Objective
The purpose of this work is to design an information system to support the development and evaluation of evidence-based environmental health programs and policies to protect health and prevent environmentally-related diseases in Ontario.

Background
Environmental health tracking (EHT) is the ongoing, systematic collection, integration, analysis, and interpretation of data on environmental hazards, exposure and health effects potentially related to exposure and use of this data in decision making for environmental health programs and policies (figure 1).

The development of an Ontario EHT system is supported by the current Ontario Public Health Standards, the Ontario’s Public Health Sector Strategic Plan and the need demonstrated by public health practitioners throughout Ontario for better quality and improved access to environmental health data.

1. Literature Review
A literature review revealed EHT programs and activities in jurisdictions throughout the US, Canada and Europe. Experts were identified and contacted to discuss their experience in five key areas:

- **Motivation** for developing
- **Approach** (and process) for building
- **Resources** needed to fund and staff
- **Challenges** to designing, establishing, maintaining and evaluating
- **Successes** that demonstrate the public health utility of EHT

A review of past and current EHT programs was prepared. This review also included special topics in EHT such as, data standardization, geo-spatial techniques, secondary use of data, and program and policy development.

2. Needs Assessments

In September 2013, an online survey (phase 1) was completed by 102 Ontario public health practitioners (public health inspectors, epidemiologists, managers and medical officers of health).

Key findings (figure 2):
- Environmental health data don’t exist or are inadequate/inaccessible (68%)
- outdoor air (41%)
- built environment (29%)
- extreme weather (29%)
- contaminated sites (25%)
- radon (24%)
- drinking water (22%)

EHT could improve public health (78%)
- baseline characterization (78%)
- risk prioritization (76%)
- develop programs (75%)
- risk identification (68%)
- monitor/forecast trends (64%)
- evaluate programs (58%)

There are barriers to EHT (68%)
- examples include: local level resources, data quality and availability, standardizing data and making indicators comparable, timeliness, infrastructure and relevance for small and rural health units.

"Although we respond to complaints related to these issues, we do not have data to support recommendations or actions on these issues."

"Aggregation of data to a common source would prevent duplication of work from health unit to health unit, and assist in a unified approach and response."

In January 2014 a 1-day workshop (phase 2) was attended by 54 participants from 14 local public health units, Public Health Ontario*, Provincial Ministries, Federal Agencies, Cancer Care Ontario, the Ontario Poison Centre, British Columbia CDC and the California Department of Public Health. All attendees had knowledge of environmental health policies and programs at their organization.

The workshop was divided into presentations, plenaries and facilitated break out sessions on one of three topics: (i) EHT system data, (ii) EHT system design and (iii) EHT system use. A proposed system architecture for Ontario EHT was developed in the system design session (figure 3).

3. Pilot Projects

A raw water contaminants interactive mapping application has been designed as a proof-of-concept for Ontario EHT (figure 4). This application will support public health by helping to identify areas with small drinking water systems that might be affected by chemical contaminants.

The pilot was developed using publically available data from three Ontario Ministry of Environment and Climate Change programs:
- Provincial Stream Water Quality Monitoring Network
- Provincial Ground Water Monitoring Network
- Drinking Water Surveillance Program

The target audience for this application are those responsible for risk assessments of small drinking water systems across Ontario. The current version has been made accessible via mobile devices for use in the field. The target audience will begin evaluating the functionality of this application during fall 2014 via an online survey.

Findings
1. Due to a lack of environmental health data, it is often not possible for Ontario public health practitioners to assess population exposure to environmental hazards that could affect human health.
2. The utility of EHT in developing effective environmental health programs and policies has been demonstrated in the US.
3. EHT data should be standardized, comprehensive, accurate, timely, and relevant to public health.
4. Priority needs for developing Ontario EHT include funding, personnel, training and expertise, partnership development, data sharing, and provincial leadership.
5. The proof-of-concept pilot project demonstrates that Public Health Ontario has the knowledge and skill required to develop EHT.

Next Steps
The next stages of this work will involve:
- Continued discussions with identified experts to learn from their experience
- Data platform design
- Identification of data for Ontario EHT
- Continued development and evaluation of pilot projects
- Ongoing communication with public health practitioners

Figure 1 Environmental Health Tracking (EHT)

Figure 2 Online Survey Results

Figure 3 Proposed System Architecture for Ontario EHT

Figure 4 Proof-of-Concept Pilot Project: Raw Water Contaminants

References:
3. *Public Health Ontario (PHO) is a Crown corporation responsible for providing scientific and technical advice and support on environmental health to Ontario governments and the health care system.

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