Early warning surveillance and response in emergencies

Report of the second WHO technical workshop

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Disease Control in Humanitarian Emergencies

Global Alert and Response

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Background

The Disease Control in Humanitarian Emergencies (DCE) team within the department of Global Alert and Response at WHO headquarters is conducting a project aimed at strengthening disease surveillance in the immediate aftermath of acute emergencies, through the early warning alert and response network (EWARN) mechanism. The objectives of the project are:

- To assemble, review and analyse the available evidence and experience regarding the operation of EWARN in emergencies, and
- To develop and update standards, tools and guidelines to guide and support improvements in the effectiveness, operational efficiency, and sustainability of EWARN in emergencies.

In support of these objectives, DCE convened a technical workshop of experts from a range of global partners in December 2009. Consensus was reached around several key areas of the EWARN principles and practice. The findings were published on the WHO web site and in the WHO Weekly Epidemiological Record. Participants called for the establishment of a Technical Working Group (TWG) to advance the project by undertaking a review of experiences and examples of EWARN in emergencies to help guide the development of tools and standards in this area. The TWG was formed in February 2010.

A second technical workshop was held in May 2011 at which the findings of the field reviews were presented and discussed. Participants were requested to review the draft framework, in light of the findings presented, and to reach consensus among the group on its contents and intended publication. The objectives of the workshop were as follows:

- Review the examples of EWARN implementation in Haiti and Pakistan in 2010 as well as other experiences of members of the TWG; review available evidence regarding the efficacy and effectiveness of such systems; identify strengths and weaknesses; and use the lessons learned to inform the development of WHO guidance in this area.

- Review and finalize the draft WHO technical note *Early Warning Surveillance and Response in Emergencies: a framework for implementation* in light of the evidence presented from the field examples.

- Identify next steps in the accomplishment of the overall objectives of the EWARN project.

This document is a report of the proceedings of the second technical workshop, held 10–11 May 2011 at WHO headquarters in Geneva.

Introduction

The meeting was opened by Dr Bruce Aylward, Assistant Director-General of the Health Action in Crisis cluster. He emphasized the importance of the EWARN project to WHO and reiterated the need for progress in this area for the advancement of health security.

The technical workshop was chaired by Dr Dominique Legros, an independent expert. He began by briefing participants on the origins of the EWARN project and outlined its progress to date. He reiterated the areas in which consensus had already been reached among partners, namely the principal objectives of establishing an EWARN system in an emergency, the need to link any such system to existing national surveillance systems and the importance of on-going evidence gathering.

Dr John Watson, Technical Officer within the WHO Disease Control in Emergencies team, and EWARN project leader, presented the rationale for the project, the methodology that had been defined to review existing systems, gather evidence for best practice, draw consensus on basic principles and publish practical guidance for use in emergency settings. Initial reviews of existing systems, in Darfur and in South Sudan, had focused specifically on their effectiveness in detecting outbreaks, the relevance of thresholds used and the methods of detection. It was observed that these systems were frequently characterized by inconsistency of data, a lack of standardization of reporting methods, human resource constraints and undefined end-points with little success in integrating into national health information systems after the acute emergency phase was over.

In 2010, further reviews had taken place of EWARN in Haiti, following the earthquake and in Pakistan, following the floods. A review had also taken place looking specifically at data transfer in the Philippines. In parallel, DCE has developed in consultation with partners, a draft framework for EWARN implementation that was designed to provide specific guidance while being sufficiently generic to be applicable in most emergency settings.

Part I: Review of EWARN systems

Haiti

Dr Susan Cookson, Centers for Disease Control and Prevention, presented an overview of experience of EWARN in Haiti in the post-earthquake period.

Key points

An initial version of EWARN had been in place in Haiti since the hurricane of 2008. The objective of the existing system was to monitor a wide range of public health issues, including disease trends, mental health concerns, interruption to TB and HIV treatment programmes and injuries. Detection of disease outbreaks was considered less of a priority.

Data collection sites had been selected according to capacity and location and were concentrated around the capital. However, in practice a lack of trained personnel reduced the coverage of useful data collection further.

In general, the system was hampered by under-reporting, inconsistency of case definitions, lack of base-line data, fluid population movements, technological errors, lack of trained personnel and missing data. The demand for daily reporting exacerbated these problems.

Following the earthquake, EWARN was expanded to cover the internally displaced persons (IDP) camps with the voluntary participation of the many NGOs present. After negotiation with the Ministry of Public Health and Population, the wide range of diseases covered was reduced from 26 to 20, with six infectious diseases now requiring immediate notification. Reporting was reduced to weekly. A virtual "Google group" was established to improve electronic communication and laboratory capacity was strengthened in parallel.

The Islamic Republic of Pakistan

Dr Francesco Checchi, London School of Hygiene and Tropical Medicine, presented findings from a review of the Disease Early Warning System (DEWS) in place in Pakistan implemented by the Ministry of Health and the National Institute of Health with the support of the WHO Country Office. The review looked at knowledge of and participation in DEWS, weekly reporting mechanisms, the alert and response function and its relationship with other surveillance systems.

Key points

DEWS has become the principal surveillance system in Pakistan covering 92 districts and 60% of the population. It is centralized in Islamabad, with regional hubs and surveillance officers active at district level.

Weekly reporting includes priority epidemic diseases and those with high morbidity as well as flood-related diseases. Data sources include up to 2600 basic health units and all large government hospitals, relayed using a variety of media, SMS, fax, and telephone. The quantity of weekly data reported places very high work burden on the surveillance officers, many of whom cover wide geographical areas.

Despite the quantity of weekly data, 90% of outbreaks have been detected by formal immediate alerts. Only 10% were detected through data analysis. Positive examples exist of outbreaks of both cholera and measles being rapidly contained through early alert and response without waiting for laboratory confirmation.

DEWS is widely appreciated, understood and enjoys widespread compliance, due in part to the regular in-person visits of the surveillance officers to the health-care facilities. It has become the only functioning early warning and alert system and is enabling capacities to be built at all levels of the health system. However, there are incompatibilities with other vertical surveillance systems and there is little sign of a transition towards integration into routine government surveillance systems in the near future.

The Philippines

Dr Peter Mala, Disease Control in Emergencies, WHO Headquarters presented the design and implementation of Surveillance in Post Extreme Emergencies and Disasters (SPEED), that was utilized in the Philippines from March to August 2010. The presentation looked specifically at the issue of transferring data from district (including rural health posts) to central level. SPEED utilizes mobile phones, and Internet where available, linked to on-line servers to convey data rapidly and simply.

Key points

Data is conveyed via a simple SMS message, or on-line form in health facilities with internet access, to a central server on a daily basis rather than compiled on a weekly basis. Reporting units use SMS codes provided at no cost by the major mobile networks. Nearly 100% national coverage is achieved, including rural health facilities. Additional delivery systems are also available including telephone and fax.

The system is timely, cost-effective and limits the overload of a manual weekly reporting system. The codes can be easily adjusted as priorities change. However, it was noted that there may be issues of IT compatibility with other national databases which may have a negative impact on long term integration into routine surveillance systems.

Part II: Review of draft WHO document

Early Warning Surveillance and Response in Emergencies: a framework for implementation

The second objective of the workshop was to review the draft document *Early Warning Surveillance and Response in Emergencies: a framework for implementation.* Members of the TWG had contributed to its development and participants at the meeting were now requested to agree its format and suggest any additional amendments prior to publication.

Overview

The group agreed that the introduction to the guidance document should provide the reader with a full background to the purpose and rationale for EWARN. Mention should be made of why this guidance is needed, the problems that had been encountered in the past and the specific demands of conducting surveillance for early warning of disease outbreaks in an emergency setting. The target audience for this document is likely to comprise medically-focused humanitarian workers responding to public health needs in the immediate aftermath of an emergency, caused by either a natural disaster or by civil strife. It was stressed that it was important not to assume any prior knowledge of EWARN and to ensure the document offered practical, operational guidance for the implementation of EWARN in a step-by-step format, for use at the field level in an emergency situation.

Wherever possible, practical examples, case studies and templates of forms and registers should be included along with detailed instructions on how to establish and implement an effective EWARN. In addition to recommended action, it was felt that it would be useful to state clearly what should not be done. It was widely agreed that a clear rationale behind each recommendation be included wherever relevant, as this would support negotiations and decision-making with government and health cluster counterparts.

Participants agreed that the primary objective of EWARN should be to detect outbreaks as soon as possible. As such, the reader should be reminded that the rapid alert function must be established immediately, while the weekly reporting system should be implemented as soon as possible thereafter.

Surveillance data

Considerable discussion took place around the kind of information that should be collected and for what purpose. Participants stressed that EWARN should only gather information that would trigger action and warned against overwhelming the system with irrelevant or unusable data that would crowd out important alerts. As effective early warning cannot wait for laboratory confirmation, syndromes should be monitored rather than specific diseases. It was noted, however, that where rapid diagnostic tests (RDT) were available at the peripheral level, reporting forms should distinguish between cases that had been confirmed by RDT, such as malaria, and cases of unexplained syndromes, such as acute jaundice.

An iterative risk assessment should determine the specific diseases to which the affected population may be vulnerable and it was noted that, as in the case of Haiti, this could change suddenly and unexpectedly.

Immediate alerts should be used to detect epidemic-prone diseases where and when they occur. Weekly data reporting, meanwhile, should be used to monitor disease trends, proportional mortality of endemic diseases and other unusual events. Participants agreed that it would be helpful if the guidance document include mention of what EWARN should not be used to monitor, such as interruption to TB or HIV treatment, and provide suggestions of other systems that could be used to record such data.

Concerning the recommendation that EWARN should not record individual mortality figures and focus only on clusters of unexplained deaths, the group requested that the guidance document provide a more detailed and explicit rationale. Political imperatives often demand that surveillance systems record numbers of deaths. However, the data are difficult to collect outside of hospital settings and cannot be used to determine population mortality rates.

Implementation

The group discussed the modalities of EWARN implementation including selection of sites, mechanisms for relaying information, response to alerts, analysis and aggregation of data and feedback. Discussions

also noted the need for guidance on outbreak investigation and event management. Participants urged WHO to provide as much step-by-step instructions as possible to aid implementation.

Site selection

It was agreed that EWARN should aim to collect information on an exhaustive basis, from all possible sources. This is particularly important in the case of immediate alerts as it is essential that the system is able to detect a single case of an epidemic-prone disease wherever it occurs. Immediate alerts could come from formal health-care settings or as a result of a rumour from a community. In areas of sparse formal health-care coverage, it was recommended that community outposts be established. Immediate alerts should be transmitted using an instant mode of transmission, such as telephone or SMS. Good examples have been seen of a "hot-line" being put in place to receive telephone alerts. In the case of rumours from the community or from the media, it was noted that a simple rapid process of verification would need to be conducted, such as telephone interview, in order to determine the veracity of the alert.

In the case of determining sources for weekly reporting, it was recognized that although a policy of exhaustive coverage should equally be applied, in practice some sites may be able to produce more meaningful and reliable data than others. It was suggested that some targeting of selected sites may be useful to ensure the consistency of good data. This may include training, additional resources, personal contact and proactive soliciting for data.

Analysis and aggregation of data

Aggregation of weekly data is likely to be done at the district level rather than peripheral level allowing trends to be detected that would warrant investigation. The group recommended that indicators be included along with thresholds to guide aggregation and response. It was noted that the analysis of the weekly data submitted by the health-care facilities would provide valuable context and baselines against which any unexpected increases in cases of concern could be detected as well as providing a means for quality control of the reports received.

For most epidemic-prone diseases the threshold for response would be a single case. Health-care facilities should be made fully aware of the imperative of raising an immediate alert into the system if a single case of one of these diseases is detected. It was suggested that in addition to the weekly reporting forms, posters be provided for the health-care facilities clearly listing the diseases requiring an immediate alert, together with the relevant "hot-line" number.

Feedback and reporting

The group requested more emphasis in the guidance document on the value and importance of feedback on the results of data analysis both to the health-care facilities and to the wider humanitarian community. Regular feedback to the providers of data was not only courteous, but would also help cement a commitment to the EWARN process and an understanding of the importance of immediate alerts and weekly reports. Regular reporting to the humanitarian health cluster and other coordination groups, such as the Water, Sanitation and Hygiene (WASH) cluster, would ensure that information on potential public health concerns is shared and acted upon before evolving into a public health crisis. Regular bulletins are often used to disseminate health information, however, these can vary in quality and usefulness. It was suggested that the guidance document could highlight the components of a good bulletin.

Laboratory diagnosis

To be effective, EWARN must function without waiting for formal laboratory confirmation of a suspected disease. However, laboratory support is an important element of the outbreak investigation process and plays a significant quality assurance role. District level outbreak investigation teams will therefore need to collect the appropriate specimens for the diseases under surveillance. The guidance document should provide clear instructions on the correct specimens to collect, the materials needed, the packaging and transportation requirements and information on the relevant receiving laboratories. Any risks involved to the investigation team must be clearly highlighted, particularly in the case of viral haemorrhagic fevers.

Outbreak preparedness

The group suggested that the guidance document provide more detailed information on outbreak preparedness and indicate to the reader where further details on the operational components of outbreak management, such as reactive vaccination and social mobilization, can be found. It was also stressed that guidance should be provided on how EWARN should be adapted to be able to conduct specific disease surveillance in an outbreak situation.

Further information

The participants reiterated the value of providing practical tools in the guidance document. In addition to the annexes already included, it was suggested that certain examples, such as an alert register and outbreak line list, be included. A glossary of terms was requested with clear definitions of potentially ambiguous phrases. Additional information on training, evaluation, supervision, implementation and transition post-emergency would be useful.

Part III: Way forward for the EWARN project

Participants were all agreed of the pressing need to develop practical guidance for EWARN in emergencies. WHO reiterated its strong appreciation for the high level of commitment shown by all partners since the beginning of this project, including the wealth of valuable feedback that participants had provided during the meeting.

As an initial step, the group requested WHO to incorporate their suggestions into the existing draft guidance document, providing as much practical examples and tools as possible, and circulate a final iteration for comments. Supporting information products, such as standard operating procedures, may prove useful in due course, however at this stage it was agreed that efforts should focus on finalizing the document as generic guidance. WHO would then circulate the final iteration of the draft guidance document to the participants for final comments prior to publication.

A period of review could then take place to gather additional evidence from the field and to evaluate its practical use. It was anticipated that the aim would be for this guidance to evolve into a more comprehensive and practical guidance document for field workers with little or no experience with EWARN. It was recognized that this would entail a considerable amount of work and while WHO was requested to coordinate the development of such guidance with the support of partners, participants were requested to consider what practical support their organizations may be able to offer WHO in this respect.

Annex. List of participants

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