I. Introduction

The Ontario Health Study (OHS) is a prospective, population-based study that serves as a platform to investigate environmental, lifestyle, clinical, and genetic factors associated with cancer and other chronic diseases. It is also the largest contributor to the Canadian Partnership for Tomorrow Project (CPTP), a pan-Canadian study of five regional cohorts that has recruited over 300,000 participants across Canada.

Ontario residents aged 18 years and older joined the OHS by completing an online health questionnaire located at www.ontariohealthstudy.ca. A subset of participants also provided biological samples, measures of physiologic hemoglobin, complete blood counts, and physical measurements. The OHS has also genotyped about 6,000 samples utilizing the UKBiobank Affymetrix arrays, and inflammatory markers have been assayed for ~2,000 OHS participants as part of a CPTP-wide project.

The OHS is a rich and unique resource for researchers investigating cancer and other chronic diseases. De-identified OHS data and biospecimens are now available to researchers. Please contact access@ontariohealthstudy.ca for more information.

Step 1: Baseline Questionnaire
- Over 700 variables describing social and economic demographics, personal and family health histories, medications, sleep patterns, alcohol and tobacco use, physical activity and environmental exposures were collected from September 2010 to March 2017.

Step 2: Biospecimen and Physical Measurements
- Blood and urine samples collected from a subset of participants;
- Physical measures include anthropometrics, blood pressure, resting heart rate, body fat percentage, grip strength and spirometry;

Step 3: Regular Follow-up Questionnaires and Additional Data Collection Measures
- Follow-up questionnaires administered to track changes in overall health, with additional questions on marijuana and e-cigarette use;
- Ontario Sleep Health Study will collect accelerometer and sleep respiratory function from approximately 4,000 participants;
- Canadian Alliance for Healthy Hearts and Minds collected MRIs, Food Frequency Questionnaires, and cognitive assessments from approximately 3,000 participants;
- 36% of participants were linked with administrative health data. Linkage with the Ontario Cancer Registry was used to validate self-reported cancer cases and calculate the sensitivity and specificity of self-reported cancer history in OHS. Prevalence of cancer in the cohort is ~9%.

II. Participant Demographics

Figure 1: Number of Blood Samples Collected by Forward Sortation Area (FSA)

Figure 2: OHS Participant Demographics

III. Data Collection

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IV. Biospecimen Collection Model

OHS “Biobank”

-13,400
- Physical assessments completed
-61,000 Blood samples collected
-12,600 Urine samples collected

OHS Dataset

-235,000 Online questionnaires completed
-700 Nutrient questionnaire responses
-3,000 MLLs collected

V. Data Linkage

The OHS is partnered with the Canadian Urban Environmental Health Research Consortium (CANUE). This aims to address challenges faced in urban environments where more than 80% of Canadian residents are located. Harmonized OHS data is linked with standardized measures of environmental factors including air pollution, green space, traffic, noise, weather, walkability, and socio-economic indicators for every neighborhood in Ontario. These rich data resources can be useful for evaluating the impact of the environment on health, particularly gene-environment interactions, and provides an unprecedented opportunity to study how multiple factors are linked to a wide range of health outcomes.

VI. Future Steps

The promise of longitudinal health data is the identification and connection of exposures to the onset of disease or death in an individual. Administration of follow-up questionnaires and future biospecimen collections will capture changes in participants’ health over time, and will analyze the impacts of newly emerging health topics (e.g., electronic cigarette and marijuana use). Additionally, data linkage initiatives and partnerships with ancillary studies will increase the available health data for OHS participants.

The OHS is a rich resource for health and chronic disease research. Access to de-identified data and biospecimens is now available. Contact access@ontariohealthstudy.ca for more information.

The Ontario Health Study: An Innovative Platform for Chronic Disease Research

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Notes:
- **The work presented is an equal contribution from all authors**
- OHS data and biospecimens are now available to researchers. Please contact access@ontariohealthstudy.ca for more information.