COACTION PUBLISHING

Application of event-based biosurveillance to disease emergence in isolated regions

Wai-Ling Mui*, Brian White, Emily Iarocci, Aimee Reilly, Noele Nelson and David Hartley

Division of Integrated Biodefense, Georgetown University Medical Center, Washington, DC, USA

Objective

To demonstrate how event-based biosurveillance can be utilized to closely monitor disease emergence in an isolated rural setting, where medical information and epidemiological data are limited, for the purpose of identifying areas for public health intervention improvements.

Introduction

Argus is an event-based surveillance system, which captures information from publicly available Internet media in multiple languages. The information is contextualized, and indications and warning (I&W) of disease are identified. Reports are generated by regional experts and are made available to the system's users (1). In this study a small-scale disease event, plague emergence, was tracked in a rural setting, despite media suppression and a low availability of epidemiological information.

Methods

Argus reports meeting the following inclusion criteria were selected retrospectively: (1) disease: plague, (2) location: Peru, (3) time period: April–October 2010. The reports were reviewed for relevant I&W of plague infection, with the goal of identifying factors that contributed to disease spread and ineffective public health response.

Results

From the time period specified, media reported on a human plague outbreak in northern Peru where all 3 clinical forms of plague were identified (septicemic, pneumonic and bubonic); in one area, bubonic plague was registered for the first time in over a decade while pneumonic plague was reported for the first time ever in the country, according to an official (2).

The first human case of bubonic plague was reported in April, followed by a 2-month reporting lull from May to July. Subsequently, new media information revealed ongoing human plague cases, including nosocomial pneumonic infections which had spread from one patient to medical staff and one relative, as well as a severe lack of biosafety personal protective and laboratory equipment (3).

Retrospective review of Argus reports later identified 3 key factors that limited the effectiveness of disease management in the region: (1) a lack of government leadership and accountability, (2) poor sanitation leading to an inability to decrease the vector population and (3) an inadequate regional healthcare infrastructure (4). Media sources recognized discrepancies in medical information provided by health officials and the medical community, and as the outbreak continued, protests erupted over poor sanitary conditions and insufficient medical resources as observed by healthcare workers. In August, the Minister of Health (MOH) declared that the outbreak had been 'controlled'; however, the media continued to report human plague cases and noted concern regarding the potential danger of plague spreading to urban markets. Travel restrictions were applied and reports later speculated that the World Health Organization (WHO) would close ports and issue a national quarantine if plague extended into coastal export areas (5, 6). Further, officials declared a latent risk of disease transmission to bordering countries. At the end of the study reporting timeframe, media continued to identify the confirmation of new human bubonic plague cases, the implementation of vector control efforts, and the ongoing risk to residents despite attempted disease management efforts.

Conclusions

The use of an event-based methodology provided detailed insight into a localized, small-scale disease situation where limited medical and epidemiological information was available. Argus documentation of this event allowed for a retrospective review, which identified deficiencies in the current disease management system in Peru and drew attention to the potential negative impact of social and political context on public health efforts.

Keywords

Surveillance; plague; emergence; intervention; isolated

Acknowledgments

Members of the Georgetown Medical Center Project Argus team, including but not limited to, Denise McAnany, Sarah Riedl and Carlos Balhana.

References

1. Nelson NP, Brownstein JS, Hartley DM. Event-based biosurveillance of respiratory disease in Mexico, 2007–2009: connection to the 2009 influenza A(H1N1) pandemic? Euro Surveill. 2010;15: pii:19626.
2. www.laindustria.pe.
3. www.generaccion.com/noticia/80923/libertad-poblacion-atemorizada-por-posible-peste.
4. www.larepublica.pe.
5. peru21.pe/impresa/noticia/peste-anulada-mas-tres-anos/20100726/280925.
6. www.noticiastrujillo.com/index.php?option=com_content&task=view&id=40987&Itemid=56.

***Wai-Ling Mui**
E-mail: mui@isis.georgetown.edu

Citation: Emerging Health Threats Journal 2011, **4**: 11071 - DOI: 10.3402/ehtj.v4i0.11071