Automated Mortality Surveillance for Pandemic Influenza Preparedness

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Objective

To describe the implementation of an automated mortality surveillance system using weekly-updated municipal death data as part of an integrated public health electronic monitoring system in South-Eastern Ontario.

Background

- In Canada, the most recent national and provincial pandemic preparedness plans call for the development of surveillance capability for influenza-related mortality during a pandemic.
- As a measure of disease severity, excess mortality may signal shifts in influenza strains and epidemic potential.

Methods

Data Sharing and Privacy:

- A data-sharing agreement with the City of Kingston, Ontario, formalized a partnership to facilitate regular updates of municipal mortality data over a secure connection (see Figure 1).
- Data is stripped of personal identifiers to ensure full compliance with provincial privacy legislation.
- Municipal records include the date, age and causes of death as listed on the medical death certificate.

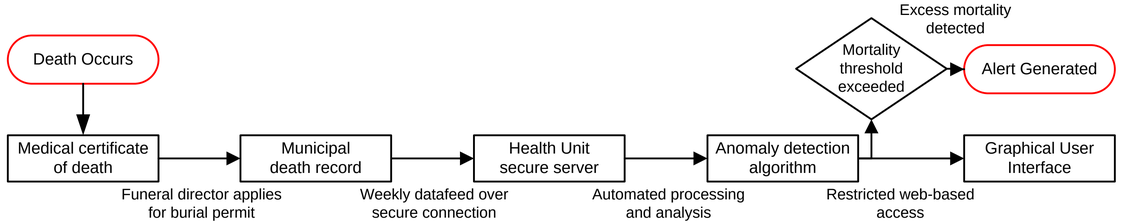

Figure 1. The broad sequence of events following death that leads to data acquisition by the surveillance system.

Automated Data Processing:

- Processing and analysis has been automated as a scheduled task to enable continuous monitoring without human intervention.
- Influenza-related deaths were identified using keyword classification and a phonetic algorithm.
- In this version, anomaly detection is accomplished using CUSUM flags. The final thresholds for alert generation are still under evaluation.

Results

- The system went online in September 2009 with 12 years of historic municipal data and weekly updates going forward (see Figure 2). Approximately 25% of records in this region lack age data.
- Retrospective analysis of twelve years of mortality data was performed to establish baseline mortality rates in Kingston. The historic burden of seasonal Pneumonia-Influenza mortality in this region was shown to be greatest among the elderly (see Figure 3).
- In 2009, the age-distribution of mortality from all-causes and pneumonia-influenza has not changed significantly.

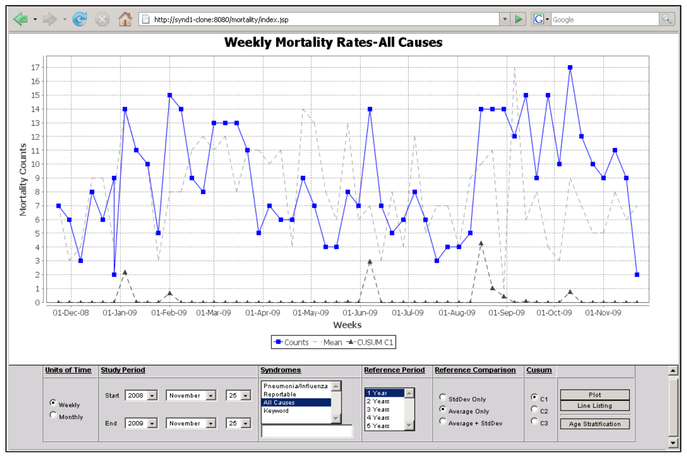

Figure 2. Mortality surveillance GUI screenshot.

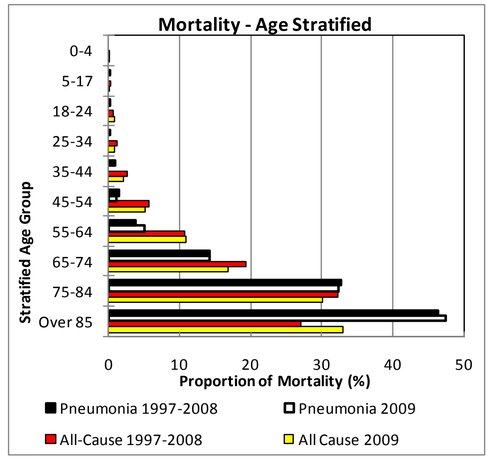

Figure 3. Age-stratified mortality analysis.

Conclusions

- The importance of population-specific monitoring to quickly detect these trends to improve situational awareness and reduce socio-economic disruption remains a strong argument for developing real-time surveillance capability.
- The quality of death data depends on the diligence of attending physicians in completing medical death certificates, the inclusion of age information by municipalities, and data timeliness.
- Evaluation of the usefulness of this system as a module in a comprehensive real-time public health electronic system for influenza A (H1N1) surveillance is ongoing.

Next Steps

- Integration of multiple datastreams within a unified graphical user interface could further enhance the ability to detect and respond to public health emergencies.

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