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Supplementary Appendix

Table A1. Databases used for cohort construction

Database	Description	Generating process	Key content	Limitations
PharmaNet	All prescriptions for drugs and medical supplies dispensed from pharmacies including hospital outpatient dispensations.	Electronically submitted by pharmacists dispensing medications in real time. Required for reimbursement.	Drugs dispensed (using DIN/PIN* number), date of dispensation, quantity and duration of prescription, billing information, prescriber code and drug costs.	Records of drugs dispensed within physician private practice incomplete. Third party paid amounts not explicit. Practitioner IDs in PharmaCare are not linkable to practitioner IDs in PharmaNet. No provincial health information standards authority to ensure data quality (disbanded in 2003). PharmaNet does not capture: • Medications administered to hospital in-patients • Antiretroviral medications dispensed from the Centre of Excellence in HIV / AIDS at St. Paul's Hospital • Chemotherapy agents dispensed by the BC Cancer Agency • Medications purchased without a prescription may not be on PharmaNet (e.g., over the counter medications, herbal products, vitamins) • Medication samples dispensed at a physician's office (some are entered by physicians with PharmaNet access) https://www2.gov.bc.ca/assets/gov/health/forms/5431save.pdf
Discharge Abstract Database (DAD)	All hospital discharges, day surgery, transfers, and deaths of inpatients. Data of BC residents treated at hospital out of province, and out-of-province residents treated within BC hospitals included.	Data files grouped into fiscal years by separation date (not admission date). Each hospital submits electronic records of patient visits to the provincial government which cleans and then submits the records to the Canadian Institute for Health Information (CIHI). CIHI regularly conducts re-abstraction to ensure data quality.	Hospitalization dates, most responsible diagnosis (ICD 9/10-CA code) and up to 24 additional diagnostic codes, 25 procedure codes using CCI/CCP procedure/ intervention codes†, transport method, transfers, primary physician responsible for stay, condition specific resource intensity weights, inpatient grouping. Hospital number, level of care, admission date/time, admission category, readmission, and transfer codes, discharge date/time, discharge,	Visits to emergency department, abortion procedures, outpatient care (e.g. x-rays and blood word) excluded.

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			disposition, length of stay, stay by level of care.	
Medical Services Plan (MSP) Database	All medically necessary services provided by fee-for-service practitioners covered by the province's universal insurance program: Medical Services Plan (MSP).	Majority of billing records submitted electronically by practitioners' offices for reimbursement purposes. Diagnosis codes accurate only to 3rd digit.	Medically necessary services including laboratory and diagnostic procedures (x-rays, ultrasounds), and dental and oral surgery performed in hospital. Up to 5 diagnoses codes included (ICD-9-CA). Service date, fee item, diagnostic codes, practitioner code, service costs and location.	Inconsistent 'shadow billing' of services provided for no charge referrals, in Primary Health Care encounters claims, or by nurse practitioners. Insurance Corporation of British Columbia (ICBC) or WorkSafeBC claims; abortion services; and services provided through alternative payment plans (e.g. salaried, sessional, and service agreement contracts) excluded. Most current year of MSP payment data is 5-10% incomplete, with up to 6 month lag in billings filed.
Vital Statistics (VS)	All deaths registered in the province.	Data is checked against nationally uniform vital registration and statistics standards.	Date of death (year and month), location, underlying cause of death (ICD-9-CA and ICD-10-CA), and nature of injury codes.	Excludes abortions and out-of-province deaths of BC residents. Non-specific information on overdose deaths, drug type not indicated.
National Ambulatory Care Reporting System Database	All hospital-based and community-based ambulatory care including day surgery, outpatient and community-based clinics emergency departments	Data is collected directly from participating facilities or from regional health authorities or ministries of health.	ED records, day surgery, clinic submissions from several jurisdictions, patients' presenting complaint, and ED discharge diagnosis	There is no clear indicator of diseases and the level of the patient's type of separation from the ambulatory care service after registration to that service is not organized.
BC Corrections	The Provincial Health Officer compels Corrections Data from the Ministry of Public Safety and Solicitor General.	The Ministry of health receives inmate client file, inmate event file and inmate event movement files from the Public Safety and Solicitor General. The Ministry of Health Data Provisioning Team anonymizes client	Inmate events: incarceration in/out dates from BC corrections; Inmate moves: movements during incarceration from BC corrections	Ministry data for personal health numbers that are not in the cohort but that are associated with a Corrections Client ID that is also associated with a personal health number in the cohort are not provided, but all the Corrections data will be provided. All "youth" files excluded.

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		ID and personal health numbers and provides an anonymized version of the Client File that contains anonymized IDs.		
Perinatal Database	Perinatal Services BC houses the provincial perinatal database, which consists of data collected from obstetrical facilities as well as births occurring at home attended by BC Registered Midwives.	Perinatal data is collected from facilities throughout the province and imported into the central BC Perinatal Data registry. Installation hospitals have the same software as the central system, and send data on a periodic basis to the provincial database. The non-installation hospitals have their databases maintained at the central office. Data from the Canadian Institute for Health Information (CIHI) and matched files from the British Columbia Vital Statistics Agency complement the data elements. Participation in the registry is not mandatory.	Mother: admission date, discharge date, first contact with physician/midwife date, number of births in current pregnancy, number of antenatal visit in the current pregnancy, gestational age at delivery (in week), mode of delivery, health authority, local health authority (LHA), health service delivery area (HSDA), transfer in/out to another facility, HIV testing flag, Hepatitis B testing flag, substance use flag, mental illness flag, prior still birth, prior low weight baby flag, prior neonatal death, postpartum infection, HSDA, HA, LHA, Institute transferred from/to, admission date, discharge date, institute where mother delivered, first ultrasono date, gestational age at first U/S, ICD code for diagnoses, gestational age at delivery. Baby: admission date, discharge date, HA, HSDA, LHA, birth weight, gestational age at birth, blood culture test, urine culture test, breast feeding	Substance use flag is available only from March 2008- August 2014.

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			initiation, institution to which baby was transferred from the current episode of care, Baby's length of stay for admission expressed in hour, where the baby was discharged to, or the status of the baby at the time of discharge, location where baby received care.	

*DIN: Drug Identification Number; PIN: Product Identification Number; ICD-9/10-CA: International Statistical Classification of Diseases and Related Health Problems, Ninth and Tenth Revisions, Canada. † Coding structures used by the Canadian Institute of Health Information (CIHI); ‡ A standardized code picklist for presenting complaint developed by CIHI.

Table A2. ICD-9/10-CA and drug identification numbers used to draw initial cohort

Database	Code no.*	Description
PharmaNet	999792, 999793, 66999990, 66999991, 66999992, 66999993, 66999997, 66999998, 66999999, 67000000, 67000008, 67000007, 67000005, 67000006, 67000004, 67000003, 67000001, 67000002	DIN/PIN for methadone as OAT
PharmaNet	2242962, 2242963, 2242964,2295695, 2295709, 66999994, 66999995, 66999996, 2408090, 2408104, 2424851, 2424878, 2453908, 2453916, 2468085, 2468093	DIN/PIN for buprenorphine/naloxone as OAT
PharmaNet	22123349, 22123346, 22123347, 22123348	DIN/PIN for slow-release oral morphine
PharmaNet	22123357, 66123367, 2146126, 22123340	DIN/PIN for injectable OAT
PharmaNet	999776	DIN/PIN for Narcotic compound
MSP/DAD	304	ICD-9-CA for drug dependence
MSP/DAD	305.2-305.9	ICD-9-CA for non-dependent abuse of drug
MSP/DAD	E850-E854, 969.4-969.7, 965	ICD-9-CA for drug poisoning
MSP/DAD	292, 305, 648.3, 751, 752, 753, 760, 779.5,	ICD-9-CA for cohort creation
MSP/DAD/VS/NACRS/PSBC	T40, T42.4, T43.6, Z50.3, Z71.5, Z72.2, P04.4, P96.1	ICD-10-CA for cohort creation
MSP/DAD/VS/NACRS/PSBC	F11-F16, F19	ICD-10-CA for abuse of drug
MSP/DAD/VS/NACRS/PSBC	X42, X62, Y12	ICD-10-CA for drug poisoning
MSP fee item	39,15039,13013,13014	Fee item for OAT

DAD: Discharge Abstract Database; MSP: Medical services Plan; VS: Vital statistics; NACRS: National Ambulatory Care Reporting System; PSBC: Perinatal services British Columbia; *PharmaNet database: Drug Identification Numbers (DIN)/Product Identification Numbers (PIN) used for identification; ICD-9/10-CA: International Statistical Classification of Diseases and Related Health Problems, Ninth and Tenth Revisions, Canada.

Table A3. Identification of concurrent chronic conditions

Diseases	Diagnosis code	References
MH	ICD-9-CA from DAD and MSP: 295-298,300,301, 308, 309, 311, 314, 317, 318, 319, 76071; ICD-10-CA from DAD/NACRS/VS/PSBC: F20-F25, F28-F34, F38-F43, F48, F60-F61, F69, F70-F73, F78, F79, F90, Q86.0; MSP additional diagnostic code 50B	(1), (2), (3), (4), (5, 6)
HIV	ICD-9-CA from DAD and MSP: 042-044, 079.53, 795.8, V08; ICD-10-CA from DAD/NACRS/VS: B20-B24, B97.35, F02.4, O98.7, Z21; MSP fee item: 13015, 13105, 33645, 36370	(7), (8)
HCV	ICD-9-CA from DAD and MSP: 70.41, 70.51, 70.44, 70.54, 70.7; ICD-10-CA from DAD/NACRS/VS: B17.1, B18.2, B19.2; DIN/PIN: 2370816, 2371448, 2371456, 2371464, 2371472, 2444755, 2451131, 2467550, 2432226, 2436027, 2447711, 2416441, 2418355, 2467542, 2456370, 2371553	(9),(10),(11), (12)
OUD	ICD-9-CA from DAD and MSP: 304.0, 304.7, 305.5, 965.0, E850.0-E850.2 ICD-10-CA from DAD/NACRS/VS/PSBC: F11, X42 & (T40.0-T40.4 or T40.6), X62 & (T40.0-T40.4 or T40.6), Y12 & (T40.0-T40.4 or T40.6) MSP fee item: 39,15039,13013,13014 DINPIN from Pharmanet: 999792, 999793, 66999990, 66999991, 66999992, 66999993, 66999997, 66999998, 66999999, 67000000, 67000008, 67000007, 67000005, 67000006, 67000004, 67000003, 67000001, 67000002, 2242962, 2242963, 2242964,2295695, 2295709, 66999994, 66999995, 66999996, 2408090, 2408104, 2424851, 2424878, 2453908, 2453916, 2468085, 2468093, 22123349, 22123346, 22123347, 22123348, 22123357, 66123367, 2146126, 22123340, 999776	(1), (13), (15),(16)
AUD	ICD-9-CA from DAD and MSP: 291, 303, 305.0, 357.5, 425.5, 535.3, 571.0-571.3, 655.4, 760.71, V65.42; ICD-10-CA from DAD/NACRS/VS/PSBC: F10, Z50.2, Z71.4, Z72.1, G31.2, G62.1, G72.1, I42.6, K29.2, K70, K86.0, O35.4, P04.3, Q86.0; DIN: 2293269, 2158655, 2213826, 2444275, 2451883,2534, 2542, 2041375, 2041391, 66124089, 66124085, 66124087	(13), (14)
SUD	ICD-9-CA from DAD and MSP: 292, 304.1-304.6, 304.8, 304.9, 305.2-305.4, 305.6-305.9, 648.3,655.5, 760.73,760.75,779.5, 967, 969.4,969.6,969.7,970, E851, E852,E853.2,E854.1,E854.2, E854.3; ICD-10-CA from DAD/NACRS/VS/PSBC: F12-F16, F19, P04.4, P96.1, T40.5,T40.7, T40.8, T40.9, T42.4, T43.6, X42, X62, Y12, Z50.3, Z71.5, Z72.2	(1), (13), (15),(16)
Chronic pain	ICD-9-CA from DAD and MSP: 338.2, 338.4, 307.80, 307.89, 338.0, 719.41, 719.45-719.47, 719.49, 720.0, 720.2, 720.9, 721.0-721.4, 721.6, 721.8, 721.9, 722, 723.0, 723.1, 723.3-723.9, 724.0-724.6, 724.70, 724.79, 724.8, 724.9, 729.0-729.2, 729.4, 729.5, 350, 352-357, 344.0, 344.1, 997.0, 733.0, 733.7, 733.9, 781; ICD-10-CA from DAD/NACRS/VS: F45.4, G89.0, G89.2, G89.4, M08.1, M25.50, M25.51, M25.55-M25.57, M43.2-M43.6, M45, M46.1, M46.3, M46.4, M46.9, M47, M48.0, M48.1, M48.8, M48.9, M50.8, M50.9, M51, M53.1-M53.3, M53.8, M53.9, M54, M60.8, M60.9, M63.3, M79.0-M79.2, M79.6, M79.7, M96.1, G50, G52 -G64, G82, G97, M89, R29	(2), (17), (18)

OUD: opioid use disorder; MH: mental health; HCV: hepatitis C; AUD: alcohol use disorder; SUD: substance use disorder other than OUD and AUD; DAD: Discharge Abstract Database for hospitalization; MSP: Medical Service Plan for physician billing; NACRS: National Ambulatory Care Reporting System; VS: Vital Statistics database in British Columbia; PSBC: Perinatal Services British Columbia; DIN: drug identification number from PharmaNet; ICD-9/10-CA: International Statistical Classification of Diseases and Related Health Problems, Ninth and Tenth Revisions, Canada..

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