter-Religious Council of Liberia highlighted how the project has altered the organisation's view of traditional healers in the outbreak, from being relatively unimportant to playing a significant role in the containment of the epidemic.

REVIEW FINDINGS

Incentives for undertaking the research

The principal investigators (PIs) of the research projects reported several reasons for applying to the R2HC call for proposals in support of the Ebola response:

1) They considered that there was a dearth of information regarding certain critical areas, such as the social factors that can influence the spread and management of Ebola, the role of traditional healers in tackling Ebola and the predicted spread of the virus.

2) They perceived that there were errors or gaps in the way that organisations were responding, such as the messages used to affect behaviour change, as well as the lack of social science and anthropological research to inform the response. For example, it was noted that health communication informing people on how to protect themselves needed to be sensitive to the environment in which they lived.

3) There was recognition that these countries' fragility deeply influenced their ability to deliver effective health services, particularly in hard-to-reach or remote areas.

4) They felt that they had something to offer to the response, and that they had a duty to contribute. They perceived that their expertise or previous experience would put them in a good position to support the Ebola response.

5) In certain cases, colleagues or partners of the PIs that were later funded under the R2HC emergency Ebola Call for Proposals, including global level actors, had requested information from the researchers about disease progression and modelling.

How the R2HC-funded research was used

Uptake of research findings in "real-time" by governments of affected countries, international partners, United Nations agencies and NGOs included:

- The Anthropology Platform played a significant role in shaping the response to the Ebola crisis through providing advice on engaging with the crucial socio-cultural dimensions of the outbreak. This work has the potential to change how the role of anthropologists is understood in public health emergencies;

- Health messages generated through this research were adopted by the Ministry of Health in Sierra Leone for use in "house-to-house" activities, and during mass behaviour change campaigns;

- Research findings from the mathematical modelling studies were included in weekly Epidemiology Briefs that informed international and national strategy, the design of interventions and decision-making about resource allocation, including predictions about the numbers of beds required, the location of beds and the use of community health centres;

- Improved infection prevention and control practices in health care facilities that have sustained following the end of the outbreak, including infection prevention and control practices in supervision checklists, on-the-job training and rating health facilities on IPC practices using a traffic light system;

- Community-based testing for Ebola in Guinea allowed for quicker authorisation for burial and improved relationships with communities.

Additionally, some of the funded research will have a longer term impact:

- Software and guidance was developed for use in future public health emergencies
- Diagnostic technology was developed that can be used to test for Ebola and other diseases
- The role of traditional healers in supporting the response to Ebola in Liberia was investigated and has potential for involvement of traditional healers in future public health responses

Research ownership and uptake

Strong on-the-ground partnerships were fundamental to ensuring the uptake of the research findings. In addition, there was scope for building local capacity to support any future response, which in turn created a platform for national ownership.

Dissemination of research findings through a range of publications in peer-reviewed journals, and presentations at conferences, meetings and seminars has promoted significant follow-up interest in the research and the potential for future collaboration.

USING R2HC AS THE MECHANISM FOR FUNDING THE RESEARCH

Elrha, through the R2HC, was selected by DfID and the Wellcome Trust to channel responsive research funding for several reasons. The R2HC had prior experience of supporting humanitarian public health research, including through rapid response grants, and has extensive links with and access to humanitarian communities. R2HC's funding partners also brought different strengths to the implementation of the call: DfID provided development experience and understanding of the context, which was coupled with scientific and research expertise from the Wellcome Trust, enabling a strong partnership to guide and implement the call.

Processes that worked well

There were many processes involved in implementing this call for research. Processes that worked well included:

- Quick and pragmatic application process
- R2HC support to research teams
- Categorisation of applications into distinct fields
- Flexibility of deadlines
- Knowledge sharing across the R2HC projects

Processes that could be strengthened

There were several processes that worked less well or could have been implemented more quickly:

- Need for more rapid approval and contracting processes
- Challenge of selecting proposals to fund given the number and range of proposals received
- Delays in administrative processes
- Challenges in obtaining rapid ethical approval in affected countries

CONCLUSIONS

Overall value of the research

The R2HC-funded research clearly influenced policy and practice. Those interviewed for the review – PIs, R2HC stakeholders and end users – reported that funding research during a crisis can be highly beneficial.

In this case, firstly there is a lack of evidence in general to inform decisions on how best to respond to a crisis such as the Ebola outbreak. Research can offer reassurance about decisions made, and can challenge or provide other options to decision-makers.

Secondly, some types of evidence can only be generated during a crisis situation. Vaccine efficacy, implementation of diagnostic tests within the outbreak and understanding people's behaviour can only be investigated at the time of a crisis. The Ebola crisis was seen as being a unique opportunity and some reported that it would have been unethical not to conduct research during the crisis.

Thirdly, although it was strongly believed that the evidence generated through research should be fed directly into the response to that crisis, it was also recognised that some of the research undertaken could also be valuable for informing future responses.

Certain caveats were also identified, namely that the research needed to be conducted with care to ensure that it did not interfere with the operational response. In addition, such research should be designed to ensure that, wherever possible, it can be fed into decision-making processes. It should also follow ethical and safety standards.

Effective partnerships within countries

Research undertaken during a public health emergency such as Ebola should provide evidence needed for the response, and should answer key questions that governments, NGOs or humanitarian agencies are asking. The research findings then need to be fed into the response as quickly as possible. Both of these activities require that the researchers are linked to people working on the response and that the responders are "ready" to receive and use research findings. This is to some extent dependent on the development of strong relationships between researchers and key stakeholders, which can take time.

Effective partnerships with actors in the affected countries are essential so that research is relevant, is conducted quickly and to high standards, and is used to inform policy and practice. There was a strong view that any research carried out during a public health emergency – not just R2HC funded research – needs to be closely linked to the operational response. Although challenging, it is possible and valuable to conduct research during a public health crisis. Effective partnerships and close engagement between researchers and end users can ensure immediate uptake of research findings. Most importantly, research should be responsive to the changing needs of the crisis and closely linked to the operational response and end users.

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