# Characteristics of health care related to mental health and substance use disorders among Community Health Centre clients in Ontario: a population-based cohort study

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## Abstract

**Background:** Community Health Centre (CHC) client populations with a history of mental illness or substance use disorders, or both, are not described well in the literature. We identified CHC clients in Ontario with a history of health care related to mental health or substance use disorders, or both, and describe their demographic characteristics, health system use and related health risks in comparison to other people in the province with similar diagnoses who did not use CHC services.

**Methods:** We conducted a population-based cohort study using provincial health administrative data among Ontario residents aged 21–105 years with a previously established medical history of a mental illness or substance use disorder, or both. We examined 3 groups: clients of CHC sites that serve at-risk priority populations (PPCHCs) who presented for care at a CHC between Apr. 1, 2014, and Mar. 31, 2015, clients of CHC sites that serve nonpriority populations (NPPCHCs) who presented for care at a CHC over the same period, and a community control group of patients with a history of health care use related to mental illness or substance use disorders, or both, in the 2 years before the index date who were not CHC clients. We used descriptive statistics and multivariable logistic regression to estimate the odds of psychiatric care and emergency department use within 1 year of the index date.

**Results:** Compared to the community control patients (*n* = 1 673 200), clients of PPCHCs (*n* = 6575) and NPPCHCs (*n* = 15 208) were younger, experienced more residential instability and had an increased prevalence of medical comorbidities; they had higher odds of receiving care from a psychiatrist (adjusted odds ratio [OR] 1.26, 95% confidence interval [CI] 1.20–1.33, and 1.47, 95% CI 1.41–1.53, respectively) and visiting an emergency department (adjusted OR 1.15, 95% CI 1.10–1.20, and 1.13, 95% CI 1.09–1.17, respectively) in the 1-year follow-up period.

**Interpretation:** Ontario CHC clients with mental health or substance use disorders had medically complex needs and were intensive users of the health care system. Specific interventions should be developed to better serve this vulnerable population.

Mental illness and substance use disorder are prevalent within the Ontario population, especially in vulnerable and marginalized populations.[1,2] Owing to the ongoing stigma associated with these conditions, societal exclusion and isolation is commonplace,[3,4] including within primary health care settings.[5] In Ontario, Community Health Centres (CHCs) are a primary health care model that serves populations who experience barriers to obtaining health care (e.g., poverty, geographic isolation, ethno- and culturocentrism, racism, sexism, heterosexism, transphobia, language discrimination and other forms of social exclusion).[6] Community Health Centres provide a comprehensive range of interprofessional health care services, including care from physicians, nurse practitioners, nurses, social workers, dieticians and health promoters.[7] For over 40 years, CHCs have served over 600 000 people in 110 communities across the province,[8] including large populations of people living in lower-income neighbourhoods with severe mental illness and chronic health conditions.[9,10]

Although mental illness and substance use disorders in Ontario have been studied,[11,12] there is limited population-level research in this area specific to the CHC client population. Owing to the increasing rates of mental health problems and addictions in Ontario,[1,13–15] obtaining a better understanding of CHC clients with a history of use of health care related

to mental illness or substance use disorder, or both, is needed, especially given that existing work has highlighted that CHCs serve populations with higher proportions of patients with complex medical and mental illnesses compared to the general Ontario population.[9,10]

The objectives of the present study were to identify CHC clients with a history of use of health care related to mental health or substance use disorder, or both, and describe their demographic characteristics, socioeconomic background, use of health care services and related health risks in comparison to community controls who did not use CHC services.

## Methods

### Setting

We conducted a population-based cohort study in Ontario, Canada using data from Apr. 1, 2014, to Mar. 31, 2015. We deemed this time span contemporary enough to be meaningful for practice and policy but with a sufficient lag to ensure completeness of health administrative data. Ontario has a single-payer health care insurance plan (Ontario Health Insurance Plan) that allows residents to access medically necessary health care services through providers and health care organizations. Records generated through interaction with the health care system thus represent the entire population.

### Data sources

We identified CHC clients using the CHC data set, which was extracted from the CHC electronic medical record and linked deterministically to health administrative data sets housed at ICES.[16] ICES is an independent, nonprofit research institute whose legal status under Ontario's health information privacy law allows it to collect and analyze health care and demographic data, without consent, for health system evaluation and improvement. We determined health care use using the Canadian Institute for Health Information Discharge Abstract Database (2011–2016), which contains patient-level hospital admission and discharges; the National Ambulatory Care Reporting System (2011–2016), which contains data related to ambulatory and emergency department use; the Ontario Mental Health Reporting System (2011–2016), which contains data related to all adults who receive mental health services; and the Ontario Health Insurance Plan (2011–2016) database, which contains physician billing and diagnostic data. In addition, we identified certain chronic conditions using ICES-derived data sets applying validated case definitions, including the Ontario Asthma data set,[17] the Ontario Chronic Obstructive Pulmonary Disease cohort,[18] the Ontario Diabetes data set,[19] the Ontario Hypertension data set,[20] the Ontario Rheumatoid Arthritis data set,[21] the Ontario Crohn's and Colitis Cohort[22] and the Ontario HIV database.[23]

Other sociodemographic data used in the study were drawn from the ICES Registered Persons Database, the Immigration, Refugees and Citizenship Canada Permanent Residents data set (information on immigration), Client Agency Program Enrolment (patients registered to a primary

health care physician), the Ontario Marginalization Index[24,25] (levels of marginalization across the province, including the derived variables residential instability, material deprivation, dependency and ethnic concentration), and the Primary Care Population database[26] (an ICES-derived population-level data set that contains a representative sample of Ontarians and their demographic and health information). These data sets were linked by means of unique encoded identifiers and analyzed at ICES.

### Study population

The CHC group included all people aged 21–105 years who presented for care at a CHC between Apr. 1, 2014, and Mar. 31, 2015. We excluded those aged less than 21 years in order to provide a 3-year look-back window for specific comorbidities. All CHC clients in the study had a history of use of outpatient health care related to a mental health diagnosis or substance use, or both (Appendix 1, Supplemental Table S1, available at www.cmajopen.ca/content/8/2/E391/suppl/DC1). We defined clients as having any health care interaction related to mental problems or substance use as indicated through outpatient (CHC or traditional physician visits), emergency department or inpatient diagnostic codes from the Discharge Abstract Database, the National Ambulatory Care Reporting System, the Ontario Mental Health Reporting System or the Ontario Health Insurance Plan database in the preceding 2-year period.

We categorized CHC clients into 2 subgroups, priority-population CHC (PPCHC) clients and nonpriority-population CHC (NPPCHC) clients, using the CHCV variable within the CHC database. Priority-population CHCs are defined as CHC sites located in major urban environments that predominantly serve at-risk populations who are homeless or have challenges with mental health or substance addictions.[16] There are currently 18 PPCHCs in Ontario.[16] Nonpriority-population CHCs are all other CHC sites located in urban or rural areas of Ontario that serve populations with barriers to care (e.g., rural or remote, lack of ready access to other sources of primary health care) but have not been identified as priority populations in terms of homelessness or issues with mental health or substance addictions.[16]

As a comparator to the CHC client groups, we identified a reference population of people in Ontario aged 21–105 who had a history of health care use related to mental illness or substance use disorders, or both, in the 2 years before the index date and were not CHC clients during that period. This comparator population was drawn from the Primary Care Population database.[26]

### Outcome measures

We assessed descriptively several outcomes occurring within 1 year after entry into the cohort to obtain an initial understanding of the CHC subgroups and their related health care use, including basic markers of quality of care (use of specialists and other health care services) and complexity of need (common chronic conditions, including asthma, chronic obstructive pulmonary disease, diabetes, hypertension,

congestive heart failure or HIV infection). Selected outcomes included outpatient visits (whether to a primary health care physician or a CHC), visits to a subset of specialists (cardiologists, endocrinologists, psychiatrists or respirologists), emergency department visits and hospital admissions. We further investigated 2 previously reported outcomes indicative of quality of care for people with mental illness and addictions, with adjustment for potential confounders: receipt of psychiatrist care and an emergency department visit in the follow-up year.[27]

## Variables

The exposure of interest was group type (PPCHC, NPPCHC or Ontario community control). We considered a range of other predictors, including age, sex, type of health care related to mental health or substance use disorders used within the previous 2 years and any past diagnosis of a chronic condition. Owing to the nature of the condition or issues related to data record completeness, other comorbidities were limited to diagnosis within the previous 3 years (chronic liver disease, chronic kidney disease, Crohn disease or ulcerative colitis, infective endocarditis or rheumatoid arthritis) or within 1 year of the index date (i.e., after entry into the cohort) (chronic pain, or skin or soft-tissue infection).

We used neighbourhood-level income quintiles and the Ontario Marginalization Index[24,28] to show marginalization and area-level inequalities, using 2006 census data. We also identified whether people were rostered to a family physician at their cohort entry date, since, in Ontario, clients can be registered at a CHC and with another primary health care model simultaneously.[9] Predictor and outcome variables, including standardized diagnosis and fee codes where applicable, are available in Appendix 1, Supplemental Table S1.

## Statistical analysis

We compared baseline characteristics between groups using 1-way analysis of variance and $\chi^2$ tests as appropriate. We then used 2 stratified multivariable logistic regressions to assess whether, after accounting for clustering by family physician, CHC client status was associated with 2 outcomes: receipt of health care from a psychiatrist and emergency department use within 1 year of the index date. We accounted for clustering of family physician at the index date using the STRATA statement in PROC LOGISTIC). We calculated adjusted odds ratios (ORs) with 95% confidence intervals (CIs). All analyses were conducted with SAS version 9.4 (SAS Institute).

## Ethics approval

The use of data in this project was authorized under section 45 of Ontario's *Personal Health Information Protection Act*, which does not require review by a research ethics board.

## Results

After exclusions, the cohort included 21 783 CHC clients (6575 PPCHC and 15 208 NPPCHC) and 1 673 200 patients in the Ontario community control group with a history of health care related to a mental health or substance use disorder (Figure 1). The 3 subgroups had distinct demographic, comorbid and health care use profiles (Table 1, Figure 2). Clients of PPCHCs were generally younger than NPPCHC clients and community control patients. They had higher rates of health care use for psychotic disorders compared to NPPCHC clients and substantially more compared to community control patients. Clients of PPCHCs also had higher rates of health care use related to substance use disorder than
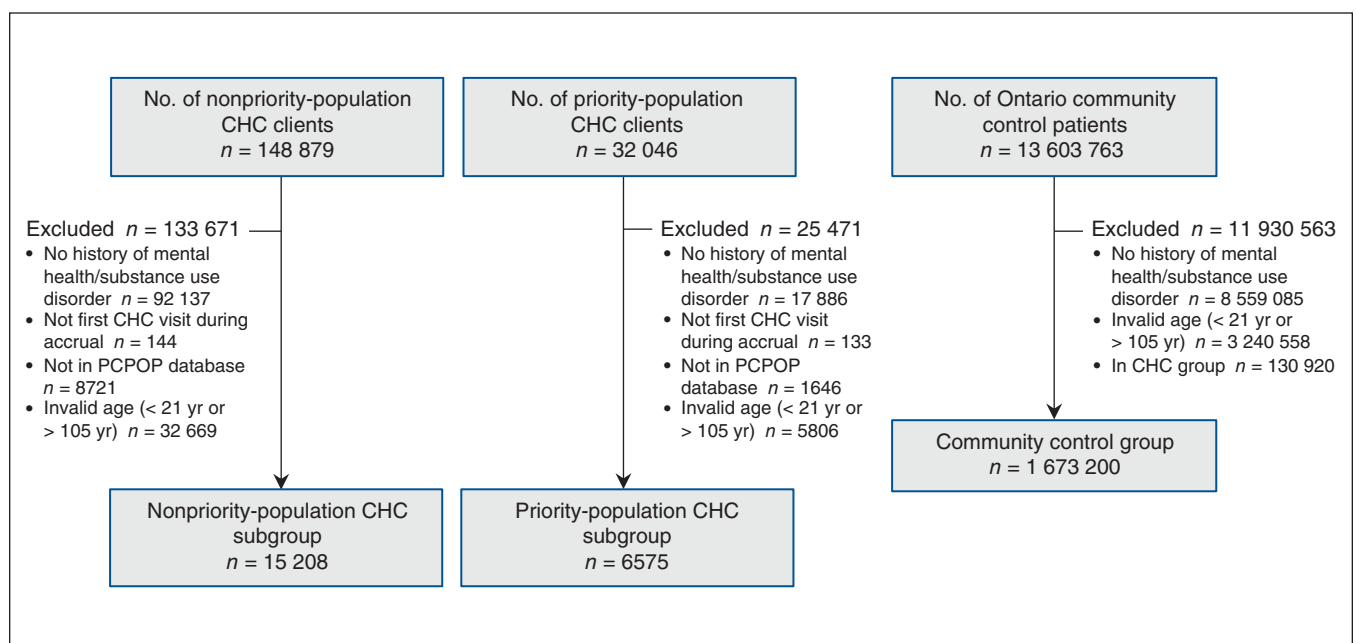


**Figure 1:** Flow diagram showing creation of the cohort subgroups. Note: CHC = Community Health Centre, PCPOP = Primary Care Population.

| Table 1 (part 1 of 2): Characteristics of the cohort subgroups at baseline | | | |
|---|---|---|---|
| | Group; no. (%) of people* | | |
| Characteristic | Priority-population CHC n = 6575 | Nonpriority-population CHC n = 15 208 | Community control n = 1 673 200 |
| Female sex | 3293 (50.1) | 9050 (59.5) | 978 646 (58.5) |
| Age group, yr | | | |
| 21–35 | 1656 (25.2) | 3712 (24.4) | 361 560 (21.6) |
| 35–49 | 2240 (34.1) | 4373 (28.8) | 477 381 (28.5) |
| 50–64 | 2212 (33.6) | 5016 (33.0) | 502 974 (30.1) |
| ≥ 65 | 467 (7.1) | 2107 (13.9) | 331 285 (19.8) |
| Income quintile† | | | |
| Quintile 1 (lowest) | 3030 (46.1) | 6049 (39.8) | 346 854 (20.7) |
| Quintile 2 | 1367 (20.8) | 3258 (21.4) | 330 170 (19.7) |
| Quintile 3 | 961 (14.6) | 2362 (15.5) | 326 318 (19.5) |
| Quintile 4 | 687 (10.4) | 1960 (12.9) | 340 802 (20.4) |
| Quintile 5 (highest) | 448 (6.8) | 1495 (9.8) | 318 302 (19.0) |
| Residential instability† | | | |
| Quintile 1 (lowest) | 218 (3.3) | 1284 (8.4) | 300 967 (18.0) |
| Quintile 2 | 373 (5.7) | 1715 (11.3) | 293 752 (17.6) |
| Quintile 3 | 611 (9.3) | 2526 (16.6) | 296 501 (17.7) |
| Quintile 4 | 1328 (20.2) | 3528 (23.2) | 325 170 (19.4) |
| Quintile 5 (highest) | 3960 (60.2) | 5980 (39.3) | 443 292 (26.5) |
| Material deprivation† | | | |
| Quintile 1 (lowest) | 337 (5.1) | 1278 (8.4) | 278 032 (16.6) |
| Quintile 2 | 494 (7.5) | 1828 (12.0) | 307 538 (18.4) |
| Quintile 3 | 795 (12.1) | 2528 (16.6) | 319 847 (19.1) |
| Quintile 4 | 1354 (20.6) | 2838 (18.7) | 341 218 (20.4) |
| Quintile 5 (highest) | 3510 (53.4) | 6561 (43.1) | 413 047 (24.7) |
| Dependency† | | | |
| Quintile 1 (lowest) | 1533 (23.3) | 2890 (19.0) | 416 126 (24.9) |
| Quintile 2 | 1477 (22.5) | 2660 (17.5) | 325 971 (19.5) |
| Quintile 3 | 1250 (19.0) | 2878 (18.9) | 299 413 (17.9) |
| Quintile 4 | 1069 (16.3) | 3068 (20.2) | 283 751 (17.0) |
| Quintile 5 (highest) | 1161 (17.7) | 3537 (23.3) | 334 421 (20) |
| Ethnic concentration† | | | |
| Quintile 1 (lowest) | 1101 (16.7) | 4076 (26.8) | 257 281 (15.4) |
| Quintile 2 | 1227 (18.7) | 2679 (17.6) | 285 263 (17.0) |
| Quintile 3 | 1089 (16.6) | 2032 (13.4) | 320 477 (19.2) |
| Quintile 4 | 1727 (26.3) | 3034 (20.0) | 366 559 (21.9) |
| Quintile 5 (highest) | 1346 (20.5) | 3212 (21.1) | 430 102 (25.7) |
| Recent immigrant status‡ | 148 (2.3) | 560 (3.7) | 65 024 (3.9) |
| Rural residence§ | 214 (3.3) | 2958 (19.5) | 164 704 (9.8) |
| Rostered to family physician | 2029 (30.9) | 4467 (29.4) | 1 368 951 (81.8) |

**Table 1 (part 2 of 2): Characteristics of the cohort subgroups at baseline**

| Characteristic | Group; no. (%) of people | | |
|---|---|---|---|
| | Priority-population CHC *n* = 6575 | Nonpriority-population CHC *n* = 15 208 | Community control *n* = 1 673 200 |
| Mental-health–related care¶** | | | |
|     Psychotic disorder | 1596 (24.3) | 3587 (23.6) | 180 503 (10.8) |
|     Nonpsychotic disorder | 3680 (56.0) | 8011 (52.7) | 934 312 (55.8) |
|     Substance use disorder | 2832 (43.1) | 3250 (21.4) | 182 173 (10.9) |
|     Other mental health | 1234 (18.8) | 2359 (15.5) | 238 961 (14.3) |
| Comorbidities | | | |
|     Asthma†† | 1700 (25.9) | 3765 (24.8) | 313 695 (18.7) |
|     COPD†† | 1360 (20.7) | 3026 (19.9) | 204 227 (12.2) |
|     Diabetes†† | 1073 (16.3) | 2815 (18.5) | 249 948 (14.9) |
|     Hypertension†† | 1738 (26.4) | 4973 (32.7) | 541 200 (32.0) |
|     Infective endocarditis** | 48 (0.7) | 21 (0.1) | 1089 (0.1) |
|     Rheumatoid arthritis** | 55 (0.8) | 116 (0.8) | 4985 (0.3) |
|     Congestive heart failure†† | 146 (2.2) | 455 (3.0) | 45 813 (2.7) |
|     Chronic liver disease** | 1394 (21.2) | 1400 (9.2) | 65 287 (3.9) |
|     Chronic kidney disease** | 459 (7.0) | 1183 (7.8) | 82 278 (4.9) |
|     Crohn disease/ulcerative colitis** | 51 (0.8) | 163 (1.1) | 18 461 (1.1) |
|     HIV infection†† | 23 (0.3) | 21 (0.1) | 758 (< 0.1) |
| Comorbidities within 1 yr before index date | | | |
|     Skin/soft-tissue infection | 1094 (16.6) | 1742 (11.5) | 105 782 (6.3) |
|     Chronic pain | 1690 (25.7) | 3783 (24.9) | 224 204 (13.4) |

Note: CHC = Community Health Centre, COPD = chronic obstructive pulmonary disease.
*Percentages may not total 100% owing to missing data.
†Drawn from the Ontario Marginalization Index.[24,25]
‡Presence in the Immigration, Refugees and Citizenship Canada Permanent Residents database with a landing date less than 10 years before the index date.
§Settlement of less than 10 000 people.
¶Includes any hospital admission or 2 claims in 2 years or less of any eligible diagnostic or fee code (Appendix 1, Supplemental Table S1).
**Within 3 years before the index date.
††Any diagnosis before the index date.

NPPCHC clients and community control patients. In addition, clients of PPCHCs had higher rates of chronic liver disease and skin and soft-tissue infections than NPPCHC clients and community control patients.

Figure 3 illustrates the differences between the subgroups across elements of the Ontario Marginalization Index.[24,25] More PPCHC clients resided in areas of lower income and greater material deprivation, residential instability and dependency compared to NPCHC clients and community control patients.

Clients of NPPCHCs were more likely to live in rural areas and have middle incomes, and less likely to be rostered to a primary health care physician practice than PPCHC clients and especially community control patients. The 3 groups had similar rates of health care use for nonpsychotic disorders. Clients of NPPCHCs and community control patients had similar rates of congestive heart failure, hypertension, and Crohn disease or ulcerative colitis, which were higher than those observed for PPCHC clients.

One-year unadjusted outcomes are presented in Table 2. Overall, PPCHC clients had higher rates of outpatient primary health care visits and emergency department visits than NPPCHC clients and community control patients. The proportions of PPCHC and NPPCHC clients who had psychiatrist and respirologist visits were similar and were higher than the proportion of community control patients with such visits. Clients of NPPCHCs had a higher proportion of visits to endocrinologists than did PPCHC clients and community control patients.

The odds of a PPCHC client's receiving care from a psychiatrist or visiting an emergency department in the year after
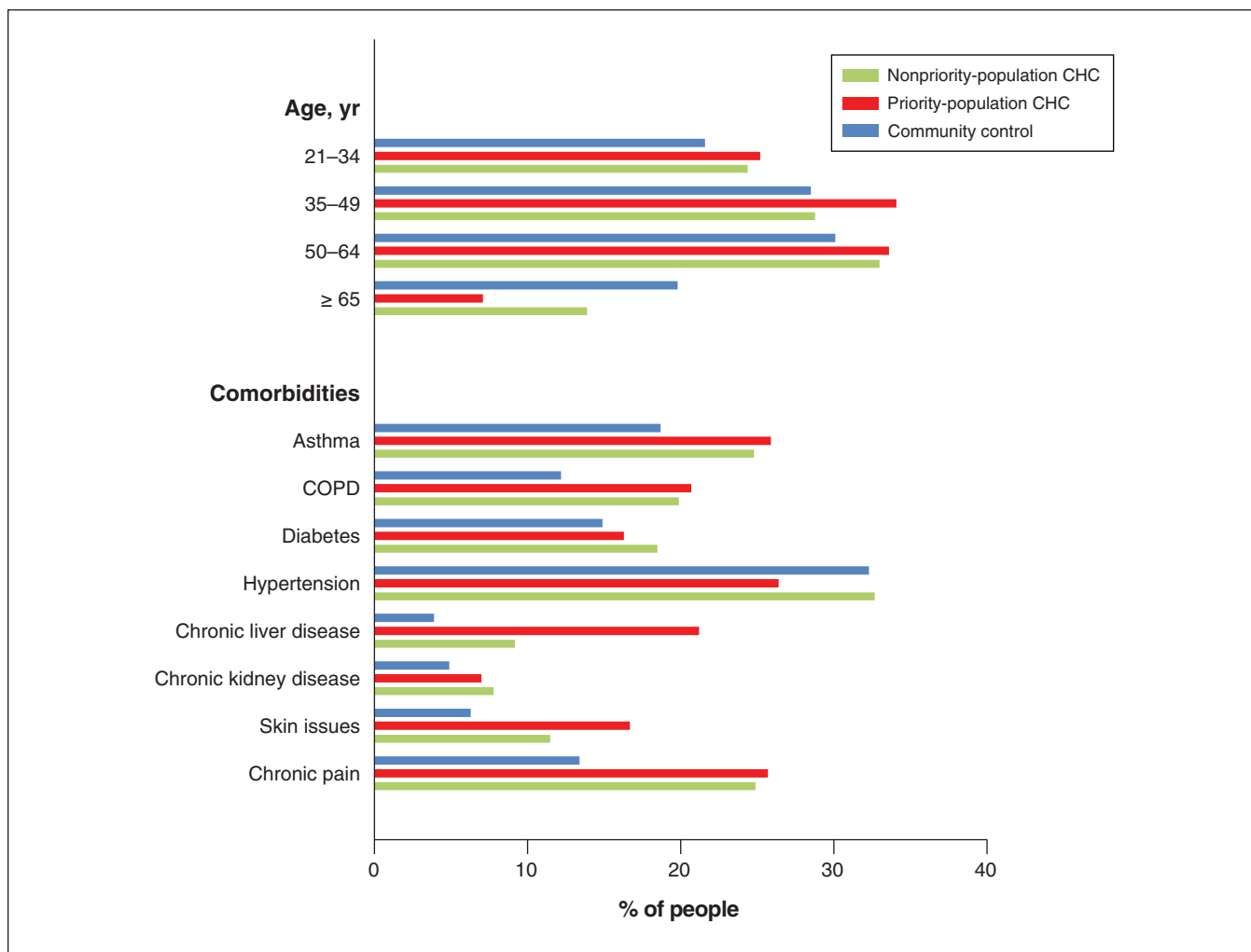
**Figure 2:** Selected demographic and comorbidity characteristics of the cohort subgroups at baseline. Note: CHC = Community Health Centre, COPD = chronic obstructive pulmonary disease.

interaction with a CHC was 26% (adjusted OR 1.26, 95% CI 1.20–1.33) and 15% (adjusted OR 1.15, 95% CI 1.10–1.20) higher, respectively, compared to community control patients (Table 3). The corresponding odds for NPPCHC clients was 47% (adjusted OR 1.47, 95% CI 1.41–1.53) and 13% (adjusted OR 1.13, 95% CI 1.09–1.17) higher.

## Interpretation

In this population-based study set in Ontario, we examined characteristics and health care use of a cohort of people with a history of health care related to mental health or substance use disorders seen at PPCHCs and NPPCHCs. It appears that both PPCHC and NPPCHC clients had higher rates of mental health conditions or substance use disorder, or both, than a reference population of people who had a history of health care use related to mental health or substance use disorders in the preceding 2 years who were not CHC clients during that period. Furthermore, PPCHC and NPPCHC clients were generally younger and poorer, and had increased

levels of material deprivation, residential instability and comorbidity complexity compared to the Ontario population. Not surprisingly, both PPCHC clients and NPPCHC clients were also more intensive users of clinical specialists, emergency departments and hospitals. Taken together, these findings suggest that CHC clients with a history of health care related to mental health or substance use disorders likely have more complex medical needs and are more vulnerable than the average Ontarian with such a disorder. These findings, in conjunction with the reported descriptive statistics, highlight the complex needs of both PPCHC and NPPCHC clients who have health care use related to mental health problems or substance use disorder.

The striking differences in the clinical needs of CHC clients compared to a representative Ontario population are consistent with other research in this area.[9,16] Previous research exploring residential instability has suggested that lack of stable housing can influence health status in major ways.[29–31] For instance, PPCHC clients in our study appeared to be younger and to have higher rates of residential instability
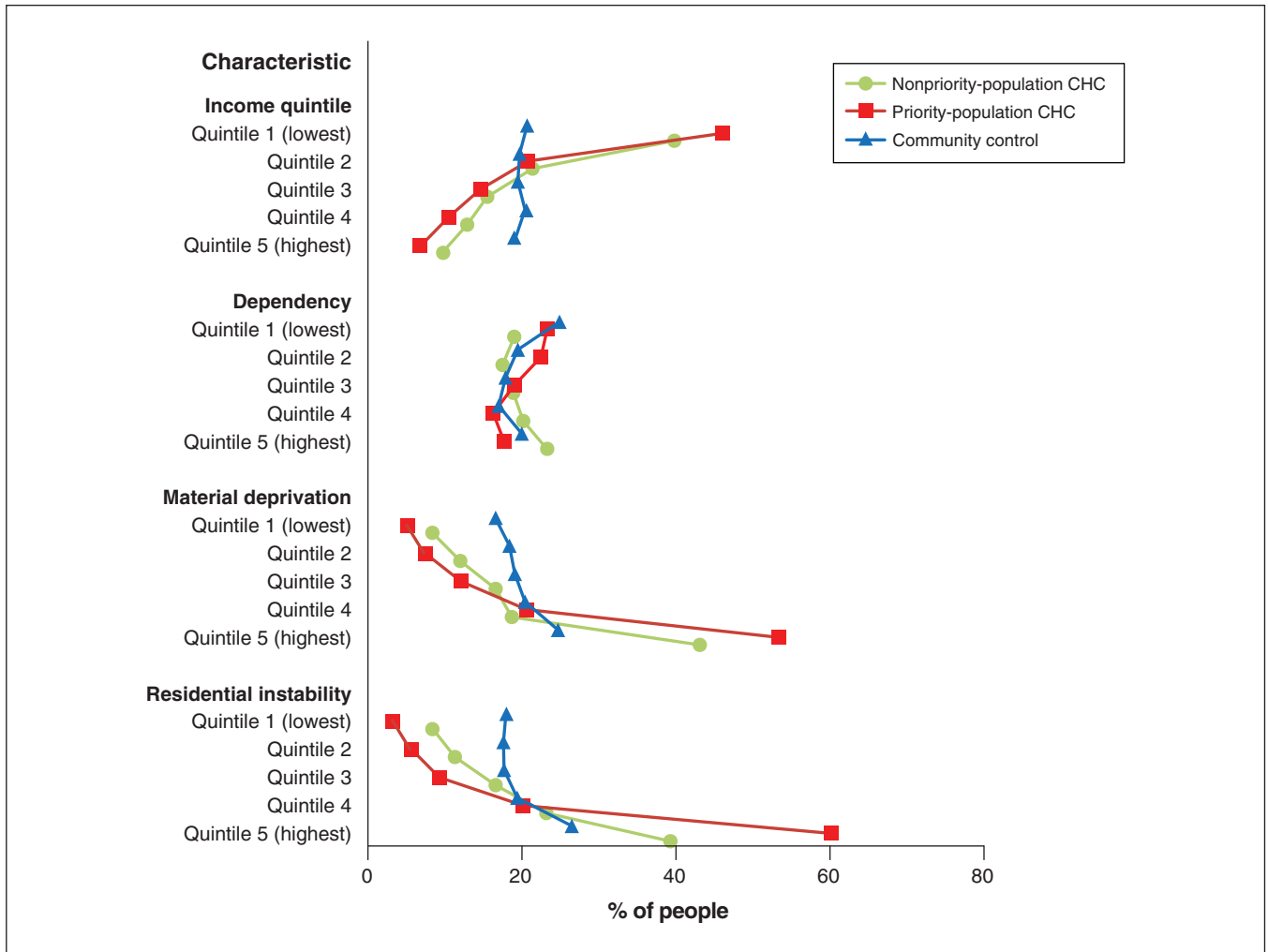
**Figure 3:** Ontario Marginalization Index[24,25] characteristics of the cohort subgroups at baseline. Note: CHC = Community Health Centre.

| | No. (%) of people* | | |
|---|---|---|---|
| Outcome | Priority-population CHC $n = 6575$ | Nonpriority-population CHC $n = 15\ 208$ | Community control $n = 1\ 673\ 200$ |
| **Table 2: Unadjusted outcomes within 1 year of the index date** | | | |
| Specialist visit | | | |
| Psychiatrist | 2514 (38.2) | 5891 (38.7) | 265 417 (15.9) |
| Respirologist | 624 (9.5) | 1399 (9.2) | 67 295 (4.0) |
| Endocrinologist | 270 (4.1) | 1016 (6.7) | 60 415 (3.6) |
| Cardiologist | 2262 (34.4) | 3750 (24.7) | 117 933 (7.0) |
| Primary health care visit, rate per 1000 patients (95% CI) | 34.41 (34.27–34.55) | 25.53 (25.45–25.61) | 16.30 (16.29–16.30) |
| Emergency department visit, rate per 1000 patients (95% CI) | 2.55 (2.51–2.58) | 1.50 (1.48–1.52) | 0.71 (0.71–0.71) |
| Hospital admission, rate per 1000 patients (95% CI) | 0.26 (0.25–0.28) | 0.20 (0.19–0.21) | 0.13 (0.13–0.13) |

Note: CHC = Community Health Centre, CI = confidence interval.
*Except where noted otherwise.

**Table 3: Odds of psychiatric care and emergency department use within 1 year of the index date**

| Outcome; group | Unadjusted OR (95% CI) | Adjusted OR (95% CI) |
|---|---|---|
| **Psychiatric care*** | | |
| Community control | 1.00 (referent) | 1.00 (referent) |
| Priority-population CHC | 1.47 (1.42–1.52) | 1.26 (1.20–1.33) |
| Nonpriority-population CHC | 1.50 (1.46–1.54) | 1.47 (1.41–1.53) |
| **Emergency department use†** | | |
| Community control | 1.00 (referent) | 1.00 (referent) |
| Priority-population CHC | 1.52 (1.47–1.58) | 1.15 (1.10–1.20) |
| Nonpriority-population CHC | 1.13 (1.10–1.16) | 1.13 (1.09–1.17) |

Note: CHC = Community Health Centre, CI = confidence interval, OR = odds ratio.
*Variables adjusted for: age, sex, income quintile, residential instability, material deprivation, dependency, ethnic concentration, recent immigrant status, rural residence, mental-health–related health care, CHC use in prior 3 years, rostered to family physician at index date (we accounted for clustering of family physician at index date using the STRATA statement in PROC LOGISTIC).
†Variables adjusted for: as above, and comorbidities in prior 3 years (i.e., chronic liver disease, chronic kidney disease, Crohn disease or ulcerative colitis, rheumatoid arthritis, infective endocarditis), any diagnosis of comorbidity before index date (i.e., asthma, chronic obstructive pulmonary disease, diabetes, hypertension, congestive heart failure, HIV infection), comorbidities in prior year (i.e., skin or soft-tissue infection, chronic pain).

and material deprivation than NPPCHC clients and especially community control patients. Consistent with other research examining community-based vulnerable populations, we found that, compared to the control group, CHC clients were more likely to use emergency department resources,[1,32] obtain specialist health care services[29] and have high levels of medical comorbidities,[33] and less likely to be rostered to a family physician.[33] Given the higher levels of residential instability and use of health care resources among PPCHC and NPPCHC clients, appropriate housing services and models of care that can support the complex needs of these clients should be developed.

As a cohort of the Ontarian population that does not appear to be well rostered to traditional physician-based primary health care services, CHC clients may have been underrepresented in previous population-level examinations of use of primary health care based on health administrative data in Ontario. Our analysis using the CHC database, a relatively recent addition to ICES,[16] suggests that clients of both PPCHCs and NPPCHCs have more complex medical needs and higher levels of material deprivation and residential instability than a comparable Ontario population. Further work is required to better describe CHC clients with mental health or substance use disorders and their larger patterns of health care use across the system.

It appears that the majority of CHC clients with mental health or substance use issues relied heavily on CHCs as their primary avenue for primary health care services. This finding, along with the complex health care needs of this vulnerable

population, has important policy and practice implications for database research: CHC clients must be represented adequately in future primary health care research based on population-level data.

## Limitations

Although it would have been possible to examine people with either a mental health disorder or a substance use disorder, given the high prevalence of the concurrent diagnosis of the 2 disorders among clients of PPCHCs and NPPCHCs, we collapsed the 2 potential groups into 1 group. Further work is required to examine subsets of the CHC population and to quantify the current burden of co-occurring mental health and substance use disorders on people's lives and the health care system.

This study is also subject to numerous confounders present in society. Although we accounted for various relevant covariates (e.g., material derivation, elements of multimorbidity, past interaction with the health care system), drawing causal inferences from this study should be avoided. In addition, because of differences in the inclusion criteria for the CHC groups and the community control group, there may be important differences between the CHC groups and the community control group. Finally, given that our study was based on health administrative data, we were unable to account for a range of variables that are determinants of health, including housing, education, and other social and physical environmental factors that can influence health substantially.[34]

## Conclusion

Ontario CHC clients with a diagnosis of mental health problems or substance use disorders, or both, had patterns of health system use that were noticeably different from those of other people in the province with similar diagnoses. As intensive users of health care resources, CHC clients with health care use related to mental health or substance use disorders need to be studied further so that more specific interventions can be developed to better serve this vulnerable population.

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