Surveillance of Emerging Disease in Resource-Limited Settings

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Objective

The goal of this project is to develop and pilot rapid electronic data collection tools and outbreak detection technology that will:

- Enable public health authorities in resource-limited areas to develop or enhance systems to monitor disease trends and identify disease outbreaks in accordance with the 2005 International Health Regulations (IHR 2005).
- Enable the development of infrastructure in resource-limited areas needed for national, regional surveillance networks.
- Improve the management of public health infrastructure needed in all countries to enable greater participation in a global surveillance and response system.

Methods

- **ESSENCE Desktop Edition (EDE)**
  - ESSENCE Desktop Edition (EDE) is a desktop version of the ESSENCE II web-based disease surveillance application that removes the flow, functionality and analytic power of the original web-based application. It:
    - Is an independent add-on application that identifies significant increases in community disease trends by analyzing longitudinal, case-level counts of disease or disease surrogates.
    - Provides time series with unexpected increases in count data highlighted. Pie charts, bar graphs, and line listings of cases and deaths can be produced from any available clinical and demographic data.
    - Works seamlessly with EpiInfo and EpiMap to create case maps by residence, or other pertinent location.
    - Is designed to work with multiple types of systems and databases, and connect to different surveillance systems with minimal effort.

- **Clinic Data Entry Software (CDES)**
  - CDES is a simple data entry tool created with the Open Office Base Database application that is designed to be used at the health clinic or health station level. CDES:
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      - Enables public health authorities in resource-limited areas to develop or enhance systems to monitor disease trends and identify disease outbreaks.
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      - Improves the management of public health infrastructure needed in all countries to enable greater participation in a global surveillance and response system.

Introduction

"Inadequate surveillance & response in a single country can risk the health of its population, and also that of the world’s..." – Heymann 2004

**Problem**

- The SARS epidemic in 2003-2004 demonstrated the increasing interconnectedness of our world, and the rapidity with which disease can circumscribe the globe. The world community needs to work together toward a global system of disease surveillance to provide optimal protection to all people.
- The revised International Health Regulations (IHR 2005) addressed this issue by requiring signatory countries to improve their ability for disease prevention, detection and response, and to report public health events of international concern (PHEIC) to the World Health Organization (WHO).

**Solution**

- Traditional paper-based disease surveillance systems were designed to track long-term disease trends, not disease outbreaks and not PHEIC.
- Electronic data collection and transmission is required for rapid outbreak detection.
- The countries most likely to have the host, microbe, environment combination that promotes emergence or re-emergence of infectious diseases, either have limited resources to rapidly detect, respond to, and contain PHEIC.

Conclusions

- The increasing interconnectedness of our world has transformed the traditional surveillance paradigm from a nation-based activity to a global responsibility.
- To prevent and respond to local and regional epidemics and adhere to IHR 2005, all countries need rapid outbreak detection and response capacity, particularly in resource-limited areas where the environment is ideal for development of new microbes.
- Ideally, national and regional systems will develop that can routinely share summarized disease surveillance information, eventually creating a ‘virtual’ global disease surveillance system.
- The project described here is developing freely available surveillance software applications that will facilitate the development or enhancement of local, regional and national disease surveillance systems in resource-limited areas of the world.

References


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Line Listing of Disease Data

Graphs of Disease Data

Table of Disease Data

References


[4] This work was supported by U.S. Department of Defense Global Emerging Infections System (GEIS) under Contract N00024-03-D-6606, T.O. 0903.