Planning & Development of a Regional Integrated Disease Surveillance System

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Objective

This paper introduces the challenges and lessons learned from the planning and development of a regional integrated disease surveillance system, presenting a new method to quantitatively measure IT support capabilities in disease surveillance and control, as well as a collaboration model integrating the information from multiple sources.

Background

Shenzhen is a special economic region in southern China, adjacent to Hong Kong, with a population of approximately 14 million. The pioneering efforts of Shenzhen in the development of electronic disease surveillance started as early as in 1995. The setup of syndromic surveillance was started after the SARS outbreak in 2003, including surveillance in Fever Clinics, GI clinics, selected schools, and sentinel surveillance for the workers in selected chicken farms and bird markets. In 2007, a regional plan was developed for systematically integrating the surveillance for environmental health, food safety, lab information systems, infectious disease notification, and outbreak management.

Methods

The planning and development of a regional integrated disease surveillance system depends on a rigorous framework to quantitatively measure IT support in workflow processes for disease surveillance and control, and a regional collaboration model. The key challenges are in the alignment of public health strategic planning with a series of IT project plans. This paper introduces a new model, which was developed in 2007 for Shenzhen regional surveillance planning. It compiles the public health workflow into an eight-dimensional model: case reporting, case investigation, case management, outbreak investigation, outbreak management, analysis and reports, data exchange with other applications, and outbreak early detection/warning. Along with each dimension, five different measurement levels were defined to quantify IT supporting capacity. With this approach, the regional surveillance current status was quantitatively evaluated, and future capacity from regional planning with a series of IT projects was analyzed. A regional collaboration model systematically defined the information exchange management processes and data content among multiple government agencies and non-government organizations.

Results

The introduced methods made it feasible for the Shenzhen CDC to have the baseline, measurable goals, and gap analyses for IT support in regional disease surveillance. Based on the developed new method, the following public health surveillance areas are analyzed: regional infectious disease surveillance and control, public health laboratory information systems, food safety, environmental health, and occupational health surveillance. A five-year plan was developed for regional integrated disease surveillance, with three stages for more than 30 application systems (including coupling with national systems, district systems, and information sharing across borders). Aligning with the regional public health strategies, the planning work included the enterprise architecture blueprint, functional architecture design, and development and implementation plans for all applications. In the implementation plan, the project priority, the level of difficulties, and the risk factors were assessed as well.

Conclusions

The planning and development of a regional integrated disease surveillance system is a complex process. The rigorous framework to measure IT support for public health capacity is the first challenge in planning, while a collaboration model is the key for disease surveillance and control.

Acknowledgments

The authors thank the Shenzhen CDC for this visionary project, Z.J. Chen & J.Z. Liu for their hard work.

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