

Supplemental Table 1: Data sources, codes and definitions

Data sources	
Database	Full name (Source): Description
ASTHMA	Ontario Asthma dataset (CIHI, MOHLTC): Contains all Ontario asthma patients identified since 1991
CHF	Congestive Heart Failure (CIHI, MOHLTC): Contains all Ontario individuals with congestive heart failure since 1991
COPD	Chronic Obstructive Pulmonary Disease (CIHI, MOHLTC): Contains all Ontario chronic obstructive pulmonary disease patients identified since 1991
DAD	Discharge Abstract Database (CIHI, MOHLTC): Contains patient-level information on all hospital admissions in Ontario from 1988 onwards
DEMENTIA	Ontario Dementia Database (CIHI, MOHLTC): Includes all Ontario persons who were identified with Alzheimer's and related dementias
ETHNIC	Surname-based Ethnicity Group (ICES): Applies validated lists of South Asian and Chinese surnames to the raw Registered Persons Database (RPDB) to assign an ethnicity to all Ontario residents
HCD	Home Care Database (OACCAC): Contains information on all home care services provided or coordinated by Local Health Integration Networks
HYPER	Ontario Hypertension Dataset (CIHI, MOHLTC): Contains all Ontario hypertension patients identified since 1991
IPDB	ICES Physician Database (MOHLTC): Contains yearly information about all physicians in Ontario
OCCC	Ontario Crohn's and Colitis Cohort Dataset (CIHI, MOHLTC): Includes all Ontario patients who were identified with Crohn's disease or ulcerative colitis
OCR	Ontario Cancer Registry (CCO): Captures incident cancers in Ontario since 1964
ODB	Ontario Drug Benefit Claims Dataset (MOHLTC): Contains claims for prescription drugs received under the Ontario Drug Benefit program
ODD	Ontario Diabetes Dataset (CIHI, MOHLTC): Contains all individuals in Ontario with any type of non-gestational diabetes identified since 1991
OHIP	Ontario Health Insurance Plan Claims Database (MOHLTC): Contains all claims paid for by the Ontario Health Insurance Plan

OMID	Ontario Myocardial Infarction Dataset (CIHI, MOHLTC): Contains all Ontario individuals hospitalized for acute myocardial infarction since 1992
ONMARG	Ontario Marginalization Index (OCHPP): A census-based index developed to quantify the degree of marginalization occurring across the province of Ontario. It is comprised of 4 major dimensions thought to underlie the construct of marginalization (residential instability, material deprivation, dependency and ethnic concentration).
ORAD	Ontario Rheumatoid Arthritis Dataset (CIHI, MOHLTC): Contains all Ontario rheumatoid arthritis patients identified since 1991
ORGD	Office of the Registrar General-Deaths (ORG): Contains the date of death as well as the cause of death based on death certificates provided by Office of the Registrar General of Ontario
PCCF	Postal Code Conversion File (ICES): Contains the rurality index and socio-economic status of each postal code
RPDB	Registered Persons Database (CIHI, MOHLTC): Provides yearly basic demographic information (date of birth, date of death, sex, postal code) about anyone who has ever received an Ontario health card number
SDS	Same Day Surgery Database (CIHI, MOHLTC): Contains patient-level data for day surgery institutions in Ontario since 1991

Codes	
Concept	Codes
Death due to bladder cancer	<i>Becker's methodology of leading causes of death</i> 22: Bladder cancer
TURBT	<i>OHIP fee codes</i> Z632: Excision of tumour or tumours including base and adjacent muscles and electrocoagulation, if necessary; single tumour 1 to 2 cm diameter Z633: Excision of tumour or tumours including base and adjacent muscles and electrocoagulation, if necessary; single tumour over 2 cm diameter Z634: Excision of tumour or tumours including base and adjacent muscles and electrocoagulation, if necessary; multiple tumours
Urinary tract cancer	<i>ICD9 codes</i> 1880: MAL NEO BLADDER-TRIGONE 1881: MAL NEO BLADDER-DOME 1882: MAL NEO BLADDER-LATERAL 1883: MAL NEO BLADDER-ANTERIOR 1884: MAL NEO BLADDER-POST 1885: MAL NEO BLADDER NECK 1886: MAL NEO URETERIC ORIFICE 1888: MALIG NEO BLADDER NEC 1889: MALIG NEO BLADDER NOS 1891: MALIG NEO RENAL PELVIS 1892: MALIGN NEOPL URETER 1893: MALIGN NEOPL URETHRA 1894: MAL NEO PARAURETHRAL 1898: MAL NEO URINARY NEC 1899: MAL NEO URINARY NOS <i>ICD10 codes</i> C65: Malignant neoplasm of renal pelvis C66: Malignant neoplasm of ureter C670: Malignant neoplasm of trigone of bladder C671: Malignant neoplasm of dome of bladder C672: Malignant neoplasm lateral wall bladder C673: Malignant neoplasm anterior wall bladder C674: Malignant neoplasm of posterior wall of bladder C675: Malignant neoplasm of bladder neck C676: Malignant neoplasm of ureteric orifice C678: Overlapping malignant lesion of bladder C679: Malignant neoplasm of bladder, unspecified

C680: Malignant neoplasm of urethra
C681: Malignant neoplasm of paraurethral gland
C688: Overlapping malignant lesion of urinary organs
C689: Malignant neoplasm urinary organ unspecified

OCR topography codes

C65: Renal pelvis
C66: Ureter
C67: Bladder
C68: Urethra

Definitions	
Covariate	Source and definition
<i>Basic demographic covariates</i>	
Age in years	RPDB; continuous; defined at date of diagnosis
Sex	RPDB; binary [female, male]
<i>Tumor-specific covariates</i>	
Histology	Population-wide pathology reports; categorical [pure urothelial carcinoma, squamous differentiation, glandular differentiation, other urothelial histology]
Grade (WHO 1973)	Population-wide pathology reports; categorical [poorly differentiated, moderately differentiated, well differentiated not reported]
Grade (WHO 2004/2016)	Population-wide pathology reports; categorical [high-grade, low-grade, not reported]
Muscularis propria	Population-wide pathology reports; categorical [sampled, not sampled, not reported]
Concurrent CIS	Population-wide pathology reports; categorical [present, absent/not reported]
Lymphovascular invasion	Population-wide pathology reports; categorical [present, absent/not reported]
Tumor size/multiplicity ^a	OHIP; categorical [multiple tumors, single tumor > 2 cm, single tumor up to 2 cm]
Number of tumors ^b	Population-wide pathology reports; continuous
Maximal dimension of tumor in cm ^b	Population-wide pathology reports; continuous
Weight of tumor in g ^b	Population-wide pathology reports; continuous
Volume of tumor in ml ^b	Population-wide pathology reports; continuous
Prior urinary tract cancer	Population-wide pathology reports/DAD (look-back window of 13 years)/OCR (look-back window of 37 years)/OHIP (look-back window of 9 years)/SDS (look-back window of 9 years); binary [yes, no]; defined as prior cancer of urethra, bladder, ureter, or renal pelvis
<i>Covariates related to comorbidity and healthcare system utilization</i>	
Charlson Comorbidity Index	DAD; continuous; based on a look-back window of 5 years preceding the date of diagnosis; ICES-internal algorithm based on the Deyo modification of the Charlson Comorbidity Index
ACG© Resource Utilization Band	DAD/OHIP/SDS; categorical [low morbidity, moderate morbidity, high morbidity, very high morbidity]; based on a look-back window of 3 years preceding the date of diagnosis; ICES-internal algorithm based on Johns Hopkins ACG© Software (version 10)

ACG© Frailty	DAD/OHIP/SDS; binary [yes, no]; based on a look-back window of 3 years preceding the date of diagnosis; ICES-internal algorithm based on Johns Hopkins ACG© Software (version 10)
Asthma	ASTHMA; binary [yes, no]; prevalence of disease during the year preceding the date of diagnosis
Chronic obstructive pulmonary disease	COPD; binary [yes, no]; prevalence of disease during the year preceding the date of diagnosis
Congestive heart failure	CHF; binary [yes, no]; prevalence of disease during the year preceding the date of diagnosis
Crohn's disease or ulcerative colitis	OCCC; binary [yes, no]; prevalence of disease during the year preceding the date of diagnosis
Dementia	DEMENTIA; binary [yes, no]; prevalence of disease during the year preceding the date of diagnosis
Diabetes mellitus	ODD; binary [yes, no]; prevalence of disease during the year preceding the date of diagnosis
Hypertension	HYPHER; binary [yes, no]; prevalence of disease during the year preceding the date of diagnosis
Prior cancer diagnosis	OCR; binary [yes, no]; occurrence of any cancer diagnoses during a look-back window of 37 years
Prior myocardial infarction	OMID; binary [yes, no]; occurrence of any hospitalization due to acute myocardial infarction during a look-back window of 8 years
Psychiatric comorbidity	DAD/OHIP/SDS; binary [yes, no]; based on a look-back window of 3 years preceding the date of diagnosis; ICES-internal algorithm based on Johns Hopkins ACG© Software (version 10)
Rheumatoid arthritis	ORAD; binary [yes, no]; prevalence of disease during the year preceding the date of diagnosis
Number of home care claims	HCD; continuous; sum of claims during the year preceding the date of diagnosis
Number of drug claims	ODB; continuous; sum of claims during the year preceding the date of diagnosis
Number of physician billing claims	OHIP; continuous; sum of claims during the year preceding the date of diagnosis
<i>Socio-economic covariates</i>	
Rurality index	RPDB/PCCF; continuous; RPDB-based postal code linked to PCCF ^c
Socio-economic status	RPDB/PCCF; ordinal/quintiles [1st quintile: lowest income]; RPDB-based postal code linked to PCCF ^c
Residential instability	RPDB/ONMARG; ordinal/quintiles [1st quintile: least marginalized patients]; RPDB-based postal code linked to ONMARG ^c
Material deprivation	RPDB/ONMARG; ordinal/quintiles [1st quintile: least marginalized patients]; RPDB-based postal code linked to ONMARG ^c

Dependency	RPDB/ONMARG; ordinal/quintiles [1st quintile: least marginalized patients]; RPDB-based postal code linked to ONMARG ^c
Ethnic concentration	RPDB/ONMARG; ordinal/quintiles [1st quintile: least marginalized patients]; RPDB-based postal code linked to ONMARG ^c
Ethnicity	ETHNIC; categorical [general population, Chinese ethnicity, South Asian ethnicity]; surname-based algorithm
<p>^a<i>Billing claim-based</i> ^b<i>Pathology report-based</i> ^c<i>We always chose the PCCF/ONMARG version with the closest temporal proximity to the date of diagnosis.</i> ACG©: Adjusted Clinical Groups©; CCO: Cancer Care Ontario; CIHI: Canadian Institute for Health Information; CIS: Carcinoma in situ; MOHLTC: Ministry of Health and Long-Term Care; OACCAC: The Ontario Association of Community Care Access Centres; OCHPP: Ontario Community Health Profiles Partnership; ORG: Office of the Registrar General; TURBT: transurethral resection of bladder tumor; WHO: World Health Organization</p>	