

Crisis Intervention Service Use by Supportive Housing Residents and People Experiencing Homelessness: Methods Documentation

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Disclaimer

The following material was developed as part of the Preventing and Reducing Homelessness integrated data project, commissioned by the Ministry of Housing and Municipal Affairs (<https://www2.gov.bc.ca/gov/content/housing-tenancy/affordable-and-social-housing/homelessness/homelessness-cohort>).

The data sets were used in this study are detailed below. You can find further information regarding these data sets by visiting the BC Data Catalogue at: <https://catalogue.data.gov.bc.ca/organization/data-innovation-program-dip>

All inferences, opinions, and conclusions in these materials are those of the authors. They do not reflect the opinions or policies of the provider(s) of the data upon which they are based.

Purpose

This analysis compares the rates of emergency department visits, incarcerations, and hospital admissions among supportive housing residents, the homeless cohort, and the general population.

This analysis is intended to evaluate the differences emergency department visits, incarcerations, and hospital admissions among supportive housing residents, the homeless cohort, and the general population.

Analyses were conducted in the **Data Innovation Program (DIP)**'s Secure Research Environment, using de-identified and linked row-level data provided by the DIP. All data processing and analyses were conducted using R version 4.3.1.

Data files used

All datasets were converted from the formats as provisioned by the DIP, standardized, and loaded into a duckdb database for ease of analysis. Considerable testing occurred to ensure that conversions were done accurately.

Other than Ministry of Health and BC Housing datasets, all data files were taken from the 20231129 core-snapshot and converted from *.dat.gz* compressed fixed width files.

All Ministry of Health datasets were taken from the 2024-03-18 core snapshot. This was done to take advantage of improvements that have been made to the Ministry

of Health datasets, including provisioning them as .csv files and consolidating MSP records into a more analysis-ready dataset.

All BC Housing datasets were taken from the 2024-08-20 core snapshot, as information on Single Resident Occupancy buildings was added to this snapshot to support this analysis.

The data sources used in the analysis include:

- Ministry of Health Central Registry
- Ministry of Health Central Demographics
- BC Housing - Supportive Housing
- BC Housing - Supportive Housing Costs
- Discharge Abstract Database (DAD)
- National Ambulatory Care (NACRS)
- Ministry of Health Medical Services Plan Payment Information File (MSP)
- Ministry of Public Safety and Solicitor General (PSSG) Custody Movement files

Homelessness Cohort

The homelessness cohort was developed by BC Stats using the methodology described in the technical document available on the [Metadata for Homelessness Cohort](#) page in the BC Data Catalogue. The [Technical Documentation](#) for document outlines how individuals are identified as homeless and included within the cohort below:

- **Homelessness:**
 - three months or more of consecutive income assistance reporting no fixed address, OR
 - fewer than 180 days in a shelter, OR
 - one or two unique visits to a shelter

To calculate the number of unique shelter visits, it was necessary to merge overlapping shelter stay intervals to create one continuous interval. A small

portion of the BC Housing shelter data contained individuals with overlapping time intervals at different locations. For instances where an individual was present in two census subdivisions, the intervals were not merged. This is a very small number of shelter visits and therefore represents an acceptable loss of data accuracy.

PSSG Corrections - Adult Community and Custody

Data Processing

Restating multiple studyids

A key part of the data-staging process is called “restating”, which deals with the issue of some individuals being associated with multiple studyids. This uses duplicate studyids identified in the PSSG, BC Housing Shelter (HIFIS), and BC Housing Supportive Housing data and chooses a single canonical studyid for each individual. This canonical studyid is inserted in place of duplicates in every dataset that is staged, and individuals identified as being linked to multiple studyids are “collapsed” into one.

Population construction

Using the homelessness cohort, MSP registry, and the supportive housing tenancy registration, a monthly population was constructed for the years 2019-2022, using individuals aged 19-65. For each month of each year, an individual was classified as being homeless, a supportive housing resident, or neither (reference population).

This population dataset was used as the basis for all analyses, so every emergency department visit, hospital admission, or incarceration admission was assigned to the appropriate population category (homeless, supportive housing, or reference).

Sub Population Descriptions (homeless, supportive housing, reference)

For each analysis, results are reported by population group (homeless, supportive housing users, and reference population).

“Homeless” individuals are those that are identified in the homeless cohort for the given year and month.

“Supportive housing residents” are those that were residents in BC Housing supportive housing in a given month based on that year and month being

between the tenancy start date and tenancy end date (or tenancy end date being null indicating continued residency).

Individuals in the “**reference population**” are those that are neither identified in the homeless cohort nor as supportive housing users for the given year and month.

Usage Rates

Emergency Department visits variables

Emergency department visits were tabulated from NACRS data, DAD data, and MSP data using the “best/comprehensive” method described in:

Peterson, S., Wickham, M., Lavergne, R., Beaumier, J., Ahuja, M., Mooney, D., & McGrail, K. (2021). Methods to comprehensively identify emergency department visits using administrative data in British Columbia. UBC Centre for Health Services and Policy Research: Vancouver, BC, Canada.

This method involves identifying records by combing NACRS, MSP, and DAD via the following steps (From Table 15 in Peterson et al, 2001):

1. All (non-scheduled) NACRS records
2. Plus additional MSP records with ServLoc=E or EmergCare=1 or EMSpec=1 (additional after linking to NACRS by StudyID, RegDate/ServDate)
3. Plus additional DAD records with Entry=E (additional after linking to the combined NACRS/MSP data by StudyID, RegDate/ServDate/AdDate)

Data pre-processing:

- NACRS was filtered to include:
 - Only those in BC
 - Only those dates \geq 2019
- The DAD dataset was filtered to include:
 - Only those in BC
 - Only those dates \geq 2019
 - Entries via ED, direct, Clinic, Day surge
 - Urgent admissions

- The MSP dataset was filtered to include:
 - BC residents
 - Only those dates \geq 2019
 - Services performed in BC
 - Only services administered in emergency departments

Emergency department (ED) visits were identified for all BC residents during the study period (2019-2022). Where there was more than one visit in a day for an individual, the encounter with the highest triage level and/or the visit where the patient did not leave without actually receiving care was kept.

An individual's housing status during each visit was determined by which subpopulation (described above) they were in during the year and month of that visit.

The individual row-level visit data was summarized to give monthly totals and rates. The data were grouped by year and month, and the total number of visits and the number of unique individuals that visited the ED for each population group for each year and month were summed. Rates were calculated for each population group by dividing the total number of visits by individuals in each population group (eg., homeless, SH residents, reference) by the total number of people in that population group in the given year and month.

In addition to calculating usage rates, we calculated the proportion of ED visits that fall into each triage level by population group and year. Following the Canadian Triage and Acuity Scale (CTAS)¹ the five acuity levels are:

Level 1 Resuscitation:

Definition: Conditions that are **threatening to life or limb** and require **immediate, aggressive intervention**.

Examples: Cardiac arrest, major trauma, severe respiratory distress, unconsciousness, shock.

Goal: Immediate medical attention, ideally within **0 minutes** (upon arrival).

¹ **CTAS National Guidelines** (2014 edition).

<https://www.cihi.ca/sites/default/files/document/ctas-national-guidelines-2014-en.pdf>

Level 2 Emergent:

Definition: Conditions that are **potentially life-threatening** or could rapidly deteriorate without urgent medical care.

Examples: Chest pain suggestive of a heart attack, major bleeding, altered mental status, severe pain.

Goal: Assessment and treatment within **15 minutes**.

Level 3 Urgent:

Definition: Serious conditions that require **early intervention**, but are not immediately life-threatening.

Examples: Moderate asthma attack, abdominal pain, high fever with signs of infection, dehydration.

Goal: Assessment and treatment within **30 minutes**.

Level 4 Less Urgent:

Definition: Conditions that are **non-life-threatening**, but may require investigation or interventions.

Examples: Minor fractures, ear infections, urinary symptoms without fever, mild abdominal pain.

Goal: Assessment and treatment within **60 minutes**.

Level 5 Non-Urgent:

Definition: Conditions that are **non-acute** and could be managed in a **primary care setting**.

Examples: Prescription refill, sore throat with no other symptoms, mild rashes, chronic conditions without complications.

Goal: Assessment and treatment within **120 minutes**.

Hospital Admissions

Similar to ED visits, all hospital admissions were identified for BC residents in the time range 2019-2022, and an individual's housing status at the time of each admission was determined by which subpopulation (described above) they were in during the year and month of that admission.

Data pre-processing:

- DAD (hospital admissions) was filtered to include:
 - Only those in BC
 - Only those dates \geq 2019
 - Entries via ED, direct, Clinic, Day surgery (excludes newborn and stillborn infants)
 - Urgent and elective admissions (excludes newborn and stillborn infants and cadaveric donors)
 - Only “typical” cases (not transfers, deaths, sign-outs)
 - When there were multiple admissions per day for an individual, the record was kept where they stayed in hospital the longest (i.e., the latest separation date).
- MSP was filtered to include:
 - Only those in BC
 - Only those dates \geq 2019
 - Services performed in hospital

Incarceration Rates

All data were obtained from the BC Ministry of Public Safety and Solicitor General (PSSG) Custody Movement files. These datasets only include data from B.C. provincial corrections institutions and do not include data on incarcerations in Federal institutions. Both remand and custody incarcerations were included, but not distinguished, in the analysis.

Full duration incarcerations were assembled by creating a table of admissions and a table of releases. These were joined together by studyid and a window join finding the closest release date after the admission date. This resulted in one row per incarceration event, with an admission data and a release date. In instances where an individual was admitted multiple times on the same day, only the first record was kept.

Incarcerations were then filtered to exclude intermittent stays, and only include provincial incarcerations. Intermittent stays are court-ordered sentences that allow offenders to serve their jail time in periodic intervals, such as on weekends, rather than continuously. Admissions included were new admissions, captures, and parole suspensions, and releases were filtered to exclude deaths, immigration, release to child custody/child services, release to outside the province, and day parole.

When there was a missing release date it was assumed that that person was still incarcerated as of the time of the data snapshot and it was filled in as the last date of the data snapshot as a placeholder.

The data were transformed to create one row per person per day incarcerated and joined to the monthly population table to add attributes (population group, age, sex). They were then summarized by month and population group to calculate the number of incarceration days per population group per month.