Can automated data from Emergency Department data collections help to assess vaccine safety?

Jim Buttery
ED data in syndromic surveillance

• US Bioterrorism/Communicable disease surveillance
  • CDC BioSense system
    • Amb care, ED diagnostic and procedural data from military and veterans facilities
    • Clin lab Ix from LabCorp
    • Incl ISDS Distribute ED system- ceased 2012
  • Real-time Outbreak Detection System (RODS)
    • >500 ED, admissions, + OTC sales
    • Syndromes incl: GI, resp, botulism, neurologic, rash, haemorrhagic
  • Electronic Surveillance System for the Early Notification of Community based Epidemics (ESSENCE)
    • Military and civilian ambulatory visits, civilian ED chief-complaint records, school absenteeism data, OTC and prescription medication sales, veterinary health records, and requests for influenza testing
  • Rapid Syndrome Validation Protocol (RSVP) - human and animal
  • BioDefend, BioALIRT, BioStorm, BioPortal, B-SAFER, INFERNO...
Other syndromic surveillance systems

Media based
  • HealthMap [www.healthmap.org](http://www.healthmap.org)
  • Argus Project (Georgetown)

OTC sales
Ambulance despatches
Telephone Help line
Web searches
Social media
Australian non-ED surveillance systems

Primary care

- ASPREN GP Influenza and Infectious Disease Surveillance
  - >200 GPs
  - Fever, cough, fatigue ILI
  - Swab for viral resp pathogens
  - Extract via Canning tool

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Click here to find out more about becoming an ASPREN GP.
ED surveillance systems in Australia: ILI
Public Health Real-time Emergency Dept Surveillance System (PHREDSS) - NSW

Liljeqvist et al. BMC Public Health 2011 11:435
ED surveillance systems in Australia: ILI

• NT
  • Daily extraction and manual review
    • ILI
    • Intussusception

• SYNSURV – SatScan based
  • Pilot system run from 2 Melb EDs for 2006 Commonwealth Games
    • Detected norovirus outbreak in athletes village before other mechanisms
  • ILI
    • ICD coding influenced by clinician awareness of flu activity

Moore et al BMC Public Health 2011
National Capacity:

• Paediatric Research in Emergency Departments International Collaborative

• 13 member sites which have a combined annual visits of >450,000 children
  • Australia and New Zealand
    • all major tertiary children’s hospital ED
    • some larger mixed (adult and paediatric) ED

• No group extraction process as yet
Role of geotemporal data in vaccine safety

Utility for:
- Graduated introduction
- Immunisation error-related AE
- Differential coverage
  - Eg paed TIV
SYNTRACK pilot: real time mapping of syndromic ID and vaccine safety presentations to paediatric EDs

**Aims:** To demonstrate technical and ethical feasibility of

- real time uploading of coded syndromic de-identified data from paediatric ED software systems in Victoria
- To geocode each episode by postcode
- To cluster clinically-related codes to enable automated geotemporal signal detection

**Hypothesis**

- That real time uploading of de-identified paediatric ED information is feasible, ethically acceptable and has utility for public health signal detection purposes.
SYNTRACK

Methods

Extract real-time from the ED software systems of 5 Melbourne EDs

• RCH, Sunshine [HASS software]
• 3 x Monash Health [Ascribe Symphony software]
• ICD-10 codes
  • related to potential vaccine safety presentations (eg vaccine adverse event codes, febrile convulsions)
  • and syndromic infectious disease presentations (eg acute infective respiratory illnesses; gastroenteritis)
• age band/postcode of origin/ free text
• uploaded to a secure website.
• combined data analysed using geotemporal methods
Issues:

• Real time extraction
  • Varied and evolving software
  • Variable flexibility
    • HASS vs the world

• Coding
  • Usually only need 1 code to discharge from system (>1 rarely entered)
  • Influenced by clinician assumptions of “ambient business”

• Free text
  • Reliance on NLP

• Privacy
  • Aggregation and de-identification
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