Appendix 1 (as supplied by the authors)

Supplemental Table S1 – Case Definition of Recent History of Homelessness

Case Definition = Any positive ("homeless") indicator in any of the following sources between October 1 2018 and May 31 2020:

Database	Variable Name	Indicator Value	Description
DAD	HOMELESS	"Y"	Homelessness indicator
	INSTTYPE	"SH"	Institution Type = Supportive Housing
	DX10CODE1 to DX10CODE25	"Z590" or "Z591"	ICD-10 diagnosis codes for "Homelessness" and "Inadequate housing"
	CMGDIAG	"Z590" or "Z591"	ICD-10 diagnosis codes for "Homelessness" and "Inadequate housing"
	PSTLCODE	"XX"; uniquely identifying shelter code[1]	Used to indicate transient/homeless patients
NACRS	DX10CODE1 to DX10CODE10	"Z590" or "Z591"	ICD-10 diagnosis codes for "Homelessness" and "Inadequate housing"
	RESTYPE	"3" or "4"	Residence Type = "Homeless" or "Shelter"
	PSTLCODE	"XX"; uniquely identifying shelter code[1]	Used to indicate transient/homeless patients
OMHRS	PREDX10CODE to PREDX10CODE11	"Z590" or "Z591"	ICD-10 diagnosis codes for "Homelessness" and "Inadequate housing"
	POSTDX10CODE1 to POSTDX10CODE24	"Z590" or "Z591"	ICD-10 diagnosis codes for "Homelessness" and "Inadequate housing"
	PRIOR_RESIDENCE	"6"	Prior residential status = "Homeless (with or without shelter)"
	USUAL_RESIDENCE	"8"	Usual residential status = "Homeless (with or without shelter)"
	ADMITFROM	"8"	Admitted from = "Homeless (with or without shelter)"
	DISCHLIVING	"8"	Living arrangement at discharge = "Homeless (with or without shelter)"
	P5_Retired_2009	"6"	(Variable retired in 2009) Living arrangement = "Homeless (with or without shelter)"
	PSTLCODE	"XX"; uniquely identifying shelter code[1]	Used to indicate transient/homeless patients
RPDB PSTLYEAR	PSTLCODE	uniquely identifying shelter code[1]	Used to indicate transient/homeless patients

1. ICD=International Classification of Diseases. 1. The most updated list of uniquely identifying Ontario shelter postal codes (ie. postal codes containing a homeless shelter or shelter-providing facility and no other residences) is available in Richard L, Ouédraogo AM, Shariff SZ. Identifying homelessness using administrative data and postal codes. London, ON: ICES Western; 2020.

Supplemental Table S2: Databases Used

Name	Data Source	Description
Canadian Institute for Health Information Discharge Abstract Database (DAD)	Canadian Institute for Health Information (CIHI)	The DAD contains administrative, clinical (diagnoses and procedures/interventions), demographic, and administrative information for all admissions to acute care hospitals in Ontario. At ICES, consecutive DAD records are linked together to form 'episodes of care' among the hospitals to which patients have been transferred after their initial admission
Canadian Institute for Health Information Same Day Surgery (SDS)	Canadian Institute for Health Information (CIHI)	The SDS contains patient-level data admitted for same-day surgery at acute care hospitals in Ontario. Every record corresponds to one same-day surgery or procedure stay.
National Ambulatory Care Reporting System (NACRS)	Canadian Institute for Health Information (CIHI)	The NACRS contains administrative, clinical (diagnoses and procedures), demographic, and administrative information for all patient visits made to hospital- and community-based ambulatory care centres (emergency departments, day surgery units, hemodialysis units, and cancer care clinics) in Ontario. At ICES, NACRS records are linked with other data sources (DAD, Ontario Mental Health Reporting System [OMHRS]) to identify transitions to other care settings, such as inpatient acute care or psychiatric care.
Ontario Mental Health Reporting System (OMHRS)	Canadian Institute for Health Information (CIHI)	The OMHRS contains administrative, clinical (diagnoses and procedures), demographic, and administrative information for all admissions to adult designated inpatient mental health beds. This includes beds in general hospitals, provincial psychiatric facilities, and specialty psychiatric facilities. Clinical assessment data is ascertained using the Resident Assessment Instrument for Mental Health (RAI-MH), but different amounts of information are collected using this instrument depending on the length of stay in the mental health bed. Multiple assessments may occur during the length of a mental health admission.
ICES-derived PSTLYEAR database	ICES; Ministry of Health	The ICES-derived PSTLYEAR database contains the best known postal code for persons in the OHIP Registered Persons Database on July 1st of each year starting from year 1991. Postal codes supplied by the Ministry of Health are enriched with information in CIHI and other ICES-housed datasets to take advantage of the postal code information recorded each time an individual accesses certain healthcare services.

Name	Data Source	Description
Ontario Laboratory Information System (OLIS)	Ministry of Health eHealth Ontario	The OLIS contains lab orders, test requests and lab results from most laboratories in Ontario. Starting April 7 2020, ICES began receiving daily cumulative updates of COVID-19 test orders from eHealth Ontario (eHO, now part of Ontario Health Digital Health Services). These data are a minimum dataset extracted from lab orders with COVID-19-specific test request (TR) or LOINC codes and other TR/LOINC codes indicative of viral or respiratory virus testing.
OHIP Registered Persons Database	Ministry of Health	The OHIP RPDB provides basic demographic information (age, sex, location of residence, date of birth, and date of death for deceased individuals) for those issued an Ontario health insurance number. The RPDB also indicates the time periods for which an individual was eligible to receive publicly funded health insurance benefits and provides the best known postal code for each registrant on July 1st of each year.
Ontario Health Insurance Plan (OHIP)	Ministry of Health	The OHIP claims database contains information on inpatient and outpatient services provided to Ontario residents eligible for the province's publicly funded health insurance system by fee-for-service health care practitioners (primarily physicians) and "shadow billings" for those paid through non-fee-for-service payment plans. Billing codes on the claims (OHIP fee codes) identify the care provider, their area of specialization and the type and location of service. OHIP billing claims also contain a 3-digit diagnosis code - the main reason for the service - captured using a modified version of the ICD, 8th revision coding system.
Immigration, Refugees, and Citizenship Canada's Permanent Resident database (IRCC)	Immigration, Refugees and Citizenship Canada	The Ontario portion of the IRCC Permanent Resident Database includes immigration application records for people who initially applied to land in Ontario since 1985. The dataset contains permanent residents' demographic information such as country of citizenship, level of education, mother tongue, and landing date. New immigrants who are currently residing in Ontario but originally landed in another province are not captured in this dataset.
Ontario Drug Benefit (ODB) database	Ministry of Health	The Ontario Drug Benefit (ODB) database contains claims for prescription drugs received under the Ontario Drug Benefit program. Most participants of this program are over 65 years but a small number from 1997 onward are participants in other eligible programs, such as Ontario Works or the Ontario Disability Support Program.
PCCF+	Statistics Canada	The Postal Code Conversion File plus (PCCF+) provides a crosswalk between Canada Post six-character postal codes and Statistics Canada's standard geographic areas. Through the link between postal codes and standard geographic areas, the PCCF permits the integration of data from various sources. It also permits the calculation of socioeconomic status proxies, such as neighbourhood-level income quintiles.

Name	Data Source	Description
Chronic Obstructive Pulmonary Disease (COPD) dataset	Canadian Institute for Health Information (CIHI)	The Ontario COPD Database is created using two separate algorithms applied to inpatient hospitalization (DAD), same day surgery (SDS) records, and physician billing claims (OHIP) data to determine the diagnosis date for incident cases of chronic obstructive pulmonary disease in Ontario. In an algorithm which maximizes sensitivity, the definition for COPD is any physician billing claim with a diagnosis for COPD (OHIP diagnosis codes: 491, 492, 496) or any inpatient hospitalization or same day surgery record with a diagnosis for COPD (ICD-9 diagnosis codes: 491, 492, 496; ICD-10 diagnosis codes: J41- J44; in any diagnostic code space). When using expert panel review of primary care charts as the reference standard, this definition has been shown to have the following performance characteristics: Sensitivity (85.0%), Specificity (78.4%), Positive Predictive Value (57.5%), and Negative Predictive Value (93.8%).[7] In an algorithm which maximizes specificity, the definition for COPD is ≥3 physician billing claims with a diagnosis for COPD (OHIP diagnosis codes: 491, 492, 496) or ≥1 inpatient hospitalization or same day surgery record with a diagnosis for COPD (ICD-9 diagnosis codes: 491, 492, 496; ICD-10 diagnosis codes: J41, J42, J43, J44; in any diagnostic code space) in a two-year period. When using expert panel review of primary care charts as the reference standard, this definition has been shown to have the following performance characteristics: Sensitivity (57.5%), Specificity (95.4%), Positive Predictive Value (81.3%), and Negative Predictive Value (86.7%).[1]
Ontario Asthma dataset	Canadian Institute for Health Information (CIHI)	The Ontario Asthma Database is created using two separate algorithms applied to inpatient hospitalization (DAD), same day surgery (SDS) records, and physician billing claims (OHIP) data to determine the diagnosis date for incident cases of asthma in Ontario. In the algorithm which maximized sensitivity, the definition for Asthma is receipt of one hospital admission with an asthma diagnosis or two OHIP claims with asthma diagnosis within two years. This definition has been shown to have the following performance characteristics in adults: Sensitivity (80.6%), Specificity (81.4%), Positive Predictive Value (72.5%), and Negative Predictive Value (87.3%).[2]

Name	Data Source	Description
Ontario Diabetes Database (ODD)	Canadian Institute for Health Information (CIHI)	The ODD is created using algorithms applied to inpatient hospitalization (DAD) records, same day surgery (SDS) records, and physician billing claims (OHIP) data to determine the diagnosis date for incident cases of diabetes in Ontario. For adults aged 19 years and greater, the definition for diabetes is 2 physician billing claims with a diagnosis for diabetes (OHIP diagnosis code: 250) or 1 inpatient hospitalization or same day surgery record with a diagnosis for diabetes (ICD-9 diagnosis code: 250; ICD-10 diagnosis codes: E10, E11, E13, E14; in any diagnostic code space) within a 2 year period. Physician claims and hospitalizations with a diagnosis of diabetes occurring within 120 prior to and 180 days after a gestational hospitalization record were excluded. When using primary care chart abstraction as the reference standard, this definition has been shown to have the following performance characteristics: Sensitivity (86.1%), Specificity (97.1%), Positive Predictive Value (79.8%), and Negative Predictive Value (98.1%).(3)
Ontario CHF Database (CHF)	Canadian Institute for Health Information (CIHI)	The Ontario CHF Database is created using a definition of ≥2 physician billing claims with a diagnosis of congestive heart failure (OHIP diagnosis code: 428) and/or ≥1 inpatient hospitalization or same day surgery record with a diagnosis of congestive heart failure (ICD-9 diagnosis code: 428; ICD-10 diagnosis code: I50; in the primary diagnostic code space) in a two-year period applied to hospitalization (DAD), same day surgery (SDS), and physician billing claims (OHIP) data to determine the diagnosis date for incident cases of CHF in Ontario. When using electronic medical record data abstraction as the reference standard, the above definition has been demonstrated to have the following performance characteristics: Sensitivity (84.8%), Specificity (97.0%), and Positive Predictive Value (55.3%).(4)

Name	Data Source	Description
Ontario Hypertension dataset	ICES	The Ontario hypertension Dataset contains all Ontario hypertension patients identified since 1991. The case definition is one hospital admission/SDS record with a hypertension diagnosis (ICD 9 dxcodes: 401x, 402x, 403x, 404x, 405x or ICD 10 dx10codes: I10, I11, I12, I13, I15), or 1 OHIP claim (401, 402, 403, 404, or 405) with a hypertension diagnosis followed by either an OHIP claim or a hospital admission/SDS record with a hypertension diagnosis within two years. If the hypertension record is between 120 days before and 180 days after a gestational admission date, the hypertension record was considered to be gestational hypertension, and was excluded. This definition has been shown to have the following performance characteristics in adults: Sensitivity (72%), Specificity (95%), Positive Predictive Value (87%)(5)

Supplemental Table S3: Variable Definitions

Variable	Data Source	Definition Description
Age	RPDB	Age of the individual at index. Categories for this variable include: Youths (18-24 yrs); Young adults (25-39 yrs); Older adults (40-64 yrs); and Seniors (65+).
Sex	RPDB	Biological sex of the individual.
Neighbourhood level income quintile	Census	Income-level assigned to the individual's dissemination area at index, expressed as a quintile (compared to all other dissemination areas that year). Categories range from Quintile 1 (lowest income) to Quintile 5 (highest income). Missing values were coded as Quintile 3.
Level of urbanicity	PCCF	Adapted from CSIZEMIZ variable which categorizes individuals based on presence and size of census metropolitan area (CSIZE). Medium and small CMAs (0-500K pop) are grouped together, as are non-CMA areas. Categories include Large CMA (over 500K population); Small to medium CMA (0-500K population); and non-CMA areas.
Recent immigrant	IRCC	Presence of a landing date in the Immigration, Refugees and Citizenship Canada Permanent Database indicates immigration to Ontario between 2008 to 2018
Refugee status	IRCC	Class of immigration status = Refugee
Chronic obstructive pulmonary disease	COPD[1]	Presence in the database indicates the individual has a history of COPD
Asthma	ASTHMA[2]	Presence in the database indicates the individual has a history of asthma
Diabetes	ODD[3]	Presence in the database indicates the individual has a history of diabetes
Congestive heart failure	CHF[4]	Presence in the database indicates the individual has a history of congestive heart failure
Hypertension	HYPER[5]	Presence in the database indicates the individual has a history of hypertension
Psychosis related mental health care	DAD, NACRS, OMHRS, OHIP	1 hospitalization, ED visit or physician claim within 1 year of the index date with any of the following eligible codes: ICD-10: F20, F22, F23, F24, F25, F28, F29 DSM-IV: 295, 297, 298 OHIP dx: 295, 297, 298
Non-psychotic disorders related mental health care	DAD, NACRS, OMHRS, OHIP	1 hospitalization, ED visit or physician claim within 1 year of the index date with any of the following eligible codes: ICD-10: F30, F31, F32, F33, F34, F38, F39, F40, F41, F42, F43, F48, F60, F93 DSM-IV: 296, 300, 301 OHIP dx: 296, 300, 301, 309, 311

Variable	Data Source	Definition Description
Substance use related mental health care	DAD, NACRS, OMHRS, OHIP	1 hospitalization, ED visit or physician claim within 1 year of the index date with any of the following eligible codes: ICD-10: F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F55 DSM-IV: 291, 292, 303, 304, 305 OHIP dx: 291, 292, 303, 304, 305
Outpatient visits	OHIP	Number of physician visits within 1 year prior to the index date, defined as one visit per day per physician

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