Big data for public health – Prospects for Ontario

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Big Data for Health Workship - U of T

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Public Health Ontario

Mission: to enable informed decisions and actions that protect and promote health and contribute to reducing health inequities

PHO Serves Ontario's whole population (13 million)

Includes **Public Health Ontario Laboratories**
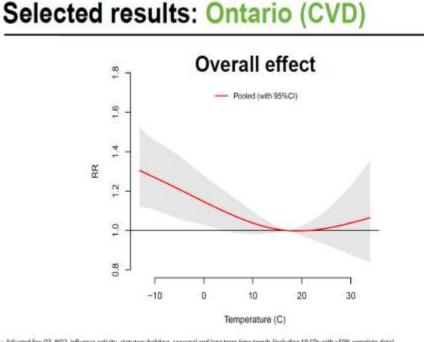
- Performed >5 million tests/year
- Advanced & high through-put facilities
  - Automated screening (immuno- and molecular diagnostics) & informatics – e.g., HIV, Syphilis, Hepatitis, Rubella, Varicella, etc.
  - Biobanks – with robotics for high volume sample processing, aliquoting, DNA extraction & storage (e.g., for large scale epidemiological & clinical studies)
- Resources for clinical & public health services, surveillance, validation & research

Hong Chen (PHO) and the 'Heat Health Research Team'

Selected results: Ontario (CVD)

Overall effect

— Pooled (with 95%CI)

RR vs Temperature (C)

- Adjusted for: O3, NO2, influenza activity, statutory holidays, seasonal and long term time trends (including 19 CDs with >50% complete data)
- The model comprised a smoother for time of 8 df/year, 4 df for the effect of temperature and 2 equally spaced knots along the log scale (4 df) for the lag space; Maximum lag = 21.
- The y-axis represents the excess mortality with respect to the 75th percentile of Toronto temperature (1996-2010). The maximum likelihood estimate is shown as a smooth line and the point-wise 95% confidence intervals are shown in the shaded area.

- Study population: Ontario residents who died 1996-2010; Analyzed 598,908 deaths over 15 years

- Data linkage to provincial admin databases (at ICES)

- Outcomes: CVD Mortality rate

- Exposures: impact of hot and cold temperatures

- Features of Results: Large population base & study size allowed complex relationship to be modeled with precision, while controlling for many confounders and modifiers

Ontario Health Study

- Long-term prospective cohort study – volunteers followed for many years to detect long-term health outcomes by record linkage (e.g., via ICES)

- Investigates causes of serious diseases – e.g., cancer, diabetes, heart disease, Alzheimer's, and infectious diseases

- Who = Ontario residents 18 or older are eligible to participate

- What = Questionnaire data, with potential to collect physical measures, environmental data, biological samples

- Current status = Over 200,000 volunteers to date, with >10,000 having provided comprehensive data

- Unique opportunity in Ontario, while linked internationally

DISCUSSION

*Research in Ontario
can and must have meaningful & prompt
public health impact*