Canada's chronic disease surveillance system is cutting edge
Risk behaviors are not usually monitored in systematic surveillance
Data accuracy in surveillance systems is not as important as timeliness
Sentinel events signal marked dips or upswings in population disease trends
Changes in ICD categories over time need to be taken into account when assessing trends
Passive surveillance is less costly than active surveillance
The ultimate aim of surveillance is policy change
Evaluation is usually a built-in component of surveillance systems

What is surveillance?
- Ongoing systematic collection, collation, analysis and interpretation of outcome-specific data for use in the planning, implementation and evaluation of public health programs and policy.
- Timely dissemination of information to those who need to know so that action can be taken.
- Methods distinguished by their practicality, uniformity, rapidity rather than accuracy or completeness

What are the targets of surveillance?
- Communicable disease
- Non-communicable disease (chronic disease)
- Health behavior (drug use, risky sexual behavior, risk factors for chronic disease)
- Injury
- Environmental risks (pollen counts, air pollution)
- Occupational exposure
- Health care services (hospital separations, diagnostic tests, prescriptions)
Sources of information for surveillance

- Death certificate databases
- Hospital separation databases
- Disease registries
- Prescription databases
- Laboratory diagnoses
- Outbreak reports
- Vaccine utilization
- Population surveys
- Sickness absence reports
- Prescription databases
- Pathologist records
- MD office visits
- And many others

Attributions of surveillance

- Sensitivity
  - system identifies all events in target population
  - for monitoring, low sensitivity acceptable if consistent over time and events detected are representative
- Timeliness – from collection to dissemination
- Representativity
- Predictive value
- Accuracy and completeness of information
- Simplicity
- Flexibility
- Acceptability
- Evaluation

Why do we need surveillance?

- Descriptive epidemiology of morbidity and mortality by region, gender, ethnicity, age
- Identify trends over time
Tobacco Use Among Youth is on the Rise Ontario, Grade 7, 9, 11, 13, 1983-97

Students who exercised 2+ times/wk (%)


Students who exercised 2+ times/wk (%)

Tobacco Use Among Youth is on the Rise Ontario, Grade 7, 9, 11, 13, 1983-97


Students who played computer games 4+ hrs/wk (%)

Walk/Bike and Automobile Trips, 1977-1995

Students who ate raw vegetables daily (%)

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Lecture 5 - Oct 16, 2003
Why do we need surveillance?

- Provide data for planning services and policy.
  - allocation of preventive/medical resources
  - projection of future service needs
- Monitor changes in health practices/health care delivery

Why do we need surveillance?

- Evaluation of services/prevention strategies

Measles surveillance

Why do we need surveillance?

- Results lead to action
  - case or outbreak investigation
  - contact tracing (TB)
  - interventions (quarantine, influenza vaccination; preventive treatment)
- Results generate hypotheses about etiology
  - allocation of research dollars
Elements of surveillance system

- Case definition, indicators
- Population under surveillance
- Cycle of surveillance
- Confidentiality
- Incentives to participation

Case definition, Indicators

- Requirements depend on location, timing
  - simple, brief (can be used by staff with little training)
  - feasible
  - reliable
  - inexpensive
  - possible versus probable
  - more difficult in chronic disease
- Examples
  - Measles: fever with red rash, red eyes, disappearing within a week
  - Malaria: Fever, headache, body aches, inability to carry out normal daily activities

Population under surveillance

- Population-based
- Institution-based
  - hospitals, practices, nursing homes, prisons, schools
- Combination
  - Drug Abuse Warning Network (DAWN) in US: morbidity and mortality data on illicit drug use from hospital ERs and medical examiners/coroners

Cycle of surveillance

- Health Surveillance Model
- The model, as seen in Figure 1 above, describes a cyclical process where information, derived from data and supplemented by other information, leads to greater knowledge and decision-making.

Confidentiality

- Legally mandated reporting requires confidentiality precautions
  - limited access to data (locks, passwords etc)
  - encryption algorithms for coding names
- Perceived lack of confidentiality a major deterrent to reporting completeness
  - STDs
  - drug use

Approaches to surveillance

- Active versus passive methods
- Legally notifiable diseases
- Sentinel events
- Sentinel surveillance
- Cross-sectional versus longitudinal
Active versus passive surveillance

- Passive surveillance
  - issue case definition
  - wait for cases to be reported
  - volunteer-reporting

- Active surveillance
  - actively search for cases in MD offices, hospitals, pathology departments
  - TB

Notifiable/reportable diseases

- By law, be reported to governmental authorities by medical practitioners
- Universally reportable
  - internationally quarantinable diseases (plague, cholera, yellow fever, smallpox)
  - under WHO surveillance (influenza, malaria)
- Recommended
  - chickenpox, dengue fever, genital warts, etc
- Others vary by country, location
  - anthrax, botulism, lyme’s disease, etc

Sentinel events

- Occurrence of rare event associated with a specific exposure that can alert health officials to hazards
- Used to assess stability or change in health levels in a population
  - death from acute head injury is a sentinel event for traffic hazard
  - death resulting from wrong medication is a sentinel event for medication errors

Sentinel surveillance

- Surveillance based on sub-populations (sentinel populations) selected to represent the relevant experience of entire population
  - networks of family physicians
  - schools
  - worksites
  - volunteer sites

Longitudinal versus cross-sectional

- Longitudinal (notifiable diseases, vital statistics, disease registries)
  - Ongoing data collection
  - Incident cases
- Cross-sectional
  - Serial surveys (NHANES, BRFSS, CCHS, Sante Quebec)

Bias in surveillance systems

- Information bias
  - Incomplete reporting (passive vs active surveillance)
  - Differences/changes in case definition
- Selection bias
  - Non-representative sentinel populations
  - Non-representative survey samples
Chronic Disease Surveillance in Canada Today

- Numerous initiatives exist including established systems to less developed initiatives
- Loose confederation of locations, data collection procedures, representativeness
- Many sources used to provide data on determinants, risk factors, diagnoses, interventions, outcomes
- No blueprint for chronic disease surveillance to achieve integration of efforts, reduce duplication, assure quality of surveillance information

Vision for chronic disease surveillance in Canada

- Bring existing systems together into a national, coordinated network that integration local, provincial and national effort
- Standardize data collection methods
- Facilitate access to data
- Formal training in chronic disease surveillance to improve capacity
- Better dissemination to professionals, public stakeholders
- Assure long-term adequate resourcing for long term continuity

Future?

- Electronic medical records (discharge diagnoses, prescriptions, lab data, test results, etc)
- Record linkage systems
- Confidentiality of data?

| True/False | Canada's chronic disease surveillance system is cutting edge | F |
|           | Risk behaviors are not usually monitored in systematic surveillance | F |
|           | Data accuracy in surveillance systems is not as important as timeliness | T |
|           | Sentinel events signal marked dips or upswings in population disease trends | F |
|           | Changes in ICD categories over time need to be taken into account when assessing trends | T |
|           | Passive surveillance is less costly than active surveillance | T |
|           | The ultimate aim of surveillance is policy change | F |
|           | Evaluation is usually a built-in component of surveillance systems | F |