EpiCore: Initial Experience with an Innovative System for Outbreak Verification

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Abstract

Objective To understand the performance of the EpiCore platform and evaluate its usefulness in obtaining information regarding potential public health outbreaks.

Methods Volunteer human, animal, and environmental health professionals from around the world are recruited and trained to provide early verification of health threat alerts in their geographic region through a secure, easy to use, online platform. Experts in the area of emerging infectious diseases send requests for information on unverified health threats to these volunteers who combine their on-the-ground knowledge and professional expertise to verify outbreak alerts to respond to those requests. Experts review and summarize responses and rapidly disseminate important information to the global health community through existing event-based disease surveillance networks such as ProMED.

Findings From March 2016 to September 2017, 2068 EpiCore volunteers from 142 countries were trained in methods for informal disease surveillance and the use of the secure EpiCore online platform. These volunteers provided 799 individual responses to 759 requests for information addressing unverified health threats in 112 countries. 61% of requests for information received at least one member response. Most responses were received within hours of the requests. 45% of responses were considered of high significance. These responses led to 194 ProMED posts with over 50% of responses supporting verification of an outbreak and were published on ProMED, an existing outbreak reporting network with more than 85,000 members.

Conclusion There is widespread willingness among health professionals around the world to voluntarily assist efforts to verify and provide supporting information on unconfirmed health threats in their region. By linking this worldwide member network of health experts through a secure online reporting platform, EpiCore enables faster global outbreak detection and reporting.

Introduction

- Rapid detection of infectious disease events of potential public health significance allows for control measures to be implemented in a timely manner, thus limiting the size and geographic spread of outbreaks

- Informal-source or event-based surveillance systems (EBS) complement formal public health mechanisms in the detection of outbreaks of infectious diseases

- Inherent transparency and wide variety of information sources available for EBS have been credited with reducing time to outbreak discovery and speed of the public communication of outbreaks

- However, early signals are often unverified and control measures may be delayed while confirmation of a public health event is awaited

- When confirmatory information is lacking, ProMED frequently issues preliminary reports of potential public health events as "requests for information" **(RFI)** in an attempt to elicit further validation or verification of these events. However, these RFIs that are sent to the entire ProMED membership (>86,000 subscribers) go unanswered up to 95% of the time

- 2013: 4 global public health organizations partnered to begin the EpiCore Global Surveillance Project. Premise: a global community of committed and qualified human, animal and environmental health professionals could rapidly validate or discard outbreak reports in their region, thereby facilitating timely outbreak responses

EpiCore Responder Qualifications

Must have *at least 2* of the following:

- An advanced degree in public health or related field (e.g. MPH)
- Health professional certification or licensure (e.g. MD, DVM, RN)
- 3-5 years of experience in human or animal health
- Current affiliation with a medical center, university, ministry of health, department of health, or other health-related organization including NGOs and private sector organizations
- Successful completion of a Field Epidemiology Training Program (FETP)

> "EpiCore utilizes crowdsourcing to enhance information gathering to validate rumors and informal reports. The goal is to help shorten the time from first learning about a rumor of an event to confirmation of the event."

Methods and Activities

- Recruitment of responders at ID meetings, TEPHINET meetings, and online by email to ProMED subscribers and other partners

Locations of 2068 EpiCore Responders in 142 countries

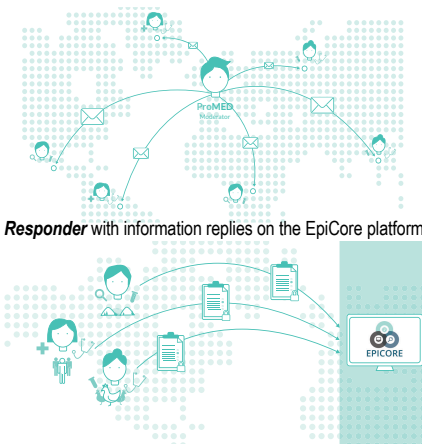- Build-out of web platform: EpiCore.org
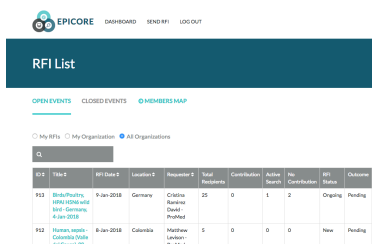
- Training of Requesters and Responders, online and in person

- Responders qualify after training and passing exam

EpiCore Flow of Information

Requester, faced with an unverified outbreak, generates an RFI and sends it to selected EpiCore responders

Responder with information replies on the EpiCore platform

Methods and Activities (cont'd)

- EpiCore responses posted in follow-up ProMED reports

Published Date: 2017-12-15 20:16:07
Subject: PRO/EDR> Poliomyelitis update (44): (Australia), pos. environmental sample, iVDPV2 iden.
Archive Number: 20171215.5506586

Date: Fri 15 Dec 2017
Source: EpiCore Global Surveillance Project [edited]

We received a rapid reply to our query on the results of genetic testing of the poliovirus type 2 isolated in environmental samples taken from the Western Sewage Treatment Plant in Melbourne, Victoria, Australia. The poliovirus isolate was genetically characterized as most probably an immunodeficiency-related vaccine derived poliovirus (an iVDPV). The genetic characterization was suggestive of chronic carriage for several years with no relationship to prior or present cVDPV isolates.

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Communicated by:
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- Data collection and analysis: Mar 2016-Sep 2017

Findings

Country	RFIs sent	Total EpiCore Responders in Country	Responses to RFIs	# of RFIs with at least one response (%)	# of useful[a] responses (%)
India	121	186	91	60 (50%)	72 (79%)
United States	78	399	38	51 (65%)	37 (97%)
Pakistan	51	86	97	37 (73%)	70 (72%)
Iraq	43	20	29	22 (51%)	24 (83%)
Egypt	30	18	18	17 (57%)	17 (94%)
Saudi Arabia	30	12	9	13 (43%)	6 (67%)
Syria	30	0[b]	0	19 (63%)	0 (0%)
Nigeria	19	189	176	19 (100%)	171 (97%)
Bangladesh	16	33	11	8 (50%)	10 (91%)
Brazil	14	32	21	11 (79%)	11 (52%)
Angola	12	3	0	0 (0%)	0 (0%)
Nepal	12	25	21	6 (50%)	17 (81%)
Israel	11	7	9	7 (64%)	7 (78%)
South Africa	10	19	8	7 (70%)	8 (100%)
United Kingdom	10	61	15	9 (90%)	11 (73%)
Russia	9	7	4	5 (56%)	3 (75%)
Kazakhstan	8	1	0	2 (25%)	0 (0%)
Kenya	8	25	8	6 (75%)	5 (63%)
Myanmar	8	4	3	2 (25%)	3 (100%)
Philippines	8	77	10	8 (100%)	10 (100%)
All other countries	231	719	790	157 (68%)	187 (93%)
Total	759	1,923[c]	1,358	466 (61%)	669 (87%)

Result highlights:
759 RFIs sent to EpiCore responder volunteers
1358 Responses
61% of RFIs received at least 1 response
87% of responses were considered "useful" by requester

Discussion

Innovative disease surveillance methods have demonstrated their utility in speeding the detection of public health threats.

However, unofficial data may consist of unverified information (sometimes referred to as "rumors") and actions to control outbreaks may be delayed pending further verification.

EpiCore complements current MOH and WHO systems by addressing this gap and has demonstrated the utility of its approach by verifying or refuting numerous unconfirmed public health events

Analysis of nearly 200 ProMED reports during the study period citing EpiCore data indicated that in most cases, validation of the report was supported. In other cases, alternative explanations for events were found, negative test results were found, or additional data concerning the event was provided and posted to ProMED readers.

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We are deeply grateful to the EpiCore volunteers