

Original Article


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Does physician compensation for declaration of involuntary status increase the likelihood of involuntary admission? A population-level cross-sectional linked administrative database study

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Abstract

Background. There is substantial variability in involuntary psychiatric admission rates across countries and sub-regions within countries that are not fully explained by patient-level factors. We sought to examine whether in a government-funded health care system, physician payments for filling forms related to an involuntary psychiatric hospitalization were associated with the likelihood of an involuntary admission.

Methods. This is a population-based, cross-sectional study in Ontario, Canada of all adult psychiatric inpatients in Ontario (2009–2015, $n = 122\,851$). We examined the association between the proportion of standardized forms for involuntary admissions that were financially compensated and the odds of a patient being involuntarily admitted. We controlled for socio-demographic characteristics, clinical severity, past-health care system utilization and system resource factors.

Results. Involuntary admission rates increased from the lowest (Q1, 70.8%) to the highest (Q5, 81.4%) emergency department (ED) quintiles of payment, with the odds of involuntary admission in Q5 being nearly significantly higher than the odds of involuntary admission in Q1 after adjustment (aOR 1.73, 95% CI 0.99–3.01). With payment proportion measured as a continuous variable, the odds of involuntary admission increased by 1.14 (95% CI 1.03–1.27) for each 10% absolute increase in the proportion of financially compensated forms at that ED.

Conclusions. We found that involuntary admission was more likely to occur at EDs with increasing likelihood of financial compensation for invoking involuntary status. This highlights the need to better understand how physician compensation relates to the ethical balance between the right to safety and autonomy for some of the world's most vulnerable patients.

Background

Involuntary admissions to psychiatric hospitals are becoming increasingly more common in Canada (Lebenbaum, Chiu, Vigod, & Kurdyak, 2018) and several European countries, including the UK, France, and Germany (Priebe et al., 2005; Salize & Dressing, 2004). While involuntarily admitting patients may sometimes be required to protect the safety of the patient and others, these decisions need to be carefully considered by the clinical team given that they limit patient autonomy. Prior studies suggest that involuntary admissions may negatively affect the patients' perceptions of their care both during and after the admission (Kallert, Glöckner, & Schützwahl, 2008; Priebe et al., 2010). Furthermore, involuntary admissions are controversial since beyond impacts on the patient experience, there are other negative impacts on patients such as possible increased risks of further involuntary admissions (Kallert et al., 2008) and links to strong emotional reactions such as shame and self-contempt (Rüsch et al., 2014). While the link between patient characteristics including severity and socio-demographic characteristics and the likelihood of involuntary admissions is strong and well characterized (Morgan et al., 2005; Mulder, Koopmans, & Selten, 2006; Van Der Post et al., 2009), a significant amount of the variance in involuntary admissions remains unexplained and there is substantial variation at the ecological level (Weich et al., 2017). Relatively few studies have been conducted on how the organizational aspects of the health care system influence the risk of these admissions (Weich et al., 2017).

Despite widespread changes of financial incentives and payment models in primary care and hospital care and numerous studies on the evaluation of these changes in Canada, UK, and USA, relatively little research has examined how financial payments affect the delivery of mental health care (Chaix-Couturier, Durand-Zaleski, Jolly, & Durieux, 2000; Eijkenaar, Emmert, Scheppach, & Schoffski, 2013; Mehrotra, Damberg, Sorbero, & Teleki, 2009; Rudoler, De Oliveira, Cheng, & Kurdyak, 2017). In Ontario and British Columbia, physicians can be compensated a top-up for completing the paperwork associated with initiating an involuntary hospitalization (i.e. a K623 payment in Ontario), in addition to receiving payment for the clinical assessment that led to the involuntary admission. A recent news investigation into payments for involuntary admissions demonstrated variation across several Canadian hospitals in Canada's largest urban center (Glaser, 2018). How this varies across the entire system and the influence it has on patient outcomes is unknown. To our knowledge, no prior study has examined how physician payments or payment mechanisms may influence the likelihood of involuntary admissions.

We investigated the association between physician payment for completing forms to declare an involuntary status and the likelihood of involuntary admissions using a large population-based North American sample covering the entire province of Ontario, Canada (population ~14 million) and multi-level models with extensive control for patient characteristics. We hypothesized that patients at EDs with greater receipt of payments for completing an involuntary status form would be at an increased likelihood of involuntary admission.

Methods

Setting

Ontario's health care system is a universal health care system which is funded through a tax system that all residents contribute to. Physician and hospital services are covered with no payments required by patients at the point of care. In the emergency department (ED), there is a mix of different payment methods including partial and 100% fee for service (FFS) payments, paying for shifts, by hour, and other payments. Although EDs have discretion over the overall funding model for the ED, EDs do not have discretion over individual fee codes, the existence and value of which are determined by the centralized Ministry of Health for Ontario. This includes the fee code for completing a Form 1.

Population

The inclusion criteria for this population-based cross-sectional study included patients who were Ontario residents admitted to a mental health bed between 1 April 2009 and 31 March 2015, between the ages of 18 and 105 years at the index date (i.e. admission date), had a valid health card number required for data linkage, and had a hospitalization preceded by an ED visit, given the decision regarding involuntary hospitalizations typically happens in the ED visit preceding the hospitalization. We excluded any hospitalizations deemed forensic or informal because the decision regarding involuntary status for these admissions does not apply, hospitalizations with contradictory legal status across records, and hospitalizations preceded by a medical hospitalization of >30 days duration following the ED visit because the relationship between involuntary status upon entry to the psychiatric hospitalization

and decisions made during the ED visit regarding involuntary status may no longer have been related. We excluded hospitalizations with possible data quality issues including those without health care eligibility a year prior to index and those with a death date prior to index. We kept one random admission per patient during the study period. Finally, we also excluded hospitalizations that occurred in settings where patients were not able to be involuntarily hospitalized, rural hospitals due to many EDs having a small number of admissions per ED which would be excluded by privacy restrictions or result in unstable estimates and differences in ED characteristics across rural/urban ED. We also excluded small EDs with <30 admissions over the study period to result in more stable estimates and those with fewer than six involuntary hospitalizations over the 5-year period to comply with internal privacy policy regarding public reporting.

Data sources

We used the Ontario Mental Health Reporting System (OMHRS) database which captures all admissions to mental health beds. This database uses a standardized assessment instrument, the Resident Assessment Instrument–Mental Health (RAI-MH) to capture socio-demographic, clinical assessments, and psychiatric diagnoses according to the Diagnostic and Statistical Manual 4th edition. The RAI-MH was developed by the interRAI organization. We linked the OMHRS database to other administrative databases including the Canadian Institute for Health Information hospital Discharge Abstract Database to obtain data on admissions to non-mental health hospital beds; the Ontario Health Insurance Program physician claims database; the National Ambulatory Care Reporting System database to ascertain ED visits; the Registered Persons Database to determine socio-demographic characteristics; and the Immigration Refugees and Citizenship Canada Permanent Resident Database. These datasets were linked using unique encoded identifiers and analyzed at ICES. Approximately 25% of mental health and addiction admissions (source: ICES unpublished data) in Ontario are to non-mental health beds captured in the Discharge Abstract Database which includes suicide attempts treated in intensive care units and overflow admissions to medical beds. These admissions were not included in the sample given the RAI-MH is not implemented in this database resulting in many variables being missing.

Outcome

Our binary outcome was whether the patient was admitted involuntarily or voluntarily. A status of Form 1 or Form 3 at admission was considered involuntary. A Form 1 is an involuntary hold for assessment of up to 72 h and is how the vast majority of involuntary admissions begin in Ontario (Ontario Hospital Association., 2012). After the psychiatric assessment is complete, the patient will become voluntary in status, unless a Form 3 is completed that initiates an involuntary hospitalization of up to 2 weeks. A Form 3 can also be completed at admission. Patients cannot appeal Form 1 but do have the right to appeal a Form 3.

Primary exposure

The main exposure was the payment pattern for Form 1s of each ED. We measured the payment patterns at the ED level as the proportion of involuntary admissions at each ED where a physician received payment for completing a Form 1, which is referred to as a 'physician K623 payment'. Using involuntary admissions

as the denominator enabled isolating the independent effect of payment, while using all admissions as the denominator would just indicate that an involuntary admission occurred. We assessed physician K623 payment during the period between ED entry and the hospital admission date and assessed it over the 5-year period in order to obtain stable estimates for smaller EDs. There are variations in the level of billings for K623s across EDs that are related to the type of hospital (i.e. teaching hospitals have psychiatry residents that do not bill for their visits) and to the general patterns of payment for physician services at an ED.

Covariates

Patient-level covariates that have previously been found to be the predictors of involuntary admissions in Ontario and international studies were included for adjustment. This includes variables measuring socio-demographic characteristics, the pathway to care, prior mental health service use, and clinical need (Lebenbaum et al., 2018; Walker et al., 2019). We also included system resource factors that may be related to billing choices.

Socio-demographic characteristics included age, sex, living in the lowest two low-income neighborhood quintiles, and whether the individual was an immigrant or a long-term resident (non-immigrant or immigrant migrating prior to 1985).

To assess the pathway to care, we determined whether the patient arrived at the ED in an ambulance, had a medical bed admission lasting <30 days preceding the mental health bed admission, and if in the past week the patient had any outpatient visit to a psychiatrist, family physician for a mental health reason (Steele, Glazier, Lin, & Evans, 2004), or contact with police.

Prior mental health service use included whether during the period from a week to a year prior to the index date, they had a mental health admission, mental health ED visit, visit to a psychiatrist, and visit to a family physician for mental health reasons (Steele et al., 2004). We also assessed whether in the past 5 years, they had an involuntary detention (i.e. a physician billed a K623 payment) or admission.

From the index hospital record, we determined whether their primary diagnosis was for one of schizophrenia/psychosis, a mood disorder, anxiety disorder, dementia, or other disorder. We only included an indicator for schizophrenia/psychosis in the regression model because of our past findings demonstrating all other diagnoses having a similar association with involuntary admissions relative to schizophrenia/psychosis (Lebenbaum et al., 2018). We assessed whether there was any indication based on diagnostic codes in the current admission that the patient had a substance abuse issue or personality disorder. We also assessed their index ED record whether there was a code for self-harm in any diagnostic position. Nurses rated the triage status of the patient on a five-point scale in the ED, which was combined into low (suicidal/depressed or other milder psychiatric complaints and are not agitated), medium (acute psychosis and/or are suicidal), and high triage (patients experiencing acute psychosis/extreme agitation) (Atzema et al., 2012). We used a number of interRAI clinical rating scales including the Risk of Harm to Others (RHO), Severity of Self-Harm (SOS), Self-Care Index (SCI), Positive Symptoms Scale (PSS), Mania Scale (MS), and Depression Rating Scale (DRS) (Chiu, Lebenbaum, Newman, Zaheer, & Kurdyak, 2016; InterRAI, 2017; Lebenbaum et al., 2018; Vigod et al., 2015). The specific diagnostic codes for each of these conditions and the symptoms and point ranges for each scale have previously been published (Lebenbaum et al., 2018).

We also assessed system resource factors such as admission during the morning (1:00–9:00 h), day (9:00–17:00 h) or night (17:00–1:00 h), admission during the week (i.e. Monday to 17:00 h on Friday) or weekend, whether the ED had teaching status, and the supply of psychiatric resources available in the region of residence. These factors may influence the availability of psychiatric consults and other health care resources. Health Care Regional Authorities in Ontario have variable levels of psychiatric resources (Kurdyak et al., 2014). We combined the 14 regional authorities [i.e. the Local Health Integration Networks (LHINs)] into three groups with high (Toronto Central or Champlain), medium (South West, South East, and Hamilton), or low (remaining nine) resources based on the supply of psychiatrists (Kurdyak et al., 2014). The supply of psychiatric hospital beds follows a similar pattern across regions to the supply of psychiatrists (Kurdyak et al., 2014; Ontario Ministry of Health & Long-Term Care, 2012).

Statistical methods

We descriptively assessed the proportion of admissions that were involuntary across all EDs and the variability across EDs in the proportion of involuntary admissions from each ED where there was a physician K623 payment. We ranked all EDs into quintiles of physician K623 payment by the proportion of involuntary admissions accompanied by physician K623 payment, balancing the number of EDs across the groups instead of the number of patients. We examined the distribution of covariates across quintiles of physician K623 payment. We used multilevel logistic regression to determine the unadjusted and fully adjusted (i.e. all covariates were included in the model) association between ED levels of physician K623 payment and involuntary admissions with physician K623 payment measured continuously (i.e. linear association) and as quintiles (Q1 = EDs among the lowest fifth of physician K623 payment). We included a random intercept for each ED to take into account clustering within EDs. We calculated the Variance Partition Coefficient (VPC), which is equivalent to the Intra-class Correlation Coefficient, using the latent response formulation for a null model with only a random intercept and no other coefficients and for the fully adjusted models (Austin & Merlo, 2017). All clinical scales were added into the model as continuous variables. Patients with missing data were excluded from analyses. All analyses were conducted in SAS version Enterprise Guide 6.1.

The use of data in this project was authorized under section 45 of Ontario's Personal Health Information Protection Act, which does not require review by a Research Ethics Board or patient consent to access data.

Results

A total of 255 201 records met the inclusion criteria. After excluding 10 174 records with contradictory or ineligible legal statuses, 2850 records with possible data quality issues, 104 698 records that were multiples for the same individual, and 14 628 records that were to ineligible/small EDs/hospitals, a total of 122 851 records remained and were included in the final sample with 15 374–30 603 records among each quintile of physician K623 payments.

There was considerable variation across EDs in the proportion of all admissions that were involuntary (Fig. 1a) and the proportion of involuntary admissions with a physician K623 payment (Fig. 1b). Across EDs, the proportion of involuntary admissions

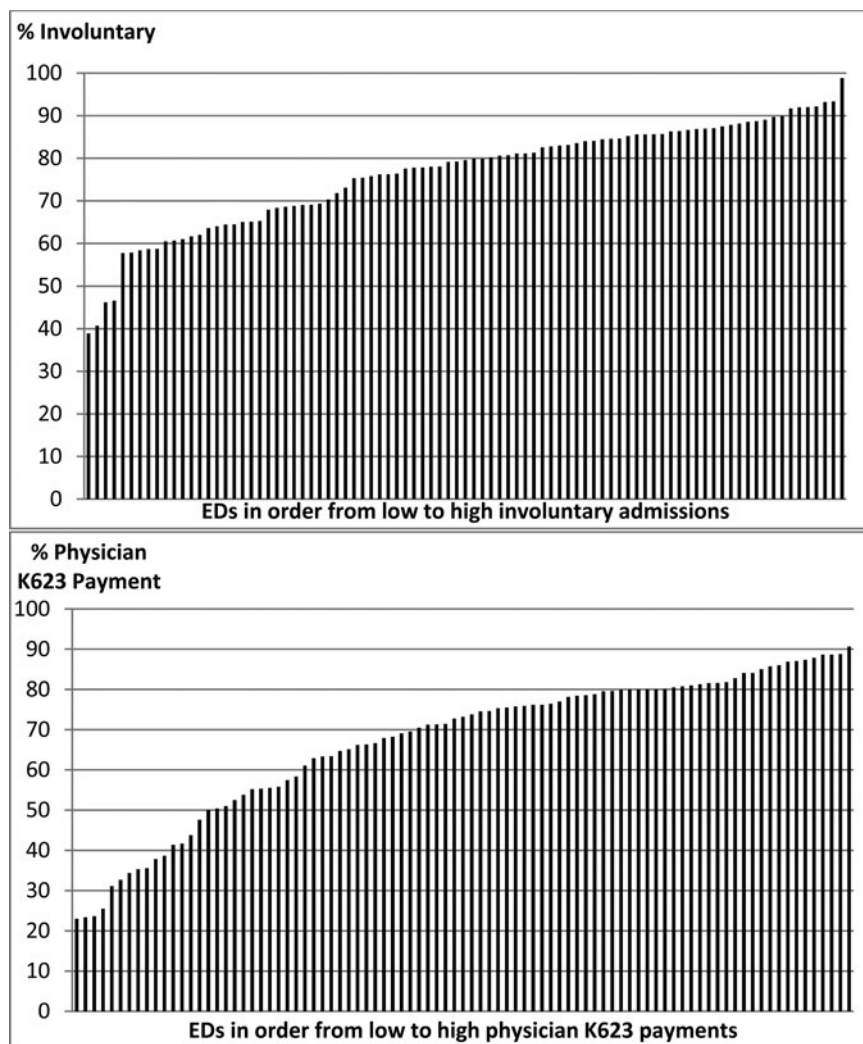


Fig. 1. (a) Proportion of involuntary admissions across EDs among a cohort of patients admitted from 89 Ontario EDs during period 1 April 2009–31 March 2015 (top). (b) Proportion of involuntary admissions with a physician K623 payment across EDs (bottom)*. *Each bar represents the value for a distinct ED.

varied from a minimum of 38.9% to a maximum of 98.8% while the proportion of involuntary admissions with a physician K623 payment ranged from a minimum of 23.0% to a maximum of 90.7%. Descriptive characteristics of the sample across quintiles of ED-level physician K623 payment are shown in Table 1 (Q1: lowest K623 payment). There was a high year-to-year correlation in ED-level physician K623 payment (i.e. $r > 0.7$ for all 89 EDs; $r > 0.9$ for 62 EDs with $N > 30$ admissions in all years).

The VPC was 0.116, 0.147 and 0.147 for the null model containing only a random intercept, the fully adjusted model with quintile K623, and the fully adjusted model with continuous K623, respectively. This demonstrates 11.6% of the variation and 14.7% of the residual variation after adjustment for other characteristics in the propensity to be involuntarily admitted is due to systematic differences between EDs. The proportion of admissions that were involuntary increased linearly across increasing quintiles of physician K623 payment when measured at the aggregate level (i.e. unweighted mean across EDs in each quintile) (Fig. 2a) and at the individual level (i.e. mean across patients in each quintile) (Fig. 2b) with a $>10\%$ absolute difference between EDs in the highest and lowest quintiles of payment. In unadjusted multi-level models, ED-level K623 payment modeled continuously (increasing by 10% increments) was also significantly associated with involuntary admissions [odds ratio (OR)

1.13 per 10% absolute increase; $p = 0.003$]. Without adjustment, there was a graded effect with increasing odds of involuntary admissions with increasing quintile of ED-level physician K623 payment, with Quintile 4 (OR 1.64; $p = 0.031$) and 5 (OR 1.75; $p = 0.014$) having significantly higher odds of involuntary admission compared to Quintile 1. In fully adjusted models, the graded effect with increasing odds of involuntary admission with increasing quintiles of ED-level physician K623 payment remained, with an association with Quintile 5 of physician K623 payment (OR 1.73; $p = 0.055$) (Table 2) and a significant relationship with physician K623 payment modeled continuously (OR 1.14; $p = 0.011$). Quartile 4 of physician K623 payments was trending toward significance but not significant at $p < 0.05$ (OR 1.68; $p = 0.068$).

Discussion

Among 122 851 psychiatric hospitalizations between 1 April 2009 and 31 March 2015, a 10% increase in the absolute level of physician payment for completing forms to declare an involuntary status (i.e. physician K623 payments) was associated with a 14% increase in the odds of an involuntary hospitalization. Although significant, our results show that the association between physician compensation and involuntary admissions is relatively modest. The associations between ED-level physician K623

Table 1. Baseline characteristics by each quintile of ED-level physician K623 payment as a proportion of involuntary admissions for a cohort of patients admitted between April 2009 and 31 March 2015

Variable	K623 quintile 1 (0.23–0.50)		K623 quintile 2 (0.51–0.67)		K623 quintile 3 (0.68–0.76)		K623 quintile 4 (0.76–0.81)		K623 quintile 5 (0.81–0.91)	
	<i>N</i> = 23 040		<i>N</i> = 15 374		<i>N</i> = 27 046		<i>N</i> = 26 788		<i>N</i> = 30 603	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
<i>Socio-demographic</i>										
<i>Age</i>										
16–24	4516	19.6	3200	20.8	5820	21.5	5602	20.9	6681	21.8
25–44	8451	36.7	5260	34.2	9979	36.9	9612	35.9	11 246	36.7
45–64	7521	32.6	5129	33.4	8645	32.0	8310	31.0	9492	31.0
65 +	2552	11.1	1785	11.6	2602	9.6	3264	12.2	3184	10.4
Female	11 025	47.9	7736	50.3	13 370	49.4	13 461	50.3	15 298	50.0
<i>Income quintile</i>										
Q1–Q2	11 749	51.0	8023	52.2	14 648	54.2	14 134	52.8	14 523	47.5
Missing	187	0.8	117	0.8	176	0.7	125	0.5	147	0.5
Immigrant	2581	11.2	906	5.9	2030	7.5	3201	11.9	5484	17.9
<i>Severity</i>										
<i>Primary psych diagnosis</i>										
Schizophrenia	6903	30.0	3272	21.3	5775	21.4	5510	20.6	7567	24.7
Mood/affective	9719	42.2	7068	46.0	12 168	45.0	11 503	42.9	12 656	41.4
Anxiety	2022	8.8	1964	12.8	3628	13.4	3971	14.8	4296	14.0
Dementia	564	2.4	442	2.9	619	2.3	836	3.1	721	2.4
Other	3832	16.6	2628	17.1	4856	18.0	4968	18.5	5363	17.5
<i>Secondary diagnoses</i>										
Substance related	6183	26.8	4830	31.4	7921	29.3	7466	27.9	7577	24.8
Personality Disorder	3082	13.4	2542	16.5	3840	14.2	3453	12.9	4531	14.8
<i>Triage level</i>										
1–2: Emergent	9917	43.0	8382	54.5	15 081	55.8	14 394	53.7	16 893	55.2
3: Urgent	10 748	46.6	6288	40.9	10 738	39.7	10 756	40.2	12 757	41.7
4–5: Non-urgent	2041	8.9	703	4.6	1130	4.2	1627	6.1	942	3.1
Unknown	334	1.4	1	0.0	97	0.4	11	0.0	11	0.0
ED self-harm	1579	6.9	1835	11.9	2818	10.4	2783	10.4	3123	10.2
<i>InterRAI scales (Mean, s.d.)</i>										
Risk of Harm to Others (RHO)	1.61	1.8	1.83	1.8	1.68	1.8	1.74	1.8	1.65	1.9
Severity of Self-Harm (SOS)	2.19	1.7	2.57	1.8	2.47	1.9	2.44	1.8	2.41	1.8
Self-Care Index (SCI)	1.84	1.8	1.86	1.8	1.46	1.6	1.71	1.8	1.51	1.7
Positive Symptom Scale (PSS)	2.27	2.9	1.85	2.8	1.62	2.7	1.80	2.8	1.66	2.6
Mania Scale (MS)	2.61	3.6	2.69	3.6	2.35	3.4	2.62	3.7	2.24	3.4
Depression Rating Scale (DRS)	3.36	2.6	3.76	2.7	3.17	2.6	3.31	2.6	2.79	2.4

(Continued)

Table 1. (Continued.)

Variable	K623 quintile 1 (0.23–0.50)		K623 quintile 2 (0.51–0.67)		K623 quintile 3 (0.68–0.76)		K623 quintile 4 (0.76–0.81)		K623 quintile 5 (0.81–0.91)	
	N = 23 040		N = 15 374		N = 27 046		N = 26 788		N = 30 603	
	N	%	N	%	N	%	N	%	N	%
<i>Utilization</i>										
Involuntary psychiatric admissions in past 5 year	7828	34.0	4807	31.3	8949	33.1	8684	32.4	10 728	35.1
<i>Past year mental health care</i>										
Psychiatrist visit	11 975	52.0	6454	42.0	10 034	37.1	10 698	39.9	12 473	40.8
FP/GP MHA visit	12 842	55.7	8414	54.7	15 021	55.5	14 407	53.8	17 072	55.8
FP/GP non MHA visit	17 550	76.2	11 664	75.9	20 530	75.9	20 614	77.0	24 888	81.3
MHA ED visit	7912	34.3	4441	28.9	7658	28.3	7310	27.3	8112	26.5
Psychiatric admission	5213	22.6	3086	20.1	5194	19.2	5421	20.2	5952	19.4
Charlson score (≥ 1)	1153	5.0	847	5.5	1310	4.8	1423	5.3	1267	4.1
<i>Pathway to care</i>										
Transfer from medical bed	1625	7.1	1623	10.6	2366	8.7	2282	8.5	2280	7.5
Past week police involvement	3676	16.0	3274	21.3	5850	21.6	7127	26.6	8470	27.7
Arrival by ambulance	6298	27.3	4624	30.1	6988	25.8	7483	27.9	8899	29.1
<i>Past week mental health care</i>										
Psychiatric visit	8879	38.5	4065	26.4	5672	21.0	4182	15.6	4407	14.4
FP/GP MHA visit	3491	15.2	2512	16.3	4604	17.0	3803	14.2	5688	18.6
<i>System level</i>										
<i>Time of day admitted from ED</i>										
9:00–17:00 h (day)	8631	37.5	5238	34.1	9437	34.9	9624	35.9	10 407	34.0
17:00–1:00 h (night)	10 563	45.8	7325	47.6	13 083	48.4	13 166	49.1	15 042	49.2
1:00–9:00 h (morning)	3755	16.3	2743	17.8	4449	16.4	3866	14.4	5114	16.7
Missing/unknown	91	0.4	68	0.4	77	0.3	132	0.5	40	0.1
<i>Day of week admitted</i>										
Weekend	7529	32.7	5154	33.5	9306	34.4	8899	33.2	10 349	33.8
Weekday	15 511	67.3	10 220	66.5	17 740	65.6	17 889	66.8	20 254	66.2
<i>LHIN resource</i>										
Low	7967	34.6	6054	39.4	16 517	61.1	17 028	63.6	22 631	74.0
Med	2641	11.5	6378	41.5	9629	35.6	5805	21.7	5013	16.4
High	12 432	54.0	2942	19.1	900	3.3	3955	14.8	2958	9.7
Missing	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Teaching	10 925	47.4	6898	44.9	7929	29.3	3356	12.5	39	0.1

ED, emergency department; Q, quintile; MHA, mental health and addictions; FP/GP, family physician or general practitioner; LHIN, Local Health Integration Network.

payments and involuntary admissions, when payments were treated continuously and when EDs were grouped into quintiles, were not attenuated in the presence of adjustment across five conceptual domains including system resource characteristics such as regional psychiatric resources and hospital teaching status. We

also controlled for a comprehensive list of individual-level risk factors including prior psychiatric care in the past week and year, prior involuntary admissions, pathway to care including police and ambulance contact, and severity variables related to the criteria of involuntary admissions. Although we cannot

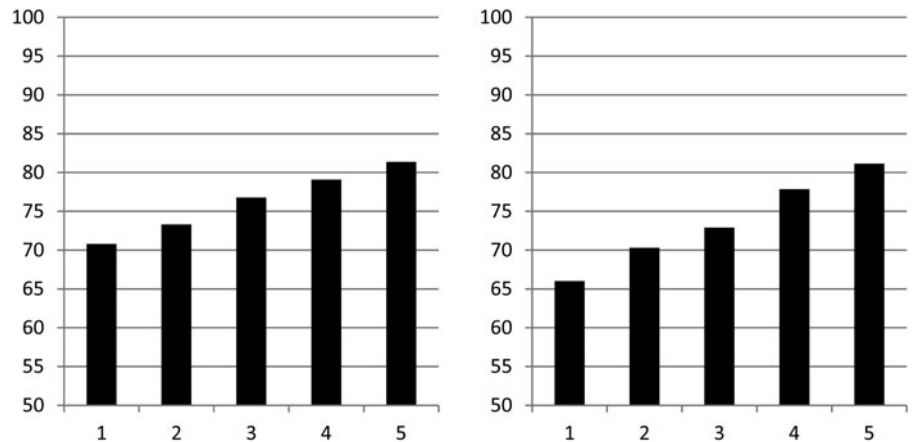


Fig. 2. Proportion of involuntary admissions across quintiles of physician K623 payment measured at the level of the emergency department (left) and patient (right).

completely rule out other factors given the observational and cross-sectional design, given our extensive control for patient characteristics, our results strongly suggest that physician payments for completing forms for initiating involuntary admissions may increase the likelihood of involuntary hospitalization. To our knowledge, this is the first study to explore whether payments or payment methods are associated with the use of involuntary admissions. Furthermore, high levels of involuntary admissions overall, and especially at some EDs, suggest that mental health beds are a scarce resource reserved for those most acutely ill.

Strengths and limitations

With the use of the OMHRS's standardized clinical assessment tool (RAI-MH) (Hirides *et al.*, 2002) and linkages with other administrative databases, this study was comprehensive in its assessment of patient-level characteristics. This included control for socio-demographic, utilization-related, pathway to care, and clinical severity characteristics. Furthermore, the study also controlled for other system resource factors and used multilevel models with random intercepts to account for clustering within EDs. The use of a population-based sample collected from 89 EDs enhances the generalizability of the study.

This study has several limitations that should be taken into consideration. First, this study cannot claim causality since it used a cross-sectional design which assessed variation across EDs to identify variation in payments. Second, payments for involuntary admissions were an average during the entire study period since involuntary admissions were not recorded at admission prior to 2009 and the need to pool multiple years to have stable estimates for smaller EDs. However, there was a very high year-to-year correlation in ED-level physician K623 payment suggesting EDs have long-term payment patterns likely pre-dating the study period and minimal variation within EDs to examine. Future studies should examine the effect of payments using alternative designs such as quasi-experimental studies investigating the effects of the introduction or removal of a payment. Third, the OMHRS database does not record the admitting physician. Therefore, the levels of payment were assessed at the level of the ED, leading to less variation than if assessed at the level of the physician, and prohibited the control of admitting physician characteristics. Future studies should examine variation in the use of payments for involuntary admissions across physicians and account for physician characteristics in the analysis. Fourth, given we do not have symptom measures during the

time of the ED visit and do not have the completed Form 1s, we are unable to determine the appropriateness of the involuntary admissions. Fifth, we lack information on the patient's level of social support, which we do not expect to be differential across the exposure group, and staffing resources at each emergency room. Therefore, residual confounding cannot be ruled out. Sixth, it is not clear what factors are the contributing causes to the variation in payment across the hospitals. Lastly, we excluded rural EDs which may limit the generalizability of the findings.

Financial payments

We found a clear relationship between greater levels of physician K623 payments for involuntary admissions and increased likelihood of involuntary admission. The value of a payment for involuntary assessment as of 2012 was \$104.80. The physician K623 payment for initiating the involuntary assessment is paid in addition to the payment for the conduct of a typical clinical interview. However, most (85.2%) EDs were non-FFS where the majority of physicians receive only 25% FFS payment schedule resulting in a payment of \$26.20 for each K623 payment for these EDs and a minority of physicians receive 100% FFS payment (Auditor General, 2011). At EDs with low levels of physician K623 payments, a large (~70%) proportion of patients are admitted involuntarily suggesting that payments are likely not necessary for physicians to use discretion when balancing the risk of harm to civil liberties around patient encounters. Given the impact of involuntary admissions on patients' rights, the findings of this study call into question the necessity of an additional payment for completing forms to initiate an involuntary admission. British Columbia also provides additional payment for the completion of a form for involuntary admissions (British Columbia Ministry of Health, 2017), suggesting this practice may not be restricted to just Ontario and that our findings may be generalizable to other jurisdictions.

Conclusions

To our knowledge, this is the first study to examine the association between payments to physicians for executing the process leading to an involuntary hospitalization and the likelihood a patient will be admitted involuntarily for a psychiatric hospitalization. This study identified a novel factor, variation in payments to physicians for completing forms initiating an involuntary admission, associated with the use of involuntary admissions. In ED

Table 2. Multi-level logistic regression of the association between involuntary admissions and quintiles and continuous assessment of physician K623 payments

	OR ^a	LCL ^b	UCL ^c	<i>p</i> value	OR ^a	LCL ^b	UCL ^c	<i>p</i> value
Physician K623 payment proportion (1 unit = 10% increase in payment proportion)					1.14	1.03	1.27	0.011
ED quintile of physician K623 payment proportion (Reference: Q1)								
Q2	1.17	0.69	1.97	0.562				
Q3	1.39	0.81	2.38	0.229				
Q4	1.68	0.96	2.92	0.068				
Q5	1.73	0.99	3.01	0.055				
<i>Socio-demographic</i>								
Age in years (Reference: 25–44)								
16–24	1.37	1.31	1.43	<0.0001	1.37	1.31	1.43	<0.0001
45–64	0.96	0.93	1.00	0.036	0.96	0.93	1.00	0.035
65+	0.86	0.82	0.91	<0.0001	0.86	0.81	0.91	<0.0001
Female sex	0.91	0.88	0.94	<0.0001	0.91	0.88	0.94	<0.0001
Low-income neighborhood (i.e. Q1, Q2)	0.98	0.95	1.01	0.286	0.98	0.95	1.01	0.300
Immigrant	1.38	1.30	1.45	<0.0001	1.38	1.30	1.45	<0.0001
<i>Severity</i>								
Primary psych diagnosis schizophrenia (relative to all other diagnoses)								
	1.64	1.56	1.71	<0.0001	1.64	1.56	1.71	<0.0001
Secondary diagnoses								
Substance related	1.13	1.08	1.17	<0.0001	1.12	1.08	1.17	<0.0001
Personality Disorder	0.91	0.87	0.96	<0.0001	0.91	0.87	0.96	<0.0001
Triage level (Reference: 4–5: non-urgent)								
1–2: Emergent	2.62	2.45	2.80	<0.0001	2.62	2.45	2.80	<0.0001
3: Urgent	1.52	1.42	1.62	<0.0001	1.52	1.42	1.62	<0.0001
ED self-harm	2.20	2.05	2.35	<0.0001	2.19	2.05	2.35	<0.0001
InterRAI scales								
Risk of Harm to Others (RHO)	1.14	1.13	1.15	<0.0001	1.14	1.13	1.15	<0.0001
Severity of Self-Harm (SOS)	1.13	1.12	1.14	<0.0001	1.13	1.12	1.14	<0.0001
Self-Care Index (SCI)	1.07	1.06	1.09	<0.0001	1.07	1.06	1.09	<0.0001
Positive Symptom Scale (PSS)	1.03	1.02	1.04	<0.0001	1.03	1.02	1.04	<0.0001
Mania Scale (MS)	1.08	1.07	1.09	<0.0001	1.08	1.07	1.09	<0.0001
Depression Rating Scale (DRS)	0.92	0.92	0.93	<0.0001	0.92	0.92	0.93	<0.0001
<i>Utilization</i>								
Involuntary psychiatric admissions in past 5 years								
	1.20	1.16	1.25	<0.0001	1.21	1.16	1.26	<0.0001
Past year mental health care								
Psychiatrist visit	0.82	0.79	0.84	<0.0001	0.82	0.79	0.84	<0.0001
FP/GP MHA visit	0.87	0.84	0.89	<0.0001	0.87	0.84	0.89	<0.0001
MHA ED visit	0.94	0.90	0.98	0.002	0.94	0.90	0.98	0.002
Psychiatric admission	0.92	0.87	0.96	0.001	0.92	0.87	0.96	0.001
<i>Pathway to care</i>								
Transfer from medical bed								
	0.53	0.50	0.56	<0.0001	0.53	0.50	0.56	<0.0001
Past week police involvement								
	3.51	3.32	3.70	<0.0001	3.51	3.32	3.70	<0.0001
Arrival by ambulance								
	1.35	1.30	1.40	<0.0001	1.35	1.30	1.41	<0.0001

(Continued)

Table 2. (Continued.)

	OR ^a	LCL ^b	UCL ^c	p value	OR ^a	LCL ^b	UCL ^c	p value
Past week mental health care								
Psychiatric visit	0.94	0.91	0.98	0.006	0.95	0.91	0.98	0.006
FP/GP MHA visit	0.77	0.74	0.80	<0.0001	0.77	0.74	0.80	<0.0001
System resources								
Time of day admitted from ED [Reference: 9:00–17:00 h (day)]								
17:00–1:00 h (night)	1.10	1.06	1.14	<0.0001	1.10	1.06	1.14	<0.0001
1:00–9:00 h (morning)	1.13	1.08	1.19	<0.0001	1.13	1.08	1.19	<0.0001
Admitted weekend	1.02	0.99	1.05	0.209	1.02	0.99	1.06	0.203
LHIN resource level (Reference: high)								
Low	0.93	0.86	0.99	0.031	0.93	0.86	0.99	0.032
Medium	0.91	0.81	1.02	0.099	0.91	0.81	1.02	0.095
Teaching	1.14	0.74	1.75	0.566	1.22	0.78	1.90	0.388

^aOR, odds ratio; ^bLCL, lower confidence limit; ^cUCL, upper confidence limit; ED, emergency department; Q, quintile; MHA, mental health and addictions; FP/GP, family physician or general practitioner; LHIN, Local Health Integration Network.

settings where physicians were getting paid less often for completing these forms, the rate of involuntary hospitalizations was still quite high suggesting that physician payment for completing forms is not necessary for physicians to assess risk and act accordingly. Future studies should investigate whether financial compensation of admissions procedures in other jurisdictions is associated with admission outcomes. The finding of an increased likelihood of involuntary hospitalization associated with greater ED levels of physician payment for completing these forms puts into question the need for extra payment for completing these forms.

Data

The dataset from this study is held securely in the coded form at ICES. While data sharing agreements prohibit ICES from making the dataset publicly available, access may be granted to those who meet pre-specified criteria for confidential access, available at <http://www.ices.on.ca/DAS>. The full dataset creation plan and underlying analytic code are available from the authors upon request, understanding that the computer programs may rely upon coding templates or macros that are unique to ICES and are therefore either inaccessible or may require modification.

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Author contributions. PK was the Principal Investigator and conceived the study. ML wrote the methods protocol, prepared the first draft and addressed edits of the manuscript. LH conducted the analysis. All authors interpreted the data, critically revised the manuscript for important intellectual content, and

approved the final version of the manuscript. LH had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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