

# The relationship between neighbourhood income and youth mental health service use differs by immigration: Analysis of population-based data in British Columbia, Canada

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## Research Article

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# Abstract

## Purpose

We investigated the relationship between neighbourhood income quintile and mental health service use by immigration among youth and explored changes during the COVID-19 pandemic.

## Method

We used administrative data to examine mental health service use in British Columbia, Canada, among youth aged 10 to 24 between April 1, 2019, and March 31, 2022. We compared rates of community-based service use, emergency department visits, and hospitalizations and the proportion of involuntary admissions by neighbourhood income quintile and immigration. We used models stratified by immigration to estimate the relationship with income.

## Results

Non-immigrant youth used substantially more services than immigrant youth. Service use increased following the pandemic's start and peaked between January and March 2021. We observed a clear income gradient for community-based service use among both immigrant and non-immigrant youth, but the direction of the gradient was reversed. Service use was highest among non-immigrant youth in lower-income neighbourhoods and lowest for immigrant youth in lower-income neighbourhoods. We observed similar patterns of income gradient for non-immigrant youth for emergency department visits and hospitalization. The proportion of involuntary admissions was higher for immigrant youth.

## Conclusions

Mental health service use was substantially lower among immigrant youth than non-immigrant youth, but higher proportions of immigrant youth were hospitalized involuntarily. The reverse income gradient patterns observed for community-mental health service use are noteworthy and suggest significant barriers to accessing preventable care among immigrant youth, particularly those living in lower-income neighbourhoods.

# INTRODUCTION

The onset of most mental illnesses occurs between childhood and early adulthood [1], and it is well established that earlier treatment can improve prognosis [2, 3] and can mitigate the potential adverse effects of poor mental health (MH) on academic achievements and social and emotional development [4, 5]. Patterns of MH service use are different between immigrant and non-immigrant youth, with studies showing that immigrant youth use fewer MH services than non-immigrants [6, 7]. This has sometimes been interpreted as reflecting a “healthy immigrant effect” with claims of better MH based on treated prevalence from administrative data [6]. Recent findings found inconsistencies in MH trends between survey and administrative data, suggesting administrative data to reflect service access rather than need

[8]. Epidemiological studies using validated diagnostic assessment measures found a high prevalence of post-traumatic stress disorder, depression, and anxiety among refugee youth compared to non-immigrant youth[9] and higher prevalence of depression, anxiety and somatic disorders among immigrants of all ages and immigration classes [10]. When seeking MH care, Canadian immigrants are more likely to consult with psychiatrists (versus other MH professionals), compared to people born in Canada, possibly suggesting a higher severity of mental illnesses and/or gaps in access to family doctors, social workers, counsellors, and psychologists among immigrants [11]. A population-based study in Ontario, Canada, found that recent immigrant youth use of emergency MH services increased over time while MH services in the community (e.g., psychiatrists, family physician office) decreased [12], further suggesting barriers to receiving preventative and timely care.

The link between economic disadvantages and mental illnesses is well-established for immigrants and non-immigrants [13, 14]. Patterns of MH service use also differ by income. For instance, youth from families of lower socio-economic statuses are more likely to seek MH care in emergency departments as a first point of contact [15] and for follow-ups [16]. Refugee and immigrant youth in Ontario were more likely than non-immigrant youth to present at the emergency department for MH care without prior use of MH services [15]. Another Ontario study on adults found that living in more deprived neighbourhoods was associated with higher use of primary care and hospital services for non-psychotic mental illnesses, though the association was smaller for recent immigrants compared to long-term residents [7]. Otherwise, studies on the relationship between income, immigration, and use of MH services are scarce. Changes brought on by the COVID-19 pandemic disproportionately disrupted usual access to MH services among youth living in low-income neighbourhoods [17] and immigrant populations in Canada during this period [18]. In this study, we investigated whether the relationship between neighbourhood income quintile and the use of MH services differs by immigration experience in youth and whether this has changed in the context of the COVID-19 pandemic in BC.

## **METHOD**

### **Study design**

We used longitudinal population-based linked administrative health and migration data to examine MH service use among youth in British Columbia (BC), Canada, between 2019/20 and 2021/22, by income and immigration group.

### **Data**

We accessed population-based administrative data, including BC's Medical Services Plan (MSP) registry file / Central Demographics File, physician payments, hospitalizations, National Ambulatory Care Reporting System (NACRS), Vital Statistics Deaths, Immigration, Refugees, and Citizenship Canada's (IRCC) Permanent Resident Database [19] and MSP Residency data. These were linked by Population Data BC and provided to the research team with a study-specific unique ID across datasets.

# Study population

We included all youth aged 10–24 years old who were living in British Columbia by March 31, 2020, and who were alive and registered for MSP in British Columbia for at least 75% of one or more fiscal years between April 1, 2019, and March 31, 2022). Using the MSP residency data, we excluded individuals with temporary status who were not present in the IRCC data, including refugee claimants and convention refugees who did not yet have permanent resident status, students, individuals with work permits, visitors, diplomats, and people on working holiday visas, as they may not be insured under the provincial plan, and so their service use would be incompletely captured.

## Study variables

### Immigration

We identified immigrant youth using IRCC records and included first- and second-generation immigrant youth. Individuals aged 10–24 with an IRCC record were included as first-generation immigrants (i.e., born outside of Canada). We also included individuals aged 10–24 born in Canada but with at least one parent with an IRCC record as second-generation youth since both first- and second-generation immigrant and refugee youth experience common challenges that can risk their mental well-being, such as discrimination and racism, acculturative stress [20], economic hardships and changes in socio-economic status [21], food insecurities [22], and inadequate housing [23]. Additionally, first and second-generation immigrant and refugee youth have shared experiences of growing up in an immigrant household with parents experiencing acculturative stress, higher rates of unemployment [24], and occupational segregation [25]. Moreover, acculturative stress experienced by parents can spillover to the family [26, 27] with implications for MH [28], and increase the risk of internalizing (e.g. anxiety, depression) [29, 30] and externalization (e.g., aggression, delinquency) problems in children [30]. Non-immigrant youth included all other individuals who were not in IRCC and whose parents, based on shared MSP contract number within the study years, were not found in IRCC.

### Neighbourhood income

We determined neighbourhood income quintiles using census dissemination areas of residence based on version 7E of the Postal Code Conversion File (PCCF+). A small number of individuals (< 1%) with unknown neighbourhood income quintile were excluded.

### Service use

We identified all individuals who had a community-based visit related to MH or substance use using MSP claims for family physicians, public health physicians, nurse practitioners, pediatricians, and psychiatrists. Community-based services would include health care clinics, physician's offices (including virtual), or home visits, as opposed to hospitals and emergency departments. To identify those who had an emergency department visit related to MH or substance use, we used MSP payment information and the National Ambulatory Care Reporting System (NACRS). NACRS captures 73% of all emergency

department visits in British Columbia, and the majority of the remainder is captured in MSP [31]. We captured hospitalization for mental illness, substance, or self-harm using the Discharge Abstract Database, which also flags involuntary admissions under the Mental Health Act (see Supplementary Table 1 for ICD-9 and ICD-10-CA codes used to identify MH and substance use services).

## Other covariates

Age and administrative sex were obtained from the MSP registration file. The options for “gender” are limited to “M and F” on the MSP registration form. As these are not genders and as it cannot be determined whether legal sex, sex assigned at birth, or gender is reflected, we refer to this variable as administrative sex. We also counted the number of Charlson comorbid conditions in the year of the analysis and the prior year, as having other recorded conditions may shape health services use. We categorized metropolitan areas (census metropolitan areas), small urban areas (census agglomerations) and rural/remote settings (areas with strong to no strong metropolitan influence) using the Statistics Canada Statistical Area Classification Metropolitan Influences Zones.

## Analysis

We reported descriptive statistics on cohort demographic characteristics and plotted the rate of community-based MH visits, MH emergency visits, and psychiatric hospitalizations per person, as well as the proportion of involuntary admissions among individuals with psychiatric hospitalization, in three-month intervals between April 1, 2019 and March 31, 2022. We used generalized estimating equations with Poisson distribution and log link to estimate unadjusted and adjusted rate ratios for community-based visits, emergency department visits, and psychiatric hospitalizations and models with binomial distribution and logit link to estimate odds ratios for involuntary hospitalization among people with psychiatric admissions. Models accounted for repeated observations with an autoregressive correlation matrix structure and for annual changes over the course of the COVID-19 pandemic with dummy variables for the study year. Adjusted models included confounders of age, administrative sex, rurality, and number of Charlson conditions as a measure of medical comorbidity. As our objective was to determine if the relationship between income and service use varies by immigration, models were stratified by immigration, and we compared rate/odds ratios across neighbourhood income quintiles for non-immigrant and immigrant youth. Data was analyzed using SAS software, Version 9.4 of the SAS system[32].

## RESULTS

### Demographic characteristics

Table 1 provides the demographic characteristics of 864,407 youth between the ages of 10 to 24 included in the analysis. Non-immigrant youth represented 67.6% (n = 584,213) and immigrant youth represented 32.4% (n = 280,194) of the total cohort. Compared to non-immigrant youth, larger percentages of

immigrant youth lived in neighbourhoods in the lowest income quintile (20.7% vs 16.5%) and in metropolitan areas (89.8% vs 58.3%).

Table 1

Characteristics of youth (aged 10–24) in British Columbia by immigration group included in analysis.

Characteristic	Non-immigrant	Immigrant	Total
Total number of people, N (%)	584,213 (67.6)	280,194 (32.4)	864,407
Age, Mean (SD)	17.5 (4.8)	16.6 (4.6)	17.2 (4.8)
Age, Median (IQR)	18.0 (13.0, 22.0)	16.0 (12.0, 21.0)	17.0 (13.0, 22.0)
Administrative sex, N (%)			
F	285,353 (48.8)	136,080 (48.6)	421,433 (48.8)
M	298,860 (51.2)	144,114 (51.4)	442,974 (51.2)
Neighbourhood income quintile (after tax), N (%)			
Q1 (lowest)	96,230 (16.5)	58,122 (20.7)	154,352 (17.9)
Q2	99,756 (17.1)	63,616 (22.7)	163,372 (18.9)
Q3	113,117 (19.4)	58,459 (20.9)	171,576 (19.8)
Q4	126,741 (21.7)	50,561 (18.0)	177,302 (20.5)
Q5 (highest)	141,890 (24.3)	47,448 (16.9)	189,338 (21.9)
Missing	6,479 (1.1)	1,988 (0.7)	8,467 (1.0)
1st or 2nd Generation, N (%)			
1st		114,913 (41.0)	
2nd		165,281 (59.0)	
Rurality, N (%)			
Metropolitan	340,864 (58.3)	251,497 (89.8)	592,361 (68.5)
Small urban	154,797 (26.5)	18,537 (6.6)	173,334 (20.1)
Rural/remote	82,188 (14.1)	8,177 (2.9)	90,365 (10.5)
Missing	6,364 (1.1)	1,983 (0.7)	8,347 (1.0)
Charlson conditions (2-years), N (%)			
0 conditions	528,356 (90.4)	257,377 (91.9)	785,733 (90.9)
1 + conditions	55,857 (9.6)	22,817 (8.1)	78,674 (9.1)
# conditions, Mean (SD)	0.10 (0.33)	0.09 (0.30)	0.10 (0.32)

## Patterns of service use April 2019 to March 2022



The quarterly rates of visits per person for all three types of services were consistently higher for non-immigrant youth than immigrant youth over the study period. Community-based MH service use grew steadily from the start of the pandemic in March 2020 and peaked between January and March 2021 for non-immigrant youth (peak values by neighbourhood income quintile: Q1 (lowest): 0.2762, Q2: 0.2510, Q3: 0.2461, Q4: 0.2361, and Q5: 0.2247 visits per person) and immigrant youth (Q1 (lowest): 0.1051, Q2: 0.1008, Q3: 0.1197, Q4: 0.1260, and Q5: 0.1431 visits per person) (Fig. 1). We also observed consistent drops in community-based MH service use for all youth between April and September each year. Emergency service use dropped for all youth shortly after the start of the pandemic between April and June 2020 but increased afterwards. Emergency service use increased slightly over time but was most prominent for non-immigrant youth in the lowest income quintile, peaking between January and March 2021 (Q1: 0.0212 visits per person). Among immigrant youth, emergency service use was highest for youth in the lowest income quintile between April and June 2021 (Q1: 0.0071 visits per person).

For community-based MH services, we observed a clear income gradient among both immigrant and non-immigrant youth but found that the income gradient was reversed. Rates of visits per person were highest for non-immigrant youth living in the lowest income quintile (Q1) and gradually decreased from Q1 (lowest) to Q5 (highest). In contrast, rates among immigrant youth were highest among youth living in the highest income quintile neighbourhoods (Q5) and declined from Q5 (highest) to Q1 (lowest). For emergency department visits, we observed the same pattern of income gradient for non-immigrant youth, with the most visits per person in the lowest income quintile and the fewest visits in the highest. However, Fig. 1 shows no clear patterns of emergency department visits by income quintile for immigrant youth.

Figure 2 plots the quarterly rate of psychiatric hospital admissions per person and the proportion of involuntary admissions among those with at least one psychiatric hospital admission by immigration and income quintile. We found that quarterly rates of hospital admission per person increased since the start of the pandemic. Hospital admission increase was most pronounced for non-immigrant youth in Q1 (lowest), Q3, and Q4.

We observed a similar income gradient in the quarterly rates of hospital admissions per person as we observed for community MH and emergency department visits, where non-immigrant youth in Q1 (lowest) had the highest rate. No income patterns were observed for immigrant youth with a hospital admission. Overall, immigrant youth from all income quintiles had lower hospital admissions than non-immigrant youth. However, among individuals with psychiatric hospital admission, a higher proportion of immigrant youth were hospitalized involuntarily.

## Relationship between neighbourhood income quintile and service use, by immigration

*Figure SEQ Figure \\* ARABIC 2 Quarterly rate of psychiatric hospital admissions per person and proportion of involuntary admissions by neighbourhood income quintile and immigration group between April 1, 2019, and March 31, 2022*

Models adjusting for age, administrative sex, rurality, and multimorbidities (number of Charlson conditions) confirm that the relationship between neighbourhood income quintile and service use differs by immigration. Among immigrant youth, the rate ratios of community MH service use increased with higher neighbourhood income quintile (*Q1 (lowest)*: rate ratio (RR) 0.81, 95% confidence interval (CI): 0.78, 0.84; *Q2*: RR 0.79, 95% CI: 0.76; 0.83, *Q3*: RR 0.87, 95% CI: 0.84, 0.91; *Q4*: RR 0.93, 95% CI: 0.89, 0.97) (Fig. 3, supplementary Table 2). The reverse pattern was observed for non-immigrant youth. Non-immigrant youth in lower neighbourhood income quintiles had significantly higher rate ratios of community-based MH visits than non-immigrant youth in the highest neighbourhood income quintile (*Q1 (lowest)*: RR 1.13, 95% CI: 1.11, 1.16; *Q2*: 1.07, 95% CI: 1.05, 1.09; *Q3*: RR 1.05, 95% CI: 1.03, 1.07; *Q4*: RR 1.04, 95% CI: 1.02, 1.06).

Income gradients were similarly observed among non-immigrant youth for emergency department visits (*Q1 (lowest)*: RR 1.85, 95% CI: 1.76, 1.94, *Q2*: 1.52, 95% CI: 1.44, 1.60, *Q3*: RR 1.33, 95% CI: 1.27, 1.40, *Q4*: 1.19, 95% CI: 1.13, 1.25) and hospital admission (*Q1 (lowest)*: 1.92, 95% CI: 1.79, 2.07, *Q2*: RR 1.58, 95% CI: 1.46, 1.70), *Q3*: RR 1.34, 95% CI: 1.25, 1.45, *Q4*: RR 1.18, 95% CI: 1.10, 1.28). However, no clear relationship with neighbourhood income quintile was observed for emergency department visits or hospital admission among immigrant youth.

Among youth who had at least one psychiatric hospital admission, non-immigrant youth in *Q1 (lowest)* (OR 1.25, 95% CI: 1.11, 1.39), *Q2* (OR 1.24, 95% CI: 1.11, 1.39), and *Q4* (OR 1.14, 95% CI: 1.01, 1.29) had significantly higher odds of involuntary admission than those in *Q5 (highest)*. Immigrant youth from *Q1 (lowest)* (OR 1.49, 95% CI: 1.13, 1.96), *Q2* (OR 1.35, 95% CI: 1.02, 1.79), and *Q4* (OR 1.46, 95% CI: 1.09, 1.95) had significantly higher odds for involuntary admissions than immigrant youth from *Q5 (highest)*. Both immigrant and non-immigrant youth with administrative sex F had higher rate ratios of using all three types of MH services than youth with administrative sex M; however, the odds ratios for involuntary admission were higher for both immigrant and non-immigrant youth with administrative sex M (Supplementary Table 2).

**Figure 3** *Rate ratios of mental health service use and odds ratios of involuntary admissions by neighbourhood income quintile and immigration among British Columbian youth aged 10 to 24 between April 1, 2019, and March 31, 2022*

## DISCUSSION

This study found that MH service use in all settings (i.e., community, emergency department, and hospital) was lower among immigrant youth than non-immigrant youth, consistent with existing literature [12, 33]. As reported in prior studies [7, 34], non-immigrant youth in lower-income neighbourhoods interacted more with MH services than those in higher-income neighbourhoods. However, the reverse income gradient observed for immigrant youth for community-based MH visits was unexpected and noteworthy.

Findings are in contrast to an Ontario study which found that adult immigrants in more materially deprived quintiles had more interactions with primary MH care than immigrants in less materially deprived quintiles [7]. One possible explanation for the variation in findings is that the Ontario study grouped long-term immigrants with Canadian-born and used material deprivation as the indicator, which included people receiving government transfer payment, unemployment, single-parent families, education level, and individuals living below the poverty line.

Given the relationship between poverty and mental illness [35], lower service use among immigrant youth in low-income neighbourhoods observed in our study cannot plausibly be explained by having lower needs, especially when significantly higher service use was found among non-immigrant youth from lower-income neighbourhoods. Other national research has found that immigrants had unmet MH needs [36] and that immigrants are less likely to have a MH consultation than their Canadian-born counterparts, even when reporting poor MH [37]. Our interpretation is that our results point to profound and entrenched barriers to accessing community-based services for immigrant youth, particularly those in lower-income settings.

One potential reason why immigrants in low-income neighbourhoods use fewer MH services is that recent immigrants are overrepresented in low-income neighbourhoods [38], and newcomers face several numerous documented barriers to receiving adequate health care [39]. Evidence shows that recent immigrants and people of lower-income in Canada are less likely to be attached to a family doctor [40] and, thereby, possibly less likely to access MH care in the community. Our findings also align with a US study that found that immigrant children whose parents have higher education were found to use more MH services [41], which could suggest that having higher education and income reduces barriers for immigrant youth accessing MH services.

Existing literature has found several factors shaping lower use of MH services among immigrants, including language barriers, distrust of health systems in destination countries, less knowledge about health services, different recognition of mental illness, and higher stigma in seeking MH services [42]. Prior studies found that a higher degree of cultural identification with the destination country [33] and number of years since immigrating [43] were associated with increased use of MH services, suggesting increased awareness of MH services, MH literacy, and reduced stigma with years spent in the destination country. However, a study of Chinese immigrants in British Columbia revealed that MH services continue to be underused by second-generation Chinese immigrants at moderate to high risk for depression [44], suggesting there are factors other than language proficiency and the number of years in Canada limiting access to MH services.

A Canadian study revealed that new immigrants have limited knowledge about the role of primary care providers and are unaware they can assist them in their MH care [45]. Immigrant youth and immigrant parents may rely on emergency departments as a first point of contact rather than a primary care physician who could assess for mental illnesses, refer them to community-based services, or manage common mental illnesses, like depression, anxiety, and attention-deficit/hyperactivity disorder.

Notably, proportions of involuntary hospitalization were higher among immigrant youth than non-immigrant youth. This is consistent with existing literature that shows that ethnic minorities and refugees experience more involuntary admissions than the general population in Canada [46, 47] and Western Europe [48, 49]. One possible explanation is the involvement of police in MH crisis calls. Evidence from Ontario found that police are 12 times more likely to refer White people to community-based services than people of colour [50] and more likely to coercively admit people of colour to emergency psychiatric services [51]. Lack of access to services in the community can worsen existing mental illness and lead to MH crises. It is plausible that poorer access to community-based MH services places immigrant youth at a higher risk for MH crises. At times of crisis, police involvement places them at higher risk of involuntary admission.

Observed trends over time showed that the use of community-based MH services increased following the COVID-19 pandemic for all youth, while emergency department visits and hospitalization for MH dropped immediately after the start of the pandemic but increased shortly after. A similar trends were observed in Ontario [52][53]. This may reflect closure of facilities and avoidance of care to reduce risk of COVID-19 infection from healthcare settings.

We consistently observed a decline in community-based MH service use for all youth during the summer months across the study years. The uptake of community-based MH service use during the school months may reflect support from teachers and school counsellors in connecting students with community-based services [54, 55].

This study has several limitations. We cannot capture specific ethnicity or racialization with administrative data. Studies in western countries found that MH service interactions vary by ethnicity and/or racialization [56–58]. We cannot measure individual-level income or household income with the databases used in this study. Neighbourhood income quintiles may not reflect individual income. Administrative data is limited to capturing publicly covered services. Therefore, we cannot capture psychosocial services paid out-of-pocket, covered by employment insurance, or provided by salaried professionals such as services delivered by psychologists, counsellors, or peer-support workers. We could not examine service use among immigrants with temporary and precarious status, including refugee claimants and convention refugees who do not yet have permanent resident status, students, and people with work permits, who may face even more profound barriers to needed care.

To the best of our knowledge, there are currently no studies comparing the relationship between income and MH service by immigration among youth in the province of British Columbia, Canada. Using population-based linked administrative data allowed us to capture a large cohort and their interaction with community-level services, hospitals, and emergency departments. Future studies should investigate factors that could explain variations in community-based service use by neighbourhood income quintiles among immigrant youth, as they differ from the patterns observed in non-immigrant youth. The immigrant landscape is also changing in Canada, and continued research in this field is needed to update

findings with new groups of immigrants entering the country as service use varies by immigrant subgroups.

## CONCLUSION

We investigated mental health service use by youth in British Columbia in various settings. We found that service use was substantially lower for immigrant youth than non-immigrant youth, and income gradients were reversed for community-based mental health services. The proportions of hospital admissions that were involuntary were higher for immigrant youth than non-immigrant youth, suggesting a lack of preventable mental health services in this population. This evidence suggests that first- and second-generation immigrant youth have significant barriers to accessing community-based services, and these barriers are compounded for youth living in lower-income neighbourhoods.

## Declarations

### STATEMENTS AND DECLARATIONS

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**Conflict of interest/Competing interest:** The authors declare that they have no conflict of interest. The authors have no relevant financial or non-financial interests to disclose.

**Ethics approval:** We received ethical approval from Simon Fraser University (SFU) and University of British Columbia (UBC) harmonized ethics review boards (REB number: H20-02303).

**Data:** We used health data holdings from the BC Ministry of Health provided by the Data Stewards that were de-identified, linked and made accessible through Population Data BC. We are not permitted to share the research extract used in this analysis. *Access to data provided by the Data Stewards is subject to approval but can be requested for research projects through the Data Stewards or their designated service providers. The following data sets were used in this study: BC’s Medical Services Plan (MSP) registry file / Central Demographics File, National Ambulatory Care Reporting System (NACRS), Hospital Separation File (DAD), Vital Statistics Deaths, Immigration, Refugees, and Citizenship Canada’s (IRCC) Permanent Resident Database [19] and MSP Residency data. You can find further information regarding these data sets by visiting the PopData project webpage at: ([https://www.popdata.bc.ca/data\\_access](https://www.popdata.bc.ca/data_access)). All inferences, opinions, and conclusions drawn in this publication are those of the author(s), and do not reflect the opinions or policies of the Data Steward.*

**Authors’ contribution:** All authors meet authorship guidelines under the International Committee of Medical Journal Editors. Ridhwana Kaoser conceptualized the paper, conducted the literature review, and

drafted the manuscript. Ruth Lavergne contributed to the conception of the paper, planned all analyses, and oversaw all aspects of this research. Ruth Lavergne worked with Mei-ling Wiedmeyer and Shira Goldenberg to secure funding for this research. Sandra Peterson analyzed the linked data. Padmini Thakore, Sandra Peterson, Mei-ling Wiedmeyer, Cecilia Sierra-Heredia, Stefanie Machado, Selamawit Petros Hagos, Elmira Tayyar, and Shira Goldenberg all contributed to planning analysis, interpreting findings, and making critical revisions to the manuscript.

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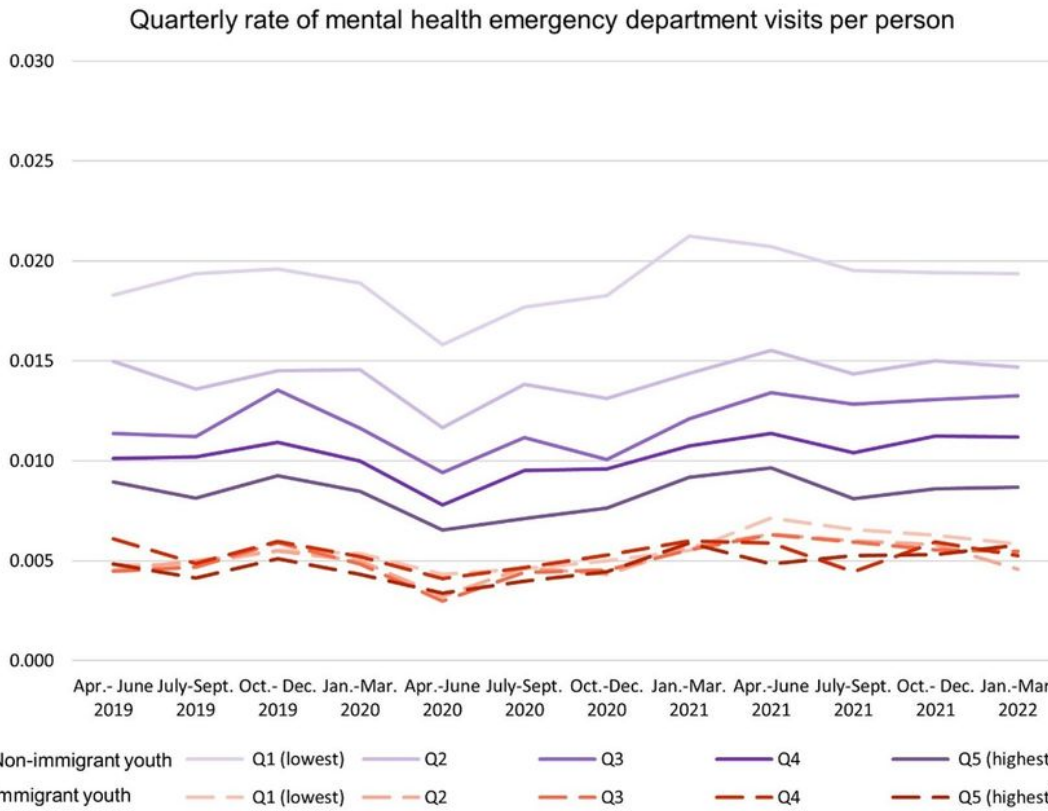
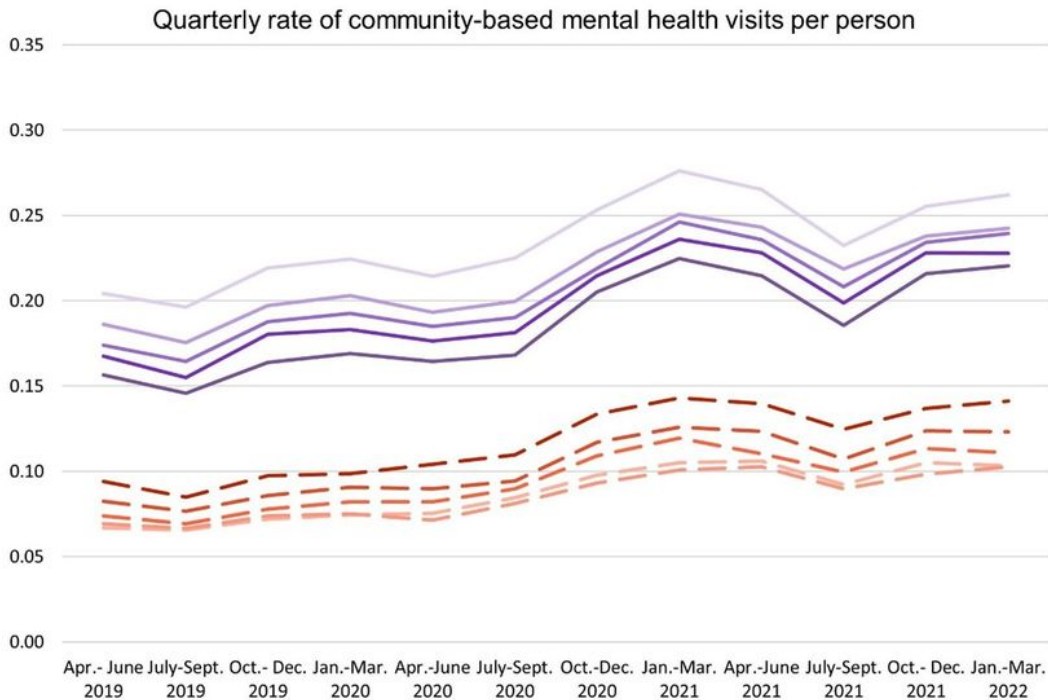
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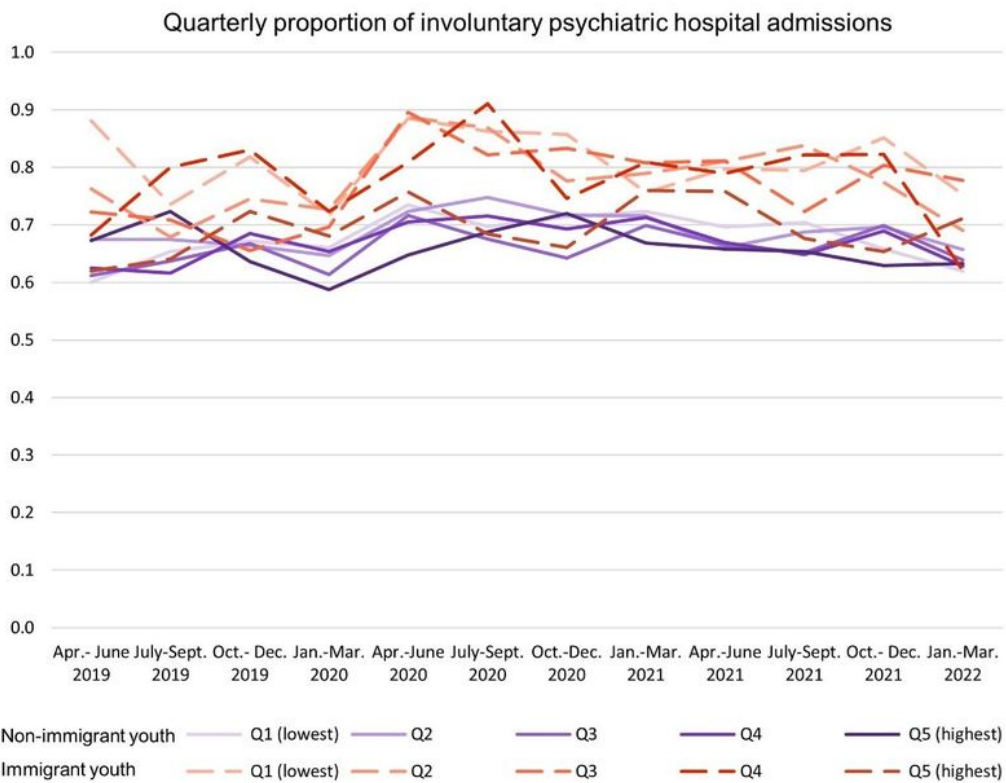
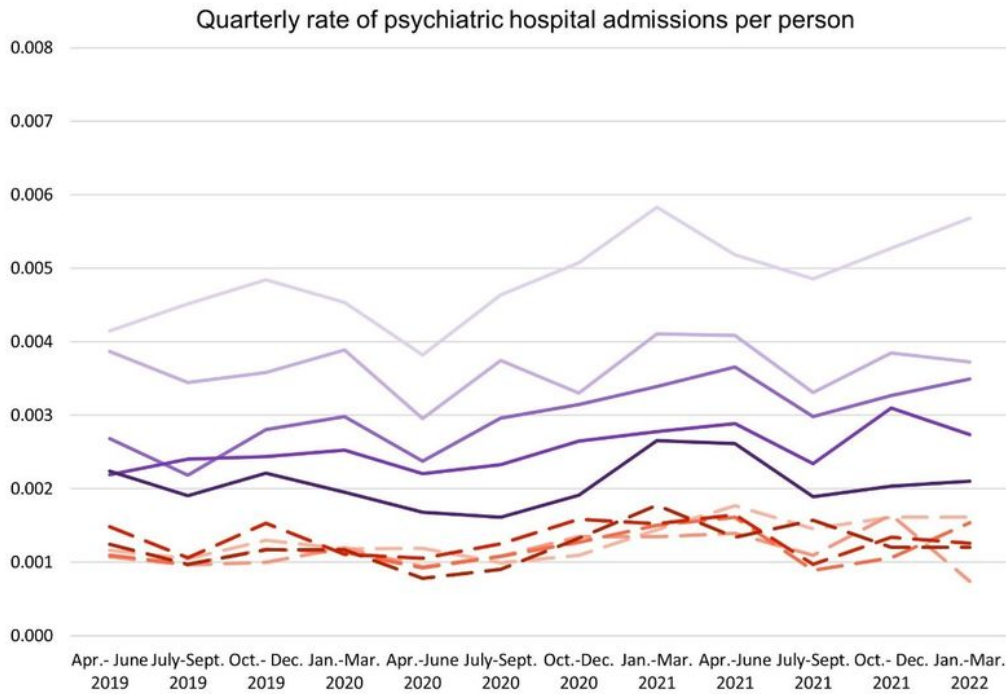
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## Figures



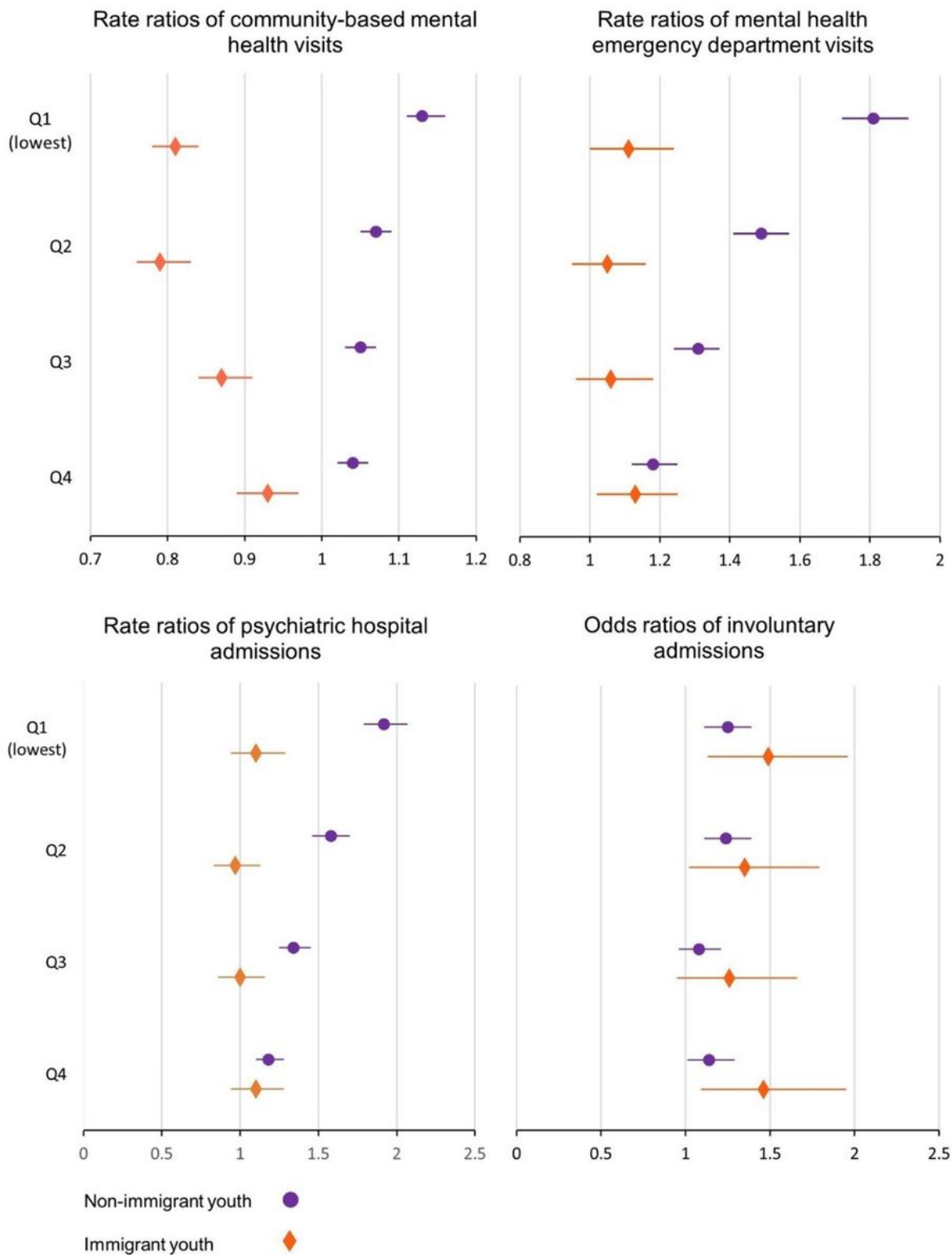
**Figure 1**

Quarterly rate of community-based mental health visits and emergency department visits per person aged 10 to 24 by neighbourhood income quintile and immigration group between April 1, 2019, and March 31, 2022



**Figure 2**

Quarterly rate of psychiatric hospital admissions per person and proportion of involuntary admissions for youth aged 10-24 by neighbourhood income quintile and immigration group between April 1, 2019, and March 31, 2022



**Figure 3**

Rate ratios of mental health service use and odds ratios of involuntary admissions by neighbourhood income quintile and immigration among British Columbian youth aged 10 to 24 between April 1, 2019, and March 31, 2022

## Supplementary Files

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