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Predictors of physician follow-up care among patients affected by an incident mental disorder episode in Quebec (Canada)

Authors

1) Marie-Josée Fleury
Douglas Hospital Research Centre
Department of Psychiatry, McGill University
Montreal, Quebec, Canada
Email: marie-josee.fleury@douglas.mcgill.ca

2) Louis Rochette
Institut national de santé publique du Québec,
Quebec City, Quebec, Canada
Email: louis.rochette@inspq.qc.ca

3) Lia Gentil
Douglas Hospital Research Centre
Montreal, Quebec, Canada
Email: lia.gentil@gmail.com

4) Guy Grenier
Douglas Hospital Research Centre
Montreal, Quebec, Canada
Email: guy.grenier@douglas.mcgill.ca

5) Alain Lesage
Centre de recherche de l'Institut Universitaire en santé mentale de Montréal
Département de Psychiatrie, Université de Montréal
Montréal, Quebec, Canada
Email: alesage.iusmm@ssss.gouv.qc.ca

Corresponding author:

Marie-Josée Fleury
Douglas Hospital Research Centre
6875 LaSalle Blvd.
Montreal, Quebec, Canada, H4H 1R3
E-mail: marie-josee.fleury@douglas.mcgill.ca

Predictors of physician follow-up care among patients affected by an incident mental disorder episode in Quebec (Canada)

Abstract

Objectives: This study identified predictors of prompt (1+ outpatient physician consultations/within 30 days), adequate (3+/90 days) and continuous (5+/365 days) follow-up care from general practitioners (GP) or psychiatrists among patients with an incident mental disorder (MD) episode. **Methods:** Study data were extracted from the Quebec Integrated Chronic Disease Surveillance System (QICDSS), which covers 98% of the population eligible for healthcare services under the Quebec (Canada) Health Insurance Plan. This observational epidemiological study investigating the QICDSS from April 1, 1997 to March 31, 2020 is based on a 23-year patient cohort including 12+ years old patients with an incident MD episode (n=2,670,133). Risk ratios were calculated using Robust Poisson regressions to measure patient sociodemographic and clinical characteristics, and prior service use, which predicted patients being more or less likely to receive prompt, adequate, or continuous follow-up care after their last incident MD episode, controlling for previous MD episodes, co-occurring disorders, and years of entry into the cohort. **Results:** A minority of patients, and fewer over time, received physician follow-up care after an incident MD episode. Women; patients aged 18-64; with depressive or bipolar disorders, co-occurring MD-substance-related disorders (SRD) or physical illnesses; those receiving previous GP follow-up care, especially in family medicine groups; patients with higher prior continuity of GP care; and previous high users of emergency departments (ED) were more likely to receive follow-up care. Patients living outside the Montreal metropolitan area; those without prior MD; patients with anxiety, attention deficit hyperactivity, personality, schizophrenia and other psychotic disorders, or SRD were less likely to receive follow-up care. **Conclusion:** This study

shows that vulnerable patients with complex clinical characteristics and those with better previous GP care were more likely to receive prompt, adequate or continuous follow-up care after an incident MD episode. Overall, physician follow-up care should be greatly improved.

Keywords: physician; follow-up care; promptness; care adequacy; care continuity; predictors; patient characteristics; mental disorders

Résumé

Objectifs : Cette étude visait à identifier les facteurs prédictifs de la dispensation de soins précoces (1+ consultations médicales ambulatoires dans les 30 jours), adéquats (3+/90 jours) et continus (5+/365 jours) offerts par les omnipraticiens ou psychiatres après la détection d'un dernier épisode de trouble mental (TM) incident chez le patient. **Méthodes :** Les données de l'étude ont été extraites du Système intégré de surveillance des maladies chroniques du Québec (SISMACQ), lequel couvre 98% de la population admissible aux services de santé en vertu du régime d'assurance maladie du Québec (Canada). Cette étude épidémiologique observationnelle basée sur les données du SISMACQ a suivi sur une période de 23 ans (1er avril 1997 au 31 mars 2020) une cohorte de 2 670 133 patients âgés de 12+ ans ayant un ou des épisodes de TM incidents. Les rapports de risque ont été calculés à l'aide de régressions robustes de Poisson, considérant les caractéristiques sociodémographiques et cliniques des patients et leur utilisation antérieure de soins, pour prédire la probabilité de recevoir ou non des soins précoces, adéquats ou continus après la détection d'un dernier épisode de TM incidents chez le patient, en contrôlant pour les épisodes de TM antérieurs, les troubles concomitants, et l'année d'entrée du patient dans la cohorte. **Résultats :** Une minorité de patients, dont le nombre a diminué au fil des ans, ont reçu un suivi médical après la détection de leur dernier épisode de TM incidents. Les femmes; les patients de 18-64 ans; ceux avec des troubles dépressifs ou bipolaires, des troubles mentaux concomitants liés

à l'utilisation de substances psychoactives (TLS) ou des maladies physiques chroniques; ceux suivis antérieurement par un médecin de famille, notamment dans des groupes de médecine de famille; ceux recevant une meilleure continuité de soins; et ceux qui sont de grands utilisateurs des services d'urgence étaient plus susceptibles de recevoir un suivi médical après la détection de leur dernier épisode de TM incidents. Les patients habitant à l'extérieur de Montréal métropolitain; ceux qui étaient sans précédent épisode de TM; ceux qui avaient des troubles anxieux, un trouble déficitaire de l'attention/hyperactivité, des troubles de la personnalité, schizophréniques ou autres troubles psychotiques, ou des TLS étaient moins susceptibles de recevoir un suivi médical. **Conclusion :** Les patients présentant des caractéristiques cliniques complexes et ayant bénéficié de meilleurs soins antérieurs par un omnipraticien étaient plus susceptibles de recevoir des soins précoces, adéquats ou continus après la détection de leur dernier épisode de TM incidents. Globalement, les soins médicaux après la détection d'un épisode de TM incidents méritent d'être grandement améliorés.

Introduction

Receiving prompt (1+ outpatient consultations/within 30 days), adequate (3+/90 days) or continuous (5+/365 days) follow-up physician care after an incident mental disorder (MD) episode, including substance-related disorders (SRD), is crucial for optimizing patient recovery[1] and a key trend in system reforms.[2, 3] Such follow-up care may prevent adverse outcomes like high ED use,[4] hospitalization,[5, 6] and death.[7] Even a small amount of follow-up care after hospital discharge, when patients are still vulnerable, promotes better access to biopsychosocial specialized[8] or outpatient care,[6, 7] continuity of care,[8] health outcomes[9] and treatment compliance.[6, 10] Still, few studies have evaluated the quality of follow-up care by the number of outpatient consultations received with general practitioners (GP) or psychiatrists over a one-year period or close after a patient MD incident episode. Patients first diagnosed with schizophrenias,[11] and those with incident depressive disorders, suicidal behaviors,[12] and chronic physical illnesses[13] are especially in need of close follow-up care. Better knowledge of individual characteristics and prior service use of patients with incident MD episodes who have or haven't received prompt, adequate or continuous follow-up care may suggest interventions to improve such care.

Most previous studies have investigated prompt follow-up care within 30 days of patient hospital discharge[5, 6, 14] or after a first schizophrenia or psychotic disorder episode[8, 15] or new incident depressive disorder episodes,[16] but few have studied follow-up care by comparing different incident MD episodes and integrating adequate follow-up care within 90 days (acute treatments aimed at reducing severe symptoms)[14, 17] and continuous follow-up care within 365 days[14, 18] (based on previous benchmarks, treatments aimed at full patient recovery).[14] Roughly 60% of Canadian patients first diagnosed with schizophrenia between 1999 and 2008,[8] and those with a depressive disorder discharged from hospital in 2005-06[19] received prompt physician

follow-up care. A 2000-2004 US study[10] and a 2003-2005 Canadian study[14] showed that, respectively, 31% and 48% of patients initiating antidepressant treatment or affected by an incident depressive disorder received adequate follow-up care. Another 2007-08 Canadian study found that 52% of patients with depressive disorders received at least one minimally adequate treatment, and that, as reported in related studies,[8, 14] having a family physician was a key predictor.[20] Men [8, 14] and older patients [14] were less likely to receive follow-up care within 30 or 90 days, while those having depressive or anxiety disorders or SRD were less likely to receive follow-up within 30 days, but more likely within 90 days.[14] Patients having antidepressant prescriptions also were more likely to receive physician follow-up care within 90 days.[10]

To our knowledge, no previous study has investigated predictors of 30-, 90- and 365-day follow-up care associated with patient characteristics and prior service use of individuals diagnosed with an incident MD episode, including SRD. Patients with specific sociodemographic characteristics or types of MD, and those with co-occurring disorders, and better previous GP care may be more likely to receive follow-up care. Few studies have reported data on service use variables that may influence follow-up care. Most longitudinal studies don't cover several years[15, 16] or control for previous MD treatment episodes. This study reported incident MD episodes among patients over a 23-year period, controlling for prior MD episodes, co-occurring disorders, and years of follow-up care – better knowledge of follow-up care over years and of predictors may help decision makers to improve patient care. This study aimed to identify predictors of prompt (1+ outpatient GP or psychiatrist consultations/30 days), adequate (3+/90 days) or continuous (5+/365 days) physician follow-up care among patients in their last incident MD episode. We hypothesized that the most vulnerable patients with complex clinical characteristics and better prior GP care are more likely to receive prompt, adequate, or continuous follow-up.

Methods

Study background and data sources

The Canadian universal health insurance covers 99% of the population.[21] Data for this study were extracted from the Quebec Integrated Chronic Disease Surveillance System (QICDSS),[22] which covers 98% of the population eligible for healthcare services under the Quebec Health Insurance Plan (RAMQ). This included billing documents from physicians working on a fee-for-service basis,[22] which accounts for 80% of total physician remuneration in the public system – only 6% of physician billing occurred outside the public system in 2016–17.[23] The QICDSS includes the health insurance registry, patient sociodemographic characteristics, the Physician Claims database (diagnoses, consultations, physician seniority), and the Hospital Inpatient and Day Surgery database (hospitalizations).[22] Diagnostic codes from the Physician Claims and Hospital Inpatient databases were framed by the International Classification of Diseases, Ninth or Tenth Revisions (**Appendix 1**). Study protocol was approved by a research ethics committee.

Study design and sample

This observational epidemiological study investigated a 23-year patient cohort based on data from the QICDSS (April 1, 1997 to March 31, 2020). Patients had to be 12+ years old and diagnosed with incident MD episodes, including SRD. Based on previous research,[8, 24] incident case required two MD diagnoses in the Physician Claims database, or only one principal MD diagnosis in the Hospital Inpatient database – except for SRD, for which only one diagnosis was required in databases, as SRD are underdiagnosed.[25] Any physician could diagnose a MD, with the first MD being reported after a 3-year period without MD, but while considering co-occurring disorders within the same fiscal year. For patients with several incident MD episodes over the 23-year investigation, only the last episode was included, controlling for the number of previous MD

episodes and the year of entry into the cohort's final regression model. The cohort included 2,670,133 patients diagnosed with incident MD episodes. Deceased patient and those hospitalized for more than one third of the 30-, 90- or 365-day follow-up periods were excluded (as outpatient follow-up care was hindered), as well as patients whose data were not available for the entire follow-up period. Medical follow-up care was measured from April 1, 2000 to March 31, 2020 – taking into account the 3-year clearance required for case definition of an incident MD episode (1997-2000), which is consistent with the notion of recovery for MD-SRD.[26] For patients diagnosed during hospitalization, follow-up care started at discharge. Reporting of the study followed the Strobe guideline for epidemiological studies.[27]

Study variables

The three dependent variables were follow-care within a prompt (30-day), adequate (90-day) or continuous (365-day) period, measured after the patient's last incident MD episode. Only outpatient follow-up care provided by GP or psychiatrists in hospital settings or medical clinics was measured. Prompt follow-up care entailed at least one outpatient physician consultation within 30 days; adequate follow-up care, at least three within 90 days;[17] and continuous follow-up care, at least five within 365 days.[18] The analytical framework (**Figure 1**) identified sociodemographic, clinical, and service use independent variables linked to specific databases, with measurement timeframes.

Sociodemographic characteristics measured within the last incident MD episode included sex, age, material and social deprivation, and type of residential area (e.g., urban). Material and social deprivation indexes based on the smallest geographic areas delineated in recent versions of the Canadian census were merged into three groups: least or moderately deprived, most deprived, and non-assigned areas (e.g., nursing homes where index assignment was not feasible, missing address,

homeless). The Material Deprivation Index measured the ratio of population employment, average income, and number of individuals without a high school diploma, while the Social Deprivation Index included individuals living alone, single-parent families, and individuals without a spouse.

Clinical characteristics included: last incident MD episode; whether MD were diagnosed during hospitalization; number of MD prior to last episode; co-occurring MD or SRD within the fiscal year of the last incident MD episode; and chronic physical illnesses within two years. MD included depressive, anxiety, or adjustment disorders; attention deficit hyperactivity disorder (common MD); schizophrenia spectrum and other psychotic disorders, bipolar disorders (serious MD); personality disorders; substance-related disorders (SRD: alcohol or drug use, induced disorders, intoxication, or withdrawal). MD diagnosed during hospitalization were a proxy for patient illness severity needing more intensive follow-up care.[5] Chronic physical illnesses (e.g., diabetes) were assigned a 0-3 severity score, as adapted from the Elixhauser and Charlson Comorbidity Indexes.[28]

Service use variables included prior usual GP follow-up care, especially in family medicine groups, and prior high continuity of GP care measured 2 years before the last incident MD episode. The patient's usual GP seniority (measured from April 1, 1997 to March 31, 2020) and prior high use of ED (measured 12 months before the last incident MD episode) were also assessed. Prior usual GP consultations and ED use were considered for physical reasons only. To be designated as the patient's usual GP, a proxy for family physician, at least 2 consultations with the same GP or with a GP in the same family medicine group were required. Family medicine groups are clinics with patient registration that include GP working with psychosocial clinicians such as nurses and social workers, who deliver extended medical coverage.[29] Continuity of physician care was measured with the Usual Provider Continuity Index,[30] with scores $\geq$0.67 indicating high continuity

of care.[31] This Index describes the proportion of consultations with the usual GP (the most frequently used GP) out of all GP consulted in outpatient care, including walk-in clinics. The 20-year benchmark for GP seniority was based on a 50% distribution of GP seniority in the database. High ED use referred to a minimum of 3+ ED visits per year.[32, 33] Studies report that high ED users are often patients without adequate follow-up care,[34] and that ED care is one of the costliest options.[35]

Data analysis

Descriptive analyses followed by multivariate regressions were produced to test associations between each independent variable and the three dependent variables – prompt (1+ outpatient physician consultations within 30 days), adequate (3+/90 days), or continuous (5+/365 days) follow-up care after the last incident MD episode. Independent variables without collinearity and with an alpha value of $p < 0.01$ were entered in the multivariate models. Risk ratios were calculated using Robust Poisson regressions[36] to measure patient characteristics and their previous service use associated with risk of receiving prompt, adequate, or continuous follow-up care. Risk ratios were calculated with a 99% confidence interval. All analyses were performed using SAS Enterprise Guide version 7.15.

Results

Of the 2,670,133 patients who got prompt follow-up care, 38,206 (1%) died, 51,717 (2%) were hospitalized for more than one third of the follow-up period, and 504 (0.02%) were excluded because patient data were not available. For patients who got adequate follow-up care, numbers were 56,265 (2%), 35,001 (1%), and 1,433 (0.05%), respectively. Respective numbers for continuous follow-up care were 110,533 (4%), 8,534 (0.3%), and 8,309. After these exclusions, the final cohorts for prompt, adequate, or continuous follow-up care included 2,579,706,

2,577,434, and 2,542,757 patients, respectively (**Appendix 2**). From April 1, 2000 to March 31, 2020, the cohort increased by 4% to 7% each year. During this period, the percentage of patients receiving prompt follow-up care decreased from 45% to 33%, adequate follow-up care from 44% to 33%, and continuous follow-up care from 58% to 43% (**Figure 2**). More than 90% of follow-up care was provided by GP.

Of these patients, 57% were women, and 33% were aged 45-64 years; 56% lived in least to moderate deprived areas, and 47% in the Montreal metropolitan area (**Table 1**). Most patients (79%) had common MD, 6% serious MD, 2% personality disorders, and 13% SRD. For 5% of them, MD were diagnosed during hospitalization, and 93% had at least one prior MD. Nearly half (43%) had chronic physical illnesses, with 13% with high severity (3+), and 6% had co-occurring MD-SRD or MD-SRD-chronic physical illnesses. Within the two years prior to their last incident MD episode, 92% received follow-up care from their usual GP, 43% in family medicine groups, and 38% received high continuity of GP care. Most patients (72%) had a usual GP with over 20 years seniority. In the year prior to their last incident MD episode, 9% were high ED users.

Patients more recently diagnosed with a last incident MD episode were less likely to receive follow-up care (**Table 2**). Compared with men and patients 12-17 years old, women and older patients were more likely to receive follow-up care – except patients aged 65+ who were less likely to receive prompt follow-up care. Patients living in the Montreal metropolitan area were more likely to receive follow-up care. Compared with patients residing in least to moderately deprived areas, those in the most deprived areas were less likely to receive prompt or adequate follow-up care, while patients living in non-assigned areas were more likely to receive such follow-up care. Compared to patients with adjustment disorders, patients with depressive or bipolar disorders had a higher probability of receiving follow-up care, as did those with co-occurring MD-SRD, MD-

SRD-chronic physical illnesses or chronic physical illnesses. Patients diagnosed with incident MD episodes during hospitalization were more likely to receive prompt and continuous follow-up care than those in outpatient care settings, but less likely to receive adequate follow-up care. Compared to patients with adjustment disorders and to those with prior MD episodes, patients with anxiety, attention deficit hyperactivity, schizophrenia spectrum and other psychotic disorders, personality disorders or SRD, or without prior MD were also less likely to receive follow-up care. Patients who received prior GP physical follow-up care, especially in family medicine groups, and who had high continuity of GP care, and patients with high previous ED use were more likely to receive follow-up care than those without these conditions. And finally, compared to patients whose usual GP had more seniority, those treated by a usual GP with less than 20 years seniority were less likely to receive adequate or continuous follow-up care.

Discussion

To our knowledge, this study was the first to investigate predictors of prompt, adequate and continuous follow-up care among patients with incident MD episodes. In this study, MD were reported in roughly one third of the Quebec population, a number similar to recent prevalence rates for lifetime MD in Canadian and international estimates.[37, 38] The number of patients diagnosed with an incident MD episode nearly doubled between 2000 and 2020, going from 3.5% to 6.7% – better MD detection,[38] treatment,[39] and improved mental health literacy[40] could explain this. Yet only one third of patients in this study had received prompt or adequate follow-up care, and less than half had gotten continuous follow-up care. These results show that the Quebec mental health system needs reform, especially when it comes to improving access to prompt and adequate follow-up care within 1-3 months of an incident MD episode. More than 20% of Quebecers have no family doctor,[41] and access to a psychiatrist may take months.[42] Previous mental health reforms

have focused on improving continuity of care,[2, 43] which may explain the better results seen on this indicator. From 2000 to 2020, quality of follow-up care has decreased by roughly 13% despite efforts to optimize the efficacy of the mental healthcare system.[2] Similar results were reported in a study of overall physician care.[44] Decreased quality of follow-up care may relate to increased MD,[39] greater demand for care,[45] or malfunctioning organizational systems.[46] However, current trends recommend optimizing interdisciplinary care both in the Chronic Care[47] and Collaborative Care[48] models, increasing the number of nurse practitioners,[49] and providing more psychosocial care.[50] The inability to account for the other clinicians who work closely with physicians may have contributed to the low rate of follow-up care reported in this study.

Findings partially confirmed the first part of our hypothesis, namely that the most vulnerable patients with complex clinical characteristics would be more likely than others to receive prompt, adequate or continuous physician follow-up care after an incident MD episode. Among the most vulnerable patients receiving more follow-up care were those in the non-assigned areas, mostly patients who are living in nursing homes or homeless. These usually are high ED users,[51, 52] which may explain why they received more prompt or adequate follow-up care. Follow-up care was also higher in the Montreal metropolitan area, which is not surprising considering specialized care and GP walk-in clinics are usually overrepresented in large urban areas[53] and tend to attract more vulnerable patients such as the homeless and individuals with complex health conditions.[52, 54]

Studies also reveal that hospitalized patients are among the most vulnerable,[55] which supports current trends seeking to improve discharge planning and continuous care,[56] and to provide better follow-up care for these patients. Those with co-occurring MD-SRD[57] and chronic physical illnesses[55] are also known for highly using services, and their complex conditions justify improving follow-up care. GP reportedly prefer to treat patients with physical illnesses than those

with MD,[58] and those with common rather than complex MD.[59] Though depressive disorders are the MD most frequently detected and treated by GP,[60] patients with bipolar disorders often consult with GP and during depressive episodes.[61] Most of these patients are treatment compliant,[62] which may explain their better rates of follow-up care. Among patients with schizophrenia and other psychotic disorders, or with SRD, the lower probability of follow-up care may be related to their reluctance to accept these conditions[63] and engage in treatment.[8, 63] The recent emphasis on detection and treatment of attention deficit hyperactivity disorder could explain why these patients were less likely to receive follow-up care.[64] Not surprisingly, the study found patients with a prior MD received more follow-up care, which suggests they may show a more chronic course of MD and a greater likelihood of comorbidities.

Younger patients were underserved compared to those aged 18 to 64 – the reluctance of patients aged 12-17 to seek and receive help[65] partially might explain this result. The situation was even worse for patients over 65 needing prompt follow-up care. Despite Canada has a universal healthcare system, patients living in the most deprived areas received less prompt or adequate follow-up care compared to those living in least to moderately deprived areas. As MD usually appear prior to adulthood,[16] and given the key importance of early intervention for recovery, measures that impact MD chronicity and improve services for these patients may be prioritized, and in fact are central to most current mental health reforms.[66] More prompt follow-up care may also be implemented for the elderly whose health tends to deteriorate rapidly.[67] Outreach strategies[68] for patients residing in the most deprived areas may also be more effectively promoted. The finding that women have a higher probability of receiving follow-up care than men is easily explained by their higher reported rates of service use.[55]

Study findings also confirmed the second part of our hypothesis, namely that patients receiving better prior GP follow-up care would be more likely to receive follow-up care after an incident MD episode. Patients followed by a senior GP in family medicine groups and those receiving a high continuity of GP care were particularly more likely to get follow-up care after an incident MD episode – family medicine groups have regulations that ensure prompt and continuous care, especially for vulnerable populations. A previous study show that senior GP play a more active role than their junior counterparts in treating patients with MD.[58] As for high ED users, those are known to be high outpatient services users[69] as well as a vulnerable clientele with complex health issues,[55] which would explain why they are more likely to receive follow-up care. Overall, these findings align with the view that the Canadian healthcare system responds more effectively to the new needs of existing patients than to those of individuals not currently under care, and that facilitating patient access to care could be greatly improved.[70]

Limitations

Some variables such as race/ethnicity, suicidal behaviors, and medication compliance that could have impacted follow-up care were not available in the database. The study focused only on follow-up care provided by physicians paid by fee-for-services and did not include follow-up care with psychologists in private practices or other psychosocial clinicians in primary or specialized care, including nursing interventions; this had the effect of underestimating "global" follow-up care. The fact that the first type of MD incident selected had to come after a 3-year clearance period may have influenced study results, even as co-occurring MD-SRD were considered. Because patients hospitalized for more than a third of the follow-care period were excluded, more severe cases may have been understudied. Finally, study findings may not be generalizable to other countries, especially those without a public healthcare system.

Conclusion

This study showed that more vulnerable patients with complex clinical characteristics, and those with better previous GP care were more likely to receive prompt, adequate or continuous follow-up care for an incident MD episode. However, only a minority of patients in the study had received physician follow-up care, and results showed that the level of care actually decreased over the study period. Prompt and adequate care, in particular, must be improved, as early intervention is key to patient recovery. Men, patients aged 12-17, those living in more deprived areas, and patients with anxiety, attention deficit hyperactivity, personality disorders, schizophrenia spectrum and other psychotic disorders, or SRD, and those without previous MD may especially benefit from improved follow-up care. Better incentives and training for younger physicians may also be promoted, encouraging them to prioritize MD follow-up care.

Data availability

In accordance with the applicable ethics regulations for the province of Quebec, the principal investigator is responsible for keeping data confidential.

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Conflict of interest disclosure

The authors declare no conflicts of interest.

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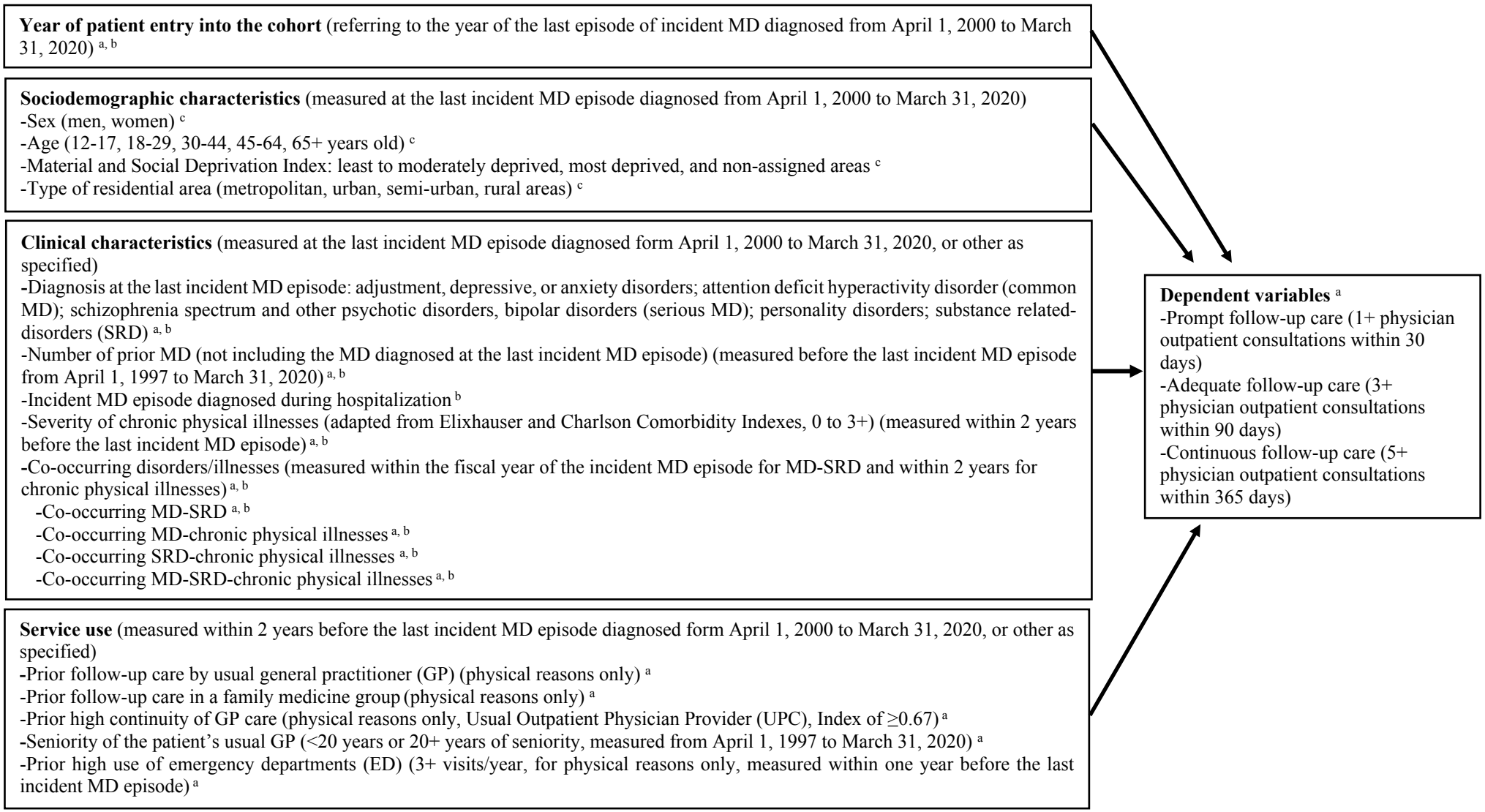
Figure 1. Conceptual framework: predictors of prompt, adequate and continuous follow-up care among patients affected by an incident mental disorder (MD) episode diagnosed from April 1, 2000 to March 31, 2020



a Régie de l'assurance maladie du Québec (RAMQ, Physician Claims database), b Maintenance et exploitation des données pour l'étude de la clientèle hospitalière (MED-ECHO, Hospital Inpatient and Day Surgery database), c Fichier d'inscription des personnes assurées (FIPA, Health Insurance Registry). Details about all the variables can be found in the article's Methods section, and in the footnotes of Tables 1 and 2.

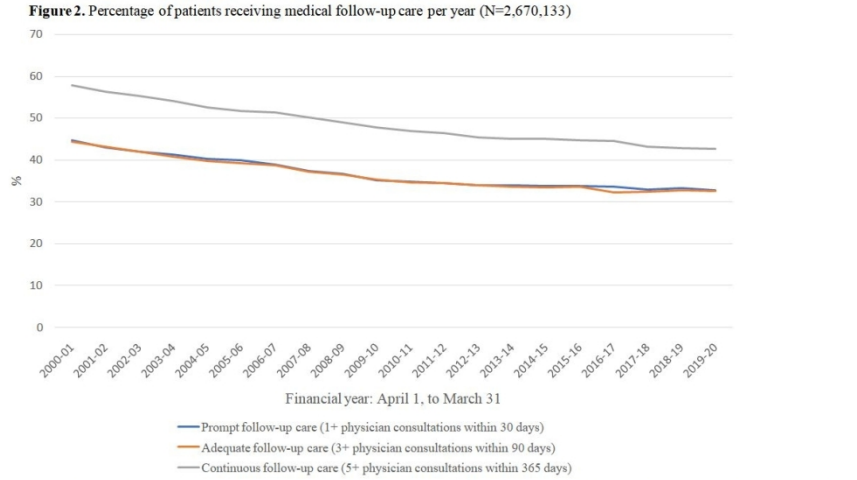


Figure 2, Percentage of patients receiving medical follow-up care per year (N=2,670,133)

296x170mm (120 x 120 DPI)

Table 1. Characteristics of patients diagnosed with an incident mental disorder (MD) episode and physician follow-up care (N=2,670,133)

	Last incident MD episode from April 1, 2000 to March 31, 2020 [a]	Prompt follow-up care (1+ physician consultations within 30 days)	Last incident MD episode from April 1, 2000 to March 31, 2020 [a]	Adequate follow-up care (3+ physician consultations within 90 days)	Last incident MD episode from April 1, 2000 to March 31, 2020 [a]	Continuous follow-up care (5+ physician consultations within 365 days)
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Total	2,579,706 (100)	929,903 (36.1)	2,577,434 (100)	921,392 (35.7)	2,542,757 (100)	1,208,3466 (47.5)
Sociodemographic characteristics (measured at the last incident MD episode diagnosed from April 1, 2000 to March 31, 2020)						
Men	1,106,448 (42.9)	377,506 (37.5)	1,105,040 (42.9)	347,550 (31.5)	1,085,523 (42.7)	442,157 (40.7)
Women	1,473,258 (57.1)	552,397 (37.2)	1,472,394 (57.1)	573,842 (39.0)	1,457,234 (57.3)	766,189 (52.6)
Age						
12-17 years	197,526 (7.7)	44,656 (22.6)	197,833 (7.7)	38,722 (19.6)	198,312 (7.8)	53,931 (27.2)
18-29 years	401,035 (15.5)	143,741 (35.8)	402,443 (15.6)	135,113 (33.6)	401,860 (15.8)	167,856 (41.8)
30-44 years	648,399 (25.1)	265,569(40.9)	649,678 (25.1)	273,699 (42.1)	647,291 (25.4)	322,381 (49.8)
45-64 years	840,043 (32.6)	311,018 (37.0)	840,471 (32.6)	323,755 (38.5)	833,725 (32.8)	421,946 (50.6)
65+ years	492,757 (19.1)	165,467 (33.6)	487,009 (19.0)	150,103 (30.8)	461,569 (18.2)	242,232 (52.5)
Material and Social Deprivation Index [b]						
Non-assigned areas (0)	135,940 (5.3)	48,180 (35.4)	135,011 (5.2)	46,087 (34.1)	129,609 (5.1)	62,186 (48.0)
Least to moderately deprived areas (1, 2, 3)	1,440,310 (55.8)	524,606 (36.4)	1,439,681 (55.9)	527,942 (36.7)	1,424,408 (56.0)	679,608 (47.7)
Most deprived areas (4, 5)	1,003,456 (38.9)	357,117 (35.6)	1,002,742 (38.9)	347,363 (34.6)	988,740 (38.9)	466,552 (47.2)
Types of residential areas						
Metropolitan (>1,000,000 inhabitants)	1,211,415 (47.0)	448,423 (37.0)	1,210,504 (47.0)	443,170 (36.6)	1,194,729 (47.0)	580,516 (48.6)
Urban (100,000 to 999,999)	535,681 (20.7)	192,858 (36.0)	535,394 (20.7)	193,941 (36.2)	528,805 (20.8)	252,892 (47.8)
Semi-urban (10,000 to 99,999)	322,441 (12.5)	110,066 (34.1)	321,970 (12.5)	109,823 (34.1)	317,608 (12.5)	145,590 (45.8)
Rural (<10,000)	502,883 (19.5)	176,213 (35.0)	502,403 (19.5)	172,329 (34.3)	491,931 (19.4)	226,585 (45.8)
Missing	7,286 (0.3)		7,571 (0.3)		6,684 (0.3)	
Clinical characteristics (measured at the last incident MD episode diagnosed from April 1, 2000 to March 31, 2020, or other as specified)						
Incident MD (ref.: adjustment disorders) [c]						
Common MD						

Depressive disorders	554,900 (21.5)	253,738 (45.7)	554,858 (21.5)	279,474 (50.4),	550,686 (21.7)	330,148 (59.9)
Anxiety disorders	939,926 (36.4)	314, 136 (33.4)	938,178 (36.4)	321,289 (34.3)	928,777 (36.5)	452,831 (48.7)
Adjustment disorders	418,136 (16.2)	167,712 (40.1)	417,376 (16.2)	172,419 (41.3)	414,283 (16.3)	204,582 (49.4)
Attention deficit hyperactivity disorder	119,829 (4.6)	18,458 (15.4)	119,810 (4.6)	16,846 (14.0)	119,654 (4.7)	25,099 (20.9)
Serious MD						
Schizophrenia spectrum and other psychotic disorders	98,722 (3.8)	37,302 (37.8)	99,142 (3.8)	30,997 (31,3)	94,772 (3.7)	46,352 (48.9)
Bipolar disorders	62,695 (2.4)	30,359 (48.4)	63,272 (2.5)	30,166 (47.7)	63,050 (2.5)	38,445 (60.9)
Personality disorders	38,946 (1.5)	14,599 (37.5)	38,840 (1.5)	13,163 (33.9)	38,009 (1.5)	17,692 (46.6)
Substance-related-disorders (SRD)	346,552 (13.4)	93,599 (27.0)	345,958 (13.4)	57,038 (16.5)	333,526 (13.1)	93,197 (27.9)
Incident MD episode diagnosed during hospitalization [d]	128,296 (5.4)	43,271 (33.7)	125,746 (4.9)	22,992 (18.3)	118,292 (4.7)	38,663 (32.7)
Number of prior MD (not including MD diagnosed at the last episode) (measured from April 1, 1997 to March 31, 2020)						
0	175,316 (6.8)	42,439 (24.2)	174,680 (7.1)	24,093 (13.8)	168,074 (6.6)	38,386 (22.8)
1	1,286,352 (49.9)	472,406 (36.7)	1,285,017 (49.7)	470,685 (36.6)	1,268,572 (49.9)	595,411 (46.9)
2+	1,118,038 (43.3)	415,058 (37.1)	1,117,737 (43.4)	426,614 (38.1)	1,106,111 (43.5)	574,549 (51.9)
Severity of chronic physical illnesses (adapted from Elixhauser and Charlson Comorbidity Indexes, measured within 2 years before the last episode of incident MD) [e]						
0	1,477,857 (57.3)	513,499 (34.8)	1,480,625 (57.4)	514,107 (34.7)	1,476,838 (58.1)	627,904 (42.5)
1	485,560 (18.9)	178,925 (36.9)	486,764 (18.9)	187,806 (38.6)	485,172 (19.0)	259,490 (53.5)
2	189,351 (7.3)	70,377 (37.1)	189,679 (7.4)	72,385 (38,2)	187,430 (7.4)	107,322 (57.3)
3+	336,600 (13.0)	126,689 (37.6)	330,349 (12.8)	107,133 (32.4)	305,103 (12.0)	162,631 (53.3)
Missing	90,338 (3.5)		90,017 (3.5)		88,214 (3.5)	
Co-occurring MD-SRD [f]	151,684 (5.9)	39,957 (26.5)	152,653 (5.9)	29,390 (19.3)	152,343 (5.9)	41,086 (27.0)
Co-occurring MD-chronic physical illnesses [f]	981,627 (38.0)	364,298 (37.1)	977,546 (38,0)	383,979 (39.3)	958,634 (37.8)	537,634 (56.0)
Co-occurring SRD-chronic physical illnesses [f]	71,682 (2.8)	21,239 (29.6)	69,953 (2.7)	9,168 (13.1)	64,402 (2.5)	18,277 (28.4)
Co-occurring MD-SRD-chronic physical illnesses [f]	148,831 (5.8)	52,542 (35.3)	150,061 (5.8)	37,840 (25.2)	144,711 (5.7)	60,362 (41.7)
Service use (measured within 2 years before the last MD episode diagnosed from April 1, 2000 to						

March 31, 2020, or other as specified)						
Prior follow-up care by usual general practitioner (GP) (for physical reasons only) [g]	2,373,919 (92.0)	894,470 (37.7)	2,371,318 (92.0)	896,190 (37.8)	2,442,311 (91.8)	1,194,132 (48.9)
Prior follow-up care in a family medicine group (physical reasons only)	1,098,619 (42.6)	404,611 (36.8)	1,098,039 (42.6)	411,822 (37.5)	1,125,238 (42.3)	544,323 (48.4)
Prior high continuity of GP care (physical reasons only, Index of ≥0.67) [h]	985,389 (38.2)	372,038 (37.8)	982,506 (38.1)	379,541 (38.6)	963,951 (37.9)	535,093 (55.5)
Seniority of the patient's usual GP (measured from April 1, 1997 to March 31, 2020) [i]						
<20 years of seniority	500,596 (19.4)	192,508 (38.5)	500,251 (19.4)	195,575 (38.5)	494,530 (19.4)	247,095 (50.0)
20+ years of seniority	1,865,901 (72.3)	699,338 (37.5)	1,863,663 (72.3)	702,780 (37.0)	1,838,601 (72.3)	939,850 (49.9)
Missing	213,209 (8.3)		213,520 (8.3)		209,626 (8.3)	
Prior high use of emergency departments (ED) (3+ visits/year, for physical reasons, measured within one year before the last incident MD episode)	226,439 (8.8)	90,697 (40.0)	223,658 (8.7)	79,757 (35.7)	212,988 (8.5)	110,656 (51.9)

[a] A 3-year clearance period was required for the case definition of an incident mental disorder (MD) episode from April 1, 1997 to March 31, 2000. Medical follow-up care, including that provided by general practitioners (GP) and psychiatrists, was thus measured from fiscal years April 1, 2000 to March 31, 2020. If a patient had several MD episodes, only the last episode was considered, controlling for the number of preceding episodes in the final model (see the Methods section for more details).

[b] This index aggregated patient data on material and social deprivation, which is related to the smallest geographic dissemination areas (zip code areas), established for the most recent versions of the Canadian census. For this study, quintiles were grouped into three levels representing the least to moderate (1-3), and most (4-5) deprived areas, and non-assigned areas (0) for missing addresses or living in areas where index assignment was not feasible, such as nursing homes or homeless individuals.

[c] At least two diagnoses from the *Régie de l'assurance maladie du Québec* (RAMQ, Physician Claims database) or one principal diagnosis from the *Maintenance et exploitation des données pour l'étude de la clientèle hospitalière* (MED-ECHO, Hospital Inpatient and Day Surgery database) over a 12-month period were needed for a patient to be diagnosed with an incident MD, except in the case of substance-related disorders (SRD) as they are often underdiagnosed and thus needed only one diagnosis either from RAMQ or MED-ECHO, including secondary diagnosis. The first MD diagnosed in a 12-month period (e.g., depressive disorders), considering this case definition, and for the last incident MD episode from April 1, 2000 to March 31, 2020, was considered. However, co-occurring MD-SRD occurring during this period were controlled for in the final model.

[d] This represents a proxy for illness severity. The follow-up care periods (prompt, adequate, and continuous follow-up care) were measured after patient discharge.

[e] Chronic physical illnesses included: renal failure; cerebrovascular, neurological, and endocrine illnesses; tumor without or with metastasis; chronic pulmonary illnesses; diabetes complicated and uncomplicated; cardiovascular illnesses, and other chronic illness conditions (e.g., blood loss anemia) (see Appendix 1 and the Methods section).

[f] These variables considered the last incident MD (including SRD) in relation with co-occurring MD or SRD and chronic physical illnesses within the fiscal year of the incident MD for MD-SRD, and within two years for chronic physical illnesses which usually have a lifetime occurrence.

[g] To be designated as the patient's usual GP (a proxy for family physician, variable not available in administrative databases), a minimum of 2 consultations with the same GP or with different GP from the same family medicine group were required, measured 2 years before the last f incident MD episode. "Usual GP" refers to the GP most frequently consulted by a patient. References are provided in the Methods section.

[h] Continuity of GP care was measured with the Usual Provider Continuity Index, in which a score of ≥0.67 refers to a high continuity of care. The Index describes the proportion of consultations with the "usual" GP out of all GP consulted in outpatient care, including consultations in walk-in clinics. References are provided in the Methods section.

[i] The seniority of the usual GP referred to the number of years of practice of the patient's usual GP (or the GP most often consulted). The 20-year benchmark for GP seniority was constructed based on a 50% distribution of physician age in the database.

Appendix 1: Codes for mental disorders including substance-related disorders and chronic physical illnesses according to the International Classification of Diseases, Ninth and Tenth revisions

Diagnoses	*International Classification of Diseases, Ninth Revision (ICD-9)*	*International Classification of Diseases, Tenth Revision, Canada (ICD-10-CA)*
Mental disorders (MD) [a]		
Common MD		
Depressive disorders	3004 (neurotic depression) *; 311, 3119* (depressive disorder, not elsewhere classified)	F320- F323 (major depressive disorder, single episode); F328 (other depressive episodes); F329 (depressive episode, unspecified); F330-F334 (major depressive disorder, recurrent); F338 (other recurrent depressive disorders); F339 (recurrent depressive disorder, unspecified); F348 (other persistent mood [affective] disorders); F380, F381 (persistent mood [affective] disorder, unspecified); F388 (other specified mood [affective] disorders); F39 (unspecified mood [affective] disorders); F412* (mixed anxiety and depressive disorder)*
Anxiety disorders	300 (except 3004); 3000 (anxiety states); 3002 (phobic anxiety disorders); 3003 (obsessive-compulsive disorder); 3001 (hysteria); 3006 (other anxiety disorder); 313 (disturbance of emotions specific to childhood and adolescence)	F40 (phobic anxiety disorders); F41(other anxiety disorders); F42 (obsessive-compulsive disorder); F45 (somatoform disorders); F48 (other neurotic disorders); F93, F94 (disturbance of emotions specific to childhood and adolescence)
Adjustment disorders	3090 (brief depressive reaction); 3092 (adjustment reaction with predominant disturbance of other emotions, include: abnormal separation anxiety); 3093 (adjustment reaction with predominant disturbance of conduct); 3094 (adjustment reaction with predominant disturbance of other emotions and conduct); 3098 (other specified adjustment reactions); 3099 (unspecified adjustment reaction)	F430 (acute stress reaction); F431 (post-traumatic stress disorder); F432 (adjustment disorders); F438 (other reactions to severe stress); F439 (reaction to severe stress, unspecified)
Attention deficit/hyperactivity disorder	314 (attention deficit/hyperactivity disorder);	F900; F901; F908; F909 (attention deficit/hyperactivity disorder);
Serious MD		
Schizophrenia spectrum and other psychotic disorders	295* (schizophrenic disorders); 297* (paranoid states); 298* (other nonorganic psychoses)	F20* (schizophrenic disorders); F22* (persistent delusional disorders); F23 (acute and transient psychotic disorders); F24* (induced delusional disorder); F25* (schizoaffective disorders); F28* (other psychotic disorder not due to a substance or known physiological condition); F29* (unspecified psychosis not due to a substance or known physiological condition); F448 (other dissociative and conversion disorders); F481 (depersonalization - derealization syndrome)

Bipolar disorders	2960-2966 (manic disorders); 2968 (other affective psychoses); 2969 (unspecified affective psychoses)	F300-F302, F308, F309 (manic episode); F310-F317, F318, 319 (bipolar episode)
Personality disorders	3010 (paranoid personality disorder); 3011 (affective personality disorder); 3012 (schizoid disorder); 3013, 3014 (obsessive-compulsive personality disorder); 3015 (histrionic personality disorder); 3016 (dependent personality disorder); 3017 (antisocial personality disorder); 3018 (other personality disorders); 3019 (unspecified personality disorder)	F600 (paranoid personality disorder); F61 (mixed and other personality disorders); F340 (cyclothymic disorder); F341 (dysthymic disorder); F601 (schizoid personality); F603 (borderline personality disorder); F605 (obsessive-compulsive personality disorder); F604 (histrionic personality disorder); F607 (dependent personality disorder); F602 (antisocial personality disorder); F609 (unspecified personality disorder); F21 (schizotypal personality); F606 (avoidant personality disorder); F608 (other specified personality disorders); F681 (factitious disorder); F688 (other specified disorders of adult personality and behaviour); F69 (unspecified disorder of adult personality and behaviour)
Substance-related disorders [a]		
Alcohol-related disorders	3030*, 3039*, 3050* (alcohol abuse or dependence); 2910*, 2918* (alcohol withdrawal), 2911*-2915*, 2919*, 3575, 4255, 5353, 5710-5713 (alcohol-induced disorders); 9800, 9801, 9808, 9809 (alcohol intoxication)	F101*, F102* (alcohol abuse or dependence); F103, F104* (alcohol withdrawal); F105-F109, K700*-K704*, K709*, G621*, I426, K292*, K852, K860, E244, G312, G721, O354 (alcohol-induced disorders); F100*, T510, T511*, T518, T519 (alcohol intoxication)
Cannabis-related disorder	3043, 3052 (cannabis abuse or dependence)	F121, F122 (cannabis abuse or dependence); F123-F129 (cannabis-induced disorders); F120, T407 (cannabis intoxication)
Drug-related disorders other than cannabis	3040-3042, 3044-3049, 3053-3057, 3059 (drug abuse or dependence); 292.0 (drug withdrawal); 2921, 2922, 2928, 2929 (drug-induced disorders); 9650, 9658, 9670, 9676, 9678, 9679, 9694-9699, 9708, 9820, 9828 (drug intoxication)	F111, F131, F141, F151, F161, F181, F191, F112, F132, F142, F152, F162, F182, F192 (drug abuse or dependence); F113-F114, F133-F134, F143-F144, F153-F154, F163-F164, F183-F184, F193-F194 (drug withdrawal) F115-F119, F135-F139, F145-F149, F155-F159, F165-F169, F185-F189, F195-F199 (drug-induced disorders); F110, F130, F140, F150, F160, F180, F190, T400-T406, T408, T409, T423, T424, T426, T427, T435, T436, T438, T439, T509, T528, T529 (drug intoxication)
Chronic physical illnesses [a, c]		
Renal failure	4030, 4031, 4039, 4040, 4041, 4049, 585, 586, 5880, V420, V451, V56	I120, I131, N18, N19, N250, Z49, Z940, Z992
Cerebrovascular illnesses	430-438	G45, G46, I60-I69
Neurological illnesses	3319, 3320, 3321, 3334, 3335, 3339, 334–335, 3362, 340, 341, 345, 3481, 3483, 7803, 7843	G10–G12, G13, G20, G21–G22, G254, G255, G312, G318, G319, G32, G35, G36, G37, G40, G41, G931, G934, R470, R56
Endocrine illnesses (hypothyroidism; fluid electrolyte disorders and obesity)	2409, 243, 244, 2461, 2468; 2536, 276; 2780	E00, E01, E02, E03, E890; E222, E86, E87; E66
Any tumor with or without metastasis (solid tumor	140-172, 174, 175, 179-195, 196–199; 200, 201, 202, 2030, 2386, 2733	C00–C26, C30–C34, C37–C41, C43, C45-C58, C60–C76, C77-C79, C80; C81-C85, C88, C900, C902, C96

without metastasis; lymphoma)		
Chronic pulmonary illnesses	490–505, 5064, 5081, 5088	I278, I279, J40-J47, J60-J64, J65, J66, J67, J684, J701, J703
Diabetes complicated and uncomplicated	2500-2502, 2503; 2504-2509	E102-E108, E112-E118, E132-E138, E142-E148; E100, E101, E109, E110, E111, E119, E130, E131, E139, E140, E141, E149
Cardiovascular illnesses (congestive heart failure; cardiac arrhythmias; valvular illnesses; peripheral vascular illnesses; myocardial infarction; hypertension and pulmonary circulation illnesses)	4021, 4041, 428; 4260, 4267, 4269,4270–4274,4276–4279, 7850, V450, V533; 394–397, 424,7463–7466, V422, V433; 093, 440, 441, 4431– 4439, 4471, 5571, 5579, V434; 4109, 4129; 4010, 4011, 4019, 4020, 4021, 4029, 4050, 405,4051, 4059, 4372; 4150, 4151, 416; 4170, 4178, 4179	I099, I110, I130, I132, I255, I420, I425–I429, I43, I50, P290; I441–I443, I456, I459, I47–I49, R000, R001, R008, T821, Z450, Z950; A520, I70-I72, I730, I731, I738, I739, I771, I790, K551, K558, K559, Z958, Z959; I05–I08, I091, I098, I34–I39, Q230–Q233, Q238, Q239, Z952, Z953, Z954I210-I214, I219, I220, I221, I228, I229, I252; I101, I100, I11, I1500, I1501, I1510, I1511, I1521, I1581, I1590, I1591, I674; I26, I27, I280, I288, I289
Other chronic physical illness categories (blood loss anemia; ulcer illnesses; liver illnesses; AIDS/HIV; rheumatoid arthritis/collagen vascular illnesses, coagulopathy; weight loss, paralysis; deficiency anemia)	2800, 2809; 286, 2871, 2873-2875; 5317, 5319, 5327, 5329, 5337, 5339, 5347, 5349; 0702, 0703, 0704, 0705, 4560–4562, 5723, 5728, 5733, 5734, 5739, V427; 042–044; 1361, 446; 7010, 7100–7104, 7105, 7108, 7109, 7112, 714, 7193, 720, 725, 7285, 7288, 7293; 260–263, 7832, 7994; 3341, 342, 343, 3440-3446, 3448, 3449; 2801, 2809, 281, 2859	D500; K257, K259, K267, K269, K277, K279, K287, K289; B20-B24; D65–D68, D691, D693-D696; B18, I85, I864, I982, K700- K703, K709 K711, K713–K715, K716, K717, K721, K729, K73, K74, K754, K760, K761, K763, K764, K765, K766, K768, K769, Z944; L900, L940, L941, L943, M05, M06, M08, M120, M123, M30, M31, M32–M35, M45, M460, M461, M468, M469; G041, G114, G80, G81, G82, G83; E40–E46, R634, R64, D51–D53, D63, D649; D501, D508; D509

[a] All diagnoses identified in RAMQ (*Régie de l'assurance maladie du Québec,* Quebec Health Insurance Plan database) for the full study period were based on the International Classification of Diseases Ninth Revision (ICD-9), which included a 4-digit code, for the financial year: April 1 to March 31. The Canadian Tenth Revision (ICD-10-CA) was used in MED-ECHO (*Maintenance et exploitation des données pour l'étude de la clientèle hospitalière*, hospitalization database) (2006-07+). All diagnoses related to the above databases were considered, and all data integrated each year, for each patient. MED-ECHO is the only database that includes several diagnoses: principal diagnosis and numerous secondary diagnoses. In the databases used in this study, MD were considered only as principal diagnoses, but substance-related disorders (SRD) as both principal and secondary diagnoses, considering that SRD is often underdiagnosed. [b] The list of chronic physical illnesses is based on an adapted and validated version of the Elixhauser Comorbidity Index, integrating the Charlson Index, which consists of 32 major categories of physical illnesses (see reference in the methods section). In this list of chronic physical illnesses, three categories of MD and two of SRD (identified with an asterisk [*]) were also included in the list of MD-SRD, thus appearing twice.

Table 2. Physician follow-up care among patients with an incident mental disorder (MD) episode based on Robust Poisson regression models

	Prompt follow-up care (1+ physician consultations within 30 days)				Adequate follow-up care (3+ physician consultations within 90 days)				Continuous follow-up care (5+ physician consultations within 365 days)			
	Unadjusted RR	99% CI	Adjusted RR	99% CI	Unadjusted RR	99% CI	Adjusted RR	99% CI	Unadjusted RR	99% CI	Adjusted RR	99% CI
Year (referring to the last incident MD episode, measured from April 1, 2000 to March 31, 2020) [a]	0.98*	0.98-0.98	0.98*	0.98-0.98	0.98	0.98-0.98	0.98*	0.98-0.98	0.98*	0.98-1.00	0.98*	0.98-0.98
Sociodemographic characteristics (measured at the last incident MD episode diagnosed form April 1, 2000 to March 31, 2020)												
Women (ref.: men)	1.10*	1.09-1.10	1.01*	1.01-1.02	0.93*	0.92-0.94	1.07*	1.07-1.08	1.29*	1.28-1.29	1.13*	1.13-1.14
Age (ref.: 12-17 years)												
18-29 years	1.58*	1.56-1.60	1.23*	1.22-1.25	1.71*	1.69-1.73	1.31*	1.29-1.33	1.53*	1.51-1.52	1.20*	1.19-1.21
30-44 years	1.81*	1.79-1.83	1.30*	1.28-1.31	2.15*	2.12-2.17	1.46*	1.45-1.48	1.83*	1.81-1.84	1.28*	1.27-1.29
45-64 years	1.63*	1.61-1.65	1.14*	1.12-1.15	1.96*	1.94-1.99	1.31*	1.30-1.33	1.86*	1.84-1.87	1.22*	1.21-1.23
65+ years	1.48*	1.46-1.50	0.99*	0.97-1.00	1.57*	1.55-1.59	1.08*	1.06-1.09	1.92*	1.91-1.94	1.20*	1.18-1.21
Material and Social Deprivation Index (ref.: least to moderately deprived areas, 1, 2, 3) [b]												
Most deprived areas (4, 5)	0.97*	0.96-0.98	0.98*	0.98-0.98	0.93*	0.92-0.94	0.97*	0.97-0.98	0.98*	0.98-0.99	1.00	1.00-1.01
Not assigned areas (0)	0.97*	0.96-0.98	1.02*	1.01-1.03	0.93*	0.92-0.94	1.03*	1.02-1.04	1.00	0.99-1.01	1.00	0.99-1.01
Types of residential areas (ref.: metropolitan: >1,000,000 inhabitants)												
Urban (100,000 to 999,999)	0.97*	0.97-0.98	0.97*	0.96-0.97	0.98*	0.98-0.99	0.98*	0.97-0.99	0.98*	0.97-0.98	0.97*	0.97-0.98
Semi-urban (10,000 to 99,999)	0.92*	0.91-0.93	0.92*	0.91-0.93	0.93*	0.92-0.93	0.94*	0.93-0.94	0.94*	0.93-0.94	0.94*	0.93-0.94
Rural (<10,000)	0.94*	0.94-0.95	0.95*	0.95-0.96	0.93*	0.93-0.94	0.96*	0.95-0.96	0.94*	0.93-0.94	0.95*	0.94-0.95
Missing	0.86*	0.83-0.90	0.87*	0.83-0.91	0.81*	0.77-0.85	0.85*	0.81-0.89	0.85*	0.81-0.88	0.90*	0.87-0.93
Clinical characteristics (measured at the last incident MD episode diagnosed from April 1, 2000 to March 31, 2020, or other as specified)												
Incident MD (ref.: adjustment disorders) [c]												
Common MD												
Depressive disorders	1.14*	1.13-1.14	1.11*	1.10-1.11	1.21*	1.21-1.22	1.17*	1.17-1.19	1.21*	1.20-1.22	1.16*	1.15-1.17
Anxiety disorders	0.83*	0.82-0.84	0.82*	0.82-0.83	0.82*	0.82-0.83	0.82*	0.81-0.82	0.98*	0.98-0.99	0.95*	0.95-0.96
Attention deficit hyperactivity disorder	0.38*	0.37-0.39	0.48*	0.47-0.49	0.34*	0.33-0.34	0.46*	0.45-0.47	0.42*	0.41-0.43	0.59*	0.58-0.60
Serious MD												
Schizophrenia spectrum and other psychotic disorders	0.94*	0.93-0.95	0.94*	0.92-0.97	0.75*	0.74-0.76	0.81*	0.80-0.82	0.99*	0.98-0.99	0.93*	0.92-0.94
Bipolar disorders	1.20*	1.19-1.22	1.18*	1.17-1.20	1.15*	1.14-1.16	1.15*	1.13.1.16	1.23*	1.22-1.26	1.19*	1.18-1.20
Personality disorders	0.93*	0.92-0.95	0.92*	0.90-0.93	0.82*	0.80-0.83	0.85*	0.84-0.87	0.94*	0.92-0.95	0.95*	0.93-0.96
Substance-related-disorders (SRD)	0.67*	0.66-0.68	0.64*	0.63-0.64	0.39*	0.39-0.40	0.45*	0.44-0.45	0.56*	0.56-0.57	0.60*	0.57-0.58
Incident MD episode diagnosed during hospitalization [d]	0.93*	0.92-0.94	1.29*	1.27-1.30	0.49*	0.49-0.50	0.93*	0.92-0.95	0.67*	0.67-0.68	1.05*	1.03-1.06
Number of prior MD (not including MD diagnosed at the last episode) (measured from April 1, 1997 to March 31, 2020)												
0	0.65*	0.65-0.66	0.85*	0.84-0.87	0.37*	0.37-0.38	0.78*	0.77-0.80	0.48*	0.48-0.49	0.79*	0.78-0.80

2+	1.01	1.00-1.01	1.00	1.00-1.01	1.04*	1.03-1.04	1.02*	1.01-1.03	1.10*	1.10-1.11	1.08*	1.08-1.08
Severity of chronic physical illnesses (ref.: 0) (measured within 2 years before the last incident MD episode) [e]												
1	1.04*	1.03-1.04	1.02*	1.02-1.03	1.09*	1.08-1.09	1.06*	1.05-1.06	1.23*	1.22-1.23	1.13*	1.13-1.14
2	1.05*	1.04-1.06	1.07*	1.06-1.08	1.08*	1.07-1.09	1.11*	1.11-1.12	1.32*	1.31-1.32	1.22*	1.21-1.23
3+	1.06*	1.05-1.07	1.16*	1.11-1.13	0.91*	0.91-0.92	1.14*	1.13-1.15	1.22*	1.22-1.23	1.23*	1.22-1.24
Co-occurring MD-SRD [f]	0.96*	0.95-0.97	1.14*	1.12-1.15	0.67*	0.66-0.67	1.17*	1.15-1.19	0.84*	0.83-0.85	1.16*	1.14-1.17
Co-occurring MD-SRD-chronic physical illnesses [f]	0.72*	0.71-0.72	1.32*	1.31-1.34	0.51*	0.50-0.52	1.31*	1.29-1.33	0.54*	0.54-0.55	1.30*	1.28-1.31
Service use (measured within 2 years before the last incident MD episode diagnosed from April 1, 2000 to March 31, 2020, or other as specified)												
Prior follow-up care by usual general practitioner (GP) (for physical reasons only) [g]	2.18*	2.16-2.21	1.88*	1.85-1.91	3.09*	3.04-3.13	2.18*	2.15-.2.22	2.89*	2.86-2.93	2.06*	2.04-2.09
Prior follow-up care in a family medicine group (physical reasons only)	1.03*	1.03-1.04	1.07*	1.05-1.07	1.08*	1.08-1.09	1.10*	1.09-1.10	1.06*	1.06-1.07	1.10*	1.09-1.10
Prior high continuity of GP care (physical reasons only, Index of ≥0.67) [h]	1.03*	1.03-1.04	1.03*	1.02-1.03	1.13*	1.13-1.14	1.06*	1.06-1.07	1.30*	1.29-1.30	1.14*	1.14-1.15
Seniority of patient's usual GP (<20 years of seniority (ref.: 20+ years of seniority), measured from April 1, 1997 to March 31, 2020) [i]	1.16*	1.15-1.16	1.00	0.99-1.00	1.20*	1.19-1.20	0.98*	0.98-0.99	1.23*	1.22-1.24	0.99*	0.98-0.99
Prior high use of emergency departments (ED) (3+visits/year, for physical reasons, measured within one year before the last incident MD episode)	1.12*	1.11-1.13	1.11*	1.10-1.11	0.99	0.98-1.04	1.05*	1.05-1.06	1.10*	1.09-1.10	1.06*	1.06-1.07

*p<0.01

[a] A 3-year clearance period was required for the case definition of an incident mental disorders (MD) episode from April 1, 1997 to March 31, 2000. Medical follow-up care, including that provided by general practitioners (GP) and psychiatrists, was thus measured from fiscal years April 1, 2000 to March 31, 2020. If a patient had several MD episodes, only the last episode was considered, controlling for the number of preceding episodes in the final model (see the Methods section for more details).

[b] This index aggregated patient data on material and social deprivation, which is related to the smallest geographic dissemination areas (zip code areas), established for the most recent versions of the Canadian census. For this study, quintiles were regrouped into three levels representing the least to moderate (1-3), and most (4-5) deprived areas, and non-assigned areas (0); e.g., missing addresses or living in areas where index assignment was not feasible such as nursing homes or homeless individuals.

[c] At least two diagnoses from the *Régie de l'assurance maladie du Québec* (RAMQ, Physician Claims database) or one principal diagnosis from the *Maintenance et exploitation des données pour l'étude de la clientèle hospitalière* (MED-ECHO, Hospital Inpatient and Day Surgery database) over a 12-month period were needed for a patient to be diagnosed with an incident MD, except in the case of substance-related disorders (SRD) as they are often underdiagnosed and thus needed only one diagnosis either from RAMQ or MED-ECHO, including secondary diagnosis. The first MD diagnosed in a 12-month period (e.g., depressive disorders), considering this case definition, and for the last incident MD episode from April 1, 2000 to March 31, 2020, was considered. However, co-occurring MD-SRD occurring during this period were controlled for in the final model.

[d] This represents a proxy for illness severity. The follow-up care periods (prompt, adequate, and continuous follow-up care) were measured after patient discharge.

[e] Chronic physical illnesses were measured with an adapted algorithm from Elixhauser and Charlson Comorbidity Indexes, including renal failure; cerebrovascular, neurological, and endocrine illnesses; tumor without or with metastasis; chronic pulmonary illnesses; diabetes complicated and uncomplicated; cardiovascular illnesses, and other chronic illness conditions (e.g., blood loss anemia) (see Appendix 1 and the Methods section).

[f] These variables considered the last incident MD (including SRD) in relation with co-occurring MD or SRD and chronic physical illnesses withing the fiscal year of the incident MD for MD-SRD, and within two years for chronic physical illnesses which usually have a lifetime occurrence.

[g] To be designated as the patient's usual GP (a proxy for family physician, variable not available in administrative databases), a minimum of 2 consultations with the same GP or with different GP from the same family medicine group were required, measured 2 years before the last incident MD episode. "Usual GP" refers to the GP most frequently consulted by a patient. References are provided in the Methods section.

[h] Continuity of GP care was measured with the Usual Provider Continuity Index, in which a score of ≥0.67 designates having high continuity of care. The Index describes the proportion of consultations with the "usual" GP of all GP consulted in outpatient care, including consultations in walk-in clinics. References are provided in the Methods section.
[i] The seniority of the usual GP referred to the number of years of practice of the patient's usual GP (or the GP most often consulted). The 20-year benchmark for GP seniority was constructed based on a 50% distribution of physician age in the database.

Appendix 2. Statistics on patients diagnosed at their last incident mental disorder (MD) episode and medical follow-up care per year (N=2,670,133)

Year [a]	Number of patients at the last incident MD episode	Prompt follow-up care (1+ physician consultations within 30 days)	Number of patients at the incident MD episode	Adequate follow-up care (3+ physician consultations within 90 days)	Number of patients at the last incident MD episode	Continuous follow-up care (5+ physician consultations within 365 days)
	2,579,706		2,577,434		2,542,757	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
2000-01	90,338 (3.50)	40,413 (44.74)	90,017 (3.49)	39,961 (44.39)	88,214 (3.47)	50,999 (57.81)
2001-02	93,149 (3.61)	40,119 (43.07)	92,834 (3.60)	40,019 (43.11)	90,875 (3.57)	51,196 (56.34)
2002-03	93,796 (3.64)	39,444 (42.05)	93,610 (3.63)	39,269 (41.94)	91,661 (3.60)	50,586 (55.19)
2003-04	95,594 (3.71)	39,410 (41.23)	95,419 (3.70)	38,989 (40.86)	93,612 (3.68)	50,618 (54.07)
2004-05	95,831 (3.74)	38,539 (40.22)	95,664 (3.71)	38,002 (39.72)	94,090 (3.70)	49,447 (52.55)
2005-06	102,869 (3.99)	41,100 (39.95)	102,608 (3.98)	40,288 (39.26)	100,853 (3.97)	52,094 (51.65)
2006-07	104,753 (4.06)	40,717 (38.87)	104,676 (4.06)	40,517 (38.71)	103,065 (4.05)	52,841 (51.27)
2007-08	109,096 (4.23)	40,849 (37.44)	108,952 (4.23)	40,517 (37.19)	107,376 (4.22)	53,708 (50.02)
2008-09	113,601 (4.40)	41,602 (36.62)	113,450 (4.40)	41,477 (36.56)	111,828 (4.40)	54,665 (48.88)
2009-10	117,728 (4.56)	41,413 (35.18)	117,596 (4.56)	41,402 (35.21)	115,883 (4.56)	55,370 (47.78)
2010-11	125,532 (4.87)	43,685 (34.80)	125,413(4.87)	43,348 (34.56)	123,794 (4.87)	57,999 (46.85)
2011-12	135,025 (5.23)	46,616 (34.52)	134,946 (5.24)	46,502 (34.46)	133,230 (5.24)	61,770 (46.36)
2012-13	139,399 (5.40)	47,386 (33.99)	139,367 (5.41)	47,180 (33.85)	137,834 (5.42)	62,381 (45.26)
2013-14	147,894 (5.73)	50,135 (33.90)	147,932 (5.74)	49,578, (33.51)	146,291 (5.75)	65,664 (44.89)
2014-15	154,309 (5.98)	52,076 (33.75)	154,314 (5.99)	51,581 (33.43)	152,677 (6.00)	68,580 (44.92)
2015-16	168,138 (6.52)	56,894 (33.84)	168,142 (6.52)	56,500 (33.60)	166,397 (6.54)	74,383 (44.70)
2016-17	182,829 (7.09)	61,343 (33.55)	182,817 (7.09)	60,666 (32.18)	181,062 (7.12)	80,334 (44.37)
2017-18	167,825 (6.51)	55,308 (32.96)	167,675 (6.51)	54,110 (32.27)	166,060 (6.53)	71,551 (43.09)
2018-19	170,064 (6.59)	56,560 (33.26)	170,106 (6.60)	55,573 (32.67)	168,403 (6.62)	71,978 (42.74)
2019-20	171,936 (6.66)	56,294 (32.74)	171,896 (6.67)	55,918 (32.53)	169,552 (6.67)	72,182 (42.57)

[a] Financial year: April 1, 2000 to March 31, 2020. A 3-year clearance period was required for the case definition of an incident mental disorder (MD) episode (April 1, 1997 to March 31, 2000). Care from general practitioners (GP) and psychiatrists are integrated in follow-up care.

Prédicteurs des soins de suivi d'un médecin chez des patients affectés par un épisode incident de trouble mental au Québec (Canada)

Objectifs : La présente étude a identifié les prédicteurs des soins de suivi rapides (1+ consultations ambulatoires de médecin/en 30 jours), adéquats (3+/90 jours) et continus (5+/365 jours) d'omnipraticiens (OP) ou de psychiatres chez des patients vivant un épisode incident de trouble mental (TM).

Méthodes : Les données de l'étude ont été extraites du Système intégré de surveillance des maladies chroniques du Québec (SISMACQ) qui couvre 98 % de la population admissible aux services de soins de santé en vertu du Régime d'assurance maladie du Québec (Canada). Cette étude épidémiologique observationnelle qui recherche le SISMACQ du 1er avril 1997 au 31 mars 2020 est basée sur une cohorte de patients incluant des patients de 12 ans et + vivant un épisode incident de TM (n = 2 670, 133). Les rapports de risque ont été calculés à l'aide de régressions de Poisson robustes afin de mesurer les caractéristiques sociodémographiques et cliniques du patient, et l'utilisation antérieure du service, qui prédisaient si les patients étaient plus ou moins susceptibles de recevoir des soins de suivi rapides, adéquats ou continus après leur dernier épisode incident de TM, en contrôlant pour des épisodes antérieurs de TM, des troubles co-occurrents et les années d'entrée dans la cohorte.

Résultats : Une minorité de patients, et moins encore avec le temps, a reçu des soins de suivi d'un médecin après un épisode incident de TM. Des femmes, patientes âgées de 18 à 64 ans; souffrant de troubles dépressifs ou bipolaires et troubles co-occurrents de TM liés aux substances (TLS) ou maladies physiques de ceux recevant des soins de suivi antérieurs d'un OP, surtout dans des groupes de médecine familiale; les patients ayant une continuité précédente plus élevée des soins d'un OP, et les utilisateurs fréquents précédents des services d'urgence (SU) étaient plus susceptibles de recevoir des soins de suivi. Les patients habitant hors de la région métropolitaine de Montréal; ceux n'ayant pas d'OP, les patients souffrant d'anxiété et de déficit de l'attention avec hyperactivité, de schizophrénie et autres troubles psychotiques ou de TLS étaient moins susceptibles de recevoir des soins de suivi.

Conclusion : Cette étude indique que les patients vulnérables ayant des caractéristiques cliniques complexes et ceux ayant eu de meilleurs soins d'un OP antérieurement étaient plus susceptibles de recevoir des soins de suivi rapides, adéquats ou continus après un épisode incident de TM. En général, les soins de suivi des médecins devraient grandement s'améliorer.