THE CANADIAN SURVEILLANCE SYSTEM FOR POISON INFORMATION

Dr. Shaun Hosein
PHPM, University of Calgary
CPHA Public Health 2015
May 24th, 2015
Objectives

1. To provide knowledge about toxoid exposures and their relevance to public and population health
2. To provide knowledge about national poison information systems present in the UK and US
3. To provide knowledge about the broad needs of a Canadian National Poison Information System

Conflict of Interest

• None
Dr. Alexander Langimur, NEJM, 1963

CDC Director of Epidemiology

Context at that time
  - Malaria / Polio / Influenza

‘The careful watchfulness over the distribution and trends of occurrence through the **systematic collection, consolidation, and evaluation of mortality and morbidity**’
Purpose

1) Identify public health problems
   • Communicable disease / Population Exposures

2) Stimulate public health intervention
   • Information to plan, set priorities and evaluate the effects of public health programs

3) Suggest hypotheses for epidemiological research

Maxcy – Rosenau 2007
Indicator based surveillance

- Vital Statistics
  - Mortality, Birth
- Health Reports
  - Communicable Disease (Notifiable Disease Registries)
  - International Health Regulations
- Hospital Data
  - CIHI
- Disease Registries
  - Cancer
  - CHIRP
- Health Surveys
  - Childhood
Event Based Surveillance

• Organized and rapid capture of information about events that can be a risk to public health.
• Data is usually from **Non-traditional sources**
• Detect events that occur in populations not able to access formal channels for reporting (Illicit Drug Use)
• **Direct Information** from witnesses of real-time events
  • Poison and Tele-health services
  • Real-time concern
• **Indirect Information**
  • Communication channels
    • Social media or established routine alert systems
  • Information channels
    • news media, public health networks
Toxicovigilance

- ‘Toxicovigilance is the active process of identifying and evaluating the toxic risks existing in a community, and evaluating the measures taken to reduce or eliminate them’

- ‘It involves the analysis of poisons centre enquiries to identify whether there are specific circumstances or agents giving rise to poisoning, or certain populations suffering a higher incidence of poisoning’

-World Health Organization
http://www.who.int/ipcs/poisons/centre/toxicovigilance/en/
Canadian Poisonings

• Public Health Agency of Canada Injury data
• 2005 - 3rd leading cause of unintentional deaths (3.2/100,000)
• 2007 – 2nd leading cause of unintentional deaths (1.0/100,000)
• Emerging Issues with mental health and intentional poisonings
• SMARTRISK (Parachute) determined that unintentional poisonings in Canada cost approximately $771 million

Toxic Hazards/Exposures

- Environmental
  - Heavy Metals (Mercury, Lead)
  - Gases (CO, Cyanide)
  - Plants / Animals / Food

- Occupational
- Industry
- Radiation
- Chemical Agents of Warfare / Terror

- Consumer Products
  - Antifreeze/ Dishwasher tablets/Pesticides
  - Pool Chemicals

- Medications
  - Prescription / Over the Counter / Errors
  - Herbal / Traditional

- Illicit Drugs
- Internet Ordering / Mail*
Public Health Problems?

Calls managed by the BC Drug and Poison Information Centre following the 2011 nuclear reactor incident at Fukushima, Japan

Monica Durigon, MSc; Tom Kosatsky, MD, MPH

Alberta's worsening fentanyl crisis cripples middle class families as doctors struggle to keep up

Heavy metal poisoning from Ayurvedic medicines

Epidemiological trends in electronic cigarette exposures reported to U.S. Poison Centers

Port Metro Vancouver chemical fire tested city's emergency response

Rollout of emergency response plan pleases officials

CBC News  Posted: Mar 05, 2015 12:26 PM PT  |  Last Updated: Mar 05, 2015 5:06 PM PT
Poison Centre Function

- Calls are handled by a Consultant Specialist in Poison Information
- There is 24/7 access to an on-call medical toxicologist
- Provide information concerning toxicological exposures to the general public
- Provide a medical toxicology consult service to health professionals
- Provide prescription drug information
- Cost-effective service - $1 invested: $13 saved
US National Poison Database System

• Developed by the CDC and AAPCC (2006)
• Key legislation in support
  • The Pandemic and All-Hazards Preparedness Act (SB 3678)
• Near real time data collection and analysis from 57 US poison centres
• 2009 – Detected 22 events of public health significance

Using Poison Center Data for National Public Health Surveillance
for Chemical and Poison Exposure and Associated Illness

Amy F. Wolkin, MSPH, Colleen A. Martin, MSPH, Royal K. Law, MPH, Josh G. Schier, MD, Alvin C. Bronstein, MD
US NPDS Surveillance Techniques

Case Based
- Arsenic
- Botulism
- Ciguatera
- Cyanide
- Nerve Agents
- Paralytic Shellfish
- Puffer fish
- Radiation Injury
- Acute Radiation Syndrome
- Ricin
- Small Pox

Volume Based
- Hourly Call Volume
  - Baseline + 3SD → Anomaly
  - Human/Animal/Info
- Clinical Effect
  - 31 definitions
  - Baseline + 2SD → Anomaly
1. Simple Over the Counter Pain Killers
2. Cosmetics / Personal Care Products
3. Household Cleaning Substances

Mowry et al. 2014
UK National Poison Information System

- Four Poison centres in the UK:
  - Newcastle/Cardiff/Birmingham/Edinburgh
- Health Care Practitioner based
- TOXBASE - Poison Database
  - 17,000 agents
- 24/7 Phone service
Limitations of Poison Centre Surveillance

- Callers
  - **No mandate to call/report** → IOM suggest 50% not detected
  - Different types of calls – Public – Health Professional - Info
  - Illustrates the **interest/concern/harm** of the population
  - Small data sets
- Exposure
  - Validation of exposure → Toxidrome vs. lab reporting
  - Coding of exposure → misclassification
- Outcomes
  - Varies based on type of call
CSSPI

- **Data** – Near real time
  - Poison Centre Data*
  - Emergency Dept / EMS / CANUTEC
  - Healthlink / Telehealth Data
  - E2 Database
  - Web crawler Technology

- **Analysis** – Automated
  - Central Database
  - Algorithms – Volume* / Indicator* / Spatial

- **Interpretation** – Web-based Dashboard
  - Validation and further analysis
  - Dissemination
Summary

• Important Canadian population level exposures that are of Public Health Concern
• Established Poison surveillance activities are present in other developed countries
• Surveillance improvement and development in Canada are underway but still require more work and awareness
Acknowledgements / Thank you

• Dr. Margaret Thompson (OPC)
• Dr. Ray Copes (PHO)
• Dr. Shamir Mukhi (CNPHI)
• Dr. Tom Kotsatsky (BCCDC)
• Mr. Richard Wootton (Health Canada)