








RESEARCH ARTICLE

International comparison of hospitalizations and emergency department visits related to mental health conditions across high-income countries before and during the COVID-19 pandemic

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Abstract

Objective: To explore variation in rates of acute care utilization for mental health conditions, including hospitalizations and emergency department (ED) visits, across high-income countries before and during the COVID-19 pandemic.

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Funding information

University of Otago; Health Foundation

Data Sources and Study Setting: Administrative patient-level data between 2017 and 2020 of eight high-income countries: Canada, England, Finland, France, New Zealand, Spain, Switzerland, and the United States (US).

Study Design: Multi-country retrospective observational study using a federated data approach that evaluated age-sex standardized rates of hospitalizations and ED visits for mental health conditions.

Principal Findings: There was significant variation in rates of acute mental health care utilization across countries. Among the subset of four countries with both hospitalization and ED data, the US had the highest pre-COVID-19 combined average annual acute care rate of 1613 episodes/100,000 people (95% CI: 1428, 1797). Finland had the lowest rate of 776 (686, 866). When examining hospitalization rates only, France had the highest rate of inpatient hospitalizations of 988/100,000 (95% CI 858, 1118) while Spain had the lowest at 87/100,000 (95% CI 76, 99). For ED rates for mental health conditions, the US had the highest rate of 958/100,000 (95% CI 861, 1055) while France had the lowest rate with 241/100,000 (95% CI 216, 265). Notable shifts coinciding with the onset of the COVID-19 pandemic were observed including a substitution of care setting in the US from ED to inpatient care, and overall declines in acute care utilization in Canada and France.

Conclusion: The study underscores the importance of understanding and addressing variation in acute care utilization for mental health conditions, including the differential effect of COVID-19, across different health care systems. Further research is needed to elucidate the extent to which factors such as workforce capacity, access barriers, financial incentives, COVID-19 preparedness, and community-based care may contribute to these variations.

What is known on this topic:

- Approximately one billion people globally live with a mental health condition, with significant consequences for individuals and societies.
- Rates of mental health diagnoses vary across high-income countries, with substantial differences in access to effective care.
- The COVID-19 pandemic has exacerbated mental health challenges globally, with varying impacts across countries.

What this study adds:

- This study provides a comprehensive international comparison of hospitalization and emergency department visit rates for mental health conditions across eight high-income countries.
- It highlights significant variations in acute care utilization patterns, particularly in countries that are more likely to care for people with mental health conditions in emergency departments rather than inpatient facilities
- The study identifies temporal and cross-country differences in acute care management of mental health conditions coinciding with the onset of the COVID-19 pandemic.

KEYWORDS

access/demand/utilization of services, acute inpatient care, comparative health systems/international health, health care organizations and systems, mental health

1 | INTRODUCTION

Addressing issues related to mental health and well-being are global priorities.¹ Approximately one billion people globally—or about one in every eight people—live with a mental health condition, including depression, bipolar disorder, anxiety, and schizophrenia or related psychotic disorders.² The consequences of poorly controlled mental health can be substantial for individuals, including increased risk of unemployment, substance use, homelessness, incarceration, suicide, worsening of other underlying medical conditions, and poor quality of life.^{3–6} Globally, in 2019, mental illness was estimated to account for 418 million disability-adjusted life years with an economic cost of approximately USD \$5 trillion.⁷

Among adults in high-income countries, there is considerable variation in the estimated annual prevalence of mental health conditions, ranging from 13.5% in Canada to 17.2% in New Zealand.⁸ Some estimates suggest that the lifetime prevalence of mental health disorders in the United States may be as high as 23%.⁹ While effective prevention and treatment options exist, most people with mental health conditions do not have access to effective care.¹⁰ For example, globally, only 29% of people with psychosis^{11,12} and only one-third of those with depression receive formal mental health care treatment.¹³ Moreover, the Organization for Economic Co-operation and Development (OECD) reported that the prevalence of anxiety and depression symptoms has substantially increased around the world since the COVID-19 pandemic, with significant variation across countries.^{14,15}

Therefore, there is a widespread concern that countries are facing substantial challenges caring for people with mental health conditions. This may result in individuals increasingly seeking care in acute hospitals and emergency rooms. Over recent years, there has been a fundamental shift in mental health care, moving from institutionalization to community-based treatment that promotes social integration for patients.¹⁶ However, among Western countries, this transition has varied significantly. Moreover, cross-country differences in health system organizational and financial structures, mental health workforce capacity and capability, and cost-related access to care barriers,⁹ mean there is likely to be considerable variation in the absolute and relative use of hospitalizations and emergency department (ED) visits among people with mental health conditions. Publicly funded and universal coverage health care systems often emphasize outpatient and community-based care but can face challenges such as long wait times, insufficient funding, and workforce shortages.^{17,18} By contrast, predominantly private systems or systems with high out-of-pocket costs and cost-sharing, like in the United States, can experience significant gaps in service coverage and financial barriers to access that may lead to higher rates of acute care use than other countries.¹⁹

While some research has been conducted comparing mental health outcomes across countries, the literature remains sparse, particularly regarding acute care mental health events. For example, a Commonwealth Fund survey analysis compared mental health service utilization and unmet needs between the United States and 10 other high-income countries.⁹ It found significant disparities in mental health diagnosis and suicide rates, access and affordability, and

workforce capacity. The OECD's "Health at a Glance" report provides data on mental health services across various countries, but it largely discusses broader health care system metrics rather than acute care specifics.²⁰ Additionally, a study on adolescent psychosomatic symptoms in Nordic countries offered some insights into health care impacts on mental health, yet it does not directly explore acute mental health care events.²¹ Therefore, the extent to which countries are treating people for mental health conditions in acute care settings, or whether there is evidence of differential treatment in emergency rooms versus inpatient hospital settings, is not well understood, especially during the COVID-19 pandemic. To improve health care for this population, understanding variation in differences of acute health care service use can be informative for national policymakers and health system leaders' efforts to inform potential strategies and tailor interventions. If concerning high rates of acute care use exist in some countries, it can also guide policymakers and clinical leaders into further inquiry to identify underlying mechanisms of why their population may be more at risk for acute care use with mental health conditions.

Therefore, as part of the International Collaborative of Costs, Outcomes, and Needs in Care, a research collaborative focused on international health comparisons,^{22–24} we sought to answer the following key questions using nationally representative data across eight countries: Canada, England, Finland, France, New Zealand, Spain, Switzerland, and the United States.

First, are there differences across high-income countries and over time in rates of hospitalizations related to mental health conditions, including conditions related to serious mental health versus other mental health conditions? Second, among a subset of countries with ED data available, are there differences in rates of ED visits for mental health conditions that do not result in hospital admission as well as in the relative rate of treatment in the ED versus inpatient setting? Third, is there variation across countries in acute care episodes related to mental health conditions arising during the first year of the COVID-19 pandemic?

2 | METHODS

2.1 | Study design and data

This study was a multi-country retrospective, observational study using administrative patient-level data from 2017 to 2020 across eight countries: Canada, England, Finland, France, New Zealand, Spain, Switzerland, and the United States. Participating countries were selected as they are high-income countries with access to high-quality individual-level administrative health data and represent a mix of health system types. All countries except Finland were original members of the International Collaborative of Costs, Outcomes, and Needs in Care network which formed in 2018. Finland was a recent addition to the collaborative in 2020. Collectively, these nations represent high-income countries with significant health care expenditures. However, there is notable heterogeneity in their funding mechanisms and

organizational structures that may drive differences in acute care visits related to mental health conditions (for more details on health system differences, see Table S1).

Datasets for this study were prioritized for inclusion if they were nationally representative or at least covered a substantial proportion of a country's population. Five countries—England, Finland, France, New Zealand, and Switzerland—used national datasets that covered the entire country's population. Three countries—Canada, Spain, and the United States—used large datasets that covered a substantial proportion of their populations. Data for Canada were from the province of Ontario, which represents 39.4% of the Canadian population. Data from Spain covered 88.2% of the Spanish population. These data did not include the Ceuta, Melilla, Castilla y León y Galicia regions from which data were not available the years of study. Data from the United States were from a national sample of insurance claims that included about 90 million unique beneficiaries between 2017 and 2020; in 2020, the sample included 49,059,761 unique people, representing about 15% of the United States population. Each country provided data for the time period January 1, 2017, until December 31, 2020.

Each country provided inpatient admissions data; however, ED data were only available for four countries: Canada, Finland, France, and the United States. Canada utilized the Canadian Institute for Health Information administrative claims data from the province of Ontario, a comprehensive dataset that includes records of health service utilization covered under the Ontario Health Insurance Plan, to provide inpatient and ED events. Hospital admissions data for England were derived from Hospital Episode Statistics Admitted Patient Care, a national collection of all NHS-funded hospital admissions. Inpatient and ED data for Finland were drawn from the Care Register for Health Care, a whole-of-population administrative data set of all inpatient admissions and ED presentations. France provided inpatient and ED data from the *Système National des Données de Santé* (National Health Data System), a universal whole-of-population, health insurance claims database. Hospital admission data from the National Minimum Dataset, a national collection of all publicly funded hospital inpatient stays, were used for New Zealand. Switzerland used data from the *Statistique médicale des hôpitaux/Medizinische Statistik der Krankenhäuser* (Medical Hospital Statistics of the Federal Statistical Office), an administrative claims database of all hospitalizations. For the United States, the Real-World Data from Inovalon Insights—a medical claims database that includes a large sample of insured populations in the US enrolled in Medicaid (42%), Medicare (6%), and commercial insurance (57%)—was used to provide inpatient and ED event information (for more detail pertaining to each country's data, see Table S2).

2.2 | Defining episodes for mental health conditions

We used the International Classification of Diseases, Tenth Revision diagnostic codes to identify inpatient hospitalizations and ED visits

with a primary diagnosis related to mental health conditions overall as well by two categorizations: (1) serious mental health conditions, which include conditions for major depressive disorder, bipolar disorder, schizophrenia, or related psychotic disorders, as defined by prior work,^{25,26} and (2) other mental health conditions, which included the remaining mental health conditions like mood disorders, eating disorders, obsessive compulsive disorders, and specific personality disorders (see Table S3). Following the Substance Abuse and Mental Health Services Administration categorization of mental health disorders,²⁷ we excluded certain conditions like dementias, cerebral degenerations, intellectual disability, and transient mental health disorders caused by substances.

2.3 | Study outcomes

Primary outcomes for this study were inpatient hospital stays and ED visits where the primary diagnosis was related to a mental health condition in either acute general care hospitals or in psychiatric hospitals. For patients who presented to ED and were subsequently admitted, we classified them as an inpatient hospital stay only. We further examined inpatient hospital stays and ED visits related to serious mental health conditions versus other mental health conditions. A composite category of overall episodes related to either inpatient hospital stays or ED visits was also constructed. These groupings were designed to accommodate cell-size restrictions from data providers. In the United States, we classified observation stays as inpatient hospital stays given that many patients stay in a hospital for up to 48 hours under this designation and the fact that the other countries do not have observation stays as a comparable designation.

2.4 | Demographic variables

Sex (male/female) and age, categorized into four groups (<18, 18–40, 41–64, and 65+ years), were used. Sex was categorized as male or female based on biological sex information recorded in administrative records. Age groupings were selected to minimize data suppression in accordance with country-specific regulations.

2.5 | Analysis

Participating countries used patient-level event data to generate aggregate annual age-sex counts of acute care mental health events. These aggregate data were pooled to construct a multi-country database for analysis. Age and sex direct standardization was employed to compare yearly mental health event rates per 100,000 people across all primary outcomes, using the yearly OECD average population as the reference. Age-sex standardized rates of ED visits for mental health were only compared for four countries with available ED data—Canada, Finland, France, and the United States.

To test the significance of within- and between-country variation in acute care mental health event rates, a series of negative binomial regression models were employed. We used negative binomial models with fixed effects for sex, age, and an interaction between country and an indicator for COVID-19 (2017–2019 or 2020). Models were stratified by setting (hospitalizations only, ED visits only, combined across both settings) and mental health conditions (serious, other, and overall). Using predicted margins, we estimated the adjusted mental health acute care event rates for each country for the 2017–2019 (pre-COVID) period, and for the 2020 (COVID-19) year with associated 95% confidence intervals.

The overall study was reviewed by the Institutional Review Board at the Harvard T.H. Chan School of Public Health and was deemed exempted, and informed consent was waived given that it used aggregated, de-identified patient data across countries. In addition, researchers from each country obtained approval for this study through each country-specific data holder.

3 | RESULTS

3.1 | Sample characteristics

Table 1 shows the sample characteristics of people who were admitted to hospital or who presented to ED with a primary diagnosis of a mental health condition across eight countries during the 4-year study period (2017–2020). There were 223,206 total inpatient hospitalizations in Canada, 315,206 in England, 120,461 in Finland, 2,763,940 in France, 72,357 in New Zealand, 157,452 in Spain, 251,528 in Switzerland, and 1,950,840 in the United States. The majority of inpatient hospitalizations were related to admissions for serious mental health conditions, ranging from 55% in England to 82% in the United States. Across all countries, the proportion of hospitalizations among females was slightly higher than among males. Four countries were able to provide ED visit data. Canada identified 479,280 ED events, 58,656 in Finland, 670,209 in France, and 2,770,958 in the United States. In contrast to inpatient events, the majority of ED visits were for other mental health conditions, ranging from 58% in France to 70% in Canada, except in the United States where the proportions were similar. Age and sex distributions for ED visits were similar to those of inpatient hospitalizations for each of the four countries.

3.2 | Temporal and cross-country variation in mental health inpatient hospitalization

Figure 1 presents annual age-sex standardized hospitalization rates per 100,000 people from 2017 to 2020. Overall, France had the highest rate of mental health hospitalizations (4-year average rate of 1023 hospitalizations per 100,000 people), followed by Switzerland (709 per 100,000 people), and the United States (704 per 100,000 people) and with Spain observing the lowest rate (87 per 100,000 people). For all countries, hospitalization rates related to

serious mental health conditions were higher than other mental condition rates, particularly in the United States at over four to one.

Temporal differences in hospitalization rates were observed across all countries, including moving into the COVID-19 pandemic period. The United States and Finland each had increasing hospitalization rates over all years but experienced a more pronounced increase in 2020. England, France, and Canada all had relatively stable hospitalization rates from 2017 to 2019 but experienced substantial drops in 2020, ranging from –6.0% (Canada) to –14.1% (France). Spain observed a more marked decrease in 2020 (–40.7%). These patterns were generally similar for both serious mental health conditions and other mental health conditions.

3.3 | Temporal and cross-country variation in mental health ED rates

Figure 2 presents annual age-sex standardized ED visit rates per 100,000 people from 2017 to 2020. Overall, the United States had the highest ED visit rates (4-year average rate of 1002 visits per 100,000 people) followed by Canada (781 per 100,000 people), substantially higher than both Finland (263 per 100,000 people) and France (248 per 100,000 people). ED visit rates for serious mental health conditions were lower than for other mental health conditions for all countries except the United States, where rates were higher.

The United States and Finland each observed increasing rates of ED visits from 2017 to 2019 with substantial declines in 2020 of –11.5% and –12.4%, respectively. Rates of mental health ED visits for Canada and France were relatively flat from 2017 to 2019, but they also observed substantial declines in 2020 of –15.9% and –10.3%, respectively. For standardized acute care mental health event rates by age and sex, see Tables S4 and S5, respectively.

3.4 | Cross-country differences in overall and relative utilization of acute care for mental health conditions by care setting before and during the COVID-19 pandemic

Table 2 presents age-sex standardized rates of acute care mental health events (and associated 95% confidence intervals) overall and by care setting, before (2017–2019 yearly average) and during (2020) the COVID-19 pandemic. Among countries with ED and inpatient event data, there was significant variation in combined acute care event rates. The United States had the highest rates in both the pre-COVID and during-COVID periods (1613 and 1602 per 100,000 people, respectively). The lowest rates were observed in Finland (776 and 817 per 100,000 people, respectively). Table 2 also confirms significant variation across countries in hospitalization and ED rates for all mental health categorizations.

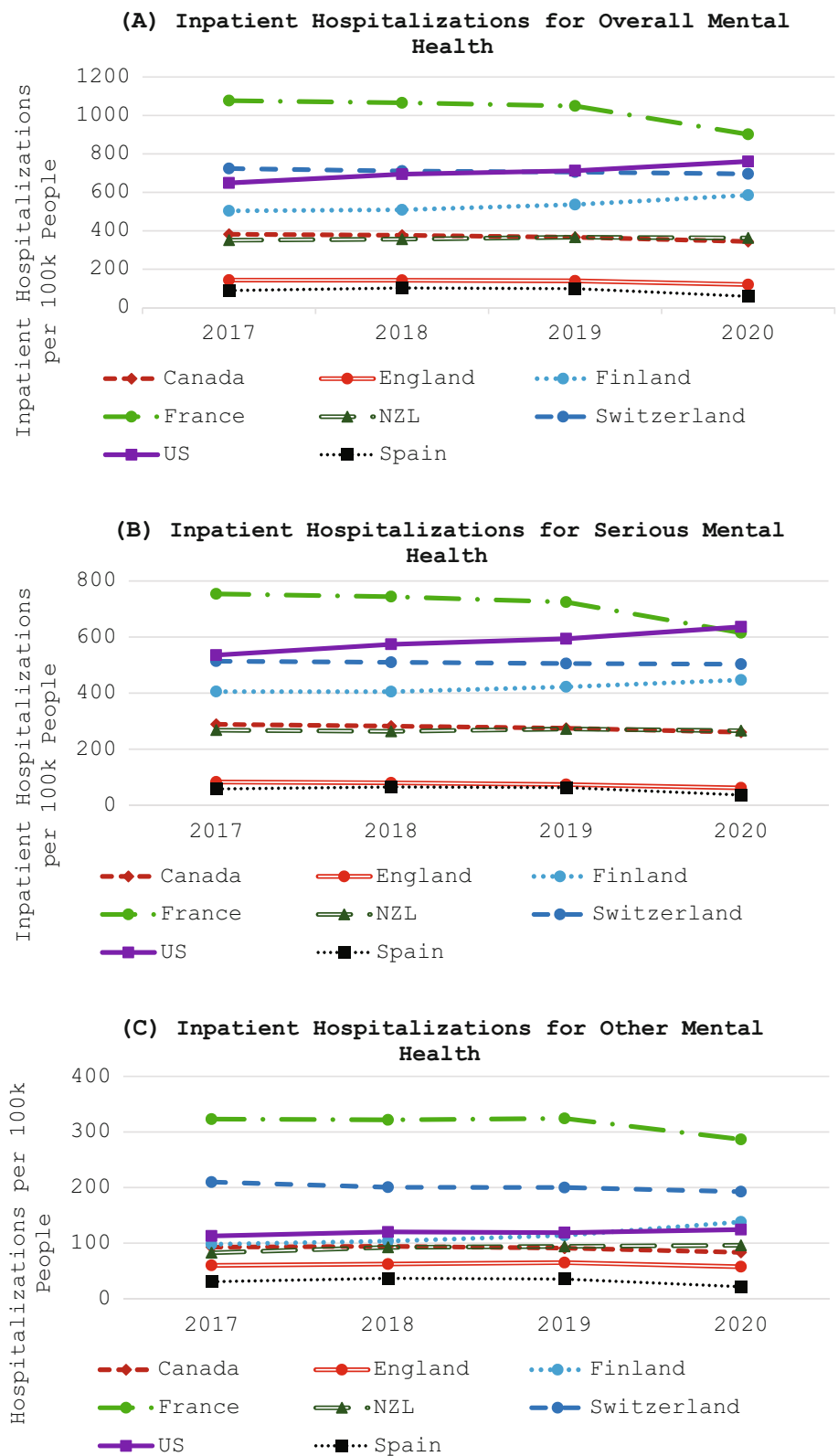
Canada observed the highest proportion of ED visits with approximately two thirds of events occurring in the ED setting.

TABLE 1 Demographics of patients experiencing hospitalizations and emergency department (ED) visits related to mental health conditions, 2017–2020.

	Canada	England	Finland	France	New Zealand	Spain	Switzerland	United States
Hospitalizations								
Total hospitalizations	223,206	315,206	120,461	2,763,940	72,357	157,452	251,528	1,950,840
Serious mental health	171,700 (76.9)	173,696 (55.1)	95,828 (79.6)	1,917,068 (69.4)	53,934 (74.5)	103,452 (65.7)	181,905 (72.3)	1,589,654 (81.5)
Other mental health	51,506 (23.1)	141,510 (44.9)	24,633 (20.4)	846,872 (30.6)	18,423 (25.5)	54,000 (34.3)	69,623 (27.7)	361,186 (18.5)
Age (years)								
<18	34,294 (15.4)	22,942 (7.3)	13,306 (11.0)	201,072 (7.3)	4413 (6.1)	8656 (5.5)	22,813 (9.1)	510,261 (26.2)
18–40	105,524 (47.3)	133,210 (42.3)	50,399 (41.8)	938,485 (34.0)	32,181 (44.5)	52,842 (33.6)	79,980 (31.8)	826,025 (42.3)
41–64	64,273 (28.8)	109,654 (34.8)	34,152 (28.4)	1,158,171 (41.9)	24,627 (34.0)	75,774 (48.1)	110,090 (43.8)	543,050 (27.8)
65+	19,115 (8.6)	49,400 (15.7)	22,604 (18.8)	466,212 (16.9)	11,136 (15.4)	20,178 (12.8)	38,645 (15.4)	71,504 (3.7)
Sex								
Female	121,301 (54.3)	179,369 (56.9)	70,864 (58.8)	1,523,074 (55.1)	38,829 (53.7)	83,940 (53.3)	142,368 (56.6)	1,053,586 (54.0)
Male	101,905 (45.7)	135,837 (43.1)	49,597 (41.2)	1,240,866 (44.9)	33,528 (46.3)	73,512 (46.7)	109,160 (43.4)	897,254 (46.0)
ED visits								
Total ED visits	479,280		58,656	670,209				2,770,958
Serious mental health	143,182 (29.9)		23,835 (40.6)	280,089 (41.8)				1,450,896 (52.4)
Other mental health	336,098 (70.1)		34,821 (59.4)	390,120 (58.2)				1,320,062 (47.6)
Age (years)								
<18	66,416 (13.9)		7371 (12.6)	47,084 (7.0)				443,396 (16.0)
18–40	254,106 (53.0)		30,508 (52.0)	292,513 (43.6)				1,405,721 (50.7)
41–64	122,403 (25.5)		14,097 (24.0)	247,132 (36.9)				823,385 (29.7)
65+	36,355 (7.6)		6680 (11.4)	83,480 (12.5)				98,456 (3.6)
Sex								
Female	266,142 (55.5)		34,856 (59.4)	384,226 (57.3)				1,572,919 (56.8)
Male	213,138 (44.5)		23,800 (40.6)	285,983 (42.7)				1,198,039 (43.2)

Note: Table shows the number of mental health-related hospitalizations and Emergency Department visits that were captured in each country from 2017 to 2020. The patient demographics associated with each care episode are shown. England, New Zealand, Spain, and Switzerland did not have data on ED visits available for analysis. Given data restrictions, the Swiss administrative data reflects slightly different age groups stratified into the following categories: <20, 20–39, 40–64, and 65+.

FIGURE 1 Age-sex standardized hospitalization rates per 100,000 people related to mental health conditions across high-income countries, 2017 to 2020. Figures show the age-sex standardized rates of hospitalizations related to mental health conditions per 100 k people.



Likewise, the United States also treated the majority of mental health events in the ED setting. By contrast, Finland and France had comparably low proportions of mental health events occurring in the ED setting.

Table 2 also demonstrates directional shifts in acute care mental health rates overall and by care setting in relation to the COVID-19 pandemic. Combined acute care mental health rates were relatively stable for the US but increased for Finland from a

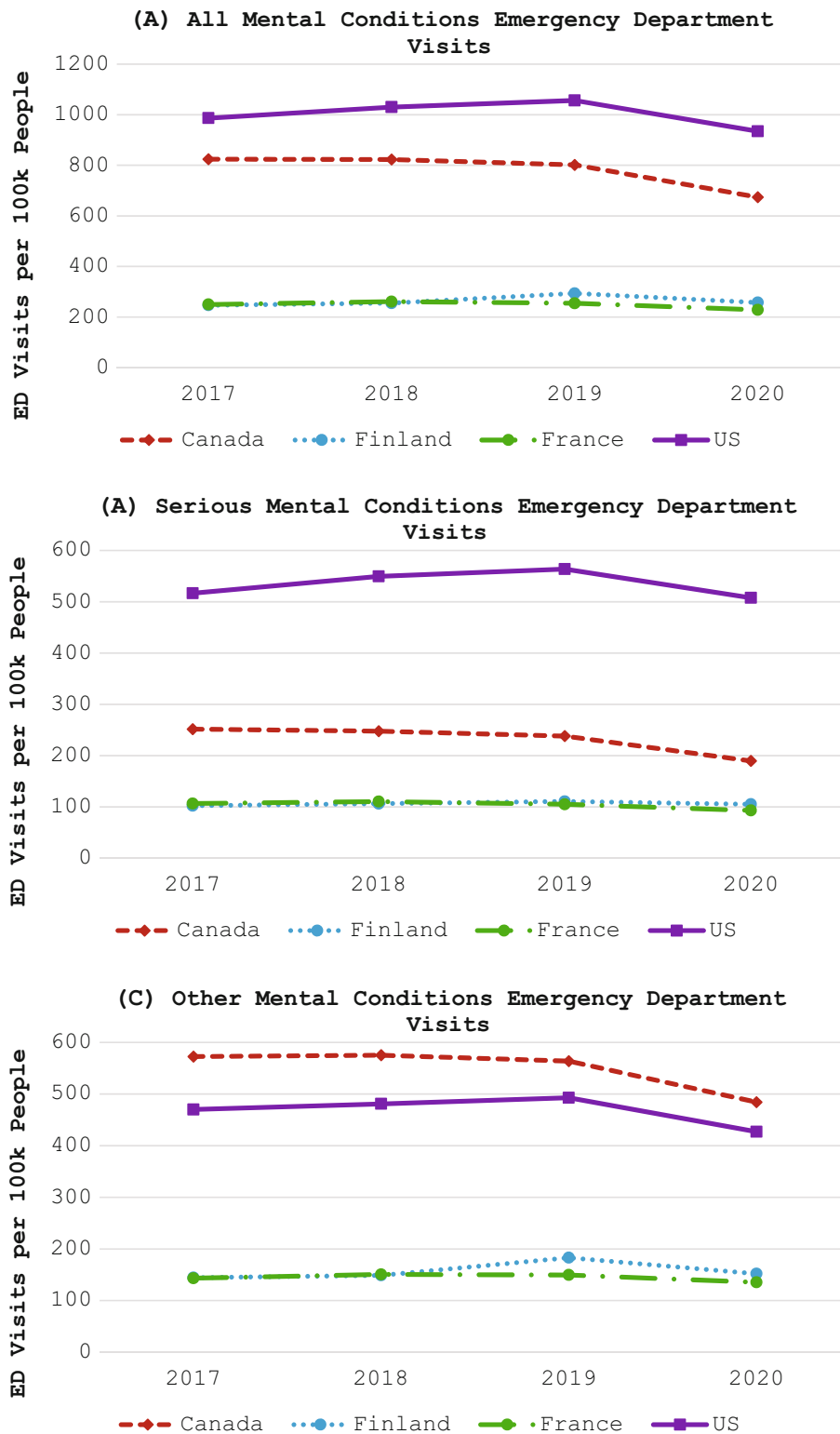


FIGURE 2 Age-sex standardized emergency department (ED) visit rates per 100,000 people related to mental health conditions across high-income countries, 2017 to 2020. Figures show the age-sex standardized rates of ED visits for mental health conditions per 100 k people.

2017 to 2019 average of 776 per 100,000 people to 817 per 100,000 people in 2020 and decreased for Canada (1150 per 100,000 people to 958 per 100,000 people) and France (1268 per 100,000 people to 1083 per 100,000 people). However, these changes were not statistically significant. Similarly, directional changes in inpatient and ED rates were observed for several

countries. For example, in the inpatient setting the United States observed an increase from a 2017 to 2019 average of 713 per 100,000 people to 813 per 100,000 people in 2020. Finland observed a similar increase from 521 per 100,000 people to 578 per 100,000 people. By contrast, Canada and France both observed declining rates of 387 per 100,000 people to 344 per

100,000 people and 988 per 100,000 to 838 per 100,000, respectively. Spain observed a statistically significant decrease from 87 per 10,000 people to 54 per 100,000 people. In the ED setting, the rate of mental health visits for Canada, France, and the United States decreased during the COVID-19 pandemic. The largest decline was in Canada from a 2017 to 2019 average of 808 per 100,000 people to 647 per 100,000 people in 2020.

4 | DISCUSSION

In this retrospective international comparison study across eight high-income countries, we found significant variation in acute care rates for mental health conditions across countries including in both the inpatient and ED settings. The United States observed the highest acute care rates per capita, significantly higher than all other countries including Finland with the lowest rate. The highest hospitalization rates were observed in France and the lowest in Spain. In the ED setting the United States had the highest rates and Finland the lowest. Furthermore, distinct temporal differences in acute care mental health rates were evident, including marked variations coinciding with the onset of the COVID-19 pandemic.

These results have important implications for clinical leaders and policymakers interested in managing and improving care for people with mental health conditions. Prior work has shown that the United States has a much lower capacity related to its mental health care workforce compared with other high-income countries—including lower per capita number of social workers, psychologists, and psychiatric nurses—to meet the needs of their patient population.^{9,28} There is also substantial concern that patients in the United States are more likely to experience significant cost-related access barriers to mental health care treatment, including high out-of-pocket costs and cost-sharing for medications, primary care, and specialty services.^{9,29} These health system shortcomings may explain why the United States had the highest rate of acute care mental health treatment in the present study. In France, the mental health care system is predominantly hospital-centered, leading to high hospitalization rates.³⁰ This is partly because hospitals serve as the main entry point for mental health care, given the lack of alternative ambulatory structures like walk-in centers and social support services. France has approximately 85 psychiatric beds per 100,000 people, significantly higher than the roughly 25 beds per 100,000 in the United States, perhaps explaining its high inpatient hospitalization rate.³¹ However, France also experiences access issues related to community-based specialist mental health services,³⁰ and while general practitioners are more accessible, they are not adequately trained to detect and manage mild to moderate mental health conditions.^{32,33} By contrast, Finland's comparatively low rates of acute mental health care can likely be attributed to major reforms over the last few decades that have shifted the focus from institutional to outpatient care. Legislation, such as the 1991 Act on Mental Health and the Health Care Act of 2010, emphasized outpatient care, integration with social services, and low-threshold access.³⁴ Additionally, the

expansion of outpatient services and the critical role of psychiatric nurses in early detection of depressive disorders have significantly reduced the need for in-hospital care.³⁵

The high hospitalization rates in France and the United States relative to other countries may also be partially explained by the fact that patients in these countries are much more likely to report having high rates of unmet need than countries such as Canada and England.^{9,29} For example, the Commonwealth Fund International Health Policy survey found that people in the United States and France are more likely to report being unable to afford mental health care or receive appropriate and timely treatment when experiencing emotional distress than other countries.²⁹ Additionally, in an international survey of primary care physician (PCP) practices in 2019, only 46% of PCP practices in the US and 31% in France reported being well-prepared to care for people with mental health conditions compared with a majority of PCP practices in other countries, including 66% in New Zealand, 63% in Switzerland, and 56% in England.⁹ Taken together, the higher burden of unmet need and limited PCP capacity may explain why people with mental health conditions in the United States and France are more likely to require acute inpatient care for management of their underlying illness. High rates of inpatient hospitalizations in Switzerland may be due to heterogeneity in mental health care provision across cantons, high psychiatric bed capacity, and a reimbursement system that incentivizes inpatient over outpatient care.³⁶⁻³⁸

Despite having a similar burden of mental health conditions compared with other OECD countries,¹⁴ Spain and England reported the lowest utilization of inpatient medical services for mental health conditions. This may be driven by multiple factors. For example, these countries have limited inpatient psychiatric capacity. An OECD report noted that both countries had significantly fewer beds available per capita than the OECD average.³¹ The limited inpatient capacity for psychiatric care may strain patient access and bottleneck inpatient hospitalizations. Indeed, in England, declining mental health bed numbers have coincided with higher thresholds for admission.³⁹ That said, the emphasis of England's NHS is on community-based mental health care through extensive use of Crisis Resolution and Home Treatment Teams, which provide intensive support to individuals in their homes to prevent the need for hospitalization.¹⁷ In the case of Spain, since the 2007 National Strategy for Mental Health, the Spanish National Health Service has promoted a more holistic community-based approach to mental care (inclusion of mental health workers in community centers, rapid intervention teams, assertive community treatments), and social measures meant to keep the patient autonomy within the community as well as to help families in their role of informal carers.⁴⁰

Among the subset of four countries with both ED and hospitalization data, we found that proportionally the United States and Canada cared for more people in the ED compared with France and Finland, which both hospitalized the majority of people who presented with a mental health condition. Plausible explanation for these results likely varies depending on the country. In Canada, for example, it is possible that the high rates of ED use with relatively lower rates of hospitalizations reflect a substitution effect. Canada has comparatively low

psychiatric bed capacity, and therefore, it is possible that these are reserved for the most severely ill presentations, with a preference for acute care management in the ED setting without hospital admission.^{31,41} In the US, prior work suggests that health care market forces and financial reimbursement by insurers have led to a decrease of inpatient psychiatric beds over time, which has resulted in more psychiatric care occurring in EDs of general acute care hospitals that have limited inpatient capacity to address mentally ill patients while favoring caring for medical and surgical conditions that may reimburse better.⁴²

Interestingly, our study also found notable temporal differences between and within countries in acute care mental health treatments at the onset of the COVID-19 pandemic. Canada and France observed declines in both inpatient and ED mental health rates in 2020. Several countries who only reported inpatient data—including Spain, Switzerland, and England—also observed declining mental health acute care rates. These findings are consistent with international evidence showing reduced rates of acute care for mental health problems, particularly during the early stages of the COVID-19 pandemic.⁴³⁻⁴⁶ This likely reflected significantly reduced health care capacity in hospital settings and possible avoidance of hospitals by patients due to an underlying fear of contracting COVID-19 or the moral conscious of avoiding seeking hospital care so as not to consume much-needed health resourcing responding to COVID-19.⁴⁶⁻⁴⁸ It is also consistent with a reorganization of mental health services for more community-based care including telehealth services for lower acuity mental health concerns.^{43,44} In the United States, there was a marked shift between treatment settings in 2020, with increased inpatient hospitalizations countered by considerably reduced ED visits. This may reflect substantially constrained ED capacity due to the influx of COVID-19 cases as well as limited outpatient options and a subsequent substitution effect to inpatient admissions.⁴⁹ Alternatively, it may suggest that individuals delayed seeking treatment for mental health concerns until they had a crisis resulting in higher severity presentations and a greater requirement for inpatient-based care.⁵⁰

4.1 | Study limitations

This study has important limitations. Most notably, the use of administrative data for research, a purpose for which they were not originally collected, presents challenges related to data accuracy, completeness, and potential biases, which can impact the validity and generalizability of study findings.⁵¹ Moreover, this issue may be exacerbated in cross-country analyses as recording practices, quality issues, completeness, and representativeness of samples may vary across countries. While we have done our best to ensure comparability across countries, including limiting the patient cohort identification criteria to primary diagnoses, key differences may influence results. For example, data for England do not have complete coverage of hospitalizations to some specialized mental health and psychiatric hospitals. The level of undercount is quite small, however, and is unlikely to materially

impact on the key findings. Likewise, data for Spain include psychiatric episodes admitted to acute care hospitals but not in long-term psychiatric hospitals. For France, coding practices for ED presentations can be heterogenous across psychiatric hospitals.⁵² The extent to which limitations related to data quality might affect study findings is likely to be small. Finally, across countries, there are structural differences in how countries capture and incentivize coding of secondary comorbidities. Therefore, we did not include secondary diagnoses for risk adjustment given underlying differences likely do not capture variations in risk but rather coding practices across countries.

Other key limitations of the research include that the underlying mental health needs of the study populations are unknown, and the data cannot distinguish between prevalent and incident cases of mental health service use. Consequently, the study's ability to accurately identify the level of unmet needs across countries is limited. Second, we were not able to adjust for underlying comorbidities that may contribute to the need for acute care, as available data do not capture comorbidities with enough accuracy to sufficiently make such adjustments. Third, while we used large, nationally representative datasets to capture inpatient hospitalizations across eight countries, only four participating countries had access to ED data that included diagnostic coding of visits to identify those related to mental health conditions. Fourth, time coverage of data varied across countries limiting our ability to look at time periods before 2017 or after 2020. This restricted our ability to examine the longer-term impacts relating to the COVID-19 pandemic. Fifth, this study was limited to examinations of age and sex differences, and it did not evaluate differences by other potentially important demographics such as prevalent racial, ethnic, and cultural groups. For example, there is prior evidence of significant inequities in access to mental health care among Māori and Pacific populations compared with non-Māori/non-Pacific in New Zealand,^{53,54} Black and Hispanic populations in the United States relative to non-Hispanic White populations,⁵⁵⁻⁵⁷ and minoritized ethnic groups, especially Black groups, in England.⁵⁸ Moreover, variation in rates of acute mental health care may also be significantly influenced by cultural stigma and the extent to which this differs across countries. The cultural stigma of accessing mental health services due to fear of discrimination and social judgment is well documented.^{59,60} Heterogeneity in the cultural make-up of participating countries and the extent to which stigmatizing beliefs prevail may help explain observed differences.^{54,61} Likewise, the study did not examine social determinants of health such as income, education, and occupation. Extant literature has shown that disadvantaged populations tend to disproportionately experience mental health concerns.^{62,63} For example, a recent systematic review highlighted the significant relationship between lower income and higher prevalence of mental health disorders in studies across many of our participant countries, including the US, England, Germany, Canada, France, and New Zealand.⁶⁴ Finally, this study was limited to examining variation in utilization patterns for acute care events related to mental health conditions. Future work should closely examine the implications of these patterns on other important measures, including the impact on quality of care, health outcomes, and patient satisfaction.

5 | CONCLUSION

In this international comparison across high-income countries, we found considerable variation in both the absolute and relative rates of ED visits and hospitalizations related to mental health conditions, including the differential effect of COVID-19. Notably, the United States experienced the highest overall rate of hospitalizations and ED visits related to mental health conditions compared with other countries. Further research is needed to elucidate the extent to which factors such as workforce capacity, higher cost-related access barriers, COVID-19 preparedness, and higher burdens of unmet mental health need among patient populations may contribute to these variations.

ACKNOWLEDGMENT

The authors have nothing to report.

FUNDING INFORMATION

This work was partially supported by a grant from the Health Foundation (UK). The University of Otago provided funding support for the New Zealand analysis. Ontario analyses were undertaken by the Health System Performance Network, which receives funding from the Ontario Ministry of Health and the Ontario SPOR Support Unit. Dr. Figueroa was partially supported by the Robert Wood Johnson Foundation Harold Amos Medical Faculty Development Award. Dr. Bowden was partially funded by Health Research South.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Bowden N, Hedquist A, Dai D, et al. International comparison of hospitalizations and emergency department visits related to mental health conditions across high-income countries before and during the COVID-19 pandemic. *Health Serv Res*. 2024;59(6):e14386. doi:[10.1111/1475-6773.14386](https://doi.org/10.1111/1475-6773.14386)