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ORIGINAL PAPER

Changing characteristics of forensic psychiatric patients in Ontario: a population-based study from 1987 to 2012

Stephanie R. Penney[1,2] · Michael C. Seto[3,4] · Anne G. Crocker[5,6] · Tonia L. Nicholls[7,8] · Teresa Grimbos[9] · Padraig L. Darby[1] · Alexander I. F. Simpson[1,2]

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Abstract

Purpose To quantify the demand for forensic psychiatric services in Ontario over the past 25 years and investigate whether the sociodemographic, clinical and offense-based characteristics of forensic patients have changed over time.

Methods We investigated all forensic admissions from 1987 to 2012 resulting in a disposition of Not Criminally Responsible on account of Mental Disorder ($N=2533$). We present annual proportions of patients with specified sociodemographic, clinical and offense characteristics, and investigate whether the duration of forensic system tenure varies as a function of admission year, psychiatric diagnosis, or index offense.

Results There has been a steady increase in forensic admissions over this time period, particularly individuals with comorbid substance use disorders and individuals of non-Caucasian ethno-racial background. The proportion of persons committing severe violence has remained low and has decreased over time. Having a comorbid personality, neurological, or substance use disorder significantly increased forensic system tenure, as did committing a violent offense. Individuals who came into the system in earlier years had slower rates of discharge compared to more recent admissions.

Conclusions Defining the trends characterizing the growth of the forensic population has important policy implications, as forensic services are costly and involve a significant loss of liberty. The current results indicate that young, substance abusing individuals of diverse ethno-racial backgrounds and who commit relatively low-level violence comprise an increasing proportion of Ontario's forensic population, and suggest that treatment must be optimized to best serve the needs of these individuals.

Keywords Psychiatric services · Mentally ill persons · Forensic mental health · Time trends · Crime

Introduction

Despite international variations in the criteria defining entry into the forensic mental health system, many industrialized nations have witnessed substantial increases in the number of persons accessing forensic mental health services over the past 3 decades (e.g., China [1]; Israel [2]; Western Europe [3–6]; for a review see [7]). Priebe and colleagues [3, 4], for example, found a substantial decline in general psychiatric beds, with the corresponding

✉ Stephanie R. Penney
stephanie.penney@camh.ca

1 Complex Care and Recovery Program, Forensic Division, Centre for Addiction and Mental Health, 1001 Queen Street West, Toronto M6J 1H4, Canada

2 Department of Psychiatry, University of Toronto, Toronto, Canada

3 Forensic Research Unit, Royal Ottawa Institute of Mental Health Research, Ottawa, Canada

4 Forensic Rehabilitation Research, Royal Ottawa Health Care Group, Ottawa, Canada

5 Department of Psychiatry and Addictions, Université de Montréal, Montreal, Canada

6 Research and Academics, Institut Philippe-Pinel de Montréal, Montreal, Canada

7 Forensic Psychiatric Services Commission and BC Mental Health and Substance Use Services, Provincial Health Services Authority, Vancouver, Canada

8 Department of Psychiatry, University of British Columbia, Vancouver, Canada

9 Child, Youth and Family Program, Centre for Addiction and Mental Health, Toronto, Canada

rises in forensic beds, supportive housing beds, as well as prison beds across nine European Union (EU) states. Salize and Dressing [5] documented the incidence and prevalence rates of persons admitted to forensic psychiatric care across 15 EU states from 1990 to 2002, finding that most states experienced an overall growth in forensic populations during this time, but that the growth rates were not uniform. In the US, substantial rises in the number of forensic beds and Not Guilty by Reason of Insanity (NGRI) accused have been noted each year from 1996 to 2009 [8] despite legislation and case law that have discouraged use of the defense [9–11].

The Canadian perspective

In Canada, forensic patients are persons detained under section 672 of the Criminal Code of Canada (CCC; [12]) as either Unfit to Stand Trial (UST) or Not Criminally Responsible on account of Mental Disorder (NCRMD). In regards to NCRMD, section 16 of the CCC encompasses the legal principle that, if certain criteria are met, no person who was suffering from a mental disorder at the time of the commission of an offense may be convicted of a crime. The legal test requires that the mental disorder render the defendant incapable of appreciating the nature or consequences of his or her actions or incapable of knowing the legal or moral wrongfulness of the offense. Similar criteria are used in most Western countries to absolve or diminish responsibility for an offense committed by persons with mental illness showing similar incapacities [13, 14].

The principle of lowered culpability for individuals unable to distinguish right from wrong, or to appreciate the potential consequences of their actions, has been present in Canadian law since the 1841 M'Naghten finding [15], when Canada was a dominion under British common law. Bill C-30 [16], passed in 1992, introduced significant procedural changes in the NCRMD defense, and increased the range of offenses that could qualify. Provincial Review Boards were established as quasi-judicial tribunals and three possible dispositions (detention in hospital, conditional discharge, and unconditional or absolute discharge) replaced the automatic detention of individuals declared NGRI under the previous regime. In the 1999 decision of *Winko v. British Columbia* [17], the onus of proof for demonstrating an individual's level of dangerousness and risk to public safety was reversed, so that the onus was on the forensic system to demonstrate dangerousness, rather than the individual to demonstrate absence of dangerousness. These changes granted NCRMD acquittees the right to an annual review by a tribunal which was mandated to detain only those who posed a significant threat to public safety in the least restrictive manner possible. Despite the procedural changes to the defense, the substance of the legal test for culpability (i.e., appreciation of nature/consequences of behavior, knowledge of wrongfulness) has remained largely unchanged since its introduction into Canadian law.

In the years following Bill C-30, research in the three most populous Canadian provinces (British Columbia, Ontario, and Quebec) found sharp increases in the number of individuals remanded for an assessment of criminal responsibility, as well as those ultimately adjudicated NCRMD [18–20]. More recent studies document rising NCRMD admissions [21–24], declines in the length of forensic hospitalization, as well as increases in the number of absolute discharges granted [24, 25]. Recent data suggest the number of new forensic (NCRMD) admissions in Ontario began to stabilize in 2005, but the mean tenure until absolute discharge has been rising, while the rate of absolute discharges has fallen, resulting in a growing total population [26].

Forensic services are costly and involve a major loss of liberty for those affected; as such, defining the factors underlying forensic population growth is an important public policy priority. Existing research has examined the Canadian forensic population cross-sectionally or over relatively short time periods. In 2006, the Department of Justice Canada reported on a random sample of active forensic patients ($N=1228$) between 1992 and 2004 from seven Canadian Review Boards (Prince Edward Island, Quebec, Ontario, Alberta, British Columbia, Yukon and Nunavut [21]). Results documented a 102% increase in the total number of forensic admissions, and noted that more cases were admitted than were released each year. The most common psychiatric diagnoses were in the psychotic spectrum (e.g., schizophrenia), with significant substance use comorbidity. Approximately three-quarters of accused were charged with a violent offense, with low base rates for the most serious violence. Duration under the supervision of the Review Board varied as a function of diagnosis and offense type. Those diagnosed with affective illnesses such as bipolar disorder, as well as those charged with sexual offenses, spent more time under the Review Board as compared to other patient groups. Lastly, there were notable changes in dispositions following the *Winko* [17] decision. While absolute and conditional discharges increased, detention orders decreased, suggesting that Review Boards were drafting less restrictive dispositions.

Most recently, an investigation of the psychosocial and criminological characteristics of forensic patients admitted between 2000 and 2005 in British Columbia, Quebec and Ontario ($N=1800$) [27] indicated that the most common clinical profile of NCRMD acquittees was characterized by psychosis with concomitant substance misuse in one-third of cases. Women were found to be older at the time of entry into the forensic system, to have fewer previous criminal charges, and more likely to be diagnosed with mood and personality disorders. In contrast, men were more likely to be diagnosed

with psychotic and substance use disorders [28]. With respect to offending, two-thirds of index offenses were against the person, but with a wide range of severity and a low rate of serious violence (e.g., murder, attempted murder, sexual assault). Follow-up data revealed a low rate of criminal recidivism among discharged forensic patients, at 17% over three years and lowest in Ontario at 9% (Ontario $N=484$; [29]). There were some interprovincial discrepancies in the demographic characteristics of patients and the duration they spent under the Review Board, highlighting the need to examine individual provinces more closely and for longer durations of time. These data are also more than a decade old, suggesting that a more recent and longer term survey of forensic patients is needed.

The current study

This study aims to identify patient and offense characteristics related to the increase in forensic service demand in Ontario, and to identify opportunities for policy responses. To this end, we focused on variables influencing entry, progress through, and discharge from the Ontario Review Board system. A major limitation of existing literature is that patient characteristics are not documented on an annual basis, precluding the examination of long-term trends. Consequently, it remains unknown, for example, whether the rise in the forensic population is the result of a more heterogeneous group of people coming under the jurisdiction of the Review Boards for less serious offenses and/or with different profiles of psychiatric illness. Effective forecasting of patient characteristics can facilitate more efficient use of resources, to the extent that increasing or declining areas of treatment need are known with greater precision.

Whereas the NCRMD/NGRI defense was formerly reserved for the most seriously mentally ill and violent individuals, the literature reviewed above suggests a greater range of offenses and persons may now be found NCRMD. The current study investigates, on an annual basis, the sociodemographic, clinical, and offending-related characteristics of all active Ontario Review Board (ORB) patients for the time period 1987–2012. Consistent with prior work, we expected to see a more heterogeneous group of persons in terms of psychiatric diagnoses and offenses receiving a defense of NCRMD in more recent years. Gender differences were anticipated in the domains of psychiatric and criminal histories, given Nicholls and colleagues [28]. The time period 1987–2012 was selected to establish a 5-year baseline prior to the first significant legislative change affecting the NCRMD defense in 1991/1992, and continued until the study's end, 20 years after Bill C-30 [16, 17]. This design improves on previous efforts to document the characteristics of persons in the forensic mental health system.

Method

A coding scheme and manual were developed for the study, containing all relevant sociodemographic, clinical, and offending-related variables. The development of these materials was guided by a previous interprovincial study examining the antecedents and trajectories of NCRMD accused, including mental health and criminal justice involvement, Review Board decision-making, mental health and criminal outcomes [27]. Three research analysts were trained on how to use the coding form, and inter-rater reliability was assessed by examining agreement between the analysts and two senior researchers who developed the tools and were familiar with the variables being recorded. Good inter-rater reliability was achieved for all variables [intraclass correlation coefficient ($ICC_{A,1}$) greater than 0.75 (kappa coefficient > 0.75 for categorical variables)].

All cases registered under the ORB and with a disposition of NGRI or NCRMD between 1987 and 2012 were included in the sample, resulting in a final sample size of 2533 cases involving 2413 distinct individuals.[1] Sources of information included all documents present in the ORB file, which usually comprised court documents for the offenses leading to the NCRMD designation, psychiatric reports, and disposition documents. When there were multiple offenses, patients were classified according to the most serious offense according to the following hierarchy: sexual (e.g., sexual assault, child pornography, indecency), severely violent (e.g., murder, manslaughter, aggravated assaults), violent (e.g., common assaults, threatening, robbery), non-violent (e.g., breaking and entering, theft), and administrative (e.g., breaches of probation) offenses.[2] Cases were coded chronologically, based on the year that the case was closed. For NCRMD cases, this meant the point at which the individual either received an absolute discharge from the ORB, was transferred out of province, or died. Study procedures were approved by the ethics review board of the principal investigator prior to the commencement of data collection.

[1] Some individuals had more than one NCRMD disposition for separate offenses, and so were registered more than once over the study period.

[2] Admittedly, there is some degree of subjectivity when classifying offense severity, particularly whether sexual offenses represent more or less serious offenses as compared to non-sexual violent crimes. We note that just four individuals in the sample had both a sexual and severely violent index offense, and none of these four included homicides. Seventy-two had both sexual and (non-severe) violent offense, with common assault being the most common violent charge accompanying the sexual offense. Results were unchanged whether these individuals were classified as sexual or violent offenders.

Statistical analysis

Annual proportions of clients with specific demographic, clinical, and offense characteristics were computed and time series analysis was performed to determine the statistical effect of time on these proportions. The Durbin–Watson statistic revealed the presence of autocorrelation, as is common with time series data. To compensate, regression models with first-order autoregressive errors were run to provide unbiased estimates (AREG procedure in SPSS). Survival analysis was used to model the time to absolute discharge, and specifically, whether an individual's likelihood of receiving an absolute discharge varied as a function of their admission year, psychiatric diagnosis, or index offense.

Results

Sample characteristics

As shown in Table 1, the majority of the sample comprised of relatively young, single Caucasian males with varying educational backgrounds. Most were living alone or with family prior to the index offense and received social assistance. The majority was diagnosed with a psychotic disorder and had a violent index offense. Most (90%) had some form of prior contact with (non-forensic) mental health services, with 61% having a prior inpatient admission; 10% had prior forensic admissions.

Female forensic service users were older at the time of the index offense and had shorter ORB dispositions than male cases. They were more likely to be of African or Caribbean ethnicity and to have a higher level of education. Prior to the index offense, female patients were more likely to be married or divorced, supported by family or friends, and living independently. They were more likely than males to have a sole psychotic or mood disorder, and less likely to have a co-occurring substance use disorder. Although comparable percentages were diagnosed with a personality disorder, significantly more men (7.3%) than women (0.8%) were diagnosed with antisocial personality disorder ($\chi^2 = 21.97$, $p < 0.001$) while more women (7.7%) than men (0.3%) were diagnosed with borderline personality disorder ($\chi^2 = 126.82$, $p < 0.001$). Women were less likely to have a sexual index offense, and had fewer previous criminal convictions.

Time trends

There was a substantial increase in the number of individuals coming under the supervision of the ORB since the 1992 legal change, up to 2007 (Fig. 1). The number of new cases adjudicated NGRI (pre-1992) or NCRMD (1992 onwards) was relatively static until the early 1990s, and since that time continued to rise at an average rate of 6.5% per annum.

Autocorrelation corrected regression models revealed significant time effects for ethnicity, type of index offense, and clinical diagnosis (Fig. 2). With respect to ethnicity, consistent with recent immigration trends [30], we observed increasing proportions of individuals of African, Caribbean, Middle Eastern and Asian backgrounds coming under the ORB in more recent years ($\beta = 0.49$–0.60, $p \leq 0.01$), alongside declining proportions of Canadian- and European-born individuals ($\beta = -0.61$, $p < 0.01$). The proportion of Aboriginal individuals remained stable ($\beta = 0.16$, $p = 0.45$) and low (on average, 2.9% of the total sample) over the course of the time frame sampled. With respect to index offenses, there was a decline in the proportion of individuals presenting with severely violent index offenses, $\beta = -0.46$, $p < 0.05$, alongside increases in the proportions with less serious violence, $\beta = 0.54$, $p < 0.01$ and administrative charges, $\beta = 0.81$, $p < 0.01$. The rates of psychotic, mood, and personality-based disorders remained stable; however, the proportion of individuals presenting with comorbid substance use disorders increased significantly ($\beta = 0.49$, $p = 0.01$). The proportion of males and females under the ORB remained stable over the time period studied, as did the average age of forensic service users.

Discharge rates over time

Cox regression analysis revealed that the odds of receiving an absolute discharge were significantly higher in later as compared to earlier years (Table 2). Individuals admitted in earlier years spent significantly more time under the ORB ($r = -0.53$, $p < 0.001$). When the sample was divided into four admission year cohorts corresponding to relevant legislative changes [i.e., 1987–1992 (pre Bill C-30), 1993–1999 (post Bill C-30/pre *Winko*), 2000–2005 (post *Winko*), 2006–2012], a similar effect emerged, with a dose-dependent decrease in the average number of months before reaching absolute discharge per later cohort, F (3, 1257) = 159.02, $p < 0.001$. The percentage of individuals in each of the four cohorts receiving an absolute discharge at 5 years post-admission was 19.6, 23.9, 44.1, and 69.9, for the earliest to latest cohort, respectively. Patients with previous criminal convictions spent longer under the ORB as compared to those with no prior criminal history.

Discharge rates as a function of illness and offense profile

Individuals with a primary or comorbid mood disorder received an absolute discharge more quickly than those in other diagnostic categories. The presence of both substance misuse and personality pathology, whether comorbid with a primary mood or psychotic disorder, was found to significantly

Table 1 Sample characteristics

	Males ($N=2171$)		Females ($N=362$)		F	Total ($N=2533$)	
	M	SD	*M*	SD		*M*	SD
Age at index offense	34.96	12.17	39.40	12.28	40.93**	35.60	12.29
Duration to absolute discharge (months)	57.74	47.21	46.79	50.75	8.31*	55.80	47.92
	N	%	*N*	%	χ^2	*N*	%
Ethnicity							
Caucasian	820	56.5	132	53.7	0.67	952	56.1
African or Caribbean Canadian	231	15.9	58	23.6	8.83*	289	17.0
Middle Eastern	85	5.9	9	3.7	1.93	94	5.5
Asian	187	12.9	27	11.0	0.69	214	12.6
Other	128	8.8	20	8.1	0.13	148	8.7
Education							
Less than high school (< grade 13)	986	48.4	137	41.8	4.93*	1123	47.5
Completed high school	336	16.5	51	15.5	0.21	387	16.4
Post-secondary	632	31.0	127	38.7	7.69*	759	32.1
Graduate level	52	2.6	10	3.0	0.18	62	2.6
Income							
Paid employment	363	21.8	59	20.8	0.14	422	21.7
Social assistance	840	50.5	133	47.0	1.18	973	50.0
Supported by family or friends	228	13.7	53	18.7	4.90*	281	14.4
No income	62	3.7	6	2.1	1.85	68	3.5
Marital status							
Single	1223	61.8	123	36.3	77.26**	1346	58.1
Common law/married	242	12.2	75	22.1	24.06**	317	13.7
Divorced/separated	419	21.2	118	34.8	30.04**	537	23.2
Residential status prior to index offense							
Independent living	1390	72.8	263	79.9	7.32*	1653	73.8
Supervised setting/hospital	185	9.7	22	6.7	3.01	207	9.2
Homeless/shelter	331	17.3	43	13.1	3.56	374	16.7
Diagnosis							
Any psychosis	1797	82.8	279	77.1	6.82*	2076	82.0
Psychotic disorder only	602	27.7	144	39.8	21.86**	746	29.5
Any mood disorder	609	28.1	170	47.0	51.98**	779	30.8
Mood disorder only	177	8.2	81	22.4	68.10**	258	10.2
Comorbid substance abuse	1124	51.8	106	29.3	62.85**	1230	48.6
Personality disorder indicated	664	30.6	98	27.1	1.81	762	30.1
Index offense							
Violent	1245	57.5	208	57.9	0.02	1453	57.5
Severe violent	381	17.6	69	19.2	0.54	450	17.8
Non-violent	369	17.1	75	20.9	3.06	444	17.6
Sexual	171	7.9	7	1.9	16.92**	178	7.0
Prior mental health services	1922	89.6	328	90.9	0.57	2250	89.8
Prior psychiatric admission	1211	60.5	209	64.5	1.88	1420	61.1
Prior criminal convictions	1249	59.6	128	36.4	65.89**	1377	56.3
Prior ORB tenure	225	10.4	28	7.7	2.51	253	10.0

Sample sizes range from 1697 (ethnicity) to 2533 (diagnosis) due to missing data

ORB Ontario Review Board

*$p \leq 0.05$, **$p < 0.001$

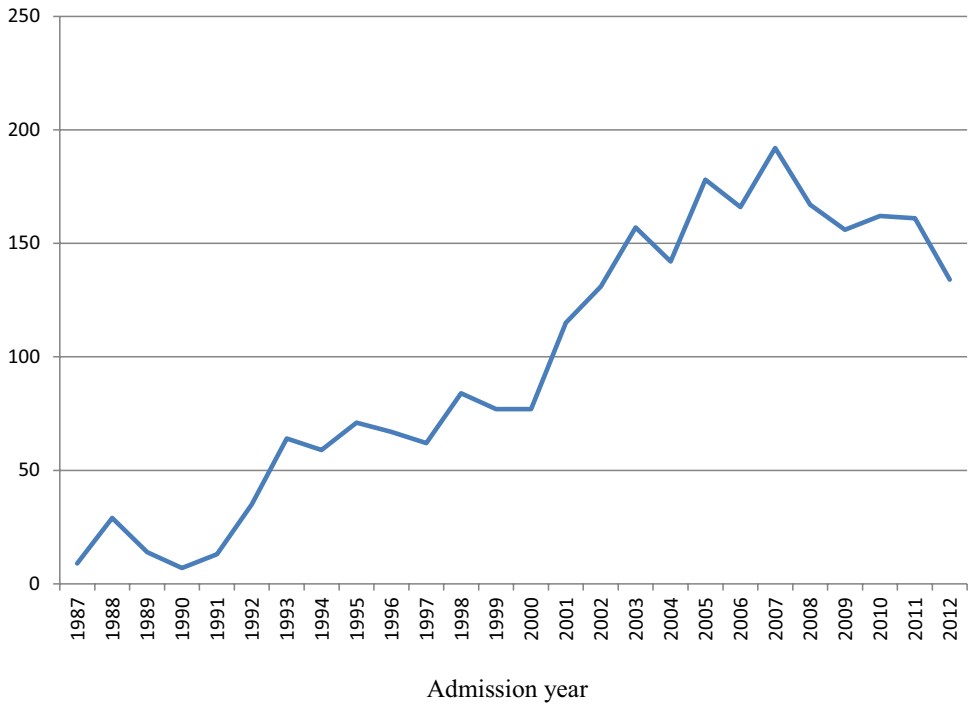

Fig. 1 Annual new admissions to the Ontario Review Board (NGRI/NCRMD)

prolong the amount of time under the ORB (Fig. 3; displayed for psychotic disorder). The same was true of neurologic conditions such as dementia. Those committing exclusively non-violent offenses received absolute discharges in the shortest period of time, followed by those committing exclusively (non-severe) violent offenses. Individuals committing severely violent, sexual, and administrative offenses spent significantly longer under the supervision of the ORB (Fig. 3).

Discussion

The phenomenon of rising forensic patient numbers has been observed both in Canada and internationally [7], despite regional variations in offending prevalence, mental health law, and procedures through which mentally disordered offenders are managed. There are substantial economic repercussions associated with these trends [31], and which are compounded by the fact that forensic hospitalizations tend to be far lengthier as compared to voluntary [32] and involuntary [33] psychiatric admissions. Despite the costs associated with increased demand for forensic care, there is little empirical knowledge to shed light on the causes of this trend, or the characteristics of the changing population of forensic service users. To date, the major Canadian studies of forensic patients [21, 27] have not provided a population-level analysis of long-term trends over time. In this context, this study is the first to present a year-by-year analysis of all individuals adjudicated NGRI or NCRMD in the province of Ontario over a 25-year period, including data for key sociodemographic, clinical, and offense characteristics.

We observed a substantial increase in the number of new forensic admissions over this time period. The number of new cases adjudicated NGRI or NCRMD was relatively static until the early 1990s, but increased at an average rate of 6.5% per annum from 1992 to 2007. Ontario forensic services have grown to cope with the rising number of individuals under the ORB, but the total number of admissions consistently outpaces new resources and has resulted in concerns regarding pressures on forensic inpatient and outpatient services. Such problems have resulted in lengthier wait times for available beds, as well as individuals waiting in higher security settings (e.g., jail, maximum or medium security units) than their clinical needs require. Understandably, judicial findings have been critical of Ontario for failing to increase funding of forensic services [34].

So what variables appear to be driving this trend? First, increasing forensic patient numbers showed a clear and immediate response to the legislative changes introduced in 1992 (Bill C-30) and subsequently in 1999 (*Winko v. British Columbia*), changes which essentially ended the automatic and indefinite detention of individuals found NCRMD and granted them the right of an annual review by a tribunal that possessed increased flexibility in disposition provisions. Criteria for civil psychiatric admissions also became progressively stricter during this time period, leading physicians to exercise these criteria in only the most urgent situations, and resulting in a "forensification" of patients who may have otherwise been served by civil psychiatric services [7]. Between

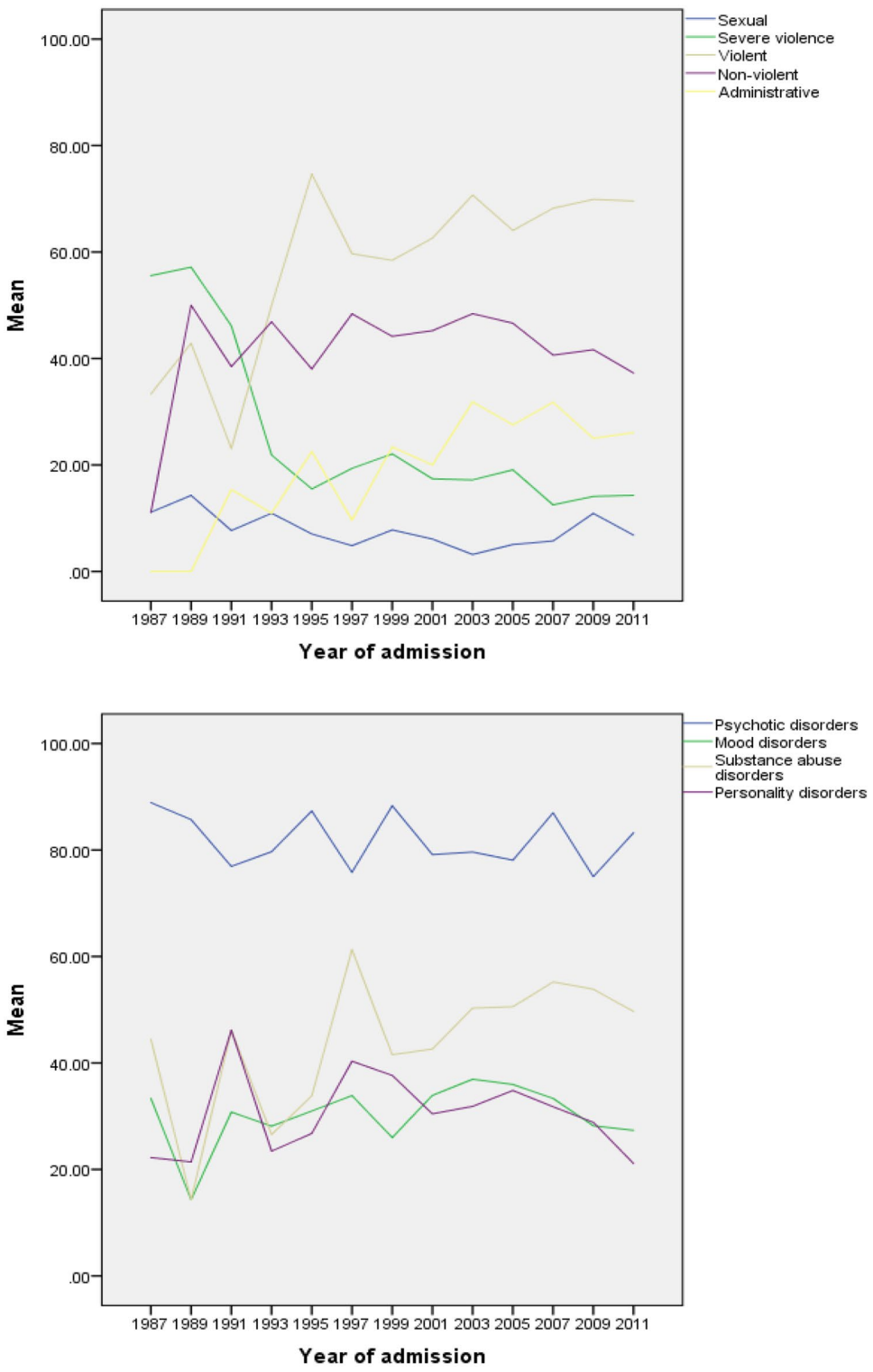

Fig. 2 Annual proportions of forensic services users by most severe index offense (upper panel) and diagnosis (lower panel)

1992 and 1999, and up until 2007, there was a progressive and steady increase in new ORB numbers. Since 2007, new cases have been declining by approximately 6.6% per annum to the end of 2011. This decrease was unexpected, and may reflect the evolution of diversion and community-based programs (e.g., court support, assertive community treatment teams) that intervene earlier in the criminal justice process for mentally ill persons and provide mental health services that may have otherwise been sought within the forensic system.

Female forensic patients were older at the time of admission, consistent with the well-documented finding

Table 2 Cox regression predicting time to absolute discharge from the Ontario Review Board

	β	Wald	OR (95% CI)
Year of admission	0.02	18.13	1.02 (1.01–1.04)**
Sex	−0.01	0.01	0.99 (0.85–1.16)
Number of previous convictions (reference group = none)			
1–5	−44	40.89	0.64 (0.56–0.74)**
6–10	−0.70	44.32	0.50 (0.40–0.61)**
10+	−0.90	71.75	0.41 (0.33–0.50)**
Index offense (reference group = non-violent)			
Sexual	−0.78	31.01	0.46 (0.35–0.60)**
Severe violence	−0.85	72.80	0.43 (0.35–0.52)**
Violent	−0.35	4.29	0.71 (0.61–0.82)**
Administrative	−0.51	20.32	0.60 (0.37–0.97)*
Diagnosis			
Psychosis only	0.19	4.46	1.21 (1.02–1.45)*
Mood	−0.17	7.21	0.84 (0.74–0.94)*
Neuro	0.43	18.23	1.54 (1.26–1.88)**
Personality disorder	0.50	42.80	1.64 (1.42–1.91)**
Substance use disorder	0.25	10.11	1.29 (1.10–1.51)**

Having no prior convictions and a non-violent index offense were used as the reference groups with indicator contrast coding

OR odds ratio

Model results: χ^2 (14, $N = 2429$) = 351.07, $p < 0.001$

*$p \leq 0.05$, **$p < 0.001$

of later onset of serious mental illness in women [35, 36]. Women were as likely as men to perpetrate minor and more serious acts of violence, consistent with the finding that the gender 'gap' in rates of violence and aggression are substantially smaller among people with mental illness [37–39]. Women in this sample were also more likely to have a post-secondary education, less likely to be single, and more likely to have a primary mood disorder without substance use comorbidity. Compared to men, women also had significantly fewer past criminal convictions. These findings are congruent with the National Trajectory Project [27], and suggest that female forensic service users have unique profiles of need that would benefit from gender-sensitive treatment programming. For example, the higher prevalence of mood disorders and borderline personality disorder point to the importance of treatment focused on emotional regulation and interpersonal skills. Other variables not included in the current study (e.g., trauma histories) may further distinguish the distinct treatment needs of women.

When annual changes in patient characteristics were examined, we observed a shift in the ethno-racial composition of the forensic population, with increasing proportions of non-Caucasian individuals coming into care as time progressed. To assess the degree to which this represents demographic changes in the general population versus changes that may be unique to the forensic system, we compared a cohort of patients admitted into forensic care between 2000 and 2011 to the total adult immigrant population in Ontario in 2011 [30]. Results revealed higher proportions of Caribbean, Central American, Eastern European, and Eastern and Western African persons in the forensic system, and lower proportions of individuals from East and South Asia. The annual average percentage of Aboriginal individuals in this sample (2.9%) is consistent with recent Ontario estimates [40] and was stable over time. Concerns have been raised that individuals of Aboriginal heritage with mental health problems and who offend are significantly more likely to be channelled into the correctional than forensic mental health system [21].

Results also pointed to greater heterogeneity in the index offending of more recent NCRMD acquittees, with declining rates of severely violent offenses and the corresponding increases in the rate of less seriously violent offenses and administrative offenses. These findings rebut the popular notion that the rise in forensic patients is due to a rise in seriously violent offending among those with mental illness [41]. Rather, results are consistent with the idea that the use of the NCRMD defense has been progressively expanded to include less serious violence and administrative offenses. Findings are also consistent with the small set of prior studies: Livingston and colleagues [23] found that, compared with an earlier NGRI sample, NCRMD acquittees in British Columbia were charged with proportionately fewer murder or attempted murder offenses (10.5% versus 40.4% of the NGRI sample) and a greater proportion of assault (45.5% versus 19.1%) and nuisance-type (14.9% versus 1.6%) offenses. Schanda et al. [6] demonstrated that the incidence of NGRI judgments for homicide in Austria remained constant from 1990 to 2007, while those for offenses such as threatening, compulsion, and obstructing a police officer showed a substantial increase. These latter offenses accounted for more than half of all admissions in 2007, compared with only 20% in 1990.

Diagnostically, psychotic spectrum disorders remain overwhelmingly the most common, but the major change is a steady rise in comorbidity, particularly for substance use disorders. Prevalence rates of substance abuse and dependence disorders are vastly higher among psychiatric samples as compared to the general population [42], including forensic patients [43], and represent an important risk factor in the emergence, severity, and chronicity of symptoms. Among forensic patients in particular, substance misuse often represents one of the most critical risk factors for ongoing mental instability, violence and offending, and is often the most challenging barrier to successful community reintegration [44]. The current results regarding the rise in substance misuse among forensic

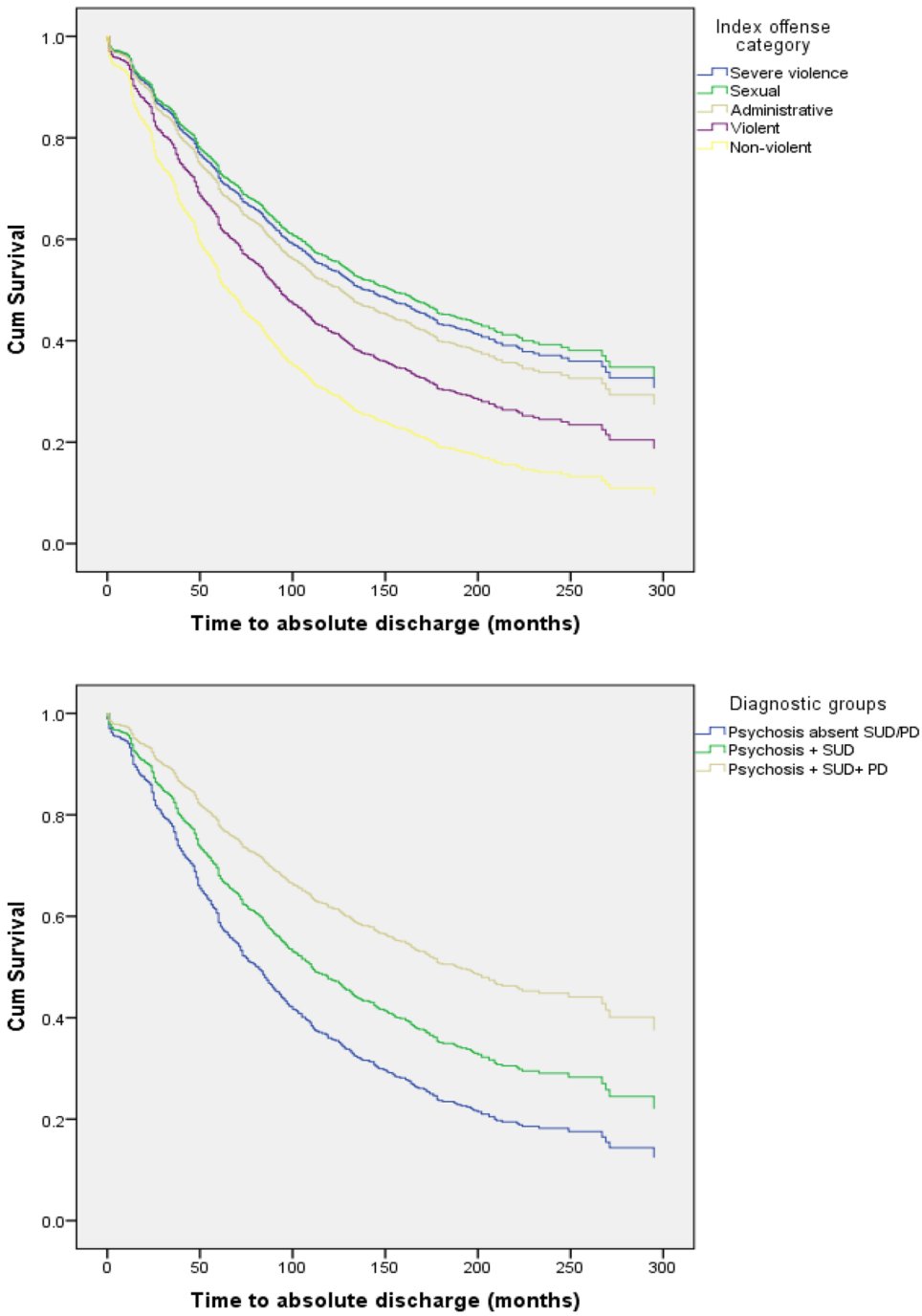

Fig. 3 Time to absolute discharge as a function of index offense (upper panel) and diagnosis (lower panel)

patients underscore the need for expanded rehabilitative programming that actively focuses on addiction services and best-practice models for concurrent disorders [45]. This issue may become particularly relevant as Canada moves forward with legislation to legalize the use of cannabis [46].

Lastly, we examined the length of time patients remained under the supervision of the ORB. Patients with primary mood disorders were found to spend significantly less time under the ORB, in contrast to a randomly selected, cross-provincial sample of Canadian forensic patients [21]. Patients who committed non-violent or less seriously violent index offenses were also found to spend less time under the ORB, in contrast to those with more seriously violent and sexual offenses. Provincial Review Boards are supposed to detain only those who are deemed to pose a significant threat to public safety, and decisions surrounding an individual's progression and discharge from the system are predicated on this criterion. While the severity of one's offending should not necessarily have a direct bearing on Review Board

decisions vis-à-vis risk of future violence, current findings do suggest that the ORB is managing patients with serious personal index offenses in a conservative manner.

We also found that patients with exclusively administrative offenses (e.g., breach of probation) spent significantly longer under the ORB as compared to other groups. Supplementary analyses revealed that more members of this group had prior criminal convictions [86.5% versus 55.6% of the remaining sample ($\chi^2 = 20.12$, $p < 0.001$)], as well as significantly more prior offenses [$M = 10.39$ (SD = 13.14) versus $M = 5.07$ (SD = 9.61), $t = 3.91$, $p < 0.001$]. This aligns with our clinical experience of this group of patients, who are adjudicated NCRMD on minor administrative charges but who often bring with them lengthy criminal histories and other criminogenic needs that ultimately delay progress through the forensic system.

Having a comorbid personality, neurologic or substance use disorder also significantly increased the duration of supervision under the ORB across the time period studied. This is understandable from a clinical perspective, given that these types of comorbid conditions often create additional challenges with respect to effective treatment and risk management. Personality and substance use disorders are also risk factors for violence and re-offending in their own right, and so concerns about treatment non-compliance and breaches of ORB dispositions may be viewed as particularly risk-enhancing for patients with these diagnoses. With respect to substance use disorders, as noted, they can exacerbate the chronicity and severity of psychiatric symptoms, as well as hamper the effectiveness of psychotropic medications. Unfortunately, the proportional increase in substance use disorders noted above, paired with the finding of increased duration under the board for those with substance use disorders, will likely give rise to ongoing pressures on forensic inpatient and community resources.

This study has limitations. First, although we adopted a systematic approach to data retrieval, there is apt to be some degree of missing data across the time frame sampled. However, there is no indication that data were missing systematically for particular years, but rather, are missing in a random manner across the 25-year time window. Figure 1 shows the expected rise in new forensic admissions over the study period, and the annual rate of increase is consistent with previous projections of this trend [21]. The exception is the last study year (2012), where we observed a steeper decline in the number of new admissions and where it was more likely that the very newest cases may not have been available to our research assistants at the time of coding. Second, with respect to clinical diagnoses, we are unable to parse out what may be true changes in the prevalence of specific disorders through time, from changes in diagnostic practices and documentation. Related to this is the limitation of our reliance on secondary data and archived clinical records. Given the longitudinal, population-based design of this study, we were unable to assess patients directly, and so were limited in the variables that could be examined. Future efforts may consider bridging large-scale databases of forensic patients with smaller, in-depth patient surveys to yield a comprehensive summary of the relevant psychosocial, clinical, and offense-based characteristics of this group. Lastly, our data pertain only to the province of Ontario. The existing literature highlights both areas of similarity and difference between forensic populations in Ontario and other Canadian [21, 27, 28] and international [5, 6] jurisdictions. The generalizability of current findings will be limited to the extent jurisdictional differences with respect to mentally disordered accused are relevant.

Notwithstanding these limitations, this study represents the first comprehensive examination of all forensic patients receiving a status of NCRMD in one of Canada's most populous provinces, over a long time frame encompassing significant legislative changes. It represents an important effort to document the changing characteristics and associated treatment needs of this patient population. Results highlight the need for improved access to intensive substance use treatment programming, as well as gender-informed and culturally sensitive assessment and treatment services to best serve the needs of this marginalized and vulnerable population.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Shaoling Z, Jun W, Graham M, Chen C, Simei Z, Qiguang L, Qun W, Jiansong Z, Xiaoping W (2017) Attitudes of Chinese community members and psychiatrists towards forensic psychiatric assessments. Psychiatry Res 258:283–288. https://doi.org/10.1016/j.psychres.2017.08.069
2. Abramowitz MZ, Grinshpoon A, Priebe S, Ponizovsky AM (2008) New institutionalization as a rebound phenomenon? The case of Israel. Isr J Psychiatry Relat Sci 45:272–277

3. Priebe S, Badesconyi A, Fioritti A, Hansson L, Kilian R, Torres-Gonzales F, Turner T, Wiersma D (2005) Reinstitutionalisation in mental health care: comparison of data on service provision from six European countries. BMJ 330:123–126. https://doi.org/10.1136/bmj.38296.611215.AE
4. Priebe S, Frottier P, Gaddini A, Kilian R, Lauber C, Martínez-Leal R, Munk-Jørgensen P, Walsh D, Wiersma D, Wright D (2008) Mental health care institutions in nine European countries, 2002 to 2006. Psychiatr Serv 59:570–573. https://doi.org/10.1176/ps.2008.59.5.570
5. Salize HJ, Dressing H (2007) Admission of mentally disordered offenders to specialized forensic care in fifteen European Union member states. Soc Psychiatry Psychiatr Epidemiol 42:336–342. https://doi.org/10.1007/s00127-007-0159-2
6. Schanda H, Stompe T, Ortwein-Swoboda G (2009) Dangerous or merely difficult? The new population of forensic mental hospitals. Eur Psychiatry 24:365–372. https://doi.org/10.1016/j.eurpsy.2009.07.006
7. Jansman-Hart EM, Seto MC, Crocker AG, Nicholls TL, Côté G (2011) International trends in demand for forensic mental health services. Int J Forensic Ment Health 10:326–336. https://doi.org/10.1080/14999013.2011.625591
8. National Association of State Mental Health Program Directors Research Institute (n.d.). http://www.nri-inc.org. Accessed 25 Sept 2017
9. Appelbaum PS (1994) Almost a revolution: mental health law and the limits of change. Oxford University Press, Oxford
10. Jones v United States (1983) 463 U.S. 354
11. Federal Insanity Defense Reform Act (1984) 18 U.S.C. § 17
12. Criminal Code of Canada (1985) R.S.C. c. 46. http://laws.justice.gc.ca/en/C-46/. Accessed 25 Sept 2017
13. Howard H (2003) Reform of the insanity defense: theoretical issues. J Crim Law 67:51–69
14. Zapf PA, Golding SL, Roesch R (2006) Criminal responsibility and the insanity defense. In: Weiner IB, Hess AK (eds) The handbook of forensic psychology, 3rd edn. Wiley, Hoboken, pp 332–363
15. R v M'Naghten (1843) 10 Cl. and F. 200, 8 Eng.Rep. 718
16. Bill C-30 (1992) An act to amend the criminal code and to amend the National Defense Act and the Young Offenders Act in consequence thereof (c. 43, s. 4)
17. Winko v British Columbia (Forensic Psychiatric Institute) (1999) 135 C.C.C. (3d) 129 (S.C.C.)
18. Nussbaum D, Malcolmson S, Dosis O (2000) Summary of research on Bill C-30 implementation in Ontario during 1993 and 1994. In: Eaves D, Ogloff JRP, Roesch R (eds) Mental disorders and the criminal code: Legal background and contemporary perspectives. Mental Health, Law, and Policy Institute, Burnaby, pp 104–118
19. Ohayon M, Crocker A (2000) Impact of Bill C-30 in the province of Quebec. In: Eaves D, Ogloff JRP, Roesch R (eds) Mental disorders and the criminal code: legal background and contemporary perspectives. Mental Health, Law, and Policy Institute, Burnaby, pp 119–128
20. Roesch R, Ogloff JRP, Hart SD, Dempster RJ, Zapf PA, Whittemore KE (1997) The impact of Canadian criminal code changes on remands and assessments of fitness to stand trial and criminal responsibility in British Columbia. Can J Psychiatry 42:509–514. https://doi.org/10.1177/070674379704200508
21. Department of Justice Canada (2006) The Review Board systems in Canada: an overview of results from the mentally disordered accused data collection study. Author, Ottawa
22. Crocker AG, Nicholls TL, Côté G, Latimer EA, Seto MC (2011) Individuals found not criminally responsible on account of mental disorder: are we providing equal protection and equivalent access to mental health services across Canada? Can J Community Ment Health 29:47–54
23. Livingston JD, Wilson D, Tien G, Bond L (2003) A follow-up study of persons found not criminally responsible on account of mental disorder in British Columbia. Can J Psychiatry 48:408–415
24. Schneider RD, Forestell M, MacGarvie S (2002) Statistical survey of provincial and territorial review boards. Department of Justice Canada, Ottawa
25. Balachandra K, Swaminath S, Litman LC (2004) Impact of Winko on absolute discharges. J Am Acad Psychiatry Law 32:173–177
26. Ontario Review Board (2015) Annual report. Author, Toronto
27. Crocker AG, Nicholls TL, Seto MC, Côté G, Charette Y, Caulet M (2015) The national trajectory project of individuals found not criminally responsible on account of mental disorder in Canada. Part 1: context and methods. Can J Psychiatry 60:98–105. https://doi.org/10.1177/070674371506000304
28. Nicholls TL, Crocker AG, Seto MC, Wilson CM, Charette Y, Côté G (2015) The national trajectory project of individuals found not criminally responsible on account of mental disorder. Part 5: how essential are gender-specific forensic psychiatric services? Can J Psychiatry 60:135–145. https://doi.org/10.1177/070674371506000308
29. Charette Y, Crocker AG, Seto MC, Salem L, Nicholls TL, Caulet M (2015) The national trajectory project of individuals found not criminally responsible on account of mental disorder in Canada. Part 4: criminal recidivism. Can J Psychiatry 60:127–134. https://doi.org/10.1177/070674371506000307
30. Statistics Canada (2011) National Household Survey. http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/index.cfm?Lang=E. Accessed 16 May 2018
31. Jacobs P, Moffatt J, Dewa CS, Nguyen T, Zhang T, Lesage A (2014) Criminal justice and forensic psychiatry costs in Alberta. Institute of Health Economics, Edmonton
32. Vigod SN, Kurdyak PA, Seitz D, Herrmann N, Fung K, Lin E, Perlman C, Taylor VH, Rochon PA, Gruneir A (2015) READMIT: a clinical risk index to predict 30-day readmission after discharge from acute psychiatric units. J Psychiatr Res 61:205–213. https://doi.org/10.1016/j.jpsychires.2014.12.003
33. Lebenbaum M, Chiu M, Vigod S, Kurdyak P (2018) Prevalence and predictors of involuntary psychiatric hospital admissions in Ontario, Canada: a population-based linked administrative database study. BJPsych Open 4:31–38. https://doi.org/10.1192/bjo.2017.4
34. Centre for Addiction and Mental Health v Ontario (2012) 342 O.N.C.A.
35. Castle DJ, Sham P, Murray RM (1998) Differences in distribution of ages of onset in males and females with schizophrenia. Schizophr Res 33:179–183. https://doi.org/10.1016/S0920-9964(98)00070-X
36. Häfner H (2003) Gender differences in schizophrenia. Psychoneuroendocrinology 28:17–54. https://doi.org/10.1016/S0306-4530(02)00125-7
37. Nicholls TL, Brink J, Greaves C, Lussier P, Verdun-Jones S (2009) Forensic psychiatric inpatients and aggression: an exploration of incidence, prevalence, severity, and interventions by gender. Int J Law Psychiatry 32:23–30. https://doi.org/10.1016/j.ijlp.2008.11.007
38. Robbins PC, Monahan J, Silver E (2003) Mental disorder, violence, and gender. Law Hum Behav 27:561–571. https://doi.org/10.1023/B:LAHU.0000004886.13268.f2
39. Hiday VA, Swartz M, Swanson JW (1998) Male–female differences in the setting and construction of violence among people with severe mental illness. Soc Psychiatry Psychiatr Epidemiol 33:568–574. https://doi.org/10.1007/s001270050212

40. Social and Aboriginal Statistics Division (2011) Aboriginal peoples: fact sheet for Canada. Statistics Canada, Ottawa
41. Penney SR, Prosser A, Grimbos T, Darby P, Simpson AI (2018) Time trends in homicide and mental illness in Ontario from 1987 to 2012: examining the effects of mental health service provision. Can J Psychiatry 63:387–394. https://doi.org/10.1177/0706743717737034
42. Koskinen J, Löhönen J, Koponen H, Isohanni M, Miettunen J (2010) Rate of cannabis use disorders in clinical samples of patients with schizophrenia: a meta-analysis. Schizophr Bull 36:1115–1130. https://doi.org/10.1093/schbul/sbp031
43. Simpson AIF, Penney SR, Seto M, Crocker AG, Nicholls TN, Darby PL (2014) Changing characteristics of the Review Board population in Ontario: a population-based study from 1987 to 2012. Report commissioned by the Ontario Ministry of Health and Long-term Care
44. Penney SR, Marshall L, Simpson AI (2018) A prospective study of pathways to hospital readmission in Canadian forensic psychiatric patients. J Forensic Psychiatry Psychol 29:368–386. https://doi.org/10.1080/14789949.2017.1395061
45. Minkoff K (2001) Developing standards of care for individuals with co-occurring psychiatric and substance use disorders. Psychiatr Serv 52:597–599. https://doi.org/10.1176/appi.ps.52.5.597
46. Cannabis A (2017) S.O. c. 26, Sched. 1