

Appendix 2. Detailed description of each characteristic

Region of Residence

A annual flag was developed using postal codes associated with residence codes and census subdivisions unique to First Nations communities were identified from the RPDB, DAD, and NACRS to classify whether an individual resided within a First Nations community (“on-reserve”) or outside of a First Nations Community (“off-reserve”). This was then used to determine if an individual resided within or outside of a First Nations community during the year of matching date (phase entry or 6 months prior to death for terminal phase).¹ First Nations community status was only available until 2014, for any individual with a matching date from 2015 to 2017, their 2014 community status was carried forward.

HIV and HBV

Cases of human immunodeficiency virus (HIV) and hepatitis B virus (HBV) were identified by searching diagnostic codes, service/procedure codes, the Ontario HIV database at ICES, and/or PHO testing records (Supplemental Table S1).

Supplemental Table S1. Codes used to identify records of HIV or HBV.

Flag	Database Searched	Codes Searched
HIV	Ontario HIV Database	Any record
	DAD, SDS, and NACRS	ICD-9 diagnostic codes starting with: 042, 043, 044 ICD-10 diagnostic codes starting with: B20, B21, B22, B23, B24
HBV	DAD, SDS, and NACRS	ICD-9 diagnostic codes: 070.2, 070.3 ICD-10 diagnostic codes: B16.0, B16.1, B16.2, B16.9, B17.0, B18.0, B18.1, Z22.50
	PHO Laboratory Testing Records	Any positive HBV antibody or confirmatory test

Abbreviations: DAD, Discharge Abstract Database; HIV, human immunodeficiency virus; HBV, hepatitis B virus; ICD, International Classification of Diseases; PHO, Public Health Ontario; NACRS, National Ambulatory Care Reporting System; SDS, same day surgery database.

Mental Health Conditions

Records of mental health diagnoses, including substance abuse-related disorders, were reported by using stratified diagnostic groupings that categorize mental health and addictions-related diagnostic codes in the

administrative datasets (Supplemental Table S2). Diagnostic groups were developed by ICES and used as part of the Ontario Mental Health and Addiction Scorecard.² Conditions were identified from January 1, 2002 (the earliest date of the diagnostic grouping variable) to Dec 31, 2017 and flagged if the record occurred during the year prior to matching date. Diagnostic groups were supplemented with OHIP outpatient mental health diagnostic codes where there was sufficient detail to categorize the physician services claim. As alcohol can effect the progression of liver disease,³ although already included in the substance-related and addiction disorder category, alcohol use disorder was also identified separately using related diagnostic codes.

Supplemental Table S2. Codes used to identify records of mental health and addiction disorders.

Diagnostic Group	ICD-9 codes (Used to search OMHRS)	ICD-10 Codes (Used to search DAD and NACRS)	OHIP Diagnostic Code
Substance-Related and Addiction Disorders	291.x, 292.x, 303.x, 304.x, 305.x, 312.31, DSM Provisional=16	F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F55, F63.0	303, 304
Schizophrenia Spectrum Disorders	293.81, 293.82, 295.x, 297.x, all 298.x, DSM Provisional=2	F06.0, F06.1, F06.2, F20, F22-F29, F53.1	295, 297, 298
Depression Mood Disorder	296.2x, 296.3x, 296.9x, 300.4x, 311.x, 625.4x, DSM Provisional=4	F32, F33, F34.1	311
Bipolar Mood Disorder	296.0x, 296.4x, 296.5x, 296.6x, 296.7x, 296.8x, 301.13, DSM Provisional=3	F30, F31, F34.0	-
Anxiety Disorders	293.84, 300, 300.0x, 300.2x, 309.21, 313.23. DSM Provisional=5	F06.4, F40, F41, F93.0, F93.1, F93.2, F94.0	300
Trauma/Stressor-related Disorders	308.3x, 309, 309.0x, 309.24, 309.28, 309.3x, 309.4x, 309.81, 309.89, 309.9x, 313.89. DSM Provisional=7	F43, F94.1, F94.2	309
Alcohol Use Disorder	291.0, 291.1, 291.3, 291.5, 291.81, 291.89, 291.90, 292.2, 303.0, 303.9, 305.0 Additionally, for OMHRS: 291, 303	F10	303

Notes: x represents all subcategories within the respective diagnosis code. Provisional represents broader provisional diagnoses categories found in OMHRS based on DSM-IV and DSM-V codes. Diagnostic group codes (with the exception of alcohol use disorder) were adapted from the Ontario Mental Health and Addiction Scorecard.

Abbreviations: DAD, Discharge Abstract Database; DSM, Diagnostic and Statistical Manual of Mental Disorders; ICD, International Classification of Diseases; NACRS, National Ambulatory Care Reporting System; OHIP, Ontario Health Insurance Plan; OMHRS, Ontario Mental Health Reporting System.

Outpatient Prescription Drugs

Outpatient prescription drugs likely related to HCV infection, were captured from the Ontario Drug Benefit (ODB) database, which contains information about claims covered by the Ontario Drug Benefit plan for eligible individuals.⁴ Eligible individuals include Ontario residents who are aged 65 and older, or living in long-term care facilities, or who have a high drug cost relative to their income.⁴ Any record of claims specific to direct-acting antivirals (DAA), interferon, ribavirin, and interferon-based combination therapies were captured up until December 31, 2017 and categorized using their respective drug identification numbers (DIN) (Supplemental Table S3).

Supplemental Table S3. HCV-related treatment regimens and their associated identification numbers searched in the Ontario Drug Benefit database.

Treatment	Drug Identification Numbers
Ribavirin	02246030, 02246026, 02246027, 02246028, 02246029, 02254581, 02254603, 02254638, 02254646, 02239730, 02241159, 09852417, 09853260, 02439212
Direct Acting Antivirals	02371464, 02371472, 02436027, 02432226, 02425890, 02425904, 02416441, 02418355, 02371553, 02444747, 02452294, 09857396, 02370816, 02451131, 02456370, 02467542, 02444755, 02447711, 02371448, 02371456
Interferon	02239832, 02223384, 02223392, 02223406, 02231651, 00889067, 02223414, 02238674, 02238675, 09853995, 09854045, 09854053, 00705896, 00705918, 00705926, 02240693, 02240695, 01911988, 01911996, 01912003, 00812471, 00812498, 00812501, 02217015, 02217031, 02217058, 02217066, 02019914,
Peginterferon	02240694, 02242966, 02242967, 02242968, 02242969, 02248077, 02248078
Peginterferon-Ribavirin Combination	09857505, 02253429, 02253410, 09857418, 09857420, 09857421, 09857421, 09857506, 09857509, 02254573

Multimorbidity

Multimorbidity was captured and scored using the Johns Hopkins ACG System, Aggregated Diagnosis Groups (ADG),⁵ based on one year prior to matching date. The number of individuals within each ADG category was reported. Also, individuals were categorized as having 0 to 3, 4 to 7, 8 to 10, and 11+ categories, corresponding to an increasing degree of multimorbidity.

Decompensated Cirrhosis and Hepatocellular Carcinoma

Validated algorithms were used to detect cases of decompensated cirrhosis and hepatocellular carcinoma within Ontario healthcare administrative data (Supplemental Tables S4 and S5).⁶

Supplemental Table S4. Codes used to identify cases of decompensated cirrhosis.

Databases Searched	Codes Searched
OHIP	Procedure billing codes: J057, Z591
DAD, SDS and NACRS	CCP codes: 1006, 6691 CCI codes: 1NA13BAFA, 1NA13BAX7, 1NA13BABD, 1KQ76GPNR, 1OT52HA ICD-9 diagnostic codes: 572.2, 572.3, 572.4, 456.0, 456.2, 782.4, 789.5 ICD-10 diagnostic codes: K76.6, K76.7, R17, K72.1, K72.9, I85.0, I98.20, I98.3, I86.4, R18
ORGD	ICD-9 codes for cause of death: 571.5, 571.2, 572.2, 572.3, 572.4, 572.8, 456.0 ICD-10 codes for cause of death: K72.1, K72.9, K70.3, K70.4, K71.7, K74, K74.6, K76.6, K76.7, I85, I98.2, I98.3, I86.4

Notes: The algorithm consisted of one physician visit code for cirrhosis and any one of the hospital diagnosis, procedure, or cause of death codes.

Abbreviations: DAD, Discharge Abstract Database; CCI, Canadian Classification of Health Interventions; CCP, Classification of Procedures; ICD, International Classification of Diseases; NACRS, National Ambulatory Care Reporting System; ORGD, Office of the Registrar General Deaths register; SDS, same day surgery database.

Supplemental Table S5. Codes used to identify cases of hepatocellular carcinoma.

Databases Searched	Codes Searched
DAD, SDS, and NACRS	ICD-9 diagnostic code: 155.0 ICD-10 diagnostic codes: C22.9, C22.0, 81703, 81803
ORGD	ICD-9 code for cause of death: 155.0 ICD-10 codes for cause of death: 81703, 81803
OCR	Topography: C22.0 Morphology: 81703, 81723, 81733, 81743, 81753, 81803

Notes: The algorithm consisted of a diagnosis in the Ontario Cancer Registry, a hospital diagnostic code, or a cause of death code. Diagnosis in the Ontario Cancer Registry (OCR) used the ICD-O coding system and consisted of one topography code and a 5-digit morphology code.

Abbreviations: DAD, Discharge Abstract Database; ICD, International Classification of Diseases; ICD-O, International Classification of Diseases- Oncology; NACRS, National Ambulatory Care Reporting System; OCR, Ontario Cancer Registry; ORGD, Office of the Registrar General Deaths register; SDS, same day surgery database.

Liver Transplant

Supplemental Table S6. Codes used to identify cases of liver transplant.

Databases Searched	Codes Searched
DAD, SDS, and NACRS	ICD-9 diagnostic codes: V42.7, 996.82 ICD-10 diagnostic codes: Z94.4, T86.40, T86.41, T86.42, T86.43, T86.49, T86.9 CCI codes: 1OA85LAXXK, 1OA85VCXXK, 1OA85WLXXJ, 1OA85WLXXK

Notes: The algorithm consisted of the presence of any of the diagnostic or procedure codes.

Abbreviations: DAD, Discharge Abstract Database; CCI, Canadian Classification of Health Interventions; ICD, International Classification of Diseases; NACRS, National Ambulatory Care Reporting System; SDS, same day surgery database.

Resource Categories

The ‘other services’ category was used to capture OHIP non-physician claims, assisted device program, rehabilitation services, home care, complex continuing care, and long-term care services. OHIP non-physician claims include services provided by a health care practitioner who is not a medical doctor.

Examples include services provided by optometrists, physiotherapists and chiropractors. OHIP only partially covers the costs of these services or covers them for specific populations or circumstances; e.g., for those aged 65 years and older.

Most physicians in Ontario bill OHIP fee-for-service. Those on alternative funding programs are encouraged to “shadow-bill”, that is, submit a claim for services provided, for which they are paid a small percentage of the usual fee.⁷

References

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Appendix 2, as supplied by the authors. Appendix to: Mendlowitz A, Bremner KE, Walker JD, et al. Health care costs associated with hepatitis C virus infection in First Nations populations in Ontario: a retrospective matched cohort study. *CMAJ Open* 2021. DOI:10.9778/cmajo.20200247. Copyright © 2021 The Author(s) or their employer(s). To receive this resource in an accessible format, please contact us at cmajgroup.cmajca.

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