



**CANHEART**

CArdiovascular HEalth in Ambulatory Care Research Team

[www.canheart.ca](http://www.canheart.ca)

ICES

# CANHEART – Methods Paper

## *Using Big Data to Measure & Improve Cardiovascular Health & Healthcare Services*

Feb 3, 2015

Circulation: Cardiovascular Quality and Outcomes



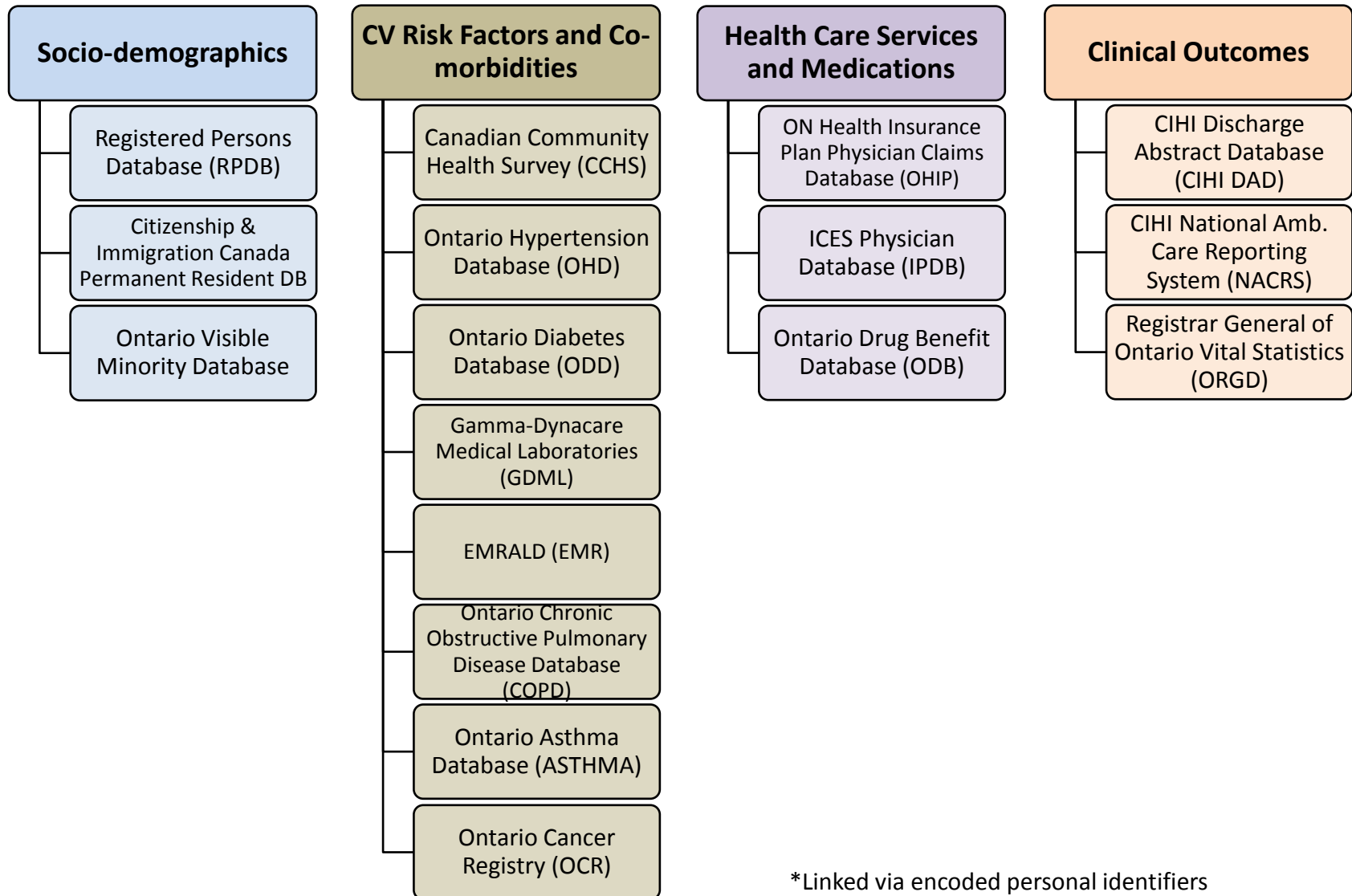
Public Health  
Agency of Canada

Agence de la santé  
publique du Canada

# Background

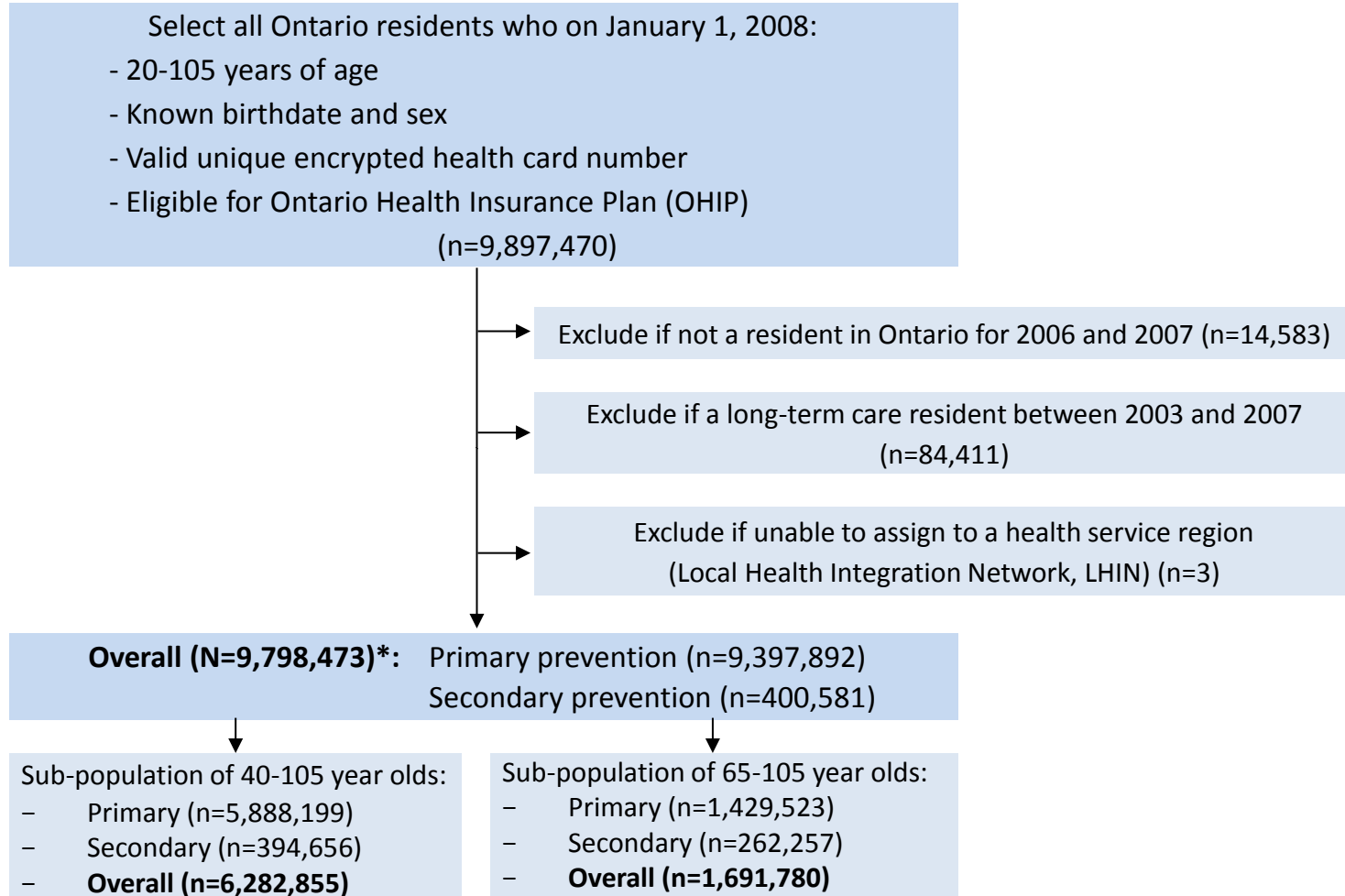
- Cardiovascular diseases (CVD) are the 2<sup>nd</sup> leading of cause of death in Canada.
- Electronic data capture in the era of **big data** can enable new insights into ambulatory care management of CVD via linkage of multiple population-based health databases in Ontario.
- Linking databases at the individual level using unique, encoded identifiers has enabled creation of a CANHEART cohort of over 9.8 million Ontario adults aged  $\geq 20$  years.
- ***Overall Objective***
  - Measure and improve primary and secondary prevention of CVD in a diverse multi-ethnic population.

# Data sources\*



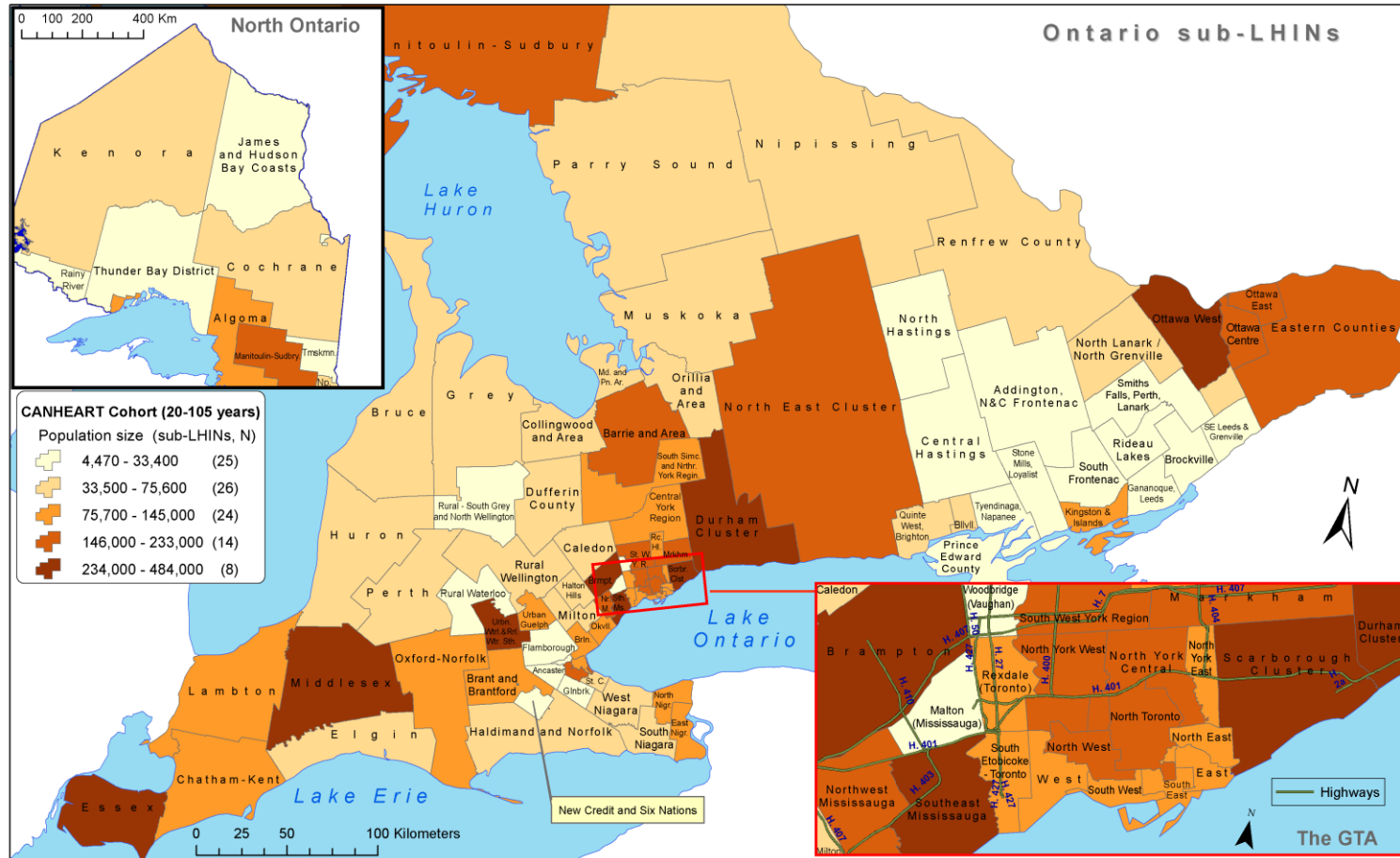
\*Linked via encoded personal identifiers

# CANHEART 2008 Cohort Creation



\* Individuals with a known history of acute myocardial infarction, stroke, congestive heart failure or revascularization with percutaneous coronary intervention or coronary artery bypass graft surgery are classified as secondary prevention, all others as primary prevention.

# CANHEART Study Population, by sub-Local Health Integration Network (LHIN)



For the purposes of health service planning, integration and funding, Ontario is comprised of 14 geographic areas called LHINs. Sub-LHINs are sub-divisions of LHINs, defined by each LHIN as the areas that best suit its needs for planning and reporting purposes.

# CANHEART 2008 Cohort Baseline

## Socio-demographic Characteristics (20-105 years)

Characteristic	Primary Prevention	Secondary Prevention	Overall
Population size, n	9,397,892	400,581	9,798,473
Age, years, mean $\pm$ SD	46.5 $\pm$ 16.5	69.3 $\pm$ 12.8	47.4 $\pm$ 17.0
Female, %	51.9	35.7	51.2
Income quintile, % 1 (lowest)	19.6	21.1	19.7
2	20.1	21.2	20.1
3	19.9	19.7	19.8
4	20.3	19.3	20.3
5 (highest)	20.1	18.7	20.1
Rural or small town residence, %*	11.5	15.6	11.6
Long-term resident or immigrant >20 years in ON, %	83.4	94.5	83.8
Immigrant, <10 years in ON, %	8.5	1.4	8.2
10-20 years in ON, %	8.1	4.1	7.9

\* Based on Statistics Canada's 2006 census population and defined as community size of <10,000. (du Plessis V et al, Statistics Canada Catalogue. no. 21-006-XIE; 2001).

# CANHEART 2008 Cohort Baseline Cardiovascular Risk Factors and Co-morbidities (20-105 years)

Characteristic	Primary Prevention	Secondary Prevention	Overall
Current smoker, %*	21.6	16.4	21.4
Body mass index, kg/m <sup>2</sup> , mean*	26.0	27.4	26.0
Hypertension, %	22.4	78.9	24.7
Diabetes mellitus, %	8.4	36.4	9.5
Total cholesterol, mmol/L, mean $\pm$ SD <sup>†</sup>	5.1 $\pm$ 1.0	4.4 $\pm$ 1.1	5.1 $\pm$ 1.1
HDL cholesterol, mmol/L, mean $\pm$ SD <sup>†</sup>	1.5 $\pm$ 0.4	1.3 $\pm$ 0.4	1.5 $\pm$ 0.4
Cancer	3.9	13.9	4.3
Chronic obstructive pulmonary disease	5.8	27.0	6.6
Acute myocardial infarction (AMI)	--	46.8	1.9
Stroke	--	19.5	0.8
Revascularization	--	49.4	2.0
AMI/stroke/revascularization	--	86.6	3.5

\* Amongst a sub-population of respondents to the Canadian Community Health Survey (CCHS): 2000-2010 cycles for ethnicity (n=143,817), 2005-2010 cycles for body mass index and smoking (n=87,212). Aboriginal percentages are based on those living off-reserve and do not include those living on-reserve who are ineligible to participate in the CCHS.

† Amongst sub-population with testing performed at Gamma-Dynacare Medical Laboratories (n=2,319,664 for primary prevention cohort; n=136,091 for secondary prevention cohort).

|| Revascularization includes percutaneous coronary intervention or coronary artery bypass surgery.

# Summary

- The CANHEART cohort will:
  - Enable measurement of cardiovascular risk factors and preventive care among the Ontario adult population.
  - Be used to support a wide range of health services, population epidemiology, CVD pathophysiology and public health studies.
- Insights gained from the CANHEART cohort study will be shared with clinicians, decision makers, and the public to support cardiovascular population health and quality improvement initiatives.





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