The Use of Control Interventions in Adult Mental Health Inpatient Services in Ontario Hospitals and Identification of Risk Factors

by

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I hereby declare that I am the sole author of this thesis.

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Abstract

The use of control interventions (CI) such as mechanical/physical restraints (MP), chairs that prevent rising (Chair), and acute control medications (ACM) with mental health (MH) patients is not without controversy. Clinicians report using CIs with patients to gain immediate control of a situation of harm or imminent risk of harm involving the patient and/or others and not unexpectedly, there are unintended physical, psychological, emotional injuries and in the most serious of unintended consequences, death. Despite these substantial negative consequences, there is a dearth of research on the use of CIs in MH hospital services.

The goals of the current study were three-fold: to establish the prevalence of CI use and to profile the sociodemographic, MH service use, and MH clinical characteristics of adult MH inpatients with CI use; to better understand the potential risk factors for the use of MP, Chair, ACM, and an inclusive category of "any control intervention"; and thirdly to examine the use of CIs with adult MH inpatients in the absence of a psychiatric emergency situation (NoPES).

Methods: The study sample included adult inpatient mental health patients with an admission Resident Assessment Instrument- Mental Health assessment between 2006 and 2010 in Ontario. A descriptive analysis was conducted and multivariate logistic regression was used to investigate potential risk factors for the use of control interventions and the same investigation was conducted for a subsample comprised of patients presenting in hospital without a psychiatric emergency situation. Control interventions included mechanical/physical restraints, chairs that prevent rising and acute control medications.

Findings: In Ontario, 21.0% of MH adult inpatients had at least one kind of CI use in the study sample (N = 115,384). The most frequently used CI type was ACM (18.6%) followed by MP (6.5%), and Chair (0.9%). The risk models for each CI type was more informative than for an all-inclusive category of Any-CI. Aggressive behaviour, mania, positive signs and symptoms, risk of harm to

others and severity of self-harm increased the risks for CI use. Non-voluntary admission increased the risk of use for all CI types. Unexpectedly greater deficits in performing of activities of daily living, instrumental activities of daily living, cognitive performance, self-care, and having a history of falls increased the risk of CI use. A focus on these latter risk factors will be important in the development of CI reduction strategies. Sociodemographic and history of health service use variables were also considered in the model including older age which was uniquely a risk for Chair use whereas younger age was a risk for MP and ACM showing a bias or preference for Chair use with older patients. Gender was a significant risk factor for MP, ACM use, and only for Chair use with NoPES.

Seventy four percent (or 85,514) of the sample did not present in the three days prior to assessment with a psychiatric emergency situation (NoPES) such as extreme behaviours that may put the patient or others at risk of harm. Of these NoPES patients 12,097 (14%) experienced CI use regardless. The identification of NoPES patients is an immediate opportunity for reducing the use of control interventions in MH. The risk models developed in the current research can inform the development of CI reduction strategies; deficits in functional performance increased the risk of CI use as did a history of falls, and attenuated aggressive behaviour, mania, positive signs and symptoms and risk of harm to others. If CI use could be eliminated for the NoPES patients, Ontario could reduce its CI use to less than 10% achieving a major step to providing higher quality patient care for patients and increasing staff satisfaction with the care.

Conclusion: This study made use of the new interRAI Control Intervention clinical assessment protocol (CAP) which is embedded in the RAI-MH tool to identify the NoPES patients. This innovation in the RAI-MH is readily available to all hospitals currently using the hospital-based MH assessment instruments. Ontario is in a unique position to immediately use this capability to advance a quality improvement initiative to reduce the use of CIs in MH. The data is readily available

enabling public reporting and benchmarking on CI use rates as a patient safety indicator as well as providing hospital-level reports. Additionally, more study is needed nationally and internationally to increase our knowledge of why CIs are used in MH and consequently create effective staff education/training strategies to reduce their use.

In conclusion, the use of CIs in adult MH inpatient services in Ontario requires the attention of policy makers and hospital administrators. If CI use in adult MH inpatient services was identified as a priority patient safety concern by government (as it has done for hand hygiene, hospital mortality, and medication safety), Ontario could use readily available data on CI use to immediately measure prevalence, establish performance targets, and report on the progress of improving the quality and safety of care of adult MH inpatients.

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Dedication

To my Yey Yey and Gnin Gnin, Mah Diu Chek (Chuck) and Mah Gee Mee and to my Gong Gong and Pao Pao, Tam Yuen On and Chan Chun Yit Seen. Their sacrifices made in the old country and the careful choices made for their families in the new country made it possible for me to pursue anything I choose. I am grateful for the hope, wisdom, determination and love passed on to me through the generations.

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List of Abbreviations

ABS	Aggressive Behaviour Scale
ACM	Acute Control Medication
ADL	Activities of Daily Living
ADRD	Alzheimer's disease and other related disorders
ALS	Amyotrophic Lateral Sclerosis
Any CI	Any Control Intervention
Any Neuro	Neurological Disorders
AUC	Area Under the Curve
C.I.	Confidence Interval
CAPs	Clinical Assessment Protocols
Chair	Chair That Prevents Rising Restraint
CI	Control Intervention
CIHI	Canadian Institute for Health Information
CP	Cerebral Palsy
CPS	Cognitive Performance Scale
CPSI	Canadian Patient Safety Institute
DSI	Depressive Severity Index
DSM-IV	Diagnostic and Statistical Manual - IV
EUNOMIA	European Evaluation of Coercion in Psychiatry and Harmonization of Best Clinical Practice
GAO	General Accounting Office (United States)
HCFA	Health Care Financing Administration (United States)
HHS	Health and Human Services (U.S. Department)
H-L	Hosmer-Lemeshow
IADL	Instrumental Activities of Daily Living
ICD 10	International Classification of Diseases 10
ID	Intellectual Disability
IM	Intra-Muscular
JCAHO	Joint Commission on Accreditation of Healthcare Organizations (United States)
LTCH	Long Term Care Home
MD	Muscular Dystrophy
MH	Mental Health
MHA, 1990	Mental Health Act, 1990

List of Abbreviations (cont.)

MHAPs	Mental Health Assessment Protocols
MMSE	Mini-Mental State Examination
MoCA	Montreal Cognitive Assessment
MOHLTC	Ministry of Health and Long Term Care
MP	Mechanical and Physical Restraint
MS	Multiple Sclerosis
NASMHPD	National Association of State Mental Health Program Directors
NoPES	No Psychiatric Emergency Situation
NS	Not Significant
OBRA, 1987	Omnibus Budget Reconciliation Act, 1987
OHA	Ontario Hospital Association
OMHRS	Ontario Mental Health Reporting System
OMHSAS	State Office Mental Health, Substance Abuse Services
OR	Odds Ratio
PES	Psychiatric Emergency Situation
PO	By mouth
PRN	Pro Re Nata; as circumstances may require
PSS-Short	Positive Signs and Symptoms-Short
RAI-MH	Resident Assessment Instrument - Mental Health
RHO	Risk of Harm to Others
ROC Curves	Receiver Operator Characteristics Curves
SAMHSA	Substance Abuse and Mental Health Administration (in the U.S. Department of Health and Human Resources)
SCI	Self-Care Index
SES	Socio-Economic Status
SoS	Severity of Self-Harm
TBI	Traumatic Brain Injury
WHO	World Health Organization

1.0 INTRODUCTION

There is controversy related to the use of control interventions with psychiatric patients. Greater public scrutiny has been given to the use of control interventions (CI) in response to highly publicized cases where the use resulted in or contributed to the injury or death of patients(1-4). There are competing points of view on the appropriate balance between human rights/autonomy, clinical care, ethics, patient/staff safety, and the dangers associated with CI use(5-7). There is a growing movement in psychiatric care away from a health service provider driven approach towards the adoption of a recovery model that emphasizes that patients and their support networks be at the centre of care and directly participate in the decisions about that care. This philosophy of care puts the use of coercive procedures at odds with what is deemed as "best" psychiatric care(5, 8-10).

It is generally acknowledged that the use of control interventions should be viewed as a last resort option in the list of choices for interventions available to health service providers(1, 2, 6, 11-19), although there are some who believe that the use of control interventions should be eliminated entirely(5, 8). The abolition of the use of control interventions in mental health may be the gold standard of the future, but arguably a greater focus on the reduction and restriction of the use of control interventions may be the reasonable incremental path forward. There is a dearth of research on the use of control interventions in MH care and hence policy and clinical practice has limited scientific evidence to gain a better understanding of the frequency of control intervention use and the risks factors of their use.

1.1 Search Strategy

A comprehensive review of the literature was conducted for English language papers between 1995 – 2011. A review of the literature was undertaken using: Cochrane Library, Ebsco, ProQuest, Scholars Portal, Scopus, and Web of Science. Key terms included: seclusion, physical restraint,

mechanical restraint, control intervention, control medications, chemical restraint, coercive measures, mental health, hospital, psychiatr*.

The focus of the literature search included studies that quantified the use of control interventions with an adult population in an inpatient hospital psychiatric setting. This search resulted in 21 English-language published papers studying inpatient adult mental health control intervention use(16-18, 20-37).

1.2 Control Intervention Nomenclature and Definitions

Measurement of the use of control interventions is a foundational element in the study of their use. A fundamental element to allow for accurate accounting of the frequency of use of control interventions is to ensure consistency in the operational definitions. The literature revealed a lack of that standardization in the labelling and definitions of control interventions and the differing types control interventions in the health care sector(19).

1.2.1 Nomenclature

There was inconsistency in the terms used to label different types of control interventions and in the meaning of those labels. Regardless of type, the general terms used to describe procedures for the purpose of achieving greater control of the patient and applied by health service providers with or without patient consent included: coerced interventions, compulsory measures, control interventions, or forced interventions. Mechanical restraints and physical restraints were terms used to describe the application of an external device applied to a patient to achieve control. In other instances, these terms had distinct meaning. For example, physical restraint was restricted to physical holding, physical restraint, therapeutic holding, and physical coercive intervention that did not include the use of any external appliance. Conversely, physical restraints were also used exclusively to describe the

use of external devices. Physical coercive intervention was a term used in one paper and was described as inclusively restraints (measures to confine bodily movement) and seclusion(31). The terms used to describe the use of a medication to control a patient were: acute control medications, chemical restraint, coerced medication, coerced psychopharmacological medication, forced medication, involuntary medication, and pharmacological restraint. The terms used to describe the placement of a patient in a controlled physical environment were called: seclusion, isolation, time out, involuntary confinement, or environment controls.

The use of these various terms in the literature become problematic when attempts are made to compare, for example, rates of control intervention use or differing types of control interventions. Table 1.1 list the terms used in the articles that were retained for this current literature review and the definitions therein, to the extent that they were documented.

In most instances, researchers provided an explicit definition of some but not all of the terms used to describe control interventions(26, 30, 31). Researchers identified different sources in determining the definitions used in their research. In some instances, the researchers used existing hospital definitions for data collected directly through a chart review(21, 25, 33). Others conducted a survey in which the researchers did not provide a definition but instead asked respondents to answer the survey according to the standard definitions as set out by their own facility(24, 29). Others adopted definitions created by government, e.g., legislation, mandatory reporting(28, 29, 35). There were other definitions developed by research institutes/collaboratives, networks, or associations. Examples include the European Evaluation of Coercion in Psychiatry and Harmonization of Best Clinical Practice (EUNOMIA) project(34), interRAI (38), Health Care Financing Administration (HCFA)(22), Joint Commission on Accreditation of Healthcare Organizations(39), National Association of State Mental Health Program Directors Research Institute (NASMHPD)(32),

Substance Abuse and Mental Health Services Administration (SAMHSA)(18) and the State Office Mental Health, and Substance Abuse Services (OMHSAS)(16).

Table 1.1 Control Interventions - Terms, Definitions and Use Rates

Author, et al	Year	Study Design	Term Used and Definition	Country	Unit of measure	Count/rate of use
Bowers	2010	Cross sec-tional	*Seclusion* Isolation of a patient in a locked room *Time out* Pt asked to stay in room or an area for a period, without door being locked.	GBR	# of incidents over three week study period	N = 136 acute MH wards in 67 hospitals Avg ~0.05 incidents of seclusion/day Avg ~0.31 incidents of time out/day
Bredthauer	2005	Case study	*Physical Restraint* The use of belts, (waist, wrist, ankle) used in beds, and/or chairs and wheelchairs, bed siderails, chair-tables ("gerichair") and other devices (e.g. overalls, mittens, tapes) which prevent persons from rising or moving and which cannot be removed independently. Bedrails were excluded in case of total inability to move independently (maximal immobility)	GER	% of patients exposed by # days and avg hours a day of being restrained measured over a three week period	N= 122 patients 30.3% (37 pts) ≥ 1x restrained/3 wk period
Busch	2000	Litera-ture review	References the HCFA seclusion, physical or mechanical restraint, chemical restraints definitions but were modified somewhat. The term "physical restraint" or "restraint: will include mechanical restraint and NOT include "physical holding" or "therapeutic holding" "Chemical restraints" will be considered only if described for use in an emergent intervention for acutely assaultive and therefore referred to as "emergency medications"	USA Mass	% of MH patient sample exposed	N = 5,580 adult inpt Emergency meds: 5.5% Seclusion or restraint: 1.9%

Table 1.1 Control Interventions – Terms, Definitions and Use Rates (cont.)

Author, et al	Year	Study Design	Term Used and Definition	Country	Unit of measure	Count/rate of use
CIHI	2011	Cross sec-tional	*Seclusion* A person is placed in a room that confines him or her and from which he or she cannot exit freely *Mechanical restraint* A person is place in mechanical restraints and is unable to ambulate (e.g., restrained in bed), or a person is place in mechanical restraints and is able to ambulate (e.g., wrist restraints only) *Physical restraint* A person is physically held to restrict his or her movement for brief period of time, in order to restore calm to the individual. This does not refer to holding a person in order to apply a mechanical restraint. *Acute control medication* Psychotropic medication is administered as an immediate response to control agitation or threatening, destructive or assaultive behaviours in order to prevent harm to self or others. Created mutually exclusive grps with the following rules: - Mechanical and physical restraint grouped. - If a pt had an acute control medication in concert with any other type of control intervention, the pt was counted only in the "non" acute control medication category, e.g. physical restraint	CAN ON	% patient sample exposed to event	N = 92,551 patient (initial assessments) Seclusion 5.4% (4,965) Physical/mechanical restraint 5.4% (5,027) Acute control medication 15.4% (14,290)

Table 1.1 Control Interventions – Terms, Definitions and Use Rates (cont.)

Author, et al	Year	Study Design	Term Used and Definition	Country	Unit of measure	Count/rate of use
Crenshaw	1995	Cross sectional	*Seclusion* Patient is placed in a locked room *Restraint*: not defined; participating hospitals asked to report incidents of restraint based on their own hospital's definition of restraint	USA	Incidents/1000 pt days Hrs/1000 patient hrs	N = 101 state hospitals; not all reporting on each metric Seclusion: 78 incidents/1000 pt days 78 hrs/1000 pt hrs Restraint: 85 incidents/1000 pt days 82 hrs/1000 pt hrs
Dumais	2011	Cross sectional	*Seclusion* Isolating individuals and limiting their contact with their peers by confining them to a separate room that is locked from the outside *Mechanical restraint* use of leather wrist and ankle restraint to keep patients in bed and protect them from harming themselves or others, such as nursing staff	CAN Mtl	Prevalence of seclusion with or without restraint	N = 2,721 patients Seclusion: 23.2% at least once (with or without restraint) Restraint: Of those secluded (632 pts) 77.2% were restrained at least once
Forquer	1996	Cross sectional	*Seclusion and restraint* Not defined	USA NY	% of MH patient sample exposed	N = avg 13,133 pts/mo in 22 adult facilities Seclusion + restraints reported together: 5.1% (558) Range of frq of events/100 pts 0 – 19 events per 100 pts/mo

Table 1.1 Control Interventions – Terms, Definitions and Use Rates (cont.)

Author, et al	Year	Study Design	Term Used and Definition	Country	Unit of measure	Count/rate of use
Hendryx	2010	Cross sec-tional	*Seclusion* Involuntary confinement of a patient alone in a designated locked room where the patient was prevented from leaving or if staff were placed proximal to a room with the intent to prevent exit with the threat of consequences if the patient left the room *Restraint* Any method of physical and involuntary restriction of a patient's freedom of movement, physical activity, or normal access to his/her body including manual or mechanical restraints either with or without ambulatory restraint	USA WA	% of MH patient sample exposed avg hrs/episode avg hrs/pt median hrs/pt hrs/1000 pt hrs	N = 1,266 patients Seclusion and restraint: 15% (78 pts) one or more episodes both secluded and restrained (recorded only if it was an "emergency" intervention) Seclusion: 12% (157 pts) avg 17.4 hrs/episode avg 66.7 hrs/pt med 5.7 hrs/pt 4.2 hrs/1000 pt hrs range: 0.08 hrs – 2208 hrs Restraint: 8% (115 pts) avg 22.1 hrs/episode avg 115.9 hrs/pt median 12.2 hrs/pt 5.4 hrs/1000 pt hrs range: 0.5 – 2536 hrs
Husum	2010	Cross sec-tional	*Seclusion* Confining a patient in a single room or a separate unit or area inside the ward, accompanied by staff *Restraint* Strapping a patient to a bed with mechanical devices (belts) using a 5-point restraint system – over the arms, legs, and torso but not all belts need to be used at all times. *Depot Medication* Medication provided as a treatment to a patient on an involuntary basis at the time of discharge	NOR	% of MH patient sample exposed	N = 1,214 patients (involuntary patients) Seclusion, restraint, depot meds: Range: 0-88% Seclusion: 35% (424) Restrained: 10% (117) Depot meds at d/c: 9% (113) S+R: 9% (106) S+depot meds: 4% (47) S+R+depot meds: 1% (13)

Table 1.1 Control Interventions – Terms, Definitions and Use Rates (cont.)

Author, et al	Year	Study Design	Term Used and Definition	Country	Unit of measure	Count/rate of use
Janssen	2008	Cross sectional	*Seclusion* Locking up a patient alone in a specially designed seclusion room, clothed in (uncomfortable) safety robes either with or without his/her consent	NED	% of MH patient sample exposed Seclusion events/pt Mean and median days/episode	Seclusion: 2002; N = 17,500 12.4% (2165) secluded 2.9 seclusions/pt mean dur: 16 days Median dur: 6 days 2003; N = 18,800 10.4% (1961) secluded 2.7 seclusions/pt Mean dur: 25 days Median dur: 6 days
Kaltiala-Heino	2000	Cross sectional	*Seclusion* *Mechanical restraint* *Forced medication* No explicit definitions provided; coercive treatment and measures differentiated in that "measures" are applied for the purposes of controlling agitated behaviour. Reported frequency of coercion and restriction include both coercive treatment and measures	FIN	% pts sample exposed to event Coercive measures/ treatments per 100,000 inhabitants per year	N = 1,543 admissions Seclusion or restraint or forced medication: 32.3% (498) Seclusion: 6.6% (102) 57.1 events/100,000 inhabitants per year Mechanical restraint: 3.8% (59) 32.5 events/100,000 inhabitants per year Forced medication: 8.4% (130) 72.8 events/100,000 inhabitants per year

Table 1.1 Control Interventions – Terms, Definitions and Use Rates (cont.)

Author, et al	Year	Study Design	Term Used and Definition	Country	Unit of measure	Count/rate of use
Keski-Valkama	2007	Cross sec-tional	*Seclusion* Moving a patient to a locked seclusion room or locking up the patient in his/her room *Restraint* A mechanical restraint, i.e., confining the patient to a restraint bed Specifically excluded: physical or manual restraint, an order for isolation in an unlocked room, treatment on a locked ward or restraining the patient because of weak somatic health did not qualify as seclusion or restraint	FIN	% patient sample exposed to event Median hours/event Seclusion and restrained patients per 100,000 inhabitants by catchment area per year	2004: n = 4,589 across 5 catchment areas Seclusion: 1.3% (59) Median: 17.1 hours/event Per 100,00 inhabitants: range 0.6 – 1.7 Restraint: 0.8% (36) Median: 7 hours/event Per 100,00 inhabitants: 0.08 – 1.2
Lay	2011	Case-control	*Physical Coercive Intervention (seclusion + restraint)* *Seclusion* Placement and retention of an inpatient in a bare room *Restraint* Measures prearranged to confine a patient's bodily movements *Coerced psychopharmacological medication* Not defined	SUI	% patient sample exposed to event	$N_{(pts)}$ = 9,698 $N_{(H)}$ = 6 At least one exposure any type: 7.3% (709) Seclusion or Restraint: 6.4% (625) Coerced medication: 4.2% (412)
Lutterman	2003	Cross sec-tional	*Seclusion* The involuntary confinement of a person in a locked room. Specifically this definition excludes confinement in a locked *unit or ward* where other people receive care. *Restraint* The direct application of physical force to a patient, with or without the individual's permission, to restrict his or her freedom of movement. The physical force may be human, mechanical devices, or a combination thereof.	USA	Event hours per 1000 patient hours % patient sample exposed to event	N = 12-State Seclusion (median): 0.42 hrs/1000 pt hrs 6.3% Restraint (median): 0.5 hrs/1000 pt hrs 9.97%

Table 1.1 Control Interventions – Terms, Definitions and Use Rates (cont.)

Author, et al	Year	Study Design	Term Used and Definition	Country	Unit of measure	Count/rate of use
National Research Institute	2010	Report-ing regi-stry	*Seclusion* Involuntary confinement of an individual alone in a room. *Restraint* Includes all mechanical holds (both ambulatory and non-ambulatory) and manual holds that are over 5 minutes in duration	USA	hours/1000 inpatient hours % patient sample exposed to event	2009 (reported monthly) Seclusion hours/1000 inpt hours (range): 0.39 – 0.68 % (range): 2.48% - 2.70% Restraint hrs/1000 inpt hours (range): 0.42 - 0.68 % (range): 3.58% – 3.95%
Nielssen	1997	Cross sec-tional	*Sedation* Use of intravenous sedation	NZ	% patient sample exposed to event	N = 495 (involuntarily admitted pts) across 18 units 26.7% (132)
Raboch	2010	Prospe ctive cohort	*Seclusion* An involuntary placement of an individual locked in a room alone, which may be set up specially for this purpose *Restraint* Fixing at least one of the patient's limbs with a mechanical device or being held by a staff member for longer than 15 minutes *Forced medication* Activities using restraint or strong psychological pressure (involving at least three staff members) to administer medication against the patient's will	EU (10)	% patient sample exposed to event	N=2030 (involuntarily admitted pts) At least one exposure to any one coercive measure (of those where were 37.9% (770) Seclusion: 6% (122) Restraint: 25.7% (522) Forced medication: 40.3% (818)
Smith, G.	2005	Cross sec-tional	*Seclusion and restraint* not explicitly defined in paper. But from the text regarding restraints: hospital policy states that the use of only one of eight types of restraint devices permitted: one-, two-, three-, and four-point soft Velcro restraint devices; soft mitts, and two-, three-,and four-point leather restraint devices	USA Penn	Rate per 1000 pt days Hours/event	Year 2000; N = 2800 Seclusion: Rate/1000 pt days: 0.28 Mean: 1.31 hrs/event Restraint: Rate/1000 pt days: 1.20 Mean: 1.93 hrs/event

Table 1.1 Control Interventions – Terms, Definitions and Use Rates (cont.)

Author, et al	Year	Study Design	Term Used and Definition	Country	Unit of measure	Count/rate of use
Steinert	2007	Cross sectional	*Compulsory measures reported collectively but include:* *Seclusion* A patient is brought into a locked isolated room and is not allowed to leave the room. The definition is also fulfilled if staff is located at an open door in order to prevent the patient from leaving the room. *Mechanical restraint* Use of belts to fix a patient to a bed. *Physical restraint* Used only in administering of involuntary medication and to establish mechanical restraint, not as a single intervention *Involuntary medication (chemical restraint)* Administration of medication (oral, intramuscular, or intravenous) by physical means, e.g. physical restraint or any kind of touching, or holding the patient	GER	% patient sample exposed to event # compulsory events per affected case Cumulative duration of event/affected case Mean duration of one coercive measure	N = 36,690 cases in 10 psychiatric hospitals 9.5% of cases (3502) exposed to at least one compulsory measure Mean # compulsory events per case: 5.4 Mean duration of event/affected case: 50.6 hours Mean duration of one compulsory measure: 9.7 hours
Stolker	2005	Nested case-control	*Seclusion* Not defined	NED	% exposed to event	N = 996 in three hospitals; involuntary patients only Secluded: 40.1%
Wynn	2002	Case study	*Seclusion* *Physical Restraint* *Pharmacological restraint; differentiated from planned involuntary medical treatment* Not defined	NOR	Total count of events/year	230 compulsory events/year in 100 bed general hospital Seclusion: 16 events/year Restraint: 145 events/year Pharmacological: 69.8 events/year

1.2.2 Definitions

A review of the literature revealed several different definitions of control interventions, a variety of definitions for similarly labelled control intervention types and differing inclusion/exclusion criteria in operationalizing the definitions into practice.

Mechanical/Physical Restraint (MP)

The terms "physical" and "mechanical" restraints were terms used synonymously in some of the articles. In general, where the term "mechanical" was not used at all in an article, the term "physical restraints" would typically be used. Alternatively, if both terms were used in the same article, mechanical restraint referred to the use of an external device to restrain a patient, whereas physical restraint referred to the use of hands-on force to do the same. Overall, there were several studies that specifically associated mechanical restraints only to tying a patient to a bed so they were unable to move freely(25, 28, 35, 40), whereas other studies applied a broader purpose for the use of the mechanical restraint(18, 21, 23, 27, 32). For example, one study(21) described physical restraints as the use of belts (waist, wrist, ankle) used in beds, and/or chairs and wheelchairs; bed side rails; chair-tables ("gerichair"); and other devices (e.g. overalls, mittens, tapes) that prevent persons from rising or moving and which cannot be removed independently. Two studies defined mechanical and physical restraints separately but the researchers elected to combine the enumeration of the two types of restraints as one variable in their analysis(22, 23).

Three studies explicitly excluded the use of a device that was required to address weak "somatic health" (35), chair that prevents rising(23), or devices if they were intended to prevent the patient from falling from bed(22). Two studies set time thresholds of greater than five minutes(32) and greater than 15 minutes(34) before a patient was described as having been physically restrained.

Acute Control Medications (ACM)

There were also variations in the definitions of control medications. The major difference was the pre-condition of an immediate emergency situation involving potential harm in some

definitions(22, 23, 41). For example, one study(22) stipulated that chemical restraints would be considered as such only when they were used to "emergently manage violent and/or assaultive patients". In other studies, the definitions did not include this element of an emergent event(28, 34, 42). In the latter definition, by inference, it appears that control medications were part of the normal treatment, but in response to resistance by the patient to comply with a medication regime, force or strong coercion was applied to ensure that the patient took the medications, voluntarily or involuntarily.

Seclusion

Seclusion was generally described as the placement of the patient in a locked room. In some instances enhanced criteria or descriptors were added such as, "involuntary placement in a locked room" or "with/out consent"(18, 27, 29), or qualifying that the room be bare(31, 34). One study conducted in Norway(28) described seclusion as the confinement of a patient to an area within the unit and, as required by law in that country, the presence of a staff member in the room. This description might be more readily described as being similar to a time-out. "Isolation" was described in this same study as locking a patient in a room alone, but was not one of the dependent variables in this study. In contrast, the confinement of a patient to a locked unit or ward was specifically excluded from the definition of seclusion in other studies(18, 35). Preventing a patient from leaving a room by placing a staff member outside the door was included as seclusion in one study(36).

There are various sources of research, legislation, and best practice literature that can be drawn from to support the determination of appropriate definitions. In Ontario, the Mental Health Act (MHA) RSO 1990 defines "to restrain" as meaning to "place under control when necessary to prevent serious bodily harm to the patient or to another person the minimal use of such force, mechanical means or chemicals as is reasonable having regard to the physical and mental condition of the patient". The Act makes no mention of the use of seclusion. The Omnibus Budget Reconciliation Act 1987 (OBRA 87) from the US offers the following definition of restraints in the context of nursing home reform: "any manual method or physical or mechanical device, material or equipment attached

or adjacent to a resident's body that the individual cannot easily remove that restricts freedom of movement or normal access to one's body". Again, in the context of nursing homes, involuntary seclusion is defined as a "separation of a resident from other residents or from her or his room or confinement to her or his room (with or without roommates) against resident (or legal representative) will. Emergency or short-term monitored separation from other residents is not considered involuntary seclusion and may be permitted if used for a limited period of time as a therapeutic intervention to reduce agitation until professional staff can develop a plan of care to meet the resident's needs.

The Canadian Patient Safety Institute (CPSI) in their report on patient safety in mental health identifying the same issue of lack of standardization in nomenclature and definitions. Following an exhaustive literature review search and consultation with mental health experts and researchers, the report included following nomenclature and accompanying definitions for four types of control interventions described below.

Physical/mechanical restraint is the use of any technique or device to manually prevent, restrict or subdue the free physical movement of a person, or a portion of body. (a) Physical restraint sometimes refers to the immobilization of a patient where one or more staff members make bodily contact (e.g., manual holding); (b) Mechanical restraint involves the implementation of devices or appliances to restrain the patient (e.g., body vests, calming blankets, bed side rails, and multiple-point ligatures). Any safety devices that a patient can independently remove, (i.e., without assistance from others) was not considered a restraint.

Environmental restraint is the restriction of a person's mobility through physically confining the patient to a defined area.

Seclusion is the temporary placement of a patient, alone, in a specially designed, unfurnished and securely locked room.

Chemical restraint is the use of pharmaceuticals specifically administered for the sole purpose of temporary behaviour management or control. It is sometimes called rapid tranquilization or urgent

sedation. Drugs commonly used as chemical restraints include benzodiazepines and antipsychotics. Medication prescribed as standard treatment of a patient's physical/medical condition or psychiatric disorders are excluded from this definition.

Findings of a study in pharmacotherapy in psychiatric emergency services identify that typical acute control medications include high-potency typical antipsychotic and/or benzodiazepine sometimes given with an anticholinergic, or an atypical antipsychotic alone(43). The most common medications recommended for psychiatric emergency situations include benzodiazepines intramuscular (IM) or by mouth (PO) and high potency conventional antipsychotic such as haloperidol (IM or PO). Typical protocols would involve "drug cocktails" of these two medications. Although 78% of clinicians express preference for oral medications, practice indicates more than 65% of the time, the IM route was used in a psychiatric emergency to achieve immediate but mild sedation and PO only 28% of the time.

In summary, there are many disparities in the terms used to describe control interventions and considerable differences in the associated definitions. These differences reflect the reality of the absence of a common standardized nomenclature regarding control interventions in psychiatry. The disparity continues to be a barrier to knowledge exchange and ultimately limits the use of evidence to drive down the rate of use of control interventions through such works as systematic literature review, meta-analysis and standardized public reporting, all of which can support clinical practice change. There is a substantial need to achieve standardization of control intervention nomenclature and definitions.

1.2.3 Reported Prevalence Rates

The current literature review identified several different methods of counting and reporting the rates of use of control interventions (See Table 1.1). A majority of the papers reported on the percentage of the patients exposed to the event with the count of patients exposed as the numerator and the denominator being the sum of the total number of patients served(18, 22, 25, 26, 28, 30-32,

34, 38, 39, 42). Critics of this metric state that this measurement fails to recognize the patients' length of stay that may be considered as an explanatory variable for control intervention use and more specifically that the "days at risk" is necessary to enable comparability between hospitals(24). To address this "days at risk" factor, two articles elected to measure the number of incidents of a control intervention divided by 1000 patient days(16, 24).

There were papers with unique metrics. One measured the number of incidents of control interventions per year(17) and the other enumerated the number of incidents per 100,000 inhabitants(30). This latter article also reported the percentage of patients exposed to a control intervention over the total number of patients served. Lastly, one study measured the number of incidents of use of seclusion per day(20).

This current review has found that the most frequently reported metric was the percentage of patients exposed to a control intervention. As previously noted, the considerable differences in the definitions of control interventions in the literature confound the ability to directly compare all of the results of the research despite superficial appearances of similarities. Additionally, making an assessment of the use of control interventions based on this research is made more difficult due to inherent factors associated with health services research including heterogeneity of patients and hospital differences. The following is a description of the CI use rates as they are reported in the literature.

There was a wide variation in the reported levels of use of control interventions with some rates as low as 2% of patients exposed to control interventions(22) to as high as 88% for the use of seclusion(28). In this latter study, the definition of seclusion was more similar to an environmental restraint (i.e., containment of the patients on a unit or within an area of a unit). All of the studies reported some level of continued use of control interventions, none having achieved sustained eradication of control interventions use.

Amongst those studies that reported on the percentage of patients exposed to a control intervention, seclusion was included as a variable of interest most often (15/17). It was reported

alone(18, 21, 25, 29, 30, 32, 34, 35, 38, 44) or in combination with a restraint(22, 25, 26, 31, 42). These studies had differing definitions of seclusion (Table 1.1). The reported rates of seclusion ranged from 1%(35) to 29%(44). The highest rate of seclusion was reported as 88% but seclusion was described as confining the patient to an area of a unit and specifically not a seclusion room(28). For those studies that reported on the combination of seclusion and restraint together, the range of exposure of patients was 2%(22) to 10%(42). The Canadian studies reported rates of 5% (23) and 23%(25) for seclusion.

Amongst the studies that reported on the percentage of patients exposed to a restraint, six studies reported mechanical and physical restraint summed together(18, 23, 30, 32, 34, 39). The reported rates ranged from 4%(32) to 26%(34) with a mean of 9% and a median of 7%. The study sample in the latter study(34) included only involuntary patients and had restraints applied specifically during a psychiatric emergency whereas the other studies included both voluntary and involuntary patients as well as the use of restraint in a non-emergency situation(23, 30, 32, 39). There was one Canadian study(23) that reported on the use of mechanical and physical restraints together at rate of 5% in Ontario. This Canadian study did not include "chair that prevents rising". One study reported on the use of restraints labeled "physical restraints", but the description was more similar to that of "mechanical restraints" descriptions(21). This study described the term "physical restraints" to mean, the use of devices such as bed rails, belts, chairs that prevent moving or rising that cannot be removed independently with a reported use rate of 30%. This study was conducted in a large acute psychiatric facility on a psychogeriatric unit where the age of the patients was 60 years and older.

Eight studies included the examination of acute control medications as a variable of interest. The rates of use of acute control medications ranged from 4%(31) to 40%(34) with a mean of 16% and a median of 9%. This latter study(34) restricted the study sample to involuntary admissions whereas other studies included all psychiatric admissions. In two instances (28, 30), the use rates reported were 4% and 8% respectively and included instances when forced medications were part of the treatment and not necessarily in response to an imminent psychiatric emergency.

Table 1.1 provides a summary of the results of the studies as they pertain to the definition selected for seclusion, restraint, and acute control medications. It is further noted in the summary chart where the researchers may have combined two or more dependent variables into a single count (e.g., seclusion plus restraint(31, 42) or seclusion/restraint/acute control medication(34)).

The heterogeneity of the study populations coupled with definitional differences, make comparing rates across studies difficult. The results of this current review at a very basic level indicate that there is a continued use of control interventions in adult inpatient psychiatry. There is evidence that reduction in the use of control interventions is a goal in hospitals and that their use should be applied as a last resort measure. With the small number of studies conducted to-date and the inconsistency in reporting standards, it remains inconclusive as to the actual prevalence of control intervention use in MH inpatient hospital settings.

1.2.4 Reported Risks for Use of Control Interventions

The current search of the literature found a fairly consistent internationally held opinion that the use of control interventions should be considered as a last resort measure (i.e., used only after all other alternatives have been exhausted). Further, in the presence of a psychiatric emergency, control interventions would likely be the only solution available for the immediate resolution of the emergency. This raises the question as to what risk factors can predict the need for the use of control interventions and ultimately what earlier interventions can be put in place to avoid the psychiatric emergency and hence limit the use of control interventions?

As reported in the previous section, the definition and measurement of control interventions in inpatient adult mental health services is non-standardized. This lack of comparability creates challenges to fully benefiting from published studies.

Adding to the issues of definition and measurement of the use of control interventions is the quality of research conducted to date and specifically issues related to the potential risk factors or explanatory variables. Several papers were restricted to the examination of very few (<10) potential

explanatory variables due to lack of data availability(16, 17, 20, 24-26, 34, 35, 39, 42). In other studies, secondary analysis of existing data sets constrained the examination to mental health status variables such as diagnoses (e.g. ICD 10), standard test scores (e.g. Mini-Mental State Examination, Cohen Mansfield Agitation Inventory), or charted clinical presentations(20, 24, 42). Some studies that included diagnoses as an explanatory variable referencing the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) for Mental and Behavioural Disorders(28, 30, 31, 42) and others used the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM IV)(23, 44). Not all studies that included the diagnoses identified the standard to which the patients' diagnoses were reported/counted. Limitations were identified in the use of clinical variables to the extent that the severity of illness was not quantified in most of the articles. In a small number of studies, the severity of illness/disability was reported using a survey tool or scale such as the Brief Psychiatric Rating Scale, German Weyerer's assessment for behaviour disturbances, or Global Assessment of Functioning scale(21, 28, 44).

Some studies only included the investigation of socio-demographic variables, such as gender, age, income, education, and living arrangements, but did not include clinical variables(16, 39). There were some studies that included hospital-level variables such as number of beds, type of hospital, nursing workload, and availability of seclusion room(16, 23-26, 28, 37).

There was no study found in the literature that produced a robust comprehensive examination of potential risk factors for the use of control interventions. The most comprehensive examination (23) included 22 variables covering a combination of socio-demographic and health status measures.

Mechanical/Physical Restraint

Younger age was found to be a significant predictor of restraint use(16, 17, 23, 26, 32, 39). Gender(16, 23, 26, 30, 39), income(23), education attained(23), ethnicity(16, 26), and living arrangements(28, 30) were not significant risk factors for MP use.

Organic mental disorders such as Alzheimer's disease and other related disorders, were more consistently reported as significant risk factors for MP than other diagnostic groupings(21, 23, 30,

41). All other diagnostic groups had conflicting results amongst the articles including disorders due to psychoactive substance use, schizophrenia and other psychotic disorders, mood/affective disorders, neurotic/stress-related disorders, and personality disorders(17, 23, 26, 28, 30, 39). Of note, one study(21) focused on the psychogeriatric population (>60 years old), found organic brain disorders and schizophrenia to be significant predictors of restraint use but, also decline in activities of daily living (ADL), cognitive function, agitation, decreased mobility and other physical illness/disability (stroke) as significant predictors of restraint use. This study also used a restraint definition more akin to that used in nursing homes: the use of belts (waist, wrist, ankle) used in beds, and/or chairs and wheelchairs, bed side rails, chair-tables ("gerichair") and other devices (e.g. overalls, mittens, tapes) which prevent persons from rising or moving and which cannot be removed independently. Bedrails were excluded in case of total inability to move independently (maximal immobility). Two other studies that included patients older than 65 years old(23, 26) also reported decreased ADL function as a predictor of restraint use.

Acute Control Medication

An examination of socio-demographic variables did not produce consistent statistically significant risk factors for acute control medications (ACMs). Age and gender were the most often studied variables. Younger age was found to be a significant risk factor in two studies(23, 31), but others report older age to be a significant risk factor(21). Three studies found that age was not significant(30, 34, 45). Four of the seven studies found that gender was not significant(23, 28, 30, 34). Less often studied variables, income level(28, 31) education attained(23, 31, 34) employment status(23, 30), and living arrangements(28, 31, 34, 45) also produced differing results of significance and non-significance of these variables as risk factors for ACM use.

Schizophrenia and other psychotic disorders(17, 23, 28, 30, 31, 34) and organic disorders(17, 30, 31) were consistently identified risk factor for ACM. Other disorders including disorders due to psychoactive substance, mood/affective disorder, neurotic/stress-related, personality/behaviour, mental retardation, and childhood/developmental disorders were inconsistently identified as

significant risks for ACM. For example, some studies found mental and behavioural disorders due to psychoactive substance use was not significant(28), significant risk factor for increased use(30) and reduced risk of exposure to ACM(31).

Three studies found hospital-level characteristics contributed to greater risk of ACM. General hospitals compared to specialized psychiatric hospitals tended to use ACM more frequently after controlling for socio-demographic and clinical variables(23, 31) and that smaller hospitals in rural communities tended to use ACM more often(31). A third study found that admission to the psychiatry program through the emergency department significantly increased the likelihood of ACM use among inpatients(45).

Seclusion

Nine of eleven studies that included age, found that patients of a younger age had a higher probability of seclusion than older patients(16, 23, 25, 26, 31, 32, 35, 39, 44). A few studies included other socio-demographic variables such as ethnicity(16, 28, 31), income level(23, 30), employment status(23, 30), and education level(23, 31) but were not significant risk factors for seclusion.

Patients who had a diagnosis of schizophrenia or other psychotic disorder(17, 23, 25, 28, 30, 31, 42, 46), organic disorders(23, 30, 31, 42), were a threat to themselves or others(23, 28, 35, 47), were violent towards others(23, 28, 35), or manic (bipolar disorder)(23, 25, 44) had greater likelihood of exposure to seclusion. There was inconsistency in the results reported for mood/affective disorders including depression, neurotic/stress related disorders, personality disorders, mental retardation, disorders associated with psychoactive substance use, and anxiety disorders.

At the hospital-level, longer length of stay(24-26, 39) and treatment in general hospitals(16, 23, 31) were significant risk factors for seclusion. There were two studies(31, 44) that found a longer length of stay did not increase the risk of exposure to seclusion.

Three studies reported that a lighter patient-to-nursing ratio was a risk factor for seclusion use(16, 20, 31). In two studies, a lighter nursing workload unexpectedly increased the risk of restraint use(24, 26). Patients attending general hospitals including teaching hospitals were at greater risk of

seclusion compared to specialized standalone psychiatric hospitals(16, 23, 28). Patient acuity was not captured or reported consistently in the clinical characteristics of the patients that would allow for comparability.

The current literature review shows that control interventions use continues in psychiatry and that estimates of the range of reported rates of use are very wide. The study of control interventions in psychiatry is sparse, as evidenced by the relatively small number of articles retained for this current literature review. Of these studies, only two Canadian studies were found. The lack of standardized terms, definitions and measurement schema create substantial barriers to completing a more informative meta-analysis to take advantage of the existing published results.

1.2.5 Reasons for the Use of Control Interventions

There is some consensus that control interventions may be acceptable last-resort options to be used under close medical supervision on a short-term basis with the intent of immediately extinguishing a volatile and/or dangerous situation(22, 32). The most often cited reasons for the use of control interventions included acts of violence or aggression(21), threatening violence or aggression(17, 29, 31, 32, 44-46, 48, 49), damaging/threatening to damage property or objects(20, 22, 31, 50), and agitation/disorientation(21). Less-often cited reasons for the use of control interventions included absconding(46, 47), alcohol use(47), fall risk(21), maintain order on the nursing unit(12), and punishment/consequence(46). Clearly, these less-often cited reasons were generally not deemed to be acceptable justifications based on current acceptable standards of practice.

In a large study in Finland, psychiatric hospitals were surveyed in 1990, 1991, 1994, 1998, 2004 for the reason control interventions were used(46). The most frequent reason for control intervention use provided by clinicians was patient agitation/disorientation over all other reasons by a significant margin (47% of the responses). It is noteworthy that this category, patient agitation/disorientation was defined as: "agitated/excited/restless behaviour without actual or threatened violence, and disoriented/confused/incoherent behaviour." Examples of

agitation/disorientation behaviour included being noisy, restless, psychotic and can't cooperate, clinging to other patients, and crying all the time. The second most frequently cited reasons for control intervention use was violence (23%). Threatening violence and damaging property were reported less than 10% of the time.

1.2.6 Negative Consequences of Control Intervention Use

The use of control interventions is intended to provide immediate control of the patient and/or to restore a state of safety to the patient and/or to others. The unintended consequences of the use of control interventions range from temporary harm to extreme adverse outcomes including death of the patient. High profile cases exposed by the Western media in the past two decades have raised awareness of the public and government/agencies about the potential extreme dangers of the use of control interventions and the need to limit (if not eliminate) their use in mental health(1-3). These reports of serious consequence have spurned governments and regulators to increase the rigor in accreditation processes, required reporting, and more specific legislation and regulations with respect to the use of control interventions.

Beyond the highly publicized reports of death, there are reports of serious harm resulting in permanent or temporary physical injuries, and psychological and emotional trauma to patients. Physical injuries resulting from control intervention use have included coma, fractures, soft tissue injury, physical/muscle deconditioning, dehydration, circulatory problems, and incontinence(51). Psychological and emotional trauma for mental health patients is of particular harm to mental health patients because the current trauma of control interventions can often trigger 'reliving' past events of physical and/or sexual abuse(52).

Patients are doubly stigmatized, first as mental health patients and secondly, when control interventions are used. Within the inpatient population, restrained patients suffer isolation, humiliation, fear, estrangement from other patients, and loss of dignity (39). The use of control interventions is disruptive to the milieu of the environment. The therapeutic relationship with care

providers can be damaged and prove to be counterproductive to the goals of mental health care such as self-directed, self-managed care(39, 48).

Policy makers, the public, and mental health care providers are championing a changed view of control interventions away from “treatment options” and instead as last-resort measures for use in situations of danger or even further, as patient safety incidents to be avoided. With this growing international concern of the ethical treatment of patients and legal debates over the use of control interventions demonstrated by recent publications in the literature of work in the USA, Canada, and Europe(5, 6, 23, 32, 35, 53) work is underway to develop methods, systems, and other support structures to quantify the use of control interventions and the circumstances surrounding their use. There is need for work to build the evidence that will support the identification of risk factors associated with control intervention use and developing better clinical guidelines for identification of early warning signs and improved personalized care plans to avert escalation of conditions/patient status that would otherwise result in the need for aggressive and immediate control of patient movements. There is an immediate need to gain a better understanding of the use of control interventions.

2.0 FRAMEWORK FOR RESEARCH ON THE USE OF CONTROL INTERVENTIONS IN MENTAL HEALTH

The World Health Organization (WHO) comprehensive framework for international classification for patient safety was used to guide the examination of the use of control interventions in MH inpatient adults (Appendix A)(53).

This conceptual framework was developed by the WHO to support organizations and/or governments to standardize patient safety data and information to enable systematic use of the aggregated data for analysis purposes and to this end, enable improvement in patient care. This framework is conducive to the examination of the use of control intervention to the target research population. Adopting the key concepts that support examination of components of safe care and the examination of the use of control interventions included: patient characteristics and contributing factors or hazards.

Patient characteristics were described as selected attributes of a patient. Within the patient characteristics the WHO included two categories of factors: patient demographics and reason for encounter with the health care organization (diagnoses, procedure). Patient characteristics were included as a focus of the current research.

Five different types of *contributing factors* were described in the WHO framework including: patient-related, work-environmental, organizational, staff-related or external. This framework defined contributing factors as "a circumstance, action or influence that is thought to have played a part in the origin or development, or to have increased the risk of an incident". A contributing factor was further clarified as being an antecedent factor to an incident, but not necessarily the most basic reason for the occurrence of the event.

Patient-related contributing factors included: cognitive factors, performance factors (inability to follow rules or lacking in technical skills), behaviour, communication factors, patho-physiologic/disease related factors, emotional factors and social factors. These contributing factors were also a focus of the current research.

Other contributing factors noted in the WHO framework, but not included in the scope of the current research included: work/environment factors (physical environment or infrastructure factors, remote or long distances from the service, environmental risk and safety assessment and code or regulations), organizational contributing factors (culture, resources, workload), staff-related factors (individual staff characteristics/performance), and external factors (infrastructure, services, policies).

There has been a growing body of research in the area of safe patient care that has focused on acute care and long term care, but not specifically to mental health care which has unique patient safety factors not typically in common within physical medicine health services(6, 54, 55). An explicit consideration of the vulnerabilities of the mental health population is necessary to avoid undue discrimination, which might interfere with access to safe and appropriate care(6, 54) and in the context of the current research, the use of control interventions.

The current study sought to contribute to the literature by providing a greater understanding beginning with a focus on the patient characteristics contributing to the use of control interventions. The goal was to provide scientific evidence that would support the development of evidence-based guidelines for better care and greater patient and staff safety specifically through the identification of the prevalence of use of control intervention types and the risks associated with the use of specific control intervention types.

3.0 RESIDENT ASSESSMENT INSTRUMENT FOR MENTAL HEALTH

An examination of the literature and field did not uncover any readily available comprehensive assessment tools that captured administrative and clinical data within one tool for mental health care services that could serve the purpose of studying the use of control interventions in the inpatient mental health hospital setting, with one exception. The literature provided evidence of varying methods to collect control intervention use data and/or clinical contextual data such as patient chart reviews, surveys, incident-reporting (control intervention use) or registry type data repositories. These processes were time intensive and expensive. The studies tended to result in relatively small sample sizes due to the expense and logistical challenges. In the instance of patient chart reviews, charting practices and definitions of control interventions were non-standardized from facility to facility, limited time frame for inclusion in the study, and non-standardized clinical documentation practices has been shown to significantly underreport relevant patient conditions or status(25, 30, 34, 35, 56). Drawing generalized conclusions based on patient chart reviews is widely recognized as problematic. Where surveys were used, these collection tools were introduced with some or no training, put in place for a fixed period of time, with a limited number of facilities within a jurisdiction and/or suffered from relatively low response rates or small samples(21). These were executed typically only as one-time surveys where they were completed on a larger scale and carried out for a fixed period of time as short as one week or up to three months(28). In some jurisdictions, legislated patient data protection restricts hospitals from releasing information on an individual case basis, even if de-identified for the purposes of research allowing only the release of data in an aggregated state(42). Where incident reporting systems were used for studies there was typically relatively small number of data elements included with the control intervention incident, again limiting the scope of study of contextual factors surrounding control intervention use(25, 31, 39).

In contrast, the Resident Assessment Instrument – Mental Health (RAI-MH) is a standardized assessment instrument mandated for use in Ontario MH hospitals/MH units with general hospitals by the Ontario MOHLTC since 2005 (38) (Appendix B). Hospitals are required to submit completed

assessment data on a quarterly basis to the Canadian Institute for Health Information (CIHI), a not-for-profit organization that collects and analyzes information on health and health care in Canada. CIHI developed the Ontario Mental Health Reporting System (OMHRS) to manage the collection of the RAI-MH. The RAI-MH is one of several assessment instruments within a suite of assessments developed by interRAI.

The RAI-MH supports care planning, outcome measurement, quality improvement, and resource allocation based on a case mix classification system. The RAI-MH evaluates the needs, strengths, and preferences of patients and its primary purpose is to support clinical decision-making(57, 58). The use of the RAI-MH is a well-established mandated part of the routine in clinical practice in all mental health inpatient units and mental health hospitals in Ontario. CIHI supports the development of standardized training and substantial resource materials for OMHRS users. The data are already gathered and used to inform day-to-day practice, readily available, and standardized. Further, because its use is mandated by the MOHLTC there is full participation MOHLTC approved mental health inpatient care hospitals(59). Within CIHI, there are systematic data quality audits which feedback error reports and required corrections to submitting OMHRs hospitals and de-identified in compliance with privacy legislation(60).

3.1 Reliability and Validity

The RAI-MH is a reliable and valid assessment system. The inter-rater reliability and convergent validity of the various elements in the RAI-MH were tested with results ranging from acceptable to excellent (Kappa >0.60)(62). The criterion validity for the Mental Health Assessment Protocols (MHAPs) also demonstrated to be valid measures(58). More recently conducted validity testing of the cognitive performance scales (CPS) which is a scale derived from the items in the RAI-MH(62) reinforce these findings. The CPS screens for cognitive function/impairment. The CPS was found to be significantly correlated with the Mini-Mental State Examination (MMSE) ($r = -0.69$, $p < .001$) and Montreal Cognitive Assessment (MoCA) ($r = -0.69$, $p < .001$). In addition, scales and items

common between the RAI-MDS 2.0 and the RAI-MH have previously been validated with the nursing home and complex continuing care population including depression(63), activities of daily living(64), and aggressive behaviour(65). The depressive severity index (DSI) was found to have good internal consistency (Cronbach's alpha = 0.77)(59). In 2008, reliability testing across the entire suite of interRAI assessment tool, including the RAI-MH, further reinforced the acceptable to excellent ratings of reliability of the RAI-MH with kappa values ranging from 0.66 to 1.00 and a median of 0.87 across thirteen items (66).

3.2 Components of the Resident Assessment Instrument – Mental Health

The RAI-MH consists of approximately 400 assessment items covering areas of mental health function/performance, physical health, substance use/behaviours, social support and mental health services use(38). This comprehensive assessment is a substantially better information source than chart reviews and snapshot surveys. In bringing standardized clinical assessment findings together with the clinical, social and economic factors affecting the patient into one assessment tool, it allows for a more meaningful contextualized understanding of the observations.

An additional aspect of the RAI-MH is the output of clinical scales derived from the RAI-MH(67). These scales provide the basis on which to assess incremental acuity of illness or loss of function. Eleven scales are employed in this current research including: 1) Aggressive Behaviour Scale (ABS), 2) Activities of Daily Living Hierarchy (ADL), 3) Anhedonia, 4) Cognitive Performance Scale (CPS), 5) Depressive Severity Index (DSI), 6) Instrumental Activities of Daily Living Capacity (IADL), 7) Mania, 8) Positive Symptoms Scale Short, 9) Risk of Harm to Others, 10) Self-care Index Due to Psychiatric Symptoms (SCI), and 11) Severity of Self-harm (SoS)(67). Higher scores indicate a worsening condition of the patient. Many of these scales, as previously mentioned are internationally tested as valid and reliable, and additional testing is ongoing.

3.3 Clinical Assessment Protocols

Embedded within the RAI-MH are Clinical Assessment Protocols (CAPs) previously called Mental Health Assessment Protocols (MHAPs)(67). These serve to alert clinicians to potential areas of current concern, need or future risk that warrant attention or further investigation. CAPs are triggered by items in the RAI-MH. In an earlier study, these MHAPs were demonstrated to be sound in tests of sensitivity (26/27 MHAPS >80%), specificity (19/27 > 80%) and associated rates of false positives triggered (~20% of individuals), and false negatives triggered (~15% of individuals)(58).

In 2011, interRAI released an update of the MHAPs replacing them with CAPs(67). In this major update, two control intervention MHAPS (Seclusion and Restraint; Acute Control Medications) were combined to create one Control Intervention CAP because it was felt that these control interventions would call for similar clinical approaches to reduce and prevent their use with patients(58).

The Control Intervention CAP is triggered to support reduction or elimination of the use of control interventions. Two main groups are identified in this CAP – Persons in a Psychiatric Emergency Situation and Persons Not in a Psychiatric Emergency. The triggers for the former group include patients who have experienced a physical restraint (mechanical, chair prevents rising or physical/manual restraint by staff) seclusion or acute control medications and were in a psychiatric emergency situation (PES). A PES is indicated by one or more of the following: suicide attempt in the three days prior to the assessment, violence toward others in the three days prior to the assessment, score of 13 or higher on the longer version of the interRAI Positive Symptoms Scale (PSS long), extreme behaviour disturbance in the seven days prior to the assessment, command hallucinations in the three days prior to the assessment, or score of 6 or higher on the aggressive behaviour scale (ABS). The creation of the CAPs is an innovation not found in other assessment tools. For the purposes of the current research, the Control Intervention CAP enables an analysis of the conditions in which the use of control interventions may be considered appropriate/necessary versus inappropriate/unnecessary based on the patients' clinical presentation.

Ontario is in a unique position for research in mental health in hospital settings with trained health care clinicians collecting assessment data as part of their day-to-day practice, on 100% of the inpatient adult mental health population served in Ontario. There is substantial evidence to support the use of the robust standardized internationally tested RAI-MH for this current research.

4.0 OVERALL STUDY METHODOLOGY

4.1 Sample

The study sample was selected from all adult patients aged 18 and older admitted between April 1, 2006 and March 31, 2010 to a mental health (MH) hospital or an inpatient MH unit in a general hospital in Ontario. Those patients with a completed Resident Assessment Instrument-Mental Health (RAI-MH) initial assessment within this time frame were included in the study. The RAI-MH is a standardized valid and reliable assessment instrument that evaluates the needs, strengths and preferences of patients(38). The primary purpose of the RAI-MH is to support clinical decision-making. In 1996, the Ontario Ministry of Health and Long-Term Care (MOHLTC) and the Ontario Hospital Association (OHA) initiated the development of the RAI-MH, in collaboration with interRAI(61, 66, 68). interRAI is "a collaborative network of researchers in over thirty countries committed to improving care for persons who are disabled or medically complex." (www.interRAI.org). Adult patients excluded from the study were those who stayed in hospital for less than three days or had assessments completed prior to three days of stay as an inpatient regardless of total length of stay.

In October 2005, the MOHLTC of Ontario mandated the use of the RAI-MH as the standard assessment for all adults, 18 years and older, admitted to an inpatient designated psychiatric hospital or psychiatric unit within a general hospital(57). The MOHLTC requires hospitals to submit the completed assessment data on a quarterly basis to the Canadian Institute for Health Information (CIHI), a not-for-profit organization that collects and analyzes information on health and health care in Canada. To manage the collection of the RAI-MH, CIHI developed the Ontario Mental Health Reporting System (OMHRS).

The current research was conducted using the OMHRS data submitted by Ontario hospitals with assessments completed from April 1, 2006 to March 31, 2010. There were 72 submitting Ontario facilities including 13 psychiatric standalone hospitals and 59 psychiatric units of general hospitals

with approximately 4,330 inpatient mental health beds(38, 57). A total of 115,384 initial assessments were included in the current research.

The University of Waterloo's Office of Research Ethics provided full ethics approval for the use of de-identified OMHRS data for the current study.

4.2 Proposed Research

This current research will to contribute to a greater understanding of the prevalence of use of CIs, the patient characteristics associated with CI use, and the patient characteristics associated with CI use in the absence of a psychiatric emergency situation. There is a dearth of research in the use of CIs in inpatient psychiatry in the Canadian context. Coupled with the potential for substantial negative secondary consequences of CI use there is urgency for such a study. This research will be the first large-scale Canadian study examining the use of control interventions in MH adult inpatients and further is inclusive of older adults, not just working age adults.

The results of the research will be reported in three discrete chapters of this dissertation.

4.2.1 A Descriptive Study of the Use of Control Interventions in Adult Inpatient Mental Health Services in Ontario (Study 1)

This study will create a descriptive patient profile of the sociodemographic, mental health service use, and mental health clinical characteristics of the adult inpatient psychiatric population served in Ontario who were exposed to mechanical/physical restraint, chair prevents rising, acute control medications, or seclusion. Prevalence rates for each CI type will be reported.

4.2.2 Risk Factors in the Use of Mechanical/Physical and Acute Control Medications in Adult Inpatient Mental Health Services in Ontario (Study 2)

This study will undertake an examination of potential risk factors for the use of each CI type including mechanical/physical restraint (MP) and acute control medications (ACM) including the use of chairs that prevent rising (Chair) as a specialized type of MP. Further, this study will attempt to

identify a model that identifies risk factors for an all-inclusive control intervention type category (Any CI), in other words, an examination of risks associated with the use of any MP, Chair or ACM.

4.2.3 Identification of Risk Factors for the Use of Mechanical/Physical and Acute Control Medications in the Absence of a Psychiatric Emergency Situation (Study 3)

There may be some justification of the use of CIs in the presence of a psychiatric emergency situation requiring immediate action from staff to minimize or avoid a dangerous situation, at the cost of secondary negative effects on patients. Study 3 will examine use of CIs when there is an absence of psychiatric emergency situation (NoPES) and identify the risk factors associated with CI use with NoPES patients. This study will create a descriptive patient profile for NoPES patients, differentiating between those with MP, Chair, ACM or Any CI use and those without CI use. Secondarily, an examination of potential risk factors for MP, Chair, ACM or Any CI use for NoPES patients will be undertaken to create a risk model for each CI type including the Any CI type.

5.0 A DESCRIPTIVE STUDY OF THE USE OF CONTROL INTERVENTIONS IN ADULT INPATIENT MENTAL HEALTH SERVICES IN ONTARIO

5.1 Introduction

In recent years, mental health (MH) care services have gained greater prominence with government and the public as an area of growing concern across the entire continuum of care. A recent report from the Mental Health Commission of Canada published results of a risk analysis of the impact of mental illness in Canada(1). In that report, they estimate that 1 in 5 Canadians are currently affected by psychiatric illness and that over the next 30 years they estimate that more than 8.9 million Canadians will be living with a mental illness. Older adult are the fastest growing segment of the Canadian population. The report further reports that it is estimated that 1 in 3 seniors will be affected by mental illness. One of the more controversial aspects of MH services is the use of control interventions (CIs), (i.e., actions taken by MH service providers that overtake the independent action of a patient's movements). These actions can bring about the desired effect of extinguishing an imminently dangerous situation but secondarily, inflict injurious and sometimes lethal unintended consequences. Patients have been harmed physically, psychologically, emotionally(2-6) and some patients have died(3, 7, 8). The pursuit of improving care for today and tomorrow's patients must include the examination of this controversial aspect of MH care.

There is a dearth of research on the use of CIs in MH and in particular for the full age spectrum of adult inpatient services. Today, although it is not uncommon to see policy in government and hospitals advocating for least restraint or no restraint in the care of patients, there have been few formal studies of CI use in MH. The drive to reduce/eliminate the use of CIs has to some degree been fuelled by the Western media, which has raised awareness of the public and government/agencies about the use of CIs and their potential devastatingly lethal effects(7-10). Beyond the stimulus of sensationalized use of controversial CIs in the popular media, there have been few scientific studies conducted assessing the extent of use of CIs in the MH population that would support evidence-based practice change. A literature review on the prevalence of CI use yielded a relatively small number of

peer reviewed studies from Europe(11-21), the United States(6, 22-27), Canada(28, 29), and New Zealand(30).

The literature revealed a lack of consistent standards in reporting on the nomenclature, operational definitions, data collection methods, enumeration methods, and reporting methods providing little opportunity to make definitive conclusions about the prevalence of the use of CIs for comparative purposes. There were wide ranging reported rates of use, from 8% to 88%. This rather wide variation in reported rates is due in part to many methodological issues. Definitional differences were a key issue. Labels for CIs were used interchangeably or exclusively (e.g. physical and mechanical restraints; seclusion and confinement). It became apparent that explicit definitions must be provided as a standard in the research in order to prevent erroneous interpretation of results. This practice was not consistently found in the current literature(14, 23). Non-standardized collection and reporting methods further confounded efforts to better understanding of use rates of control interventions(15, 16, 18, 29, 31). Chart reviews, surveys, and time-limited audits are examples of some of the varied methods used to collect CI use data.

Prevalence of Control Intervention Use

The range of CI use in the literature varied from as low as 8%(22) to 88% specifically for the use of seclusion(13) although in this latter Norwegian study, seclusion was described as the containment of patients on a unit or within an area of a unit. The upper range of 29%(20) was substantially lower when based on a more commonly held North American definition of seclusion, which is to place a patient in a locked room and who is then unable to leave freely. Other studies were restricted to reporting on combinations of control interventions, such as seclusion and restraint together. These studies reported rates from 2%(20) to 10%(19). Canadian studies reported rates ranging from 5%(28) to 23%(29) for seclusion that may have included either restraint or acute control medication use. The rate of use of mechanical and/or physical restraint was similarly wide ranging with a low of 4%(26) to a high of 26%(18). This latter study sample included only involuntary patients. Other studies included patients who were either voluntary or involuntary (6, 15, 25, 26, 28).

A study of older adults (60 years and older) on a psychogeriatric unit reported a use rate of 30% for bed rails, belts, and chairs that prevent moving or rising(12). The use of ACM varied from 4%(17) to 40%(18). The inconsistency of the operational definition of ACM and the heterogeneity of the patient population, as previously mentioned for other CI types, similarly contributes to the substantial range in rates of ACM use.

Risk Factors for Control Intervention Use

The most consistent finding in the literature for sociodemographic risk factors associated with the use of MP was younger age(6, 24, 21, 26, 27, 28). Those factors not significantly associated with MP use were gender(6, 15, 24, 27, 28), income(32), education attained(32), ethnicity(24, 27), and living arrangements(13, 15). Organic mental disorders such as Alzheimer's disease and other related disorders (ADRD) was the MH clinical characteristic most consistently found to be significantly associated with MP use. There were inconsistency of findings of significance for substance use, schizophrenia and other psychotic disorders, mood/affective disorders, neurotic/stress-related disorders, and personality disorders(6, 13, 15, 21, 24, 28). Loss of functional independence in activities of daily living (ADL) or self-care was found to be a risk factor for MP use (15, 17, 21).

Significant clinical risk factors that were consistently associated with ACM use included diagnoses of schizophrenia and other psychotic disorders(13, 15, 17, 18, 21, 25) and organic mental disorders(13, 15, 20). There were no sociodemographic factors consistently identified as risk factors for ACM use.

Similar to MP use, patients of a younger age had a greater tendency to have seclusion use(6, 16, 17, 20, 24, 26, 27, 28, 29). Other sociodemographic characteristics that were studied but were not significant included ethnicity(13, 17, 27), income level(15, 28), employment status(15, 28), and education attained(17, 28). Patients who had a diagnosis of schizophrenia or other psychotic disorder(13, 15, 16, 17, 19, 21, 28, 29), organic disorders(15, 17, 19, 28), were a threat to themselves or others(11, 13, 15, 28), were violent towards others(13, 16, 28), or manic (bipolar disorder)(20, 28, 29) had greater likelihood of exposure to seclusion.

The sparseness of the literature and the lack of standardized terms, definitions, and measurement schema within available research create substantial barriers to using the evidence to its full advantage and leave the question of prevalence of CI and risks factors for CI use largely unanswered.

5.2 Purpose

An in-depth retrospective analysis will be completed to establish the prevalence of CI use and to understand the profile of the sociodemographic factors, MH services use factors and MH clinical characteristics of the adult in-patient psychiatric population served in Ontario hospitals of those patients who are subject to CI use.

5.3 Sample

This study includes all adult patients admitted on an inpatient basis and assessed in a MH hospital or a MH unit within a general hospital in Ontario from April 1, 2006 to March 31, 2010. There were 13 MH hospitals and 59 MH units within general hospitals participating with approximately 4,330 inpatient beds. In total, the sample had 115,384 assessments.

Ontario is a Canadian province located in east central Canada with a population of approximately 13.5 million (http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo02a-eng.htm). The province covers an area of 1.1 million km^2 and is Canada's most populous province.

5.4 Data Source

The RAI-MH is a standardized assessment instrument mandated for use in Ontario MH hospitals/MH units within general hospitals by the Ontario MOHLTC since 2005(32). Hospitals are required to submit completed assessment data on a quarterly basis to the Canadian Institute for Health Information (CIHI), a not-for-profit organization that collects and analyzes information on health and health care in Canada(33). To manage the collection of the RAI-MH, CIHI developed the Ontario Mental Health Reporting System (OMHRS)(32, 35).

The RAI-MH supports care planning, outcome measurement, quality improvement, and resource allocation based on a case mix classification system. The RAI-MH evaluates the needs, strengths, and preferences of patients and its primary purpose is to support clinical decision-making(34, 35). The use of the RAI-MH is a well-established mandated part of the routine in clinical practice in all mental health inpatient units and mental health hospitals in Ontario. CIHI supports the development of standardized training and substantial resource materials for OMHRS users. The data are already gathered and used to inform day-to-day practice, readily available, and standardized. Further, because its use is mandated by the MOHLTC there is full participation of MOHLTC approved mental health inpatient care hospitals(35). Within CIHI, there are systematic data quality audits which feedback error reports and required corrections to submitting OMHRs hospitals and de-identified in compliance with privacy legislation(35, 37).

The RAI-MH is a reliable and valid assessment system with substantial national and international testing for inter-rater reliability and convergent validity(38, 39) and validity testing of various scales (e.g., Cognitive Performance Scale against external standards such as the Mini-Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA)(40). Previous validation testing of CPS, depression, and disability, and aggressive behaviour within other interRAI instruments has been completed(41, 42, 43). The Depressive Severity Index (DSI) was found to have good internal consistency(36). In 2008, international reliability testing across the entire suite of interRAI suite of assessment tools including the RAI-MH showed acceptable to excellent kappa ratings(39).

5.5 Measures

5.5.1 Dependent Variables

5.5.1.1 Control Interventions

There are five dependent variables of interest in this study. The control interventions (CI) identified in the RAI-MH include: 1) mechanical restraint, or physical or manual restraint by staff (MP), 2) chair prevents rising (Chair), 3) acute control medications (ACM), 4) seclusion, and 5) any

control intervention (Any CI). The following is a summary of the descriptions of the response variables of interest, provided in "2011-12 OMHRS Resource Manual – Clinical Coding"(32):

1. "*Mechanical/Physical (MP):* A mechanical restraint is used causing the patient to be unable to ambulate or the patient is in a mechanical restraint but remains able to ambulate (e.g. wrist restraint only). Physical or manual restraint by staff is applied to a patient to restrict the patient's movement. Physical restraint does not apply when holding is required to install a mechanical restraint."
2. "*Chair Prevents Rising (Chair):* Any type of chair that restricts the patient from independently rising from the chair including chairs with a locked lap board, reclining chairs, or low-to-the-floor seating."
3. "*Acute Control Medication (ACM):* Psychotropic medication administered to a patient to achieve an immediate level of control over agitation, and threating, destructive or assaultive behaviours in order to prevent harm to self or others. This definition excludes the use of psychotropic medication for treatment purposes where a diagnosis has been identified and an ongoing course of medication treatment has been prescribed. It excludes the use of PRN medication that is part of an ongoing treatment plan."
4. "*Seclusion Room:* Any room that confines the patient and prevents the patient from freely exiting."
5. *Any Control Intervention (Any CI):* An inclusive category was created for the current study. Any CI is any one type of CI applied to a patient. The CI type could be mechanical/physical, chair prevents rising, acute control medication or seclusion.

The use of CIs were enumerated from full admission clinical assessments completed following three days of stay in hospital. The dependent variables were not mutually exclusive. Patients may have exposure to more than one type of CI.

5.5.2 Independent Variables

The selection of independent variables was guided by the findings in the literature and the World Health Organization (WHO) framework for classification of patient safety which identifies four classes of pertinent descriptive information that provides context for patient safety incidents: patient characteristics, incident characteristics, contributing factors/hazards, and organizational outcomes (Appendix A). The current study focuses on the patient characteristics which include patient demographics and reason for encounter with the health care organization (e.g., diagnoses, procedure). Further, the RAI-MH was developed through extensive international consultation with inter-disciplinary clinical experts in the field of psychiatry including physicians, nurses, social work, and other point of care providers and hence the RAI-MH instrument itself served as a point of reference in the selection of independent variables.

5.5.2.1 Sociodemographic Characteristics

Age

Age was collapsed into eight groups: 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, and 85+. Age 18-24 was used as the reference group.

Sex

Male was used as the reference group and female was the comparison group.

Marital Status

Marital status was collapsed into two groups. "Not partnered" (never married, separated, divorced, or widowed) was used as the reference group with "partnered" (married, in a common-law relationship, or living with a partner or significant other) as the comparison group.

Language

Language was collapsed into two groups. English was used as the reference group and all other languages were identified as "other" and used as the comparison group.

Income Source

This dichotomous variable assessed the patient's condition of "no income" in the form of benefits, assistance, and employment. Having income was used as the reference group and "no income" was the comparison group.

Living Arrangements

Who the patient lived with at the time of admission was collapsed into four categories: alone (includes homeless), with family (spouse and/or child), with others (not spouse or child/children; including parents, sister/brother, uncle), and group setting (boarding home, long-term care home, jail or shared accommodation with non-relatives). Living with family was used as the reference group.

Admitted from Long Term Care Home (LTCH)

This dichotomous item was derived from the RAI-MH collapsing all locations (private home, hospital, and congregate living setting) except LTCH into the "other" category and comparing to those patients admitted from a LTCH. The "other" category was used as the reference group.

Residential Stability

There were three categories included in the assessment of stability of patients' living arrangements. "Not temporary" was used as the reference group, comparing it to patients who had temporary residential arrangements (such as a shelter or hostel), and patients who were homeless.

5.5.2.2 Mental Health Service Use

Number of mental health hospital admissions (recent)

This dichotomized variable indicates patients' history of previous admissions to a MH facility or psychiatric unit within a general hospital with the previous admission(s) occurring within the last two years. No previous hospitalization was used as the reference group.

Number of mental health hospital admissions (life time)

This dichotomized variable indicates patients' history of any previous admissions to a MH facility or psychiatric unit within a hospital without regard to any time constraints. No previous hospitalization was used as the reference group.

Time since last discharge from mental health admission

The time since the discharge from a previous MH admission was collapsed into four categories: no previous admission, greater than one year, between 31 days and one year, and less than 31 days. Patients with no previous admission were used as the reference group.

Amount of time hospitalized

There were four categories enumerating the number of days in hospital in the last two years: no hospital stay, less than 31 days, between 31 days and one year, and greater than one year. Patients with no hospital admission to a MH facility or MH unit within a general hospital was used as the reference group.

Age at first hospitalization for mental health reason

There were four collapsed categories for age at first hospitalization for a MH reason: 0-24 years, 25 – 44 years, 45 – 65, and greater than 65 years old. The category 0 – 24 years was used as the reference group.

Police Intervention

Police intervention was collapsed into three categories: no history of intervention by police, police involvement more than one week ago and up to a year, and within the last 7 days. Having no history of police intervention was used as the reference group.

5.5.2.3 Mental Health Clinical Characteristics

Status at time of initial assessment

The inpatient status at the time assessment was reported across five categories: voluntary, informal, involuntary, psychiatric assessment, forensic, and unknown. Voluntary patients are

admitted by consent of the patient; involuntary patients are those patients who are detained in a psychiatric facility under a Certificate of Involuntary Admission or certificate of Renewal *(*as described in the *Ontario Mental Health Act*) absent of the consent of the patient; informal patients are those admitted with consent of the patients' designated decision-maker; psychiatric assessment order describes patients admitted to and detained in a psychiatric facility for the purposes of assessment based on a Form 1 or Form 2 of the *Ontario Mental Health Act* as completed by a physician or justice of the peace; and forensic patients are admitted for assessment and designations of not criminally responsible or unfit to stand trial or judicial treatment orders. The group, voluntary patients, was used as the reference group.

Current Patient Type

Four categories described the patients' general type of admission (i.e., the type of care anticipated to be provided): acute, longer term, psychogeriatric, and forensic evaluation. As described in the OMHRS resource manual, an acute patient was described as a patient admitted with a new problem or an acute flare-up of an existing problem and is expected to stay less than 14 days in hospital; a longer-term patient was one that had a persistent mental illness and was expected to have a length of stay in hospital longer than 14 days; psychogeriatric patients were patients with a chronic condition typically associated with aging (such as Alzheimer's disease or multi-infarct dementia) regardless of the anticipated duration of length of stay; patients in hospital for forensic evaluation were those admitted specifically for a forensic assessment or because of a designation of unfit to plead or not criminally responsible. Patients in the acute category were used as the reference group.

Capacity/Competency

This item makes an assessment of the patients' ability to demonstrate adequate understanding of information to enable informed decision-making including the consequences of the decision being made in three types of decisions. The patient was assessed as competent or not competent to make decisions independently. The three types of decision-making categories included consent to

treatment, managing property (including real estate, insurance, income sources, and personal property), and disclosure of information related to personal health records. Having competency in these three areas of decision-making were used as the reference group.

The final measure in the capacity/competency section is a dichotomous variable identifying whether the patient had a guardian and/or substitute decision-maker responsible for the financial or personal care needs of the person. The absence of a guardian and/or substitute decision-maker was used as the reference group.

Psychiatric Diagnosis

At the time of assessment, patients are assessed and provided with a provisional diagnosis. Eleven psychiatric diagnostic categories were included in this research: 1) disorders of childhood/adolescence, 2) mental disorders due to general medical conditions, 3) substance-related disorders, 4) schizophrenia and other psychotic disorders, 5) mood disorders, 6) anxiety disorders, 7) eating disorders, 8) sleep disorders, 9) impulse-control disorders not classified elsewhere, 10) adjustment disorders, and 11) personality disorders. These diagnostic groups were each dichotomized as present or not present. Patients may have more than one type of provisional diagnosis. Within each diagnostic group, the patients not diagnosed with that particular diagnosis were used as the reference group.

5.5.2.4 RAI-Mental Health Scales

Eleven clinical outcome measures, derived from the RAI-Mental Health (RAI-MH) assessment items, were included as explanatory variables in the current study, including: Aggressive Behaviour Scale (ABS), Activities of Daily Living Hierarchy (ADL), Anhedonia, Cognitive Performance Scale (CPS), Depressive Severity Index (DSI), Instrumental Activities of Daily Living Capacity (IADL), Mania, Positive Signs/Symptoms Short (PSS-Short), Risk of Harm to Others (RHO), Self-Care Index (SCI), and Severity of Self-harm (SoS). For the scales, scores were collapsed into categorical groups as described below:

Table 5.1 RAI-Mental Health Scales

Variable	Description	Items in Scale	Scale Values	Measurement
Aggressive behaviour scale (ABS)	Measure of frequency and diversity of aggressive behaviours. Includes verbal abuse, physical abuse, socially inappropriate or disruptive and resists care.	E1b E1c E1d E1f	0 1-2 3-4 5-12	no sign of aggression mild aggression moderate aggression more severe aggression
Activities of Daily Living (ADL) Hierarchy	Measures functional performance, reflecting a person's ability to carry out activities of everyday living. Includes personal hygiene, locomotion, toilet use, and eating.	G1a G1b G1c G1d G1e	0 1-2 3-4 5-6	independent supervision/ limited impairment extensive assistance required dependent
Anhedonia	Reflects frequency of symptoms related to anhedonia. Includes Anhedonia, withdrawal from activities of interest, lack of motivation, and reduced social interactions.	B1y B1z B1aa B1bb	0 1-2 3-4 5-6	none mild anhedonia moderate anhedonia severe anhedonia
Cognitive Performance Scale (CPS)	Describes the person's cognitive status. Includes short-term memory, daily decision-making, self-performance in eating, and ability to make self understood by others.	F1a F1b F2 G1e H3	0 1–2 3-4 5-6	intact borderline/mild impairment moderate impairment severe impairment
Depressive Severity Index (DSI)	An alternative measure to Depression Rating Scale for symptoms of depression. Includes sad and pained facial expressions, negative statements, self-deprecation, guilt/shame, hopelessness	B1a B1d B1e B1f B1g	0 1–2 3-5 6-15	none borderline/mild impairment moderate impairment severe impairment
Instrumental Activities of Daily Living (IADL) Capacity	An estimate of higher-level function, reflecting others' perception of a person's ability to carry out IADLs. Includes meal preparation, ordinary housework, managing finances, managing medications, phone use, shopping, and transportation (does not include using stairs)	G2a G2b G2c G2d G2e G3	0 1–2 3-5 6-42	independent supervision/limited impairment moderate impairment severe impairment
Mania	A measure of frequency of symptoms of mania. Includes inflated self-worth, hyper-arousal, irritability, increased sociability/hyper-sexuality, pressured speech, labile affect, and sleep problems due to hypomania	B1h B1i B1j B1k B1l B1m B1tt	0 1–2 3-5 6-20	none borderline/mild mania moderate mania severe mania
Positive Symptoms Scale (PSS): short	A measure of the frequency of positive symptoms. The short form includes hallucinations, command hallucinations, delusions, and abnormal thought process.	B1u B1v B1w B1x	0 1–2 3-8 9-12	none borderline/mild levels of PSS moderate levels of PSS severe levels of PSS

Table 5.1 RAI-Mental Health Scales cont.

Variable	Description	Items in Scale	Scale Values	Measurement
Risk of Harm to Others (RHO)	A measure that reflects the risk of harm to others. Includes aggressive behaviour scale, positive symptoms scale (PSS) long, violence summary scale (VSS), sleep problems, insight into mental health, delusions, and difficulty sleeping.	B1w B1gg: sleep disturbance B2 D2a ABS PSS-long VSS	0 1–2 3-4 5-6	none borderline/mild RHO moderate RHO severe RHO
Self-care Index due to psychiatric symptoms (SCI)	Reflects risk of inability to care for self due to psychiatric symptoms. Includes decline in cognitive skills for decision-making, insight into mental health, making self understood, abnormal thought process, poor hygiene, mania, anhedonia, positive symptoms scale, and decreased energy	B1c B1ff B1x B2 B2 F2 H3 ESP Mania Anhedonia PSS Short	0 1–2 3-4 5-6	independent supervision/limited impairment moderate impairment severe impairment
Severity of Self-harm (SoS)	Reflects risk of harm to oneself. Includes history of suicide attempts, positive symptoms scale, depressive severity scale, family concerned re: self-injury, cognitive performance scale, and suicide plan.	D1b D1c D1da D1db CPS DSI PSS-short	0 1–2 3-4 5-6	none borderline/mild risk self harm moderate risk of self harm severe risk of self harm

From: interRAI Mental Health Clinical Assessment Protocols (CAPs): For Use With Community and Hospital-Based Mental Health Assessment Instruments Version 9.1 Canadian Edition, 2011

This grouping of scale values are consistent with earlier studies (44, 45).

5.5.2.5 Other Health Conditions

Generally other health conditions were dichotomous as present or not present with "not present" as the reference group.

Hearing impairment was dichotomized as adequate or inadequate. Levels of inadequacy were collapsed into the inadequate group including: minimal difficulty (hears conversational level speech but has difficulty with background noise or not on a one-to-one basis), hears in special situations only (hearing is deficient but can hear with raised volume, clear articulation or the speaker's face is clearly visible), highly impaired (typically fails to hear even with maximum volume adjustment). Adequate hearing ability was used as the reference group.

Vision impairment was dichotomized as adequate or inadequate. Levels of inadequacy were collapsed into the inadequate group including: minimal difficulty (able to read large print only), moderate impairment (limited vision and only able to identify objects), highly impaired (cannot generally identify objects but able to detect movement), severely impaired (no vision or sees only light colours or shapes). Adequate vision was used as the reference group.

Making Self-Understood assesses the ability of the patient to express him/herself. The focus of this item is cognitive deficits or other health issues that prevent this expression. Expressive communication may be achieved through speech, writing, or other methods of communication messages. This item was grouped into an ordinal scale with five scores: understood (without difficulty), usually understood (some difficulty but with minor assistance or modification of speed of communication), often understood (requires moderate level of assistance through prompting/cueing, has word finding difficulty), sometimes understood (limited ability but able to express simple requests of basic needs), rarely/never understood (not able to communicate effectively). Being understood was used as the reference group.

Intellectual disabilities was dichotomized as present or not present. The presence of an intellectual disability (ID) is a confirmed diagnosis in the DSM-IV negatively affecting cognitive ability, conceptual, social, and practical skills, and further, present before the age 18 (e.g. Down's Syndrome). The absence of an ID was used as the reference group.

Falls was dichotomized to no falls and >0 falls in the past 30 days with no falls as the reference group.

Neurological conditions: Alzheimer diseases and related disorders (ADRD), cerebral palsy (CP), epilepsy, Huntington's, Multiple Sclerosis (MS), Parkinson's, stroke, and traumatic brain injury (TBI). These conditions were dichotomized for the presence of each condition or absence. An absence of the condition was used as the reference group. These diagnoses were recorded as present if they were deemed to require active treatment and monitoring at the time of assessment.

"Any Neurological" was a variable that collectively recorded the presence of any-one of the following: ADRD, CP, epilepsy, Huntington's, MS, Parkinson's, stroke, TBI, spinal cord injury, amyotrophic lateral sclerosis (ALS), and muscular dystrophy (MD). This item was dichotomized for the presence of any one type of neurological condition. An absence of any neurological condition was used as the reference group.

5.6 Data Analysis

A comprehensive analysis of the use of CIs in adult MH services will create an inpatient population profile for the province of Ontario.

The dependent variables, the CI types, were dichotomized as in-use or not in-use. CIs included: mechanical/physical restraint (MP), chair that prevents rising (Chair), acute control medications (ACM), seclusion, and Any CI (MP, Chair, ACM, Seclusion).

The enumeration of the use of specific CI types was not mutually exclusive (e.g., patients with ACM may also have had seclusion). Any CI is the all-inclusive category and identifies the use of any one type of CI (i.e., if a patient had any one type or more types of control interventions, this was counted as one event of Any CI).

The analysis included descriptive statistics at the univariate and bivariate level including count, percentage, and power. Chi-square statistics were conducted for categorical and ordinal independent variables (significance level $p < .01$).

The independent variables selected for this current research were collected in the completion of the RAI-MH instrument and include sociodemographic characteristics, MH services use, MH clinical characteristics, RAI-MH outcomes measures (scales/algorithms) and other health conditions as described in detail in the previous section.

The explanatory variables are listed below:

Sociodemographic independent variables included: age, sex, marital status, language spoken, income, living arrangements, admission from long-term care home, and residential stability.

MH services use variables include those describing patients' interaction with MH services: number of previous MH hospital admissions (recent – in the past two years and lifetime), time since last discharge, amount of time in previous hospital admission, age at first hospitalization, and police intervention.

MH clinical characteristics of the adult MH inpatient population included: status at the time of assessment, current patient type, capacity/competency in four domains (treatment, property, disclosure of health information, and acting as own decision-maker), and provisional psychiatric diagnoses as determined by a psychiatrist. Those groupings of diagnoses included: child/adolescent disorders, mental disorders due to general medical conditions, substance-related disorders, schizophrenia and other psychotic disorders, mood disorders, anxiety disorders, eating disorders, sleep disorders, impulse control disorders not classified elsewhere, adjustment disorders and personality disorders.

Additional to the above listed MH clinical characteristics, several RAI-MH Scales were examined: Activities of Daily Living Hierarchy (ADL), Aggressive Behaviour Scale (ABS), Anhedonia, Cognitive Performance Scale (CPS), Depressive Severity Index (DSI), Instrumental Activities of Daily Living Capacity (IADL), Mania, Positive Signs/Symptoms Short (PSS-Short), Risk of Harm to Others (RHO), Self-Care Index (SCI), and Severity of Self-harm (SoS).

Other health conditions examined in this current study included: hearing impairment, vision impairment, ability to make self understood, intellectual disability, falls, ADRD, cerebral palsy, epilepsy, Huntington's, Multiple Sclerosis, Parkinson's, stroke, and traumatic brain injury. An inclusive category of neurological conditions comprised of Alzheimer diseases and related dementias, cerebral palsy, epilepsy, Huntington's, Multiple Sclerosis, Parkinson's, stroke, traumatic brain injury, spinal cord injury, amyotrophic lateral sclerosis, and muscular dystrophy was also included.

5.7 Results

There were 115,384 RAI-MH assessments retained for the current study that were completed between April 1, 2006 – March 31, 2010.

Table 5.2 provides a selected list of characteristics of adult MH inpatients of the study sample. The average age of patients was 44.5 years (S.D. 16.4) with almost 65% of the sample between the ages of 25 – 54. There was no predominant presence of male versus female. A great majority of the sample was not partnered and was living either with family or living alone and to a lesser extent in a group setting. About 25% of the sample was in temporary housing prior to admission to hospital. Approximately half the sample had previous MH hospital admissions with discharges from hospital more than 31 days prior to the current admission. The vast majority of patients were admitted for acute care, but less than 10% were found incompetent or lacking in capacity to give consent for treatment, managing property, consent to releasing health information, or making decisions independently. The most frequent provisional diagnoses in the sample were mood disorders, schizophrenia and other psychotic disorders, and substance disorders. The greatest frequency of severe loss in functional independence was in the area of instrumental activities of daily living (IADL). The sample tended to score high on the scales for Anhedonia, DSI, and Mania indicating greater severity of MH condition, but with lower levels on the scale for CPS, RHO, and SCI. Approximately 5% of the sample experienced at least one fall in the 30 days prior to the completion of the RAI-MH assessment.

Table 5.3 shows the overall rates of CI use by type among the study sample. Of these assessments, 24% or 27,171 patients had experienced at least one type of CI type (Any CI). Specific to the types of control interventions, the most frequently used CI was ACM (19% or 21,422 reported events) followed by MP (7% or 7,476 events) and seclusion (6% or 6,544 cases). The use of Chair had the lowest frequency at 1% or 1,068 events. Of those included in this study, 77% (88,213) had no reports of CI use.

Table 5.4 summarizes the frequency of the types CI used with patients. Of those with reported CI use, 70% (19,417) had only one type of CI, 23% (6,206) had two types of CI, 6% (1,511) had three, and 0.1% (36) had four types of CI use. The most frequently paired CI types used were ACM with MP (3,482 events) and ACM with Seclusion (1,855 events).

Across the province by region, the rates of use of control inventions varied as widely as 28 percentage points for Any CI and as narrowly as 2 percentage points for Chair which overall, had relatively low rates of use. The range of Any CI use was 8% - 36% with a mean of 23% and median of 25%. MP use was used as infrequently as 1.6% to a maximum of 16% with a mean of 6% and median of 5%. Chair had the lowest rates of use reported with a minimum at 0.2% and maximum of 3% and a mean of 0.9% and median of 0.8%. ACM was the most often reported CI type with a minimum use rate of 7% and maximum use of 28% (mean =17% and median = 19%). Seclusion use varied widely with a reported minimum use rate of 1.0% and a maximum of 17% with a mean of 6% and median of 5%.

Bivariate analysis was undertaken to describe the patient profile of those patients with CI use. Not unexpectedly due to the large sample size, many of the variables studied were found to be significant at the bivariate level as reported in Tables 5.5 to 5.29 for sociodemographic, MH service use, MH clinical characteristics and RAI-MH scales and other health outcomes variables. The following describes the association between the use of CI types and the explanatory variables included in this study.

Any Control Interventions

The sociodemographic characteristics for those with Any CI is shown in Table 5.5. For those with Any CI, there was a tendency to be in the younger (17-24, 24-34 years old) and older adult (75-84 and 85 years and older) age groups. There were more males in the Any CI group compared to the No CI group and less likely to be partnered. The Any CI group also had greater proportion of patients who spoke a language other than English, had no source of income, and was more likely in temporary

residential arrangements or was homeless prior to admission to hospital. The Any CI group was less likely to live with family (partner/children) or alone and higher proportions living in a group setting or with other relatives (not partner/son/daughter). Any CI patients had a greater proportion of admissions from LTCH than the No CI group.

Table 5.6 lists the MH service use characteristics of those with Any CI. Patients with Any CI were more likely to have more MH admissions (recent and lifetime) than the No CI group. Having spent any amount of time spent in hospital, regardless of duration, was seen in the Any CI group more frequently. The Any CI group had a greater tendency to have police intervention versus the No CI group. The Any CI group also tended to have more recent discharges from a hospital admission than the No CI group (< 1 year) and had their first MH admissions to hospital in greater proportions at the youngest (0 – 14 years, 15 – 24) and the oldest age (65 years and older) groups compared to the No CI group.

The MH Clinical Characteristics for Any CI are listed in Table 5.7. The Any CI group were more likely have a status of informal, involuntary, and psychiatric assessment at the time of assessment compared to the No CI group and less likely to be voluntary or forensic patients. Any CI patients were more often admitted for acute care, psychogeriatric care, and forensic reasons and less likely to be admitted for longer-term care compared to the No CI group. For all categories of capacity/competency, the Any CI group had greater levels of incapacity including consent for treatment, managing property, consent to disclose health information and making own decisions. Patients with Any CI tended to have greater reported provisional diagnoses of: child/adolescent disorder, mental disorder due to general medical conditions, schizophrenia and other psychotic disorders, and impulse control disorders not classified elsewhere. Those patients in the CI Any group were less likely to be diagnosed with substance, mood, anxiety, eating, sleep, and adjustment disorders. Personality diagnoses were not significant.

Table 5.8 lists the results for the RAI-MH Scales. Patients in the Any CI group had greater levels of loss in ADL, CPS, and substantially worse off for ABS, IADL, Mania, PSS Short, RHO, and

SCI compared to No CI group. This trend was reversed for Anhedonia, DSI, and SoS. At the severe end of the scale, the Any CI group proportionately had fewer patients than in the No CI group.

Other Health Conditions are listed in Table 5.9. The Any CI group were more likely to have difficulty making themselves understood, intellectual disabilities, and falls. The Any CI group was also slightly more likely to have hearing impairment or vision impairment. Within the neurological diagnoses, Alzheimer's/Dementia and other related disorders (ADRD), Huntington's, and traumatic brain injury were identified more often in the Any CI group than in the No CI group. Conversely, multiple sclerosis ($p < .02$) and stroke ($p < .02$) were found less often in the Any CI group. The broader category of Any Neurological was found in greater proportions in the Any CI group than the No CI group. Cerebral palsy, epilepsy, and Parkinson's differences were not significant.

Mechanical/Physical Restraint

All of the sociodemographic characteristics are listed in Table 5.10. The sociodemographic characteristics comparison between the MP group versus the No MP group were similar to those found in the Any CI versus the No CI group. The one difference was the MP group proportionately had more patients in the 65-75 year old group than the No MP group.

MH Service Use characteristics are listed in Table 5.11. Again the MP group versus No MP group characteristics were similar to the Any CI/No CI analysis across most characteristics. The age at first admission followed a slightly different pattern. The MP patients were less likely to have had their first admission at the ages of 0-14, 25-44, or 45-64 and more likely at the ages of 15-24 or 65 and older compared to the No MP group.

MH Clinical Characteristics in Table 5.12 show that MP patients were substantially less likely to be voluntary patients and to a lesser extent, forensic patients, compared to the No MP group. The MP group was more typically involuntary and psychiatric assessment patients. There were very few informal patients within the MP group. From the perspective of patient type and capacity/competency, the pattern of differences was similarly to those found for the Any CI/No CI analysis, i.e., MP group had proportionately more patients with a current status of informal,

involuntarily, and psychiatric assessment as well as greater numbers in all categories of capacity/competency. Patients in the MP group more often had provisional diagnoses of child/adolescent disorders, mental disorders due to general medical conditions, schizophrenia and other psychotic disorders, and impulse control disorders. Less frequently, MP patients were given a provisional diagnosis of substance, mood, anxiety, eating, adjustment, and personality disorders. Sleep disorders was not significant.

RAI MH Scales for MP and No MP groups are listed in Table 5.13. The MP group tended to have consistently greater impairment in ADL, ABS, and CPS at all levels of loss. There were greater proportions of MP patients at the two levels of greatest loss/impairment in IADL, Mania, PSS Short, RHO, and SCI. There were proportionately fewer MP patients with borderline/minimal loss or impairment in these same scales compared to the No MP group. With respect to anhedonia, MP patients had an inconsistent pattern of presentation with greater proportions assessed as no anhedonia and moderate levels of anhedonia (3-4) and smaller proportions with lower scores (1-2) and the highest scores (5-12) of anhedonia compared to the No MP group. MP patients tended to have greater levels of DSI and SoS compared to the No MP group except for those with the most severe DSI and SoS, similar to the Any CI/No CI comparison.

Table 5.14. lists the results of the bivariate analysis for Other Health Conditions for MP. Similarly to the Any CI analysis, the MP group was more likely to have hearing impairment, vision impairment, difficulty making self understood, presence of intellectual disabilities, and falls. MP patients were more often diagnosed with ADRD, epilepsy, Huntington's, Parkinson's, and stroke. The MP group was more likely to have proportionately greater numbers with Any Neurological compared to the No MP group. The findings for CP, MS, and TBI were not significantly different.

Chair Prevents Rising

Sociodemographic characteristics are shown in Table 5.15. The patients in the Chair group were typically the older adult (65-74, 75-84, 85 and older). This age distribution is unique to Chair use. All other CI types were used at higher rates at both ends of the age group spectrum. The Chair

group was typically male, partnered, and spoke a language other than English compared to the No Chair group. The Chair group had greater likelihood of having a source of income compared to the No Chair group and prior to admission to hospital, living in a Group setting (i.e., congregate living with non-relatives). Consistent with this finding, the Chair group had greater proportion with admissions from LTCH and having Residential Stability. There were fewer tendencies for the Chair group to have lived with Family, Alone or with Others (relatives, but not spouse/children) compared to the No Chair group.

MH Service Use for Chair Prevents Rising is listed in Table 5.16. The Chair group tended to have no previous admission for MH reasons and Police Intervention. In the event there was one or more hospital admission, the Chair group were less likely to report amount of time in hospital as less than 31 days or 31 days – one year in the past two years compared to the No Chair group and was more likely to report amount of time in hospital as greater than one year.

The MH Clinical Characteristics for Chair Prevents Rising is shown in Table 5.17. The Chair group had a greater tendency to be informal than the No Chair group and further, had greater number of patients as informal status than for any other type of CI type. The Chair group also had greater tendency to be involuntary patients at the time of assessment compared to the No Chair group and was substantially more likely to be a psychogeriatric admission patient type (49% versus 3%). Across all capacity/competency categories (treatment, property, disclosure of health information, and decision-making), the Chair group was more likely to be deemed incapable. This was a similar pattern found in the Any CI and MP analyses although the magnitude of difference was less pronounced in Any CI and MP than with Chair. The Chair group had proportionately more provisional diagnoses of mental disorders due to general medical conditions and sleep disorders and less substance disorders, schizophrenia and other psychotic disorders, mood disorders, anxiety disorders, eating disorders, adjustment disorders, and personality disorders compared to the No Chair group. Child/adolescent disorders and impulse control disorders were not found to be significantly different.

RAI-MH Scales (Table 5.18) show that the Chair group typically scored higher on the ADL Hierarchy, ABS, and substantially so for the CPS, IADL scale, Mania, PSS Short, RHO, and SCI. The Chair group also had a greater tendency to have higher scores for SoS than the No Chair group except at the most severe end of the scale (score of 5 – 6). There were minor differences between the Chair and No Chair group for the Anhedonia scale, generally with the Chair group with proportionately less anhedonia. The Chair group has slightly greater tendency of depression (DSI) compared to the No Chair group, except at the most severe level of depression where there was a lower likelihood of severe depression in the Chair group.

Other Health Conditions are listed in Table 5.19 and it shows that the Chair group was more likely to have hearing and vision impairment, intellectual disability, and falls and substantially so for those who had difficulty making themselves understood. Only 30% of the Chair group were able to make themselves understood compared to 85% for the No Chair group. The Chair group proportionately typically had more difficulty with making themselves understood at all levels of disability. Just over 38% of the Chair group rarely or sometimes were understood compared to only 3% of the No Chair group. Additionally, the Chair group had substantially more ADRD diagnoses than the No Chair group (71% versus 6%) and accordingly, the broader category of Any Neuro, which includes ADRD, was similarly proportioned between the Chair and No Chair groups. To a substantially lesser extent, there were more tendencies for the Chair group to have diagnoses of CP, epilepsy, Huntington's, MS, Parkinson's, and stroke. TBI was not significant.

Acute Control Medication

Sociodemographic characteristics are shown in Table 5.20. The ACM group were more typically the younger adult (18-24, 25-34 years) but included the oldest adults (85 years and older) but only slightly. The ACM group tended to be male, not partnered, speak a language other than English, and not have a source of income. There is a greater tendency for the ACM group to live with others or in a group setting and not with family or alone. Admission from LTCH was seen more frequently in the ACM group and as well, to have more residential instability and homelessness.

The results of the analysis of MH Service Use with the ACM use are shown in Table 5.21. The ACM group typically had proportionately more MH admissions (recent and lifetime), with accompanying greater proportions with more recent discharges from hospital (31 days-1 year, and < 31 days), and amount of time spent in hospital at all levels for a MH admission compared to the No ACM group. More ACM patients had their first MH hospitalization at the age of 15-24 years and 65 years and older and less so at 0-14 years, 25-44 and 45-64 years old and greater tendency for intervention by police.

MH Clinical Characteristics for ACM use is listed in Table 5.22. ACM patients tended not to be voluntary patients instead had greater tendency to have status as informal, involuntary, and psychiatric assessment and had greater proportions of patients as acute and psychogeriatric patient types rather than longer term and forensic compared to the No ACM group. The ACM group had greater loss of capacity for all categories of competency than the No ACM group. The ACM group were more typically provisionally diagnosed with child/adolescent disorders, mental disorders due to general medical conditions, schizophrenia and other psychotic disorders, and impulse control disorders, and less likely to be diagnosed with substance, mood, anxiety, eating, and adjustment disorders. Sleep and personality disorders were not significant.

The RAI MH Scales (Table 5.23) show that the ACM group had higher tendency for more severe loss of function or greater disability in the areas of ADL, ABS, Anhedonia, CPS, IADL, Mania, PSS Short, RHO, and SCI. The ACM group had proportionately higher frequency of no DSI and SoS reported compared to the No ACM group but with the increasing scores on the scales, a greater tendency for the ACM group to have depression and SoS, except at the most severe level. The No ACM had greater levels of severe DSI and SoS.

Table 5.24 shows the results for Other Health Conditions for ACM use. The ACM group had a slightly greater tendency to have hearing impairment, vision impairment, difficulty making self understood, intellectual disability and falls (p = .001) compared to the No ACM group. The ACM

group had greater tendency to have diagnoses of ADRD, CP, Huntington's, TBI, and Any Neurological disorders category. Epilepsy, MS, Parkinson's, and stroke were not significant.

Seclusion

Sociodemographic characteristics are shown in Table 5.25. The Seclusion group were more likely to be younger (18-24, 25-34 years) than the No Seclusion group. Notably, unlike the other CI types, older patients were not found in greater numbers proportionately for Seclusion. The Seclusion group also tended to be male, not partnered, spoke a language other than English, have no source of income, and not living with family but alone, with others, or in a group setting. The Seclusion group proportionately had marginally lower frequency of temporary housing and greater likelihood of homelessness compared to the No Seclusion group.

Table 5.26 lists the results of the MH Service Use analysis for Seclusion use. The Seclusion group proportionately had greater numbers of MH admissions (recent and lifetime), more recent discharges from hospital (31 days – 1 year, < 31 days), spent more time in hospital in the past 2 years, and police intervention compared to the No Seclusion group. The Seclusion group were hospitalized for MH reasons at a younger age (0-14, 15-24) than the No Seclusion group who had proportionately more first admissions in later life (25-44, 45-64, and 65 years and older).

MH Clinical Characteristics for Seclusion is listed in Table 5.27. The Seclusion group was proportionately more likely to have involuntary, informal, psych assessment and forensic status at the time of assessment compared to the No Seclusion group. The Seclusion group was more typically an acute or forensic evaluation patient type. The Seclusion group was typically deemed incompetency across the four categories of capacity/competency in greater proportions than the No Seclusion group.

RAI MH Scales for seclusion is shown in Table 5.28. The Seclusion group was more often identified with increasing levels ADL dependence than the No Seclusion group and similarly more loss/disability in ABS, CPS, and IADL. The Seclusion group had greater tendency to have more severe Mania, PSS Short or SCI levels. The Seclusion group was less likely to have no reports of SoS

but also less likely to have severe SoS compared to the No Seclusion group. The mild to moderate SoS was more characteristic of the Seclusion group than the No Seclusion group.

The results of the Other Health Conditions by Seclusion use are listed in Table 5.29. There were small differences between the Seclusion and No Seclusion group for hearing and vision impairment with the Seclusion group with slightly lower tendency for loss. The exception to this trend was the Seclusion group had slightly greater tendency to have highly impaired hearing than the No Seclusion group. Difficulty making self understood and ID was more characteristic of the Seclusion group than the No Seclusion group. Parkinson's disease and stroke were found slightly less frequently in the Seclusion group versus the No seclusion group. Falls, ADRD, CP, epilepsy, Huntington's, MS, TBI and Any Neuro were not significant.

5.8 Discussion

The use of CIs within MH adult services in Ontario is relatively common. Achieving a full awareness and greater understanding of the degree to which CIs are used and the circumstances of their use are fundamental steps to reducing their use. In order to reduce CI use, a fine balance between the rights of the patient to CI-free care and the responsibilities of health care provider to ensure safety of the patient, other patients and staff, must be struck in the process of delivering care. Notwithstanding, the continued use of CIs will result in continued incidents of unintended but not unexpected physical, psychological and emotional adverse outcomes for the patient and staff. It is irrefutable that lowering rates of CI use and concurrently maintaining safe care are equally important priorities in MH care. Therein lies an ethical dilemma between practices that protect individual rights versus the collective rights of others.

The current study was able to ensure standardized nomenclature, definitions, collection methods, and reporting processes as a result of using the OMHRS/RAI-MH data set. The use of the RAI-MH has enabled the development of a comprehensive profile of Ontario MH patients with CI use and to further describe those profiles by type of CI. It is the largest Canadian study of CI use that

spans the age spectrum of adult inpatient MH services, inclusive of Chair Prevents Rising as a CI type, and covering four years of data collection with full facility participation in the sample.

Patients exposed to MP, ACM and Seclusion tended to be younger than those without the use of these CIs similarly reported in previous studies. Not found in previous studies was that the MP group had a tendency to have a greater proportionate numbers of patients in the 65 and older age group, and that the oldest old had more ACM use. Seclusion use was identified as a CI type used more typically with younger adults and with diminishing likelihood after 44 years. The Chair group was typically 65 years and older. The assertion that CIs are used more frequently with younger adults in previous studies may be a result of the age constraints in the study samples rather than actual CI use patterns in MH services(15, 18).

This study revealed an overall 23.5% use rate of Any CI. This rate represents the percent of patients exposed to any one-type of CI (MP, Chair, ACM or Seclusion). This rate is within the range of rates found in the literature, with caveats. It is noteworthy that the highest rate of Any CI was 38% from a study that was restricted to only involuntary patients(18). A low of 10% was reported from a ten-hospital German study with a mixed patient population, more similar to that of the current study(19). The authors of that study comment that achieving the 10% rate CI use was largely attributable to the completion of years of implementing training courses for staff, policy changes in hospitals, distribution of treatment guidelines, and that achieving rates lower than 10% would require substantive system changes. A Swiss study that included six hospitals, reported a rate of 7% for the use of Any CI(17). It is necessary to point out that the German study only included MP and Seclusion and that both the Swiss and German study did not include patients older than 65 and 70 years old (respectively). The Swiss study further stipulated that the use of CI was only in a psychiatric emergency although did not describe the criteria that would constitute a psychiatric emergency. A consistent challenge mentioned throughout this current paper, is lack of uniformity of nomenclature, definitions and collection methods and the necessary caution when drawing direct comparison between use rates.

The rates of use of the individual types of CI in this current study were cautiously determined as falling within previously reported rates for MP, ACM and Seclusion. For MP, most studies reported rates ≤10% of patients with MP use with a mean rate of 7%. This mean rate did not include studies specifying samples that only included involuntary patients, which reported rates of 25%(18). The Ontario rate for ACM use was twice the average reported in the literature (excluding studies only including involuntary patients). The current study included involuntary, informal, psychiatric assessment and forensic patients representing just over 50% of the sample. This may contribute to the higher rate, as the use rate for ACM in the current study was more typical of patients with this status. There were no studies that solely examined the use of chair that prevents rising. This CI type is associated with studies in the long-term care home (LTCH) or nursing home (NS) sector and seen as a restraint more typically used with older adults(12, 46). The results of the current study confirms this perspective, finding a substantially greater proportion of the older adults with Chair use than the younger or middle adult age groups, a pattern not replicated for any of the other CI types. Many studies cited by the current paper, explicitly excluded the older adult from their samples, missing an important cohort of MH inpatients, and the potentially unique nature of the types of CI used with older adults and the characteristics that typify their use. One study reported a 30% rate of Any CI use and was explicit in studying only the older adult and included CIs more characteristically found in the nursing home literature such as bed rails, 'geri-chairs', lap belts, and other devices that prevent rising (12). Although the current study does not include this analysis, this level of study is recommended for future study.

In the current study, those with MP, ACM, and Seclusion tended to have diagnoses of schizophrenia and other psychotic disorders, mood disorders, ADRD, intellectual disability and having difficulty making self understood and experienced recent falls. This clinical profile was similarly found for those with Chair use with the exception of schizophrenia and other psychotic disorders. Previous studies did not consistently report these same results. This may in part be

explained by the lack of consistency in many the aspects of CI use research previously mentioned and therefore drawing further direct comparisons beyond this superficial assessment would be imprudent.

The examination of the RAI-MH scales by CI types revealed clinical characteristics not found in previous studies, which tended to focus on diagnostic categories as the most commonly sourced clinical characteristic of patients. The RAI-MH scales report incremental levels of loss or disability not merely the presence of disease or disorder, which afforded greater granularity in the analyses. For example, for those with use of Chair, at low to moderate levels of loss of IADL function, there was no appreciable level of Chair use, but rather, 90% of those with Chair use had a tendency to have severe to total loss of independence in IADL function. To date, there is no other substantial Canadian jurisdiction fully implemented using the RAI-MH like Ontario. An increased spread of adoption would facilitate the development of national benchmarks for CI use devoid of the complications detailed in previous research and instead of debates about the data and the metadata, spawning constructive dialogue on practical matters of how to reduce CI use in MH services in place. The current study revealed that CI groups generally were worse off than the No CI groups. Not unexpectedly higher scores for ABS, RHO, and SoS were more typical of all CI types when compared to non CI types. Strikingly, CI patients also tended to perform worse in the areas of ADL, IADL and SCI and most pronounced was this pattern for Chair use. As previously mentioned 90% of those with Chair use had severe levels of loss of IADL capacity. Beyond building patient profiles of CI use, these types of data enable clinicians and researchers to work to identify those factors that may address clinical needs and subsequently identify strategies that could avert or delay worsening of patients' condition(s) and therefore reduce CI use.

Potential critics of the measurement chosen for the current study (# of CI incidents/total number of patients served) may point to the absence of consideration of the patients' length of stay (LOS) or the total patient days delivered as a proxy that takes into consideration patients' LOS. These metrics assume that LOS is a risk factor for CI use. Risk factors are not addressed in this current paper but should be a factor considered for future research.

5.9 Limitations of the current research

One of the limitations of this study is the enumeration of the CI use. The RAI-MH makes assessment of the use of CI for the three days prior to the assessment completion date. It would be fair to assume that this may underestimate the overall CI use experienced by patients in consideration of their entire stay. Despite this conservative estimate of CI use, the current research indicates that 1 in 5 inpatients in MH in Ontario had CI, a rate comparable to studies that were restricted to involuntary patients, clearly pointing to the critical need to better understand CI in MH. Other studies used total patient days or patient length of stay (LOS) as the denominator. The current study's goal was to determine the rate that clinicians used various CI types with patients, which is different from the equally important goal of determining the frequency of CI use with patients who have differing duration of hospital length of stay. The current study standardizes the observation period to the first three days of stay in hospital. The analysis of frequency of use of CIs based on patients' LOS could be a topic of future research.

The RAI-MH provides sociodemographic, health services use, and clinical characteristics collected concurrently with the report of the CI use. The immense further benefit is that these data are collected as a standard protocol of clinical practice versus additional one time surveillance reporting which can introduce bias in the reporting as well as result in constrained contextual data collection by design to limit the data collection burden on those completing the survey.

This study did not include all categories of contributing factors to the use of CIs. The World Health Organization's conceptual framework for international classification for patient safety identifies human factors, policy, staff work environment, staffing ratios, other infrastructure factors as well as patient characteristics(47), the latter of which was the main focus of the current study. Recognizing that there are likely multiple inputs that create a safe patient care environment as suggested by the World Health Organization, future research is needed in these other areas identified and their interactions on the use of CI.

The current research only includes Ontario hospitals and therefore the results are not generalizable to other Canadian hospitals though results of this study do begin to serve the needs of hospital administrators and clinicians for comparative analysis of CI use, which is often the starting point for benchmarking associated with quality improvement initiatives. Expansion of the use of the RAI-MH to other jurisdictions in Canada and internationally, will further enhance the international efforts to reduce the use of CIs in MH.

5.10 Conclusion

This study contributes to the literature, building our understanding of the prevalence of CIs in inpatient adult MH services as well as understanding of who is exposed to CI use. CI use in MH is a continued practice in Ontario at what appears to be a relatively high rate. The results of this study also form the basis on which to build future models that will identify risk factors for CI use. And lastly, this current research points to the need for greater study of CI use with older adults in MH and the factors contributing to their use with this subset of the adult inpatient MH population.

5.11 Tables

Table 5.2. Descriptive Univariate Analysis of Adult Mental Health Inpatient Characteristics, Ontario 2006 - 2010 (N= 115,384)

	Study Sample N = 115,384
Sociodemographic Characteristics	
Age (years); mean (SD)	44.5 (16.4)
Age Min/Max (years)	18.0/108.8
Distribution by age group %(n)	
18 – 24	11.7 (13,500)
25 – 34	19.1 (22,038)
35 – 44	21.4 (24,692)
45 – 54	22.4 (25,846)
55 - 64	13.1 (15,115)
65 – 74	6.8 (7,846)
75 – 84	4.2 (4,846)
85 and older	1.3 (1,500)
Female %(n)	50.8 (58,615) *NS*
Marital Status %(n)	
Partnered	29.7 (34,269)
Not partnered	70.3 (81,115)
Language spoken other than English %(n)	5.1 (5,885)
No income source %(n)	10.3 (11,885)
Living Arrangement %(n)	
Living with partner/children	31.7 (36,577)
Living with relatives but not partner or children	24.8 (28,615)
Living in group setting	10.3 (11,885)
Living alone	33.2 (38,307)
Residential stability %(n)	
Temporary (Shelter)	24.4 (28,154)
Homeless	0.8 (923)
MH Service Use Characteristics	
Recent MH hospital admissions (in last 2 years) %(n)	
1 – 2	36.0 (41,538)
3 or more	17.8 (20,538)
Time since last discharge from MH admission %(n)	
> 1 year	29.7 (34,269)
31 days – 1 year	28.0 (32,308)
< 31 days	13.8 (15,923)
Amount of time hospitalized in last 2 years %(n)	
< 31 days	31.8 (36,692)
31 days – 1 year	19.9 (22,961)
> 1 year	2.1 (2,423)
Police intervention %(n)	
> 1 week	22.1 (25,500)
< 1 week	5.5 (6,346)

***p< .0001* unless otherwise noted**
NS = not significant

Table 5.2: Descriptive Univariate Analysis of Adult Mental Health Inpatient Characteristics, Ontario 2006 – 2010 (N = 115,384) (*p* <.0001) cont.

		Study Sample N = 115,384
MH Clinical Characteristics		
Status at time of assessment %(n)		
Voluntary		47.4 (54,692)
Informal		1.12 (1,292)
Involuntary		25.9 (29,884)
Psychiatric Assessment		22.9 (26,423)
Forensic		2.6 (3,000)
Current patient type %(n)		
Acute		82.9 (95,653)
Long term		11.1 (12,808)
Psychogeriatric		3.42 (3,946)
Forensic Evaluation		2.6 (3,000)
Incapacity/Incompetent %(n)		
Consent for treatment		9.2 (10,615)
Managing property		6.9 (7,961)
Consent to disclose health info		4.5 (5,192)
Own decision-maker		9.1 (10,500)
Provisional psychiatric diagnosis at time of assessment %(n)		
Child/Adolescent disorders		1.7 (1,962)
Mental disorder due to gen medical conditions		1.7 (1,962)
Substance disorders		23.4 (27,000)
Schizophrenia and other psychotic disorders		37.0 (42,692)
Mood disorders		52.5 (60,577)
Anxiety disorders		11.0 (12,692)
Eating disorders		1.5 (1,731)
Sleep disorders		0.6 (692)
Impulse Control		1.7 (1,962)
Adjustment disorders		4.1 (4,731)
Personality disorders		10.8 (12,461)
RAI-MH Scales %(n)	**Scale Value**	
Activities of Daily Living Hierarchy (ADL)	0	82.9 (95,653)
	1-2	11.3 (13,038)
	3-4	4.8 (5,538)
	5-6	1.0 (1,154)
Aggressive Behaviour Scale (ABS)	0	69.9 (80,653)
	1-2	11.6 (13,385)
	3-4	8.4 (9,692)
	5-12	10.1 (11,654)

Table 5.2: Descriptive Univariate Analysis of Adult Mental Health Inpatient Characteristics, Ontario 2006 – 2010 (N = 115,384) cont.

		Study Sample N = 115,384
RAI-MH Scales cont. %(n)	**Scale Value**	
Anhedonia	0	37.6 (43,384)
	1-2	10.9 (12,577)
	3-4	13.6 (15,692)
	5-12	37.9 (43,731)
Cognitive Performance Scale (CPS)	0	60.5 (69,807)
	1-2	29.8 (34,384)
	3-4	6.3 (7,269)
	5-6	3.4 (3,923)
Depressive Severity Index (DSI)	0	25.1 (28.861)
	1-2	20.1 (23,192)
	3-5	27.8 (32,077)
	6-15	27.0 (31,154)
Instrumental Activities of Daily Living (IADL)	0	53.2 (61,384)
	1-2	10.9 (12,577)
	3-5	9.3 (10,731)
	6-42	26.6 (30,692)
Mania	0	41.7 (48,115)
	1-2	18.4 (21,231)
	3-5	18.1 (20,885)
	6-20	21.8 (25,154)
Positive Signs and Symptoms Short (PSS Short)	0	50.5 (58,269)
	1-2	11.7 (13,500)
	3-8	31.8 (36,692)
	9-12	6.0 (6,923)
Risk of Harm to Others (RHO)	0	24.9 (58,269)
	1-2	43.2 (49,846)
	3-4	17.9 (20,654)
	5-6	14.0 (16,154)
Self Care Index (SCI)	0	23.9 (27,577)
	1-2	46.5 (53,654)
	3-4	17.4 (20,077)
	5-6	12.2 (14,077)
Severity of Self Harm (SoS)	0	20.0 (23,077)
	1-2	40.5 (46,731)
	3-4	16.9 (19,500)
	5-6	22.6 (26,077)

Table 5.2: Descriptive Univariate Analysis of Adult Mental Health Inpatient Characteristics, Ontario 2006 – 2010 (N = 115,384) cont.

Other Health Conditions % (n)		
Making Self Understood	Usually	9.6 (11,077)
	Often	2.8 (3,231)
	Sometimes	2.7 (3,115)
	Rarely	0.7 (808)
Any falls in the past 30 days		5.2 (6,000)
Alzheimer's Disease and other related disorders (ADRD)		6.7 (7,731)
Any neurological condition		7.4 (8,538)

Table 5.3. Use of Control Intervention (CI) by Type Among Adult Mental Health Inpatients, Ontario 2006 - 2010 (N =115,384)

				Observations of			
		No CI	**Any CI**	**MP**	**Chair**	**ACM**	**Seclusion**
Year	# Assess-ments	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
2006/7	28,164	76.5 (21,549)	23.5 (6,615)	7.0 (1,965)	1.1 (296)	18.0 (5,058)	5.8 (1,643)
2007/8	27,851	75.3 (20,970)	24.7 (6,881)	6.7 (1,872)	0.9 (253)	19.5 (5,420)	6.1 (1,702)
2008/9	28,074	75.9 (21,318)	24.1 (6,756)	6.3 (1,775)	0.9 (240)	19.3 (5,425)	5.6 (1,558)
2009/10	31,295	77.9 (24,376)	22.1 (6,919)	6.0 (1,864)	0.9 (279)	17.6 (5,519)	5.2 (1,641)
Total	115,384	76.5 (88,213)	23.6 (27,171)	6.5 (7,476)	0.9 (1,068)	18.6 (21,422)	5.7 (6,544)
p-value		< .0001	< .0001	< .0001	< .08	< .0001	< .0001

Chi-square statistical test for fiscal year by CI type

Table 5.4. Frequency of the Number of Types of CI Used Among Adult Mental Health Inpatients, Ontario 2006 – 2010

Number of CI types	Frequency	%
1	19,417	70.3
2	6,206	22.5
3	1,511	5.5
4	37	0.1

Table 5.5. Sociodemographic Characteristics of Adult Mental Health Inpatients, Ontario 2006 - 2010 (N=115,384) by Any Control Interventions (Any CI)

		Any CI N = 27,171	No CI N = 88,213
		% (n)	% (n)
Age	*p*	< .0001	
18-24		15.8 (4,304)	11.9 (10,450)
25-34		21.3 (5,780)	19.0 (16,720)
35-44		20.6 (5,601)	21.5 (19,924)
45-54		19.7 (5,349)	22.6 (19,924)
55-64		10.8 (2,920)	13.2 (11,611)
65-74		5.5 (1,503)	6.8 (5,965)
75-84		4.5 (1,224)	4.0 (3,556)
85+		1.8 (490)	1.1 (996)
Sex	*p*	< .0001	
Male		54.0 (14,670)	48.6 (42,841)
Female		46.0 (12,495)	51.4 (45,351)
Marital status	*p*	< .0001	
Not partnered		77.4 (21,018)	70.4 (62,076)
Partnered		22.7 (6,153)	29.6 (26,137)
Language	*p*	< .0001	
English		94.2 (25,603)	95.1 (83,925)
Other		5.8 (1,568)	4.9 (4,288)
Income	*p*	< .0001	
Income		88.7 (24,110)	89.9 (79,300)
No income		11.3 (3,061)	10.1 (8,913)
Living arrangements	*p*	< .0001	
Family		22.7 (6,170)	31.7 (27,960)
Alone		32.7 (8,878)	33.5 (29,519)
Others		29.0 (7,873)	24.7 (21,800)
Group		15.6 (4,250)	10.1 (8,934)
Admitted from LTCH	*p*	< .0001	
Other		96.4 (24,110)	98.7 (87,044)
LTCH		3.6 (3,061)	1.3 (1,169)
Residential stability	*p*	< .0001	
Not temporary		73.2 (19,876)	75.3 (66,404)
Temporary		25.6 (6,946)	23.9 (21,103)
Homeless		1.3 (349)	0.8 (706)

Table 5.6. Mental Health Services Use Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Any Control Intervention (Any CI)

		Any CI N = 27,171	No CI N = 88,218
		% (n)	% (n)
# of MH admits recent	*p*	< .0001	
None		40.4 (10,988)	46.4 (40,891)
One or more		59.6 (16,183)	53.7 (47,322)
# of MH admits life time	*p*	< .0001	
None		24.2 (1,278)	28.5 (25,151)
One or more		75.8 (669)	71.5 (63,062)
Time since last discharge	*P*	< .0001	
No previous admission		24.2 (6,578)	28.5 (25,151)
> 1 year		28.9 (7,852)	29.5 (25,980)
31 days – 1 year		30.7 (8,342)	28.2 (24,891)
< 31 days		16.2 (4,399)	13.8 (12,191)
Amount of time in hospital	*p*	< .0001	
None		40.4 (10,988)	46.4 (40,891)
< 31 days		34.5 (9,373)	31.7 (27,984)
31 days – 1 year		22.6 (6,148)	19.9 (17,561)
> 1 year		2.4 (662)	2.0 (1,777)
Age at first hospitalization	*p*	< .0001	
0 – 14 years		4.2 (1,131)	3.9 (3,478)
15 – 24 years		38.5 (10,452)	30.1 (26,577)
25 – 44 years		37.7 (10,248)	42.0 (37,026)
45 – 64 years		12.2 (3,304)	17.9 (15,800)
65+ years		7.5 (2,036)	6.0 (5,332)
Police intervention	*p*	< .0001	
Never		58.7 (15,957)	72.5 (63,947)
> 1 week		27.2 (7,399)	21.7 (19,097)
<1 week		14.0 (3,815)	5.9 (5,169)

Table 5.7. Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Any Control Intervention (Any CI)

		Any CI N = 27,171	No CI N = 88,218
		% (n)	% (n)
Status at time of assessment	*p*	< .0001	
Voluntary		25.6 (6,953)	54.1 (47,685)
Informal		1.6 (444)	1.0 (843)
Involuntary		39.7 (10,786)	21.6 (19,040)
Psych assessment		30.3 (8,222)	20.6 (18,182)
Forensic		2.6 (698)	2.6 (2,291)
Unknown		0.3 (68)	0.2 (172)
Current patient type	*p*	< .0001	
Acute		87.00 (23,637)	81.6 (71,960)
Long term		5.5 (1,483)	12.9 (11,376)
Psychogeriatric		4.9 (1,340)	3.00 (2,611)
Forensic evaluation		2.6 (711)	2.6 (2,266)
Capacity/Competency			
Consent for treatment	*p*	< .0001	
Capable		84.6 (22,993)	92.8 (81,821)
Incapable		15.4 (4,178)	7.3 (6,392)
Managing property	*p*	< .0001	
Capable		88.8 (24,136)	94.4 (83,264)
Incapable		11.2 (3,035)	5.6 (4,949)
Consent to disclose health info	*p*	< .0001	
Capable		91.6 (24,890)	96.7 (85,257)
Incapable		8.4 (2,281)	3.4 (2,956)
Decision-making	*p*	< .0001	
Own decision-maker		85.7 (23,290)	92.5 (81,570)
Substitute decision-maker		14.3 (3,881)	7.5 (6,643)

Table 5.7. Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Any Control Intervention (Any CI) cont.

		Any CI N = 27,171	No CI N = 88,213
		% (n)	% (n)
Psychiatric diagnoses			
Child/Adolescent disorders	*p*	< .0001	
None		97.8 (26,562)	98.4 (86,811)
Present		2.3 (609)	1.6 (1,402)
Mental disord due to gen med	*p*	< .0001	
None		97.9 (26,609)	98.5 (86,843)
Present		2.1 (562)	1.6 (1,370)
Substance disorders	*p*	< .0001	
None		78.9 (21,446)	75.9 (66,963)
Present		21.1 (5,725)	24.1 (21,250)
Schiz/psychotic disorders	*p*	< .0001	
None		51.2 (13,919)	66.6 (13,919)
Present		48.8 (13,252)	33.4 (29,430)
Mood disorders	*p*	< .0001	
None		57.1 (15,500)	44.6 (39,341)
Present		43.0 (11,671)	55.4 (48,872)
Anxiety disorders	*p*	< .0001	
None		93.3 (25,348)	87.6 (77,295)
Present		6.7 (1,823)	12.4 (10,918)
Eating disorders	*p*	< .0001	
None		99.5 (27,026)	98.2 (86,631)
Present		0.5 (145)	1.8 (1,582)
Sleep disorders	*p*	.02	
None		99.5 (27,044)	99.4 (87,691)
Present		0.5 (127)	0.6 (522)
Impulse Control	*p*	< .0001	
None		98.0 (26,617)	98.4 (86,808)
Present		2.0 (554)	1.6 (1,405)
Adjustment disorders	*p*	< .0001	
None		96.9 (26,333)	95.6 (84,359)
Present		3.1 (838)	4.4 (3,854)
Personality disorders	*p*	.09	
None		89.5 (24,315)	89.1 (78,614)
Present		10.5 (2,856)	10.9 (9,599)

Table 5.8. RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Any Control Intervention (Any CI)

		Any CI N = 27,171	No CI N = 88,213
		% (n)	% (n)
Activities of Daily Living Hierarchy (ADL)			
	p		< .0001
None		71.5 (19,417)	86.4 (76,205)
1-2		17.0 (4,607)	9.6 (8,444)
3-4		9.2 (2,503)	3.4 (3,038)
5-6		2.4 (644)	0.6 (526)
Aggressive Behaviour Scale (ABS)	*p*		< .0001
None		38.8 (10,540)	79.4 (70,024)
1-2		15.6 (4,232)	10.4 (9,171)
3-4		15.4 (4,184)	6.3 (5,534)
5-12		30.2 (8,215)	4.00 (3,484)
Anhedonia	*p*		< .0001
None		38.1 (10,350)	37.4 (33,016)
1-2		10.8 (2,929)	10.9 (9,592)
3-4		14.3 (3,882)	13.5 (11,861)
5-12		36.8 (10,010)	38.3 (33,744)
Cognitive Performance Scale (CPS)	*p*		< .0001
None		42.2 (11,470)	66.2 (58,430)
1-2		37.2 (10,094)	27.5 (24,240)
3-4		12.5 (3,385)	4.4 (3,847)
5-6		8.2 (2,222)	1.9 (1,696)
Depressive Severity Index (DSI)	*p*		< .0001
None		27 (7,427)	24.3 (21,413)
1-2		20.3 (5,527)	20.1 (17,713)
3-5		28.9 (7,848)	27.5 (24,277)
6-15		23.4 (6,369)	28.1 (24,810)
Instrumental Activities of Daily Living (IADL)			
	p		< .0001
None		36.7 (9,981)	58.3 (51,380)
1-2		11.9 (3,239)	10.6 (9,313)
3-5		11.3 (3,057)	8.7 (7,684)
6-42		40.1 (10,894)	22.5 (19,836)

Table 5.8. RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Any Control Intervention (Any CI) cont.

		Any CI N = 27,171	No CI N = 88,213
		% (n)	% (n)
Mania	*p*		< .0001
None		20.4 (5,547)	48.3 (42,606)
1-2		14.0 (3,801)	19.7 (17,372)
3-5		21.3 (5,776)	17.1 (15,085)
6-20		44.3 (12,047)	14.9 (13,150)
Positive Sign/Symptoms (PSS Short)	*p*		< .0001
None		29.8 (8,095)	56.8 (50,127)
1-2		11.5 (3,119)	11.8 (10,424)
3-8		47.1 (12,788)	27.1 (23,902)
9-12		11.7 (3,169)	4.3 (3,760)
Risk of Harm (RHO)	*p*		< .0001
None		11.0 (2,980)	29.3 (25,818)
1-2		29.1 (7,899)	47.5 (41,901)
3-4		26.5 (7,211)	15.3 (13,473)
5-6		33.4 (9,081)	8.00 (7,021)
Self Care Index (SCI)	*p*		< .0001
None		9.6 (2,606)	28.4 (25,068)
1-2		43.6 (11,836)	47.3 (41,755)
3-4		21.3 (5,785)	16.1 (14,240)
5-6		25.6 (6,944)	8.1 (7,150)
Severity of Self-harm (SoS)	*p*		< .0001
None		11.0 (2,997)	22.8 (20,065)
1-2		49.3 (13,397)	37.8 (33,362)
3-4		20.4 (5,531)	15.9 (13,991)
5-6		19.3 (5,246)	23.6 (20,795)

Table 5.9. Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Any Control Intervention (Any CI)

		Any CI N = 27,171	No CI N = 88,213
		% (n)	% (n)
Hearing	*p*	< .0001	
Adequate		95.5 (25,938)	96.4 (87,982)
< Adequate		4.5 (1,233)	3.7 (3,231)
Vision	*p*	< .0001	
Adequate		93.5 (25,392)	94.5 (83,326)
< Adequate		6.6 (1,779)	5.5 (4,887)
Making self understood	*p*	< .0001	
Understood		73.2 (19,888)	87.6 (77,308)
Usually		14.8 (4,023)	8.1 (7,087)
Often		4.9 (1,330)	2.1 (1,846)
Sometimes		5.5 (1,488)	1.8 (1,593)
Rarely		1.6 (442)	0.4 (379)
Intellectual disability	*p*	< .0001	
No intellectual disability		94.6 (25,696)	96.5 (85,112)
Intellectual disability		5.4 (1,475)	3.5 (3,101)
Falls	*p*	< .0001	
No falls		94.0 (25,527)	95.0 (83,821)
Falls		6.1 (1,644)	5.0 (4,392)
Alzheimer's/Dementia/other related disorders (ADRD)			
	p	< .0001	
None		89.9 (24,428)	94.4 (83,242)
Present		10.1 (2,743)	5.6 (4,971)
Cerebral Palsy	*p*	.16	
None		99.8 (27,127)	99.9 (88,102)
Present		0.2 (44)	0.1 (111)
Epilepsy	*p*	.15	
None		99.2 (26.948)	99.3 (87,565)
Present		0.8 (223)	0.7 (648)
Huntington's	*p*	< .0001	
None		99.8 (27,115)	99.9 (88,139)
Present		0.2 (56)	0.1 (74)
Multiple sclerosis	*p*	.02	
None		99.9 (27,134)	99.8 (88,029)
Present		0.1 (37)	0.2 (184)

Table 5.9: Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Any Control Intervention (Any CI) cont.

		Any CI N = 27,171	No CI N = 88,213
		% (n)	% (n)
Parkinson's	*p*	.31	
None		99.4 (27,008)	99.5 (87,730)
Present		0.6 (163)	0.6 (483)
Stroke	*p*	.02	
None		99.6 (27,062)	99.7 (87,940)
Present		0.4 (109)	0.3 (273)
Traumatic Brain Injury	*p*	.0007	
None		99.8 (27,107)	99.9 (88,089)
Present		0.2 (64)	0.1 (124)
Any Neuro	*p*	< .0001	
None		89.5 (24,313)	99.6 (82,585)
Present		10.5 (2,858)	6.4 (5,628)

Table 5.10. Sociodemographic Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Mechanical/Physical Restraint (MP)

		MP N = 7,476	No MP N = 107,908
		% (N)	
Age	*p*		< .0001
18-24		17.6 (1,317)	12.5 (13,437)
25-34		20.5 (1,533)	19.4 (20,967)
35-44		18.6 (1,387)	21.5 (23,205)
45-54		17.6 (1,316)	22.2 (23.957)
55-64		9.4 (706)	12.8 (13,825)
65-74		6.6 (496)	6.5 (6,972)
75-84		6.6 (491)	4.00 (4,289)
85+		3.1 (230)	1.2 (1,256)
Sex	*p*		< .0001
Male		55.8 (4,174)	49.4 (53,337)
Female		44.2 (3,301)	50.6 (54,545)
Marital status	*p*		< .0001
Not partnered		77.0 (5,759)	71.7(77,335)
Partnered		23.0 (1,717)	28.3 (30,573)
Language	*p*		< .0001
English		93.14 (6,963)	95.05 (102,565)
Other		6.86 (513)	4.95 (5,343)
Income source	*p*		< .0001
Income		88.2 (6,597)	89.7 (96,813)
No income		11.8 (879)	10.3 (11,095)
Living arrangements	*p*		< .0001
Family		20.9 (1,565)	30.2 (32,565)
Alone		31.4 (2,347)	33.4 (36,050)
Others		29.7 (2,220)	25.4 (27,453)
Group		18.0 (1,344)	11.0 (11,840)
Admitted from LTCH	*p*		< .0001
Other		93.7 (7,001)	98.5 (106,240)
LTCH		6.4 (475)	1.6 (1,668)
Residential stability	*p*		< .0001
Not temporary		72.6 (5,430)	74.9 (80,850)
Temporary		26.0 (1,945)	24.2 (26,104)
Homeless		1.4(101)	0.9 (954)

Table 5.11. Mental Health Services Use Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Mechanical/Physical Restraint (MP)

		MP N = 7,476	No MP N = 107,908
		% (n)	% (n)
# of MH admits recent	*p*	< .0001	
None		41.4 (3,094)	45.2 (48,785)
One or more		58.6 (4,382)	54.8 (59,123)
# of MH admits life time	*p*	< .0001	
None		26.2 (1,961)	27.6 (29,768)
One or more		73.8 (5,515)	72.4 (78,140)
Time since last discharge	*p*	< .0001	
No previous admission		26.2 (1,961)	27.6 (29,768)
> 1 year		27.1 (2,209)	29.5 (31,803)
31 days – 1 year		30.0 (2,243)	28.7 (30,990)
< 31 days		16.6 (1,243)	14.2 (15,347)
Amount of time in hospital	*p*	< .0001	
None		41.4 (3,094)	45.2 (48,785)
< 31 days		35.5 (2,657)	32.2 (34,700)
31 days – 1 year		20.8 (1,547)	20.5 (22,162)
> 1 year		2.4 (178)	2.1 (2,261)
Age at first hospitalization	*p*	< .0001	
0-14 yrs		4.0 (297)	4.0 (4,312)
15 – 24 yrs		39.3 (2,941)	31.6 (34,088)
25 – 44 yrs		33.8 (2,525)	41.5 (44,749)
45 – 64 yrs		11.4 (849)	16.9 (18,255)
65+ yrs		11.6 (864)	6.0 (6,504)
Police intervention	*p*	< .0001	
Never		55.4 (4,143)	70.2 (75,761)
> 1 week		26.3 (1,966)	22.7 (24,530)
<1 week		18.3 (1,367)	7.1 (7,617)

Table 5.12 Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Mechanical/Physical Restraint (MP)

		MP N = 7,476	No MP N = 107,908
		% (n)	% (n)
Status at time of assessment	*p*	< .0001	
Voluntary		14.3 (1,065)	49.7 (53,573)
Informal		2.0 (149)	1.1 (1,138)
Involuntary		46.8 (3,498)	24.4 (26,328)
Psych assessment		34.8 (2,603)	22.1 (23,801)
Forensic		1.9 (145)	2.6 (2,844)
Unknown		0.2 (16)	0.2 (224)
Current patient type	*p*	< .0001	
Acute		85.0 (6,352)	82.7 (6,352)
Long term		5.4 (401)	11.6 (401)
Psychogeriatric		7.8 (582)	3.1 (582)
Forensic evaluation		1.9 (141)	2.6 (141)
Capacity/Competency			
Consent for treatment	*p*	< .0001	
Capable		77.5 (5,793)	91.8 (99,021)
Incapable		22.5 (1,683)	8.2 (8,887)
Managing property	*p*	< .0001	
Capable		83.9 (6,275)	93.7 (101,125)
Incapable		16.1 (1,201)	6.3 (6,783)
Consent to disclose health info	*p*	< .0001	
Capable		86.5 (6,468)	96.1 (103,679)
Incapable		13.5 (1,008)	3.9 (4,229)
Decision-making	*p*	< .0001	
Own decision-maker		80.8 (6,039)	91.6 (98,821)
Substitute decision-maker		19.2 (1,437)	8.4 (9,087)

Table 5.12 Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Mechanical/Physical Restraint (MP) cont.

		MP N = 7,476	No MP N = 107,908
		% (n)	% (n)
Psychiatric diagnoses			
Child/Adolescent disorders	*p*	< .0001	
None		97.3 (7,273)	98.3 (106,100)
Present		2.7 (203)	1.7 (1,808)
Mental disord due to gen med	*p*	< .0001	
None		97.5 (7,289)	98.4 (106,163)
Present		2.5 (187)	1.6 (1,745)
Substance disorders	*p*	< .0001	
None		81.0 (6,054)	76.3 (82,355)
Present		19.0 (1,422)	23.7 (25,553)
Schiz/psychotic disorders	*p*	< .0001	
None		50.2 (3,751)	63.9 (68,951)
Present		49.8 (3,725)	36.1 (38,957)
Mood disorders	*p*	< .0001	
None		63.2 (4,722)	46.5 (50,119)
Present		36.8 (2,754)	53.6 (57,789)
Anxiety disorders	*p*	< .0001	
None		95.8 (7,159)	88.5 (95,484)
Present		4.2 (317)	11.5 (12,424)
Eating disorders	*p*	< .0001	
None		99.7 (7,455)	98.4 (106,202)
Present		0.3 (21)	1.6 (1,706)
Sleep disorders	*p*	.11	
None		99.8 (7,444)	99.4 (107,291)
Present		0.4 (32)	0.6 (617)
Impulse Control	*p*	.002	
None		97.9(7,315)	98.3 (106,110)
Present		2.2 (161)	1.7 (1,798)
Adjustment disorders	*p*	< .0001	
None		97.7 (7,306)	95.8 (103,386)
Present		2.3 (170)	4.2 (4,522)
Personality disorders	*p*	.008	
None		90.1 (6,738)	89.1 (96,191)
Present		9.9 (738)	10.9 (11,717)

Table 5.13 RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Mechanical/Physical Restraint (MP)

		MP N = 7,476	No MP N = 107,908
		% (n)	% (n)
Activities of Daily Living	*p*	< .0001	
None		58.3 (4,361)	84.6 (92,261)
1 - 2		21.7 (1,621)	10.6 (11,430)
3-4		15.0 (1,124)	4.1 (4,417)
5-6		5.0 (370)	0.7 (800)
Aggressive Behaviour Scale	*p*	< .0001	
None		18.0 (1,343)	73.4 (79,221)
1-2		12.0 (896)	11.6 (12,507)
3-4		16.2 (1,212)	7.0 (8,506)
5-12		53.8 (4,025)	7.1 (7,674)
Anhedonia	*p*	< .0001	
None		40.4 (3,019)	37.4 (40,347)
1-2		10.1 (755)	10.9 (11,766)
3-4		14.0 (1,046)	13.6 (14,697)
5-12		35.5 (2,656)	38.1 (41,098)
Cognitive Performance Scale	*p*	< .0001	
None		32.3 (2,416)	62.5 (67,484)
1-2		35.1 (2,622)	29.4 (31,712)
3-4		17.4 (1,299)	5.5 (5,933)
5-6		15.2 (1,139)	2.6 (2,779)
Depressive Severity Index	*p*	< .0001	
None		31.4 (2,345)	24.6 (26,495)
1-2		20.8 (1,552)	20.1 (21,688)
3-5		29.4 (2,194)	27.7 (29,931)
6-15		18.5 (1,385)	27.6 (29,794)
Instrumental Activities of Daily Living	*p*	< .0001	
None		31.3 (2,343)	54.7 (59,018)
1-2		9.9 (6.90)	10.9 (11,809)
3-5		9.9 (741)	9.3 (10,000)
6-42		48.8 (3,649)	25.1 (27,081)
Mania	*p*	< .0001	
None		11.1 (831)	43.9 (47,322)
1-2		10.5 (782)	18.9 (20,391)
3-5		20.3 (1,519)	17.9 (19,342)
6-20		58.1 (4,344)	19.3 (20,853)

Table 5.13 RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Mechanical/Physical Restraint (MP) cont.

		MP N = 7,476	No MP N = 107,908
		% (n)	% (n)
Positive Sign/Symptoms	*p*		< .0001
None		23.3 (1,738)	52.3 (56,484)
1-2		9.4 (701)	11.9 (12,842)
3-8		51.8 (3,871)	30.4 (32,819)
9-12		15.6 (1,166)	5.3 (5,763)
Risk of Harm	*p*		< .0001
None		5.1 (380)	26.3 (28,418)
1-2		17.5 (1307)	44.9 (48,493)
3-4		26.0 (1,942)	17.4 (18,742)
5-6		51.5 (3,847)	11.4 (12,255)
Self Care Index	*p*		< .0001
None		4.9 (369)	25.3 (27,305)
1-2		41.4 (3,092)	46.8 (50,499)
3-4		19.7 (1,475)	17.2 (18,550)
5-6		34.0 (2,540)	10.7 (11,554)
Severity of Self-harm	*p*		< .0001
None		8.1 (606)	20.8 (22,456)
1-2		52.8 (3,946)	39.7 (42,813)
3-4		23.6 (1,764)	16.5 (17,758)
5-6		15.5 (1,160)	23.1 (24,881)

Table 5.14 Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Mechanical/Physical Restraint (MP)

		MP N = 7,476	No MP N = 107,908
		% (n)	% (n)
Hearing	*p*	< .0001	
Adequate		93.9 (7,023)	96.3 (103,897)
Min. difficulty		4.0 (297)	2.7 (2,945)
Hears in sp. situations		1.1 (80)	0.5 (515)
Highly impaired		1.0 (76)	0.5 (551)
Vision	*p*	< .0001	
Adequate		92.1 (6,886)	94.4 (101,832)
Impaired		5.0 (377)	4.0 (4,339)
Mod impaired		1.7 (125)	1.2 (1,243)
Highly impaired		0.5 (40)	0.3 (286)
Severely impaired		0.6 (48)	0.2 (208)
Making self understood	*p*	< .0001	
Understood		66.1 (4,941)	85.5 (92,255)
Usually		15.6 (1,168)	9.2 (9,942)
Often		6.5 (486)	2.5 (2,690)
Sometimes		8.5 (636)	2.3 (2,445)
Rarely		3.3 (245)	0.5 (576)
Intellectual disability	*p*	< .0001	
No intellectual disability		93.8 (7,009)	96.2 (103,799)
Intellectual disability		6.3 (467)	3.8 (4,109)
Falls	*p*	< .0001	
No falls		92.0 (6,874)	95.0 (102,474)
Falls		8.1 (602)	5.04 (5,434)
Alzheimer's/Dementia/other related disorders (ADRD)			
	p	< .0001	
None		83.9 (6,275)	94.0 (101,395)
Present		16.1 (1,201)	6.0 (6,513)
Cerebral Palsy	*p*	.33	
None		99.8 (7,463)	99.9 (107,766)
Present		0.2 (13)	0.1 (142)
Epilepsy	*p*	< .0001	
None		98.8 (7,389)	99.3 (107,124)
Present		1.2 (87)	0.7 (784)

Table 5.14 Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Mechanical/Physical Restraint (MP) cont.

		MP N = 7,476	No MP N = 107,908
		% (n)	% (n)
Huntington's	*p*	< .0001	
None		99.6 (7,449)	99.9 (107,805)
Present		0.4 (27)	0.1 (103)
Multiple sclerosis	*p*	.24	
None		99.9 (7,466)	99.8 (107,697)
Present		0.1 (10)	0.2 (211)
Parkinson's	*p*	.02	
None		99.2 (7,419)	99.5 (107,319)
Present		0.8 (57)	0.6 (589)
Stroke	*p*	< .0001	
None		99.3 (7,425)	99.7 (107,577)
Present		0.7 (51)	0.3 (331)
Traumatic Brain Injury	*p*	.15	
None		99.8 (7,459)	99.8 (0.16)
Present		0.2 (17)	0.2 (171)
Any Neuro	*p*	< .0001	
None		83.5 (6,245)	93.3 (100,653)
Present		16.5 (1,231)	6.7 (7,255)

Table 5.15 Sociodemographic Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Chair-Prevents-Rising (Chair)

		Chair N = 1,068	No Chair N = 114,316
		% (N)	% (N)
Age	*p*		< .0001
18-24		2.5 (27)	12.9 (14,729)
25-34		3.4 (36)	19.7 (22,464)
35-44		3.8 (40)	21.5 (24,552)
45-54		7.5 (80)	22.0 (25,193)
55-64		11.3 (121)	12.6 (14,410)
65-74		19.1 (204)	6.4 (7,264)
75-84		34.6 (370)	3.9 (4,410)
85+		17.8 (190)	1.1 (1,296)
Sex	*p*		.001
Male		54.7 (584)	49.8 (56,927)
Female		45.3 (483)	50.2 (57,363)
Marital status	*p*		< .0001
Not partnered		57.6 (615)	72.2 (82,479)
Partnered		42.4 (453)	27.9 (31,837)
Language	*p*		< .0001
English		90.7 (969)	95.0 (108,559)
Other		9.3 (99)	5.0 (5,757)
Income source	*p*		< .0001
Income		96.9 (1,035)	90.0 (102,375)
No income		3.1 (33)	10.5 (11,941)
Living arrangements	*p*		< .0001
Family		24.2 (258)	29.6 (33,872)
Alone		16.6 (177)	33.4 (38,220)
Others		9.1 (97)	25.9 (29,576)
Group		50.2 (536)	11.1 (12,648)
Admitted from LTCH	*p*		< .0001
Other		64.0 (683)	98.5 (112,558)
LTCH		36.1 (385)	1.5 (1,758)
Residential stability	*p*		.003
Not temporary		77.9 (832)	74.8 (85,448)
Temporary		22.0 (235)	24.3 (27,814)
Homeless		0.1 (1)	0.9 (1,054)

Table 5.16 Mental Health Services Use Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Chair-Prevents-Rising (Chair)

		Chair N = 27,171	No Chair N = 88,218
		% (n)	% (n)
# of MH admits recent	*p*	< .0001	
None		68.1 (727)	44.8 (51,152)
One or more		31.9 (341)	55.3 (63,164)
# of MH admits life time	*p*	< .0001	
None		54.8 (585)	27.2 (31,144)
One or more		45.2 (483)	72.8 (83,172)
Time since last discharge	*P*	< .0001	
No previous admission		54.8 (585)	27.2 (31,144)
> 1 year		19.9 (212)	29.4 (33,620)
31 days – 1 year		14.8 (158)	28.9 (33,075)
< 31 days		10.6 (113)	14.4 (16,477)
Amount of time in hospital	*p*	< .0001	
None		68.1 (727)	44.8 (51,152)
< 31 days		14.3 (153)	32.5 (37,204)
31 days – 1 year		14.5 (155)	20.6 (23,554)
> 1 year		3.1 (33)	2.1 (2,406)
Age at first hospitalization	*p*	< .0001	
0 – 14 years		1.5 (16)	4.0 (4,593)
15 – 24 years		9.4 (100)	32.3 (36,929)
25 – 44 years		14.1 (151)	41.2 (47,123)
45 – 64 years		16.5 (176)	16.6 (18,928)
65+ years		58.5 (625)	5.9 (6,743)
Police intervention	*p*	< .0001	
Never		84.3 (900)	69.1 (79,004)
> 1 week		9.8 (105)	23.1 (26,391)
<1 week		5.9 (63)	7.8 (8,921)

Table 5.17 Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Chair-Prevents-Rising (Chair)

		Chair N = 1,068	No Chair N = 114,316
		% (n)	% (n)
Status at time of assessment	*p*	< .0001	
Voluntary		41.4 (442)	47.4 (54,196)
Informal		10.2 (109)	1.0 (1,178)
Involuntary		30.2 (323)	25.8 (29,503)
Psych assessment		17.0 (182)	22.9 (26,222)
Forensic		0.6 (6)	2.6 (2,983)
Unknown		0.6 (6)	0.2 (234)
Current patient type	*p*	< .0001	
Acute		43.0 (459)	83.2 (95,138)
Long term		7.4 (79)	11.2 (12,780)
Psychogeriatric		49.0 (523)	3.0 (3,428)
Forensic evaluation		0.66 (7)	2.6 (2,970)
Capacity/Competency			
Consent for treatment	*p*	< .0001	
Capable		44.8 (478)	91.3 (104,336)
Incapable		55.2 (590)	8.7 (9,980)
Managing property	*p*	< .0001	
Capable		48.50 (518)	93.5 (106,882)
Incapable		51.50 (550)	6.5 (7,434)
Consent to disclose health info	*p*	< .0001	
Capable		53.3 (569)	95.9 (109,578)
Incapable		46.7 (499)	4.1 (4,738)
Decision-making	*p*	< .0001	
Own decision-maker		37.4 (399)	91.4 (104,461)
Substitute decision-maker		62.6 (669)	8.6 (9,855)

Table 5.17 Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Chair-Prevents-Rising (Chair) cont.

		Chair N = 1,068	No Chair N = 114,316
		% (n)	% (n)
Psychiatric diagnoses			
Child/Adolescent disorders	*p*	.58	
None		98.0 (1,047)	98.3 (112,326)
Present		2.0 (21)	1.7 (1,990)
Mental disord due to gen med	*p*	< .0001	
None		91.8 (980)	98.4 (112,472)
Present		8.2 (88)	1.6 (1,844)
Substance disorders	*p*	< .0001	
None		92.5 (987)	76.5 (87,422)
Present		7.6 (81)	23.5 (26,894)
Schiz/psychotic disorders	*p*	< .0001	
None		81.7 (872)	62.8 (71,830)
Present		18.4 (196)	37.2 (42,486)
Mood disorders	*p*	< .0001	
None		71.2 (760)	47.3 (54,081)
Present		28.8 (308)	52.7 (60,235)
Anxiety disorders	*p*	< .0001	
None		95.3 (1,018)	88.9 (101,625)
Present		4.7 (50)	11.1 (12,691)
Eating disorders	*p*	.02	
None		99.3 (1,061)	98.5 (112,596)
Present		0.7 (7)	1.5 (1,720)
Sleep disorders	*p*	.001	
None		98.7 (1,054)	99.4 (113,681)
Present		1.3 (14)	0.6 (635)
Impulse Control	*p*	.84	
None		98.2 (1,049)	98.3 (112,376)
Present		1.8 (19)	1.7 (1,940)
Adjustment disorders	*p*	< .0001	
None		98.7 (1,054)	95.9 (109,638)
Present		1.3 (14)	4.1 (4,678)
Personality disorders	*p*	< .0001	
None		96.9 (1,035)	89.1 (101,894)
Present		3.1 (33)	10.9 (12,422)

Table 5.18 RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Chair-Prevents-Rising (Chair)

		Chair N = 1,068	No Chair N = 114,316
		% (n)	% (n)
Activities of Daily Living Hierarchy	*p*		< .0001
None		12.5 (133)	83.5 (95,489)
1 - 2		10.6 (113)	11.3 (12,938)
3-4		49.9 (533)	4.4 (5,008)
5-6		27.1 (289)	0.8 (881)
Aggressive Behaviour Scale (ABS)	*p*		< .0001
None		18.9 (202)	70.3 (80,362)
1-2		12.6 (134)	11.6 (13,269)
3-4		17.7 (189)	8.3 (9,529)
5-12		50.8 (543)	9.8 (11,156)
Anhedonia	*p*		.98
None		37.8 (404)	37.6 (42,962)
1-2		10.6 (113)	10.9 (12,408)
3-4		14.0 (149)	13.6 (15,594)
5-12		37.6 (402)	37.9 (43,352)
Cognitive Performance Scale (CPS)	*p*		< .0001
None		8.0 (85)	61.1 (69,815)
1-2		13.1 (140)	29.9 (34,194)
3-4		25.4 (271)	6.1 (6,961)
5-6		53.6 (572)	2.9 (3,346)
Depressive Severity Index (DSI)	*p*		< .0001
None		33.1 (353)	24.9 (28,487)
1-2		21.4 (228)	20.1 (23,012)
3-5		31.7 (338)	27.8 (31,787)
6-15		14.0 (149)	27.1 (31,030)
Instrumental Activities of Daily Living (IADL)	*p*		< .0001
None		6.4 (68)	53.6 (61,293)
1-2		1.8 (19)	11.0 (12,533)
3-5		1.5 (16)	9.4 (10,725)
6-42		90.4 (965)	26.0 (29,765)

Table 5.18 RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Chair-Prevents-Rising (Chair) cont.

		Chair N = 1,068	No Chair N = 114,316
		% (n)	% (n)
Mania	*p*		< .0001
None		18.5 (198)	42.0 (47,955)
1-2		16.7 (178)	18.4 (20,995)
3-5		26.1 (279)	18.0 (20,582)
6-20		38.7 (413)	21.7 (24,784)
Positive Sign/Symptoms (PSS Short)	*p*		< .0001
None		35.9 (383)	50.6 (57,839)
1-2		13.4 (143)	11.7 (13,400)
3-8		44.0 (470)	31.7 (36,220)
9-12		6.7 (72)	6.0 (6,857)
Risk of Harm (RHO)	*p*		< .0001
None		7.9 (84)	25.1 (28,714)
1-2		20.9 (223)	43.4 (49,577)
3-4		25.8 (275)	17.9 (20,409)
5-6		45.5 (486)	13.7 (15,616)
Self Care Index (SCI)	*p*		< .0001
None		2.3 (25)	24.2 (27,649)
1-2		50.0 (534)	46.4 (53,057)
3-4		18.7 (200)	17.3 (19,825)
5-6		28.9 (309)	12.1 (13,785)
Severity of Self-harm (SoS)	*p*		< .0001
None		2.9 (31)	20.2 (23,031)
1-2		62.8 (671)	40.3 (46,088)
3-4		28.2 (301)	16.8 (19,221)
5-6		6.1 (65)	22.7 (25,976)

Table 5.19 Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Chair-Prevents-Rising (Chair)

		Chair N = 1,068	No Chair N = 114,316
		% (n)	% (n)
Hearing	*p*	< .0001	
Adequate		75.0 (801)	96.3 (110,119)
Min. difficulty		15.3 (163)	2.7 (3,079)
Hears in sp. situations		5.7 (61)	0.5 (534)
Highly impaired		4.0 (43)	0.5 (584)
Vision	*p*	< .0001	
Adequate		69.1 (738)	94.5 (107,980)
Impaired		18.9 (202)	4.0 (4,514)
Mod impaired		6.00 (64)	1.1 (1,304)
Highly impaired		3.3 (35)	0.3 (291)
Severely impaired		2.7 (29)	0.2 (227)
Making self understood	*p*	< .0001	
Understood		30.2 (323)	84.7 (96,873)
Usually		17.9 (191)	9.6 (10,919)
Often		13.6 (145)	2.7 (3,031)
Sometimes		26.2 (280)	2.5 (2,801)
Rarely		12.1 (129)	0.6 (692)
Intellectual disability	*p*	< .0001	
No intellectual disability		93.4 (997)	96.1 (109,811)
Intellectual disability		6.7 (71)	3.9 (4,505)
Falls	*p*	< .0001	
No falls		72.0 (769)	95.0 (108,579)
Falls		28.0 (299)	5.0 (5,737)
Alzheimer's/Dementia/other related disorders (ADRD)			
	p	< .0001	
None		29.4 (314)	93.9 (107,356)
Present		70.6 (754)	6.1 (6,960)
Cerebral Palsy	*p*	.003	
None		99.5 (1,063)	99.9 (114,166)
Present		0.5 (5)	0.1 (150)
Epilepsy	*p*	< .0001	
None		98.1 (1,048)	99.3 (113,465)
Present		1.9 (20)	0.7 (851)

Table 5.19 Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Chair-Prevents-Rising (Chair) cont.

		Chair N = 1,068	No Chair N = 114,316
		% (n)	% (n)
Huntington's	*p*	< .0001	
None		99.1	99.9 (114,196)
Present		0.9 (10)	0.1 (12)
Multiple sclerosis	*p*	0.40	
None		99.5 (1,063)	99.8 (114,100)
Present		0.5 (5)	0.2 (216)
Parkinson's	*p*	< .0001	
None		96.5 (1,031)	99.5 (113,707)
Present		3.5 (34)	0.5 (609)
Stroke	*p*	< .0001	
None		95.8 (1,023)	99.7 (113,979)
Present		4.2 (45)	0.3 (337)
Traumatic Brain Injury	*p*	.84	
None		99.8 (1,066)	99.8 (114,130)
Present		0.2 (2)	0.2 (186)
Any Neuro	*p*	< .0001	
None		29.4 (314)	93.2 (106,584)
Present		70.6 (754)	6.8 (7,732)

Table 5.20 Sociodemographic Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Acute Control Medication (ACM)

		ACM N = 21,422	No ACM N = 93,962
		% (n)	% (n)
Age	*p*		< .0001
18-24		15.8 (3,382)	12.1 (11,372)
25-34		21.6 (4,630)	19.0 (17.870)
35-44		21.0 (4,496)	21.4 (20,096)
45-54		20.2 (4,322)	22.3 (20,951)
55-64		10.8 (2,313)	13.0 (12,218)
65-74		5.3 (1,128)	6.8 (6,340)
75-84		3.9 (842)	4.2 (3,938)
85+		1.4 (309)	1.3 (1,177)
Sex	*p*		< .0001
Male		52.8 (11,309)	49.2 (46,202)
Female		47.2 (10,109)	50.8 (47,737)
Marital status	*p*		< .0001
Not partnered		77.6 (16,617)	70.8 (66,477)
Partnered		22.4 (4,805)	29.3 (27,485)
Language	*p*		.009
English		94.6 (20,259)	95.0 (89,269)
Other		5.4 (1,163)	5.0 (4,693)
Income source	*p*		.0008
Income		89.0 (19,064)	90.8 (84,346)
No income		11.0 (2,358)	10.2 (9,616)
Living arrangements	*p*		< .0001
Family		22.9 (4,912)	31.1 (29,218)
Alone		33.1 (7,094)	33.3 (31,303)
Others		29.5 (6,311)	24.9 (23,362)
Group		14.5 (3,105)	10.7 (10,079)
Admitted from LTCH	*p*		< .0001
Other		97.0 (20,774)	98.4 (92,467)
LTCH		3.0 (648)	1.6 (1,495)
Residential stability	*p*		< .0001
Not temporary		72.4 (15,508)	75.3 (70,772)
Temporary		26.2 (5,608)	23.9 (22,441)
Homeless		1.4 (306)	0.8 (749)

Table 5.21 Mental Health Services Use Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Acute Control Medication (ACM)

		ACM N = 21,422	No ACM N = 93,962
		% (n)	% (n)
# of MH admits recent	*p*	< .0001	
None		39.8 (8,529)	46.1 (43,350
One or more		60.2 (12,893)	53.9 (50,612)
# of MH admits life time	*p*	< .0001	
None		23.3 (4,987)	28.5 (26,742)
One or more		76.7 (16,435)	71.5 (67,220)
Time since last discharge	*P*	< .0001	
No previous admission		23.3 (4,987)	28.5 (26,742)
> 1 year		29.2 (6,258)	29.4 (27,574)
31 days – 1 year		31.1 (6,656)	28.3 (26,577)
< 31 days		16.4 (3,521)	13.9 (13,069)
Amount of time in hospital	*p*	< .0001	
None		39.8 (8,529)	46.1 (43,350)
< 31 days		35.0 (7,488)	31.8 (29,869)
31 days – 1 year		22.9 (4,912)	20.0 (18,797)
> 1 year		2.3 (493)	2.1 (1,946)
Age at first hospitalization	*p*	< .0001	
0 – 14 years		4.0 (849)	4.0 (3,760)
15 – 24 years		39.1 (8,385)	30.5 (28,644)
25 – 44 years		38.5 (8,244)	41.5 (39,030)
45 – 64 years		11.9 (2,548)	17.6(16,556)
65+ years		6.5 (1,396)	6.4 (5,972)
Police intervention	*p*	< .0001	
Never		58.4 (12,507)	71.7 (67,397)
> 1 week		27.2 (5,836)	22.0 (20,660)
<1 week		14.4 (3,079)	6.3 (5,905)

Table 5.22 Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Acute Control Medication (ACM)

		ACM N = 21,422	No ACM N = 93,962
		% (n)	% (n)
Status at time of assessment	*p*	< .0001	
Voluntary		26.2 (5,608)	52.2 (49,030)
Informal		1.4 (301)	1.1 (986)
Involuntary		39.3 (8,425)	22.8 (21,401)
Psych assessment		31.6 (6,769)	20.9 (19,635)
Forensic		1.3 (275)	2.9 (2,714)
Unknown		0.2 (44)	0.2 (196)
Current patient type	*p*	< .0001	
Acute		88.9 (19,038)	81.5 (76,559)
Long term		5.5 (1,181)	12.4 (11,678)
Psychogeriatric		4.3 (922)	3.2 (3,029)
Forensic evaluation		1.3 (281)	2.9 (2,696)
Capacity/Competency			
Consent for treatment	*p*	< .0001	
Capable		85.8 (18,380)	92.0 (86,434)
Incapable		14.2 (3,042)	8.0 (7528)
Managing property	*p*	< .0001	
Capable		89.7 (19,210)	93.9 (88,190)
Incapable		10.3 (2,212)	6.1 (5,772)
Consent to disclose health info	*p*	< .0001	
Capable		92.5 (19,814)	96.1 (90,333)
Incapable		7.5 (1,608)	3.9 (3,629)
Decision-making	*p*	< .0001	
Own decision-maker		86.2 (18,473)	91.9 (86,387)
Substitute decision-maker		13.8 (2,949)	8.1 (7,575)
Psychiatric diagnoses			
Child/Adolescent disorders	*p*	< .0001	
None		97.7 (20,936)	98.4 (92,437)
Present		2.3 (486)	1.6 (1,525)
Mental disord due to gen med	*p*	.03	
None		98.2 (21,027)	98.4 (92,425)
Present		1.8 (395)	1.6 (1,537)
Substance disorders	*p*	< .0001	
None		78.3 (16,765)	76.3 (71,644)
Present		21.7 (4,657)	23.8 (22,318)

Table 5.22 Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Acute Control Medication (ACM)) (cont.)

		ACM N = 21,422	No ACM N = 93,962
		% (n)	% (n)
Schiz/psychotic disorders	*p*	< .0001	
None		50.8 (10,873)	65.8 (61,829)
Present		49.2 (10,549)	34.2 (32,133)
Mood disorders	*p*	< .0001	
None		56.2 (12,046)	45.6 (42,795)
Present		43.8 (9,376)	54.5 (51,167)
Anxiety disorders	*p*	< .0001	
None		92.6 (19,835)	88.1 (82,808)
Present		7.4 (1,587)	11.9 (11,154)
Eating disorders	*p*	.02	
None		99.5 (21,307)	98.3 (92,350)
Present		0.5 (115)	1.7 (1,612)
Sleep disorders	*p*	.06	
None		99.5 (21,320)	99.4 (99.42)
Present		0.5 (102)	0.6 (547)
Impulse Control	*p*	< .0001	
None		98.0 (20,989)	98.4 (92,436)
Present		2.0 (433)	1.6 (1,526)
Adjustment disorders	*p*	< .0001	
None		96.8 (20,729)	95.7 (89,963)
Present		3.2 (693)	4.3 (3,999)
Personality disorders	*p*	.74	
None		89.1 (19,096)	89.2 (83,833)
Present		10.9 (2,326)	10.8 (10,129)

Table 5.23 RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Acute Control Medication (ACM)

		ACM N = 21,422	No ACM N = 93,962
		% (n)	% (n)
Activities of Daily Living Hierarchy (ADL)	*p*	< .0001	
None		72.4 (15,507)	85.3 (80,115)
1 - 2		17.7 (3,801)	9.8 (9,250)
3-4		8.3 (1,773)	4.0 (3,768)
5-6		1.6 (341)	0.9 (829)
Aggressive Behaviour Scale (ABS)	*p*	< .0001	
None		38.7 (8,286)	76.9 (72,278)
1-2		15.2 (3,254)	10.8 (10,149)
3-4		15.0 (3,219)	6.9 (6,499)
5-12		31.1 (6,663)	5.4 (5,036)
Anhedonia	*p*	.002	
None		36.6 (7,850)	37.8 (35,516)
1-2		10.9 (2,340)	10.8 (10,181)
0		14.3 (3,061)	13.5 (12,682)
5-12		38.1 (8,171)	37.9 (35,583)
Cognitive Performance Scale (CPS)	*p*	< .0001	
None		41.5 (8,898)	64.9 (61,002)
1-2		38.8 (8,301)	27.7 (26,033)
3-4		12.6 (2,691)	4.8 (4,541)
5-6		7.2 (1,532)	2.5 (2,386)
Depressive Severity Index (DSI)	*p*	< .0001	
None		26.8 (5,743)	24.6 (23,097)
1-2		20.5 (4,382)	20.1 (18,858)
3-5		28.5 (6,095)	27.7 (26,030)
6-15		24.3 (5,202)	27.7 (25,977)
Instrumental Activities of Daily Living	*p*	< .0001	
None		37.2 (7,975)	56.8 (53,386)
1-2		12.0 (2,574)	10.6 (9,978)
3-5		11.5 (2,469)	8.8 (8,272)
6-42		39.2 (8,404)	23.8 (22,326)
Mania	*p*	< .0001	
None		19.6 (4,197)	46.8 (43,956)
1-2		13.7 (2,943)	19.4 (18,230)
3-5		21.2 (4,542)	17.4 (16,319)
6-20		45.5 (9,740)	16.5 (15,457)

Table 5.23 RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Acute Control Medication (ACM) (cont.)

		ACM N = 21,422	No ACM N = 93,962
		% (n)	% (n)
Positive Sign/Symptoms (PSS Short)	*p*	< .0001	
None		29.3 (6,280)	55.3 (51,942)
1-2		11.3 (2,420)	11.8 (11,234)
3-8		47.4 (10,147)	28.3 (26,543)
9-12		12.0 (2,575)	4.6 (4,354)
Risk of Harm (RHO)	*p*	< .0001	
None		10.8 (2,305)	28.2 (26,493)
1-2		28.8 (6,160)	46.4 (43,640)
3-4		26.6 (5,693)	16.0 (14,991)
5-6		33.9 (7,264)	9.4 (8,838)
Self Care Index (SCI)	*p*	< .0001	
None		9.5 (2,034)	27.3 (25,640)
1-2		42.9 (9,181)	47.3 (44,410)
3-4		20.9 (4,471)	16.6 (15,554)
5-6		26.8 (5,736)	8.9 (8,358)
Severity of Self-harm (SoS)	*p*	< .0001	
None		10.4 (2,237)	22.2 (20,825)
1-2		48.1 (10,296)	38.8 (36,463)
3-4		21.3 (4,561)	15.9 (14,961)
5-6		20.2 (4,328)	23.1 (21,713)

Table 5.24 Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Acute Control Medication (ACM)

		ACM N = 21,422	No ACM N = 93,962
		% (n)	% (n)
Hearing	*p*	< .0001	
Adequate		95.7 (20,505)	96.2 (90,415)
Min. difficulty		2.9 (629)	2.8 (2,613)
Hears in sp. situations		0.7 (148)	0.5 (447)
Highly impaired		0.7 (140)	0.5 (487)
Vision	*p*	< .0001	
Adequate		93.8 (20,083)	94.3 (88,635)
Impaired		4.3 (919)	4.0 (3,797)
Mod impaired		1.3 (270)	1.2 (1,098)
Highly impaired		0.4 (87)	0.3 (239)
Severely impaired		0.3 (63)	0.2 (193)
Making self understood	*p*	< .0001	
Understood		72.9 (15,606)	86.8 (81,590)
Usually		15.8 (3,381)	8.2 (7,729)
Often		4.9 (1,058)	2.3 (2,118)
Sometimes		5.0 (1,080)	2.1 (2,001)
Rarely		1.4 (297)	0.6 (524)
Intellectual disability	*p*	< .0001	
No intellectual disability		94.7 (20,284)	96.3 (90,524)
Intellectual disability		5.3 (1,138)	3.7 (3,438)
Falls	*p*	.001	
No falls		94.3 (20,206)	94.9 (89,142)
Falls		5.7 (1,216)	5.1 (4,820)
Alzheimer's/Dementia/other related disorders (ADRD)			
	p	< .0001	
None		91.1 (19,519)	93.8 (88,151)
Present		8.9 (1,903)	6.2 (5,811)
Cerebral Palsy	*p*	.03	
None		99.8 (21,383)	99.9 (93,846)
Present		0.2 (39)	0.1 (116)
Epilepsy	*p*	.81	
None		99.3 (21,263)	99.2 (93,250)
Present		0.7 (159)	0.8 (712)

Table 5.24 Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Acute Control Medication (ACM) cont.

		ACM N = 21,422	No ACM N = 93,962
		% (n)	% (n)
Huntington's	*p*	.002	
None		99.8 (21,384)	99.9 (93,870)
Present		0.2 (38)	0.1 (92)
Multiple sclerosis	*p*	.08	
None		99.9 (21,391)	99.8 (93,772)
Present		0.1 (31)	0.2 (190)
Parkinson's	*p*	.19	
None		99.5 (21,315)	99.4 (93,423)
Present		0.5 (107)	0.6 (539)
Stroke	*p*	.35	
None		99.6 (21,344)	99.7 (93,658)
Present		0.4 (78)	0.3 (304)
Traumatic Brain Injury	*p*	0.02	
None		99.8 (21,375)	99.9 (93,821)
Present		0.2 (47)	0.2 (141)
Any Neuro	*p*	< .0001	
None		90.8 (19,450)	93.1 (87,448)
Present		18.2 (1,972)	6.9 (6,514)

Table 5.25 Sociodemographic Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Seclusion

		Seclusion N = 6,544	No Seclusion N = 108,840
		% (n)	% (n)
Age	*p*		< .0001
18-24		19.8 (1,297)	12.4 (13,457)
25-34		23.2 (1,515)	19.3 (20,985)
35-44		20.1 (1,316)	21.4 (23,276)
45-54		19.5 (1,278)	22.1 (23,995)
55-64		10.2 (669)	12.7 (13,862)
65-74		4.3 (281)	6.6 (7,187)
75-84		2.1 (140)	4.3 (4,640)
85+		0.7 (48)	1.3 (1,438)
Sex	*p*		< .0001
Male		60.6 (3,963)	49.2 (53,548)
Female		39.4 (2,580)	50.8 (55,266)
Marital status	*p*		< .0001
Not partnered		81.3 (5,317)	71.5 (77,777)
Partnered		18.8 (1,227)	28.5 (31,063)
Language	*p*		< .0001
English		93.5 (6,118)	95.0 (103,410)
Other		6.5 (426)	5.0 (5,430)
Income source	*p*		< .0001
Income		87.1 (5,701)	89.8 (97,709)
No income		12.9 (843)	10.2 (11,131)
Living arrangements	*p*		< .0001
Family		19.0 (1,245)	30.2 (32,885)
Alone		34.4 (2,250)	33.2 (36,147)
Others		30.3 (1,983)	25.4 (27,690)
Group		16.3 (1,066)	11.1 (12,118)
Admitted from LTCH	*p*		.74
Other		98.1 (6,419)	98.2 (106,822)
LTCH		1.9 (125)	1.9 (2,018)
Residential stability	*p*		< .0001
Not temporary		75.7 (4,951)	74.7 (81,329)
Temporary		23.3 (1,524)	24.4 (26,525)
Homeless		1.1 (69)	0.9 (986)

Table 5.26 Mental Health Services Use Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Seclusion

		Seclusion N = 27,171	No Seclusion N = 88,218
		% (n)	% (n)
# of MH admits recent	*p*	< .0001	
None		37.9 (2,479)	45.4 (49,400)
One or more		62.1 (4,065)	54.6 (59,440)
# of MH admits life time	*p*	< .0001	
None		22.0 (1,441)	27.8 (30,288)
One or more		78.0 (5,103)	72.2 (78,552)
Time since last discharge	*p*	< .0001	
No previous admission		22.0 (1,441)	27.8 (30,288)
> 1 year		28.7 (1,877)	29.4 (31,955)
31 days – 1 year		32.5 (2,127)	28.6 (31,106)
< 31 days		16.8 (1,099)	14.2 (15,491)
Amount of time in hospital	*p*	< .0001	
None		37.9 (2,479)	45.4 (49,400)
< 31 days		34.4 (2,250)	32.3 (35,107)
31 days – 1 year		25.1 (1,645)	20.3 (22,064)
> 1 year		2.6 (170)	2.1 (2,269)
Age at first hospitalization	*p*	< .0001	
0 – 14 years		5.5 (361)	3.9 (4,248)
15 – 24 years		42.9 (2,805)	31.4 (34,224)
25 – 44 years		37.4 (2,445)	41.2 (44,829)
45 – 64 years		10.3 (676)	16.9 (18,428)
65+ years		3.9 (257)	6.5 (7,111)
Police intervention	*p*	< .0001	
Never		50.5 (3,314)	70.4 (76,590)
> 1 week		33.3 (2,179)	22.3 (24,317)
<1 week		16.1 (1,051)	7.3 (7,933)

Table 5.27 Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Seclusion

		Seclusion N = 6,544	No Seclusion N = 108,840
		% (n)	% (n)
Status at time of assessment	*p*	< .0001	
Voluntary		17.1 (1,121)	49.2 (53,517)
Informal		1.5 (99)	1.1 (1,188)
Involuntary		46.2 (3,021)	24.6 (26,805)
Psych assessment		26.5 (1,734)	22.7 (24,670)
Forensic		8.3 (544)	2.3 (2,445)
Unknown		0.4 (25)	0.2 (215)
Current patient type	*p*	< .0001	
Acute		84.1 (5,502)	82.8 (90,095)
Long term		5.8 (376)	11.5 (12,483)
Psychogeriatric		1.7 (108)	3.5 (3,843)
Forensic evaluation		8.5 (558)	2.2 (2,419)
Capacity/Competency			
Consent for treatment	*p*	< .0001	
Capable		84.7 (5,545)	91.2 (99,269)
Incapable		15.3 (999)	8.8 (9,571)
Managing property	*p*	< .0001	
Capable		90.9 (5,946)	93.2 (101,454)
Incapable		9.1 (598)	6.8 (7,386)
Consent to disclose health info	*p*	< .0001	
Capable		93.4 (6,109)	95.6 (104,038)
Incapable		6.7 (435)	4.4 (4,802)
Decision-making	*p*	< .0001	
Own decision-maker		88.2 (5,773)	91.0 (99,087)
Substitute decision-maker		11.8 (771)	9.0 (9,753)

Table 5.27 Mental Health Clinical Characteristics of Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Seclusion cont.

		Seclusion N = 6,544	No Seclusion N = 108,840
		% (n)	% (n)
Psychiatric diagnoses			
Child/Adolescent disorders	*p*	< .0001	
None		97.5 (6,383)	98.3 (106,990)
Present		2.5 (161)	1.7 (1,850)
Mental disord due to gen med	*p*	.59	
None		98.2 (6,429)	98.3 (107,023)
Present		1.8 (115)	1.7 (1,817)
Substance disorders	*p*	< .0001	
None		79.1 (5,173)	76.5 (83,236)
Present		21.0 (1,371)	23.5 (25,604)
Schiz/psychotic disorders	*p*	< .0001	
None		46.8 (3,061)	64.0 (69,641)
Present		53.2 (3,483)	36.0 (39,199)
Mood disorders	*p*	< .0001	
None		59.4 (3,884)	46.8 (50,957)
Present		40.7 (2,660)	53.2 (57,883)
Anxiety disorders	*p*	< .0001	
None		96.0 (6,278)	88.5 (96,365)
Present		4.1 (266)	11.5 (12,475)
Eating disorders	*p*	< .0001	
None		99.5 (6,514)	98.4 (107,143)
Present		0.5 (30)	1.6 (1,697)
Sleep disorders	*p*	.25	
None		99.5 (6,514)	99.4 (108,221)
Present		0.5 (30)	0.6 (619)
Impulse Control	*p*	< .0001	
None		97.2 (6,363)	98.4 (107,062)
Present		2.8 (181)	1.6 (1,778)
Adjustment disorders	*p*	< .0001	
None		97.7 (6,392)	95.8 (104,300)
Present		2.3 (152)	4.2 (4,540)
Personality disorders	*p*	.03	
None		90.0 (5,891)	89.2 (97,038)
Present		10.0 (653)	10.8 (11,802)

Table 5.28 RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Seclusion

		Seclusion N = 6,544	No Seclusion N = 108,840
		% (n)	% (n)
Activities of Daily Living Hierarchy (ADL)	*p*		< .0001
None		74.3 (4,863)	83.4 (90,759)
1 - 2		14.8 (967)	11.1 (12,084)
3-4		9.5 (622)	4.5 (4,919)
5-6		1.4 (92)	1.0 (1,078)
Aggressive Behaviour Scale (ABS)	*p*		< .0001
None		29.6 (1,936)	72.2 (78,628)
1-2		15.3 (1,004)	11.4 (12,399)
3-4		17.2 (1,125)	7.9 (8,593)
5-12		37.9 (2,479)	8.5 (9,220)
Anhedonia	*p*		< .0001
None		45.2 (2,960)	37.1 (40,406)
1-2		10.7 (699)	10.9 (11,822)
3-4		14.4 (945)	13.6 (14,798)
5-12		29.7 (1,940)	38.4 (41,814)
Cognitive Performance Scale (CPS)	*p*		< .0001
None		43.3 (2,833)	61.6 (67,067)
1-2		35.6 (2,328)	29.4 (32,006)
3-4		12.0 (788)	5.9 (6,444)
5-6		9.09 (595)	3.1 (3,323)
Depressive Severity Index (DSI)	*p*		< .0001
None		28.3 (1,851)	24.8 (26,989)
1-2		18.4 (1,204)	20.3 (22,036)
3-5		32.9 (2,154)	27.5 (29,971)
6-15		20.4 (1,335)	27.4 (29,844)
Instrumental Activities of Daily Living	*p*		< .0001
None		33.6 (2,197)	54.4 (59,164)
1-2		13.7 (897)	10.7 (11,655)
3-5		11.9 (778)	9.2 (9,963)
6-42		40.8 (2,672)	25.8 (28,058)
Mania	*p*		< .0001
None		16.7 (1,095)	43.2 (47,058)
1-2		11.7 (768)	18.8 (20,405)
3-5		20.0 (1,309)	18.0 (19,552)
6-20		51.5 (3,372)	20.1 (21,825)

Table 5.28 RAI-MH Scales for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Seclusion cont.

		Seclusion N = 6,544	No Seclusion N = 108,840
		% (n)	% (n)
Positive Sign/Symptoms (PSS Short)	*p*		< .0001
None		25.3 (1,653)	52.0 (56,569)
1-2		11.3 (739)	11.8 (12,804)
3-8		50.6 (3,309)	30.7 (33,381)
9-12		12.9 (843)	5.6 (6,086)
Risk of Harm (RHO)	*p*		< .0001
None		8.3 (544)	26.0 (28,254)
1-2		24.0 (1,569)	44.3 (48,231)
3-4		26.5 (1,731)	17.4 (18,953)
5-6		41.3 (2,700)	12.3 (13,402)
Self Care Index (SCI)	*p*		< .0001
None		8.3 (545)	24.9 (27,129)
1-2		42.7 (2,792)	46.7 (50,799)
3-4		22.7 (1,488)	17.0 (18,537)
5-6		26.3 (1,719)	11.4 (12,375)
Severity of Self-harm (SoS)	*p*		< .0001
None		12.5 (820)	20.4 (22,242)
1-2		52.6 (3,445)	39.8 (43,314)
3-4		19.2 (1,259)	16.8 (18,263)
5-6		3.9 (1,020)	23.0 (25,021)

Table 5.29 Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Seclusion

		Seclusion N = 6,544	No Seclusion N = 108,840
		% (n)	% (n)
Hearing	*p*	< .0001	
Adequate		97.0 (6,348)	96.1 (104,572)
Min. difficulty		2.1 (137)	2.985 (3,105)
Hears in sp. situations		0.3 (19)	0.5 (576)
Highly impaired		0.6 (40)	0.5 (587)
Vision	*p*	.002	
Adequate		95.45 (6,240)	94.2 (102,478)
Impaired		3.2 (212)	4.1 (4,504)
Mod impaired		1.0 (66)	1.2 (1,302)
Highly impaired		0.3 (17)	0.3 (309)
Severely impaired		0.1 (9)	0.2 (247)
Making self understood	*p*	< .0001	
Understood		75.7 (4,952)	84.8 (92,244)
Usually		12.2 (798)	9.5 (10,312)
Often		4.7 (310)	2.6 (2,866)
Sometimes		5.6 (368)	2.5 (2,713)
Rarely		1.8 (116)	0.7 (705
Intellectual disability	*p*	< .0001	
No intellectual disability		93.5 (6,120)	96.2 (104,688)
Intellectual disability		6.5 (424)	3.8 (4,152)
Falls	*p*	0.08	
No falls		95.2 (6,232)	94.7 (103,116)
Falls		4.8 (312)	5.3 (5,724)
Alzheimer's/Dementia/other related disorders (ADRD)			
	p	.74	
None		93.2 (6,100)	93.3 (101,570)
Present		6.8 (444)	6.7 (7,270)
Cerebral Palsy	*p*	.53	
None		99.9 (6,537)	99.9 (108,692)
Present		0.1 (7)	0.1 (148)
Epilepsy	*p*	.60	
None		99.2 (6,491)	99.3 (108,022)
Present		0.8 (53)	0.8 (818)

Table 5.29 Other Health Conditions for Adult Mental Health Inpatients, Ontario 2006 – 2010 (N = 115,384) by Seclusion cont.

		Seclusion N = 6,544	No Seclusion N = 108,840
		% (n)	% (n)
Huntington's	*p*	.81	
None		99.9 (6,536)	99.9 (108,718)
Present		0.1 (8)	0.1 (122)
Multiple Sclerosis	*p*	.11	
None		99.9 (6,537)	99.8 (108,626)
Present		0.1 (7)	0.2 (214)
Parkinson's	*p*	< .0001	
None		99.5 (6,510)	99.4 (108,228)
Present		0.5 (34)	0.6 (612)
Stroke	*p*	.001	
None		99.9 (6,537)	99.7 (108,465)
Present		0.1 (7)	0.3 (375)
Traumatic Brain Injury	*p*	.29	
None		99.8 (6,530)	99.8 (108,666)
Present		0.2 (14)	0.2 (174)
Any Neuro	*p*	.83	
None		92.7 (6,067)	92.6 (100,831)
Present		7.3 (477)	7.4 (8,009

6.0 RISK FACTORS IN THE USE OF MECHANICAL/PHYSICAL RESTRAINTS AND ACUTE CONTROL MEDICATIONS IN ADULT INPATIENT MENTAL HEALTH SERVICES IN ONTARIO

6.1 Introduction

In recent years, mental health (MH) care services have gained greater prominence with government and the public as an area of growing concern. A 2011 report from the Mental Health Commission of Canada published results of a risk analysis of the impact of mental illness in Canada(1). In that report, they estimated that 1 in 5 Canadians were affected by psychiatric illness and that over the next 30 years they estimate that more than 8.9 million Canadians will be living with a mental illness. The older adult or seniors is the fastest growing segment of the Canadian population. It is estimated that 1 in 3 seniors will be affected by mental illness. One of the more controversial aspects of MH services is the use of control interventions (CIs), (i.e. actions taken by MH service providers that overtake the independent action of a patient's movements). These actions can bring about the desired effect of extinguishing an imminently dangerous situation but secondarily, inflict injurious and sometimes lethal unintended consequences. Patients have died(2-4) and have been injured physically, psychologically, and emotionally(3, 5-8). The pursuit of improving care for today and tomorrow's patients must include the examination of this controversial aspect of MH care.

6.2 Background

There is a dearth of examination and study of the use of CIs in MH adult inpatient services. Today, although it is not uncommon to see policy in government and hospitals advocating for least restraint or no restraint in the care of patients, there have been few studies of CI use in MH. The drive to reduce/eliminate the use of CIs has to some degree been fuelled by the Western media, which has raised awareness of the public and government/agencies about the use of CIs and their potential devastatingly lethal effects(2, 4, 9, 10). Beyond the sensationalized use of controversial CIs in the popular media, there have been few scientific studies conducted assessing the extent of use of CIs in

the MH population that would support evidence-based practice change. A recent literature review on the prevalence of CI use(11) yielded a relatively small number of peer reviewed studies from Europe(12-22), the United States(8, 23-28), Canada(29, 30), and New Zealand(31).

The literature revealed a lack of consistent standards in reporting in the nomenclature, operational definitions, data collection methods, enumeration methods, and reporting methods providing little opportunity to make definitive conclusions of the prevalence of the use of CIs for comparative purposes. There were wide ranging reported rates of use, from 8% to 88%. This rather wide variation in reported rates is likely due in part to the methodological variations described earlier. Definitional differences were a key issue. Labels for CIs were used interchangeably or exclusively (e.g. physical and mechanical restraints; seclusion and confinement). It became apparent that explicit definitions must be included in the research in order to prevent erroneous interpretation of results. This practice was not consistently found in the current literature(15, 24). Non-standardized collection and reporting methods further confounded efforts to better understanding of use rates of control interventions(16, 19, 30, 32, 33). Chart reviews, surveys, and time-limited audits are examples of some of the varied methods used to collect CI use data.

Prevalence of Control Intervention Use

There are wide-ranging levels of reported CI use in the literature. Some studies were restricted to reporting on combinations of control interventions such as seclusion and restraint together. These studies reported rates from 2%(23) to 10%(20). Canadian studies reported rates ranging from 5%(29) to 23%(30) for seclusion that may have been paired with either restraint or acute control medication use. The rate of use of mechanical and/or physical restraint was similarly wide ranging with a low of 4%(27) to a high of 26%(19). This latter study sample included only involuntary patients. Other studies included patients who were either voluntary or involuntary (8, 16, 26, 27, 29). A study of older adults (60 years and older) on a psychogeriatric unit reported a use rate of 30% for bed rails, belts, and chairs that prevent moving or rising(13). The use of ACM varied

from 4%(18) to 40%(19). The inconsistency of the operational definition of ACM and the heterogeneity of the patient population, as previously mentioned for other CI types, similarly contributes to the substantial range in rates of ACM use.

Risk Factors for Control Intervention Use

Younger age was significantly associated with increased MP use(8, 22, 25, 27-29). Those factors not significantly associated with MP use were gender(8, 16, 25, 28, 29), income(29), education attained(29), ethnicity(25, 28), and living arrangements(14, 16). There were inconsistency of findings of significance for substance use, schizophrenia and other psychotic disorders, mood/affective disorders, neurotic/stress-related disorders, and personality disorders(8, 14, 16, 22, 25, 29). Loss of functional independence in activities of daily living (ADL) or self-care was found to be a risk factor for MP use(13, 25, 29). Violence or threats of violence towards self or others was significantly associated with increased MP use(14, 29).

There were no sociodemographic factors consistently identified as risk factors for ACM use. Age was the most consistently included explanatory variable. The findings of significance were inconsistent(16, 18, 19, 22, 29, 31). Significant clinical risk factors that were consistently associated with ACM use included diagnoses of schizophrenia and other psychotic disorders(14, 16, 18, 19, 22, 29) and organic mental disorders(16, 18, 22). These studies did not further describe the diagnoses beyond the label 'organic mental disorders' but examples of diagnoses might include dementia, delirium, amnestic syndrome, and organic delusional syndromes. MH Service Use and Other Health conditions were typically not included in previous studies as risk factors for ACM use.

There is a scarcity of research on the use of CI in adult MH inpatient services in addition to the variability in the study methodology and data standards amongst available studies poses challenges in drawing greater knowledge about the use of CI and the risk factors for their use.

6.3 Purpose

The purpose of this chapter is to gain a better understanding of the potential patient characteristic risk factors for the use of mechanical or physical restraint, chair prevents rising, acute control medication, and an inclusive category of "any control intervention" use in inpatient adult mental health services in Ontario. Sociodemographic, mental health service use, and mental health clinical characteristics were included in this examination.

6.4 Methods

6.4.1 Sample

This study includes all adult patients admitted on an inpatient basis and assessed in a MH hospital or a MH unit within a general hospital in Ontario from April 1, 2006 to March 31, 2010. There were 13 MH hospitals and 59 MH units within general hospitals participating with approximately 4,330 inpatient beds. In total, the sample had 115,384 assessments.

Ontario is a Canadian province located in east central Canada with a population of approximately 13.5 million (http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo02a-eng.htm). The province covers an area of 1.1 million km^2 and is Canada's most populous province.

6.4.2 Data Source

The RAI-MH is a standardized assessment instrument mandated for use in Ontario MH hospitals/MH units with general hospitals by the Ontario MOHLTC since 2005(34). Hospitals are required to submit completed assessment data on a quarterly basis to the Canadian Institute for Health Information (CIHI), a not-for-profit organization that collects and analyzes information on health and health care in Canada. To manage the collect of the RAI-MH, CIHI developed the Ontario Mental Health Reporting System (OMHRS).

The RAI-MH supports care planning, outcome measurement, quality improvement, and resource allocation based on a case mix classification system. The RAI-MH evaluates the needs, strengths, and preferences of patients and its primary purpose is to support clinical decision-making(35, 36). The use of the RAI-MH is a well-established mandated part of the routine in clinical practice in all mental health inpatient units and mental health hospitals in Ontario. CIHI supports the development of standardized training and substantial resource materials for OMHRS users. The data are already gathered and used to inform day-to-day practice, readily available, and standardized. Further, because its use is mandated by the MOHLTC there is 100% coverage of all MOHLTC approved mental health inpatient care hospitals(37). Within CIHI, there are systematic data quality audits which feedback error reports and required corrections to submitting OMHRs hospitals and de-identified in compliance with privacy legislation(38).

The RAI-MH is a reliable and valid assessment system with substantial national and international testing for inter-rater reliability and convergent validity achieving acceptable to excellent results(39, 40), validity testing of various scales such as Cognitive Performance Scale (CPS)(41) against external standards such as the Mini-Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA), as well as other scales previously validated for depression(42), activities of daily living(43), and aggressive behaviour(44). The DSI was found to have good internal consistency(37). In 2008, reliability testing across the entire suite of interRAI assessment tool, including the RAI-MH, further reinforced the acceptable to excellent ratings of reliability of the RAI-MH(40).

Patients' initial RAI-MH assessments were used in the analysis to identify significant risk factors of CI use. Initial assessments are required to be completed 72 hours (3 days) after admission to hospital, increasing the relevancy of clinical observations and assessment of signs and symptoms, sociodemographic characteristics, and MH service use factors, to the events of CI use. RAI-MH

assessment forms can be completed by trained MH clinical professionals such as nurses, social workers, psychiatrists, occupational therapists, and recreation therapists.

The University of Waterloo's Office of Research Ethics provided full ethics approval for the use of de-identified data for the current study.

6.5 Measures

6.5.1 Dependent Variables

6.5.1.1 Control Intervention Types

There are four dependent variables of interest in this study. The control interventions (CI) identified in the RAI-MH include: 1) mechanical restraint, physical or manual restraint by staff (MP), 2) chair prevents rising (Chair), 3) acute control medications (ACM), and 4) any control intervention (Any CI). The following is a summary of the descriptions of the response variables of interest, provided in the *2011-12 OMHRS Resource Manual Module 1 – Clinical Coding*(45):

1. Any Control Intervention (Any CI): Any one type of CI applied to a patient. The CI type could be MP, Chair or ACM.
2. Mechanical/Physical (MP): "A mechanical restraint is used causing the patient to be unable to ambulate or the patient is in a mechanical restraint but remains able to ambulate (e.g. wrist restraint only). Physical or manual restraint by staff is applied to a patient to restrict the patient's movement. Physical restraint does not apply when holding is required to install a mechanical restraint."(45)
3. Chair Prevents Rising (Chair): "Any type of chair that restricts the patient from independently rising from the chair including chairs with a locked lab board, reclining chairs, or low-to-the-floor seating."(45)

4. Acute Control Medication (ACM): "Psychotropic medication administered to a patient to achieve an immediate level of control over agitation, and threating, destructive or assaultive behaviours in order to prevent harm to self or others. This definition excludes the use of psychotropic medication for treatment purposes where a diagnosis has been identified and an ongoing course of medication treatment has been prescribed. It excludes the use of PRN medication that is part of an ongoing treatment plan."(45)

The use of CIs were enumerated from full admission RAI-MH assessments completed following three days of stay in hospital. The dependent variables were not mutually exclusive. Patients may have exposure to more than one type of CI.

6.5.2 Independent Variables

The selection of independent variables was guided by the findings in the literature and the World Health Organization framework for the classification of patient safety which identifies four classes of pertinent descriptive information that provides context for patient safety incidents: patient characteristics, incident characteristics, contributing factors/hazards, and organizational outcomes (Appendix A). The current study addresses the patient characteristics class associated with the safety of patient care. Further, the RAI-MH was developed through extensive international consultation with inter-disciplinary clinical experts in the field of psychiatry including physicians, nurses, social work, and other point of care providers and hence the RAI-MH instrument itself served as a point of reference in the selection of independent variables.

6.5.2.1 Sociodemographic Characteristics

Age

Age was collapsed into eight groups: 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, and 85+. Age 18-24 was used as the reference group. The continuous age variable was converted to an

ordinal variable to address the presence of a possible curvilinear relationship to the dependent variables.

Sex

Male was used as the reference group and female was the comparison group.

Marital Status

Marital status was collapsed into two groups. "Not partnered" (never married, separated, divorced, or widowed) was used as the reference group with "partnered" (married, in a common-law relationship, or living with a partner or significant other) as the comparison group.

Language

Language was collapsed into two groups. English was used as the reference group and all other languages were identified as "other" and used as the comparison group.

Income Source

This dichotomous variable assessed the patient's condition of "no income" in the form of benefits, assistance, and employment. Having income was used as the reference group and "no income" was the comparison group.

Living Arrangements

The patients' living arrangement prior to admission was dichotomized by collapsing the types of living arrangements to Family/Alone and group setting (boarding home, long-term care home, jail or shared accommodation with non-relatives). Living with Family/Alone was used as the reference group.

Admitted from Long Term Care Home (LTCH)

This dichotomous item was derived from the RAI-MH collapsing all locations (private home, hospital, and congregate living setting) except LTCH into the "other" category and comparing to those patients admitted from a LTCH. The "other" category was used as the reference group.

Residential Stability

There were three categories included in the assessment of stability of patients' living arrangements. "Not temporary" was used as the reference group, comparing it to patients who had temporary residential arrangements (such as a shelter or hostel), and patients who were homeless.

6.5.2.2 Mental Health Service Use

Number of mental health hospital admissions (recent)

This dichotomized variable indicates patients' history of previous admissions to a MH facility or psychiatric unit within a general hospital with the previous admission(s) occurring within the last two years. No previous hospitalization was used as the reference group.

Number of mental health hospital admissions (life time)

This dichotomized variable indicates patients' history of any previous admissions to a MH facility or psychiatric unit within a hospital without regard to any time constraints. No previous hospitalization was used as the reference group.

Time since last discharge from mental health admission

The time since the discharge from a previous MH admission was collapsed into four categories: no previous admission, greater than one year, between 31 days and one year, and less than 31 days. Patients with no previous admission were used as the reference group.

Amount of time hospitalized

There were four categories enumerating the number of days in hospital in the last two years: no hospital stay, less than 31 days, between 31 days and one year, and greater than one year. Patients with no hospital admission to a MH facility or MH unit within a general hospital was used as the reference group.

Age at first hospitalization for mental health reason

There were four collapsed categories for age at first hospitalization for a MH reason: 0-24 years, 25 – 44 years, 45 – 65, and greater than 65 years old. The category 0-24 years was used as the reference group.

Police Intervention

Police intervention was collapsed into three categories: no history of intervention by police, police involvement more than one week ago and up to a year, and within the last 7 days. Having no history of police intervention was used as the reference group.

6.5.2.3 Mental Health Clinical Characteristics

Status at time of initial assessment

The inpatient status at the time assessment was reported across five categories: voluntary, informal, involuntary, psychiatric assessment, forensic, and unknown. Voluntary patients are admitted by consent of the patient; involuntary patients are those patients who are detained in a psychiatric facility under a Certificate of Involuntary Admission or certificate of Renewal (as described in the *Ontario Mental Health Act*) absent of the consent of the patient; informal patients are those admitted with consent of the patients' designated decision-maker; psychiatric assessment order describes patients admitted to and detained in a psychiatric facility for the purposes of assessment based on a Form 1 or Form 2 of the *Ontario Mental Health Act* as completed by a physician or justice of the peace; and forensic patients are admitted for assessment and designations of not-criminally-responsible or unfit to stand trial or judicial treatment orders. The group, voluntary patients, was used as the reference group.

Current Patient Type

Four categories described the patients' general type of admission (i.e., the type of care anticipated to be provided): acute, longer term, psychogeriatric, and forensic evaluation. As described in the OMHRS resource manual, an acute patient was described as a patient admitted with a

new problem or an acute flare-up of an existing problem and is expected to stay less than 14 days in hospital; a longer-term patient was one that had a persistent mental illness and was expected to have a length of stay in hospital longer than 14 days; psychogeriatric patients were patients with a chronic condition typically associated with aging (such as Alzheimer's disease or multi-infarct dementia) regardless of the anticipated duration of length of stay; patients in hospital for forensic evaluation were those admitted specifically for a forensic assessment or because of a designation of unfit to plead or not criminally responsible. Patients in the acute category were used as the reference group.

Capacity/Competency

This item makes an assessment of the patients' ability to demonstrate adequate understanding of information to enable informed decision-making including the consequences of the decision being made in three types of decisions. The patient was assessed as competent or not competent to make decisions independently. The three types of decision-making categories included consent to treatment, managing property (including real estate, insurance, income sources, and personal property), and disclosure of information related to personal health records. Having competency in these three areas of decision-making were used as the reference group.

The final measure in the capacity/competency section is a dichotomous variable identifying whether the patient had a guardian and/or substitute decision-maker responsible for the financial or personal care needs of the person. The absence of a guardian and/or substitute decision-maker was used as the reference group.

Psychiatric Diagnosis

At the time of assessment, patients are assessed and provided with a provisional diagnosis. Eleven groupings of psychiatric diagnoses were included in this research: 1) disorders of childhood/adolescence, 2) mental disorders due to general medical conditions, 3) substance-related disorders, 4) schizophrenia and other psychotic disorders, 5) mood disorders, 6) anxiety disorders, 7) eating disorders, 8) sleep disorders, 9) impulse-control disorders not classified elsewhere, 10)

adjustment disorders, and 11) personality disorders. These diagnostic groups were each dichotomized as present or not present. Patients may have more than one type of provisional diagnosis. Within each diagnostic group, the patients not diagnosed with that particular diagnosis were used as the reference group.

6.5.2.4 Resident Assessment Instrument – Mental Health Scales

Eleven clinical outcome measures, derived from the RAI-Mental Health (RAI-MH) assessment items, were included as explanatory variables in the current study, including: Aggressive Behaviour Scale (ABS), Activities of Daily Living Hierarchy (ADL), Anhedonia, Cognitive Performance Scale (CPS), Depressive Scale Index (DSI), Instrumental Activities of Daily Living Capacity (IADL), Mania, Positive Signs/Symptoms Short (PSS-Short), Risk of Harm to Others (RHO), Self-Care Index (SCI), and Severity of Self-harm (SoS). These scales were treated as continuous variables in the analysis. Table 6.1 below describes each RAI-MH scale and the measurement scale. Higher scores on the scale indicate greater loss or severity of condition.

6.5.2.5 Other Health Conditions

Generally other health conditions were dichotomous as present or not present with "not present" as the reference group.

Hearing impairment was dichotomized identifying adequate hearing ability or less than adequate hearing. Adequate hearing ability was used as the reference group.

Vision impairment was dichotomized identifying adequate or less than adequate vision with adequate vision used as the reference group.

Intellectual disabilities was dichotomized as present or not present. The presence of an intellectual disability (ID) is a confirmed diagnosis in the DSM-IV negatively affecting cognitive ability, conceptual, social, and practical skills, and further, present before the age 18 (e.g. Down's Syndrome). The absence of an ID was used as the reference group.

Table 6.1. Description of Resident Assessment Instrument - Mental Health Scales

Variable	Description	Measurement Scale
Aggressive behaviour scale (ABS)	Measure of frequency and diversity of aggressive behaviours. Includes verbal abuse, physical abuse, socially inappropriate or disruptive and resists care.	0 - 12
Activities of Daily Living (ADL) Hierarchy	Measures functional performance, reflecting a person's ability to carry out activities of everyday living. Includes personal hygiene, locomotion, toilet use, and eating.	0 - 6
Anhedonia	Reflects frequency of symptoms related to anhedonia. Includes Anhedonia, withdrawal from activities of interest, lack of motivation, and reduced social interactions.	0 – 6
Cognitive Performance Scale (CPS)	Describes the person's cognitive status. Includes short-term memory, daily decision-making, self-performance in eating, and ability to make self understood by others.	0 – 6
Depressive Severity Index (DSI)	An alternative measure to Depression Rating Scale for symptoms of depression. Includes sad and pained facial expressions, negative statements, self-deprecation, guilt/shame, hopelessness	0 - 15
Instrumental Activities of Daily Living (IADL) Capacity	An estimate of higher-level function, reflecting others' perception of a person's ability to carryout IADLs. Includes meal preparation, ordinary housework, managing finances, managing medications, phone use, shopping, and transportation (does not include using stairs)	0 - 42
Mania	A measure of frequency of symptoms of mania. Includes inflated self-worth, hyper-arousal, irritability, increased sociability/hyper-sexuality, pressured speech, labile affect, and sleep problems due to hypomania	0 – 20
Positive Symptoms Scale (PSS): short	A measure of the frequency of positive symptoms. The short form includes hallucinations, command hallucinations, delusions, and abnormal thought process.	0 – 12
Risk of Harm to Others (RHO)	A measure that reflects the risk of harm to others. Includes aggressive behaviour scale, positive symptoms scale (PSS) long, violence summary scale (VSS), sleep problems, insight into mental health, delusions, and difficulty sleeping.	0 – 6
Self-care Index due to psychiatric symptoms (SCI)	Reflects risk of inability to care for self due to psychiatric symptoms. Includes decline in cognitive skills for decision-making, insight into mental health, making self understood, abnormal thought process, poor hygiene, mania, anhedonia, positive symptoms scale, and decreased energy	0 – 6
Severity of Self-harm (SoS)	Reflects risk of harm to oneself. Includes history of suicide attempts, positive symptoms scale, depressive severity scale, family concerned re: self-injury, cognitive performance scale, and suicide plan.	0 – 6

From: interRAI Mental Health Clinical Assessment Protocols (CAPs): For Use with Community and Hospital-Based Mental Health Assessment Instruments Version 9.1 Canadian Edition, 2011

Falls was dichotomized to no falls and >0 falls in the past 30 days with no falls as the reference group.

Neurological conditions: Alzheimer disease and related dementias (ADRD), cerebral palsy (CP), epilepsy, Huntington's, Multiple Sclerosis (MS), Parkinson's, stroke, and traumatic brain injury (TBI). These conditions were dichotomized for the presence of each condition or absence. An absence of the condition was used as the reference group. These diagnoses were recorded as present if they were deemed to require active treatment and monitoring at the time of assessment.

"Any Neurological" was a variable that recorded the presence of any-one of the following: ADRD, CP, epilepsy, Huntington's, MS, Parkinson's, stroke, TBI, spinal cord injury, amyotrophic lateral sclerosis (ALS), and muscular dystrophy (MD). This item was dichotomized for the presence of any one type of neurological condition. An absence of any neurological condition was used as the reference group.

6.6 Data Analysis

The dependent variables, the CI types, were dichotomized as in-use or not in-use. CIs included: mechanical/physical restraint (MP), chair that prevents rising (Chair), acute control medications (ACM), and Any CI (MP, Chair, and ACM). The CI types were not mutually exclusive (e.g., patients with ACM may also have had MP). Any CI is the inclusive category and identifies the use of any one type of CI (i.e., if a patient had any one type or more types of control interventions, this was counted as one event of Any CI).

The bivariate analysis of the independent variables (categorical and ordinal) was conducted to determine their association with CI types using Chi-square statistics (significance level $p < .01$).

Multivariate logistic regression was performed to identify independent associations between Any CI, MP, Chair, or ACM and the explanatory variables. Significant variables identified in the bivariate analysis were loaded in a single step into the multivariate models. A staged process of

backward selection was used in the multivariate analysis retaining only significant variables ($p < .05$) at each successive stage. Additional modelling processes including step-wise and forward selection were applied to examine for potential effects of variable inclusion and exclusion. Age was retained as a main effect variable within all models to reflect consistency with variables examined in the literature. Age was grouped into 10-year increments (as ordinal values) to address a detected curvilinear relationship to the dependent variables. The RAI-MH scales were treated as continuous variables in the multivariable logistic regression modelling.

Odds ratios were produced representing the increased odds of CI use with a one-level increase in the value of the explanatory variable. Odds ratios of less than one indicate a decreased likelihood of CI use. Odds ratios with confidence limits that include the value of 1 are not significant. An examination of potential influential outliers was completed for all covariates in the models and none were found. Regression diagnostics were undertaken for each of the final models to ensure appropriate data fit. The Receiver Operating Characteristic Curves (ROC curves) were used to evaluate the model fit to the data. The c-statistic (or area under the curve -AUC) corresponds to the accuracy of the model with responses of 0.5 reflecting a model that randomly predicts the data and 1.0 perfectly discriminating the response(46). A c-statistic of 0.7 is generally considered to be reasonable and 0.8 is strong. The Hosmer and Lemeshow (HL) Goodness-of-fit statistic was secondarily used to determine the model's adequacy of fit where large values of chi-square and small p-values indicate a lack of fit of the model(47).

All the analyses were completed using SAS 9.2, Cary, NC, USA.

6.7 Results

There were 115,384 RAI-MH assessments retained for the current study that were completed between April 1, 2006 – March 31, 2010. Approximately 21.0% of the sample had Any CI use (Table

6.3). The rate of use of ACM, MP and Chair were 18.6%, 6.5% and 0.9% respectively. ACM was the most frequently used CI (18.6%) followed by MP (6.5%) and Chair (0.9%).

6.7.1 Descriptive Bivariate Analyses Results

The majority of the independent variables were found statistically significant ($p < .01$) and meeting the threshold of odds ratios < 0.80 or > 1.20. The Tables 6.3 – 6.7 list the bivariate analysis results.

Sociodemographic (Table 6.3)

Overall, patients with Any CI use tended to be in both the younger (18-24 and 24-34 year old) and older (75-84 and 85 years and older) age groups, with the same pattern for the MP and ACM use. The use of Chair was more frequently used with older patients (65 years and older) and less frequently with the younger and middle age adults. Those with MP, Chair, and ACM use were more typically male, living in a group setting prior to admission, and admitted from a long term care home (LTCH) more often than other types of settings. Patients with MP and ACM use were also more likely to not have a partner (spouse, common-law), no income source, and greater proportions with temporary residential status or homeless. In contrast, patients with Chair use, were more likely to have a partner, have a source of income and have greater residential stability. The Any CI use pattern of sociodemographic trends followed that of the MP and ACM masking the reversed pattern of the patients with Chair use for these latter SES factors.

Mental Health Services Use (Table 6.4)

With respect to MH service use characteristic, although all findings were significant, generally the differences were relatively small. Observations with noteworthy differences included were those with MP use and ACM use which tended to have more recent police intervention. The other variable of note was age at first MH hospital admission for those who had Chair use. These patients tended to be older adults (65 years and older) at the time of their first admission for a MH issue.

Mental Health Clinical Characteristics (Table 6.5)

Patients with Chair use were more often informal patients at the time of assessment and MP patients were more often either informal or involuntary. The ACM group were typically involuntary, psychiatric assessment or informal patients. Patients admitted to hospital for psychogeriatric care were more likely to have MP, Chair or ACM use. Patients who lacked capacity or competency to provide consent for treatment, management of property, disclose health information and act as his/her own decision-maker were more typically in MP, Chair or ACM than those who were assessed as capable or competent. Among the MP, Chair and ACM groups, the patients were less likely to be diagnosed with substance, mood, anxiety, or adjustment disorders. Patients with MP or ACM use were more likely to have diagnoses of child/adolescent disorders, schizophrenia and other psychotic disorders, or impulse control disorders and less likely to have eating disorders. Eating disorders was not significant for the Chair group. Patients with Chair use were less likely to have schizophrenia or other psychotic disorders but slightly more likely to have sleeping disorders. Sleep disorders were not significant for MP, ACM and Any CI patients. Patients with either MP or Chair use were more likely to have mental disorders secondary to general medical conditions but less likely to have personality disorders. Personality disorders were not significant for Any CI and ACM.

RAI-MH Scales (Table 6.6)

Patients with CI use were significantly more likely to have greater levels of loss of functional independence (ADL, IADL, and SCI). Patients with MP, Chair, or ACM were also more likely to have greater severity of ABS, mania, loss of cognitive performance (CPS), greater display of PSS Short, pose a greater risk of harm to others (RHO) and to themselves (SoS). MP, Chair and ACM patients were less frequently those at the most severe level of self-harm risk (SoS).

Other Health Conditions (Table 6.7)

CI patients also tended to be worse off in other areas of health having greater tendencies to have loss or impairment in hearing, vision, having a history of falls, and to have intellectual disability and

neurological disorders (Any Neuro). Alzheimer's disease other related disorders (ADRD) and Huntington's disease were the most consistently found neurological conditions across all patient CI types.

6.7.2 Multivariate Analyses Results

The results of the multivariate logistic regression modeling analyses was conducted for MP, Chair, ACM and Any CI use. The overall results of the modeling are summarized in Table 6.2 which shows each CI type modelled and lists the retained independent variables. Additionally, this summary table indicates the magnitude of the odds ratio for risk of CI use as well as the direction of the risk. Tables 6.9 – 6.15 lists the detailed results of the final multivariate models for MP, Chair, ACM, and Any CI use.

6.7.2.1 Mechanical/Physical Restraint Model

Table 6.9 lists the results of the multivariate logistic regression modeling for MP use. Within the Sociodemographic characteristics, the multivariate analysis identified older age, female sex and living in a group setting to lower the odds of MP use. Being partnered, speaking a language other than English, having no income source, and having residential instability increased the odds of MP use. Although these findings were statistically significant; however the odds of MP use were only slightly increased or lowered, with the exception of age which showed substantially lowered odds for MP use (i.e., lowered odds of 12% - 55%). Homelessness was not significant.

Table 6.2 Summary Table of Multivariate Logistic Regression Modelling for Risk of Control Intervention Use, Ontario (N=115,384)

		MP			Chair	ACM			Any CI		
		All	Male	Female	All	All	Male	Female	All	Male	Female
Socio-demographic Characteristics											
1	Older Age	--	--	--	++	--	--	--	--	--	--
2	Female	-							-		
3	Partnered (Marital Status)	+									
4	Language Other Than English	+									
5	No Source of Income	+									
6	Living In Group Setting	-	--	+	++						
7	Residential Instability Temp	+				+	+	+	+		+
8	Residential Instability Homeless	ns				ns	++	++	ns		ns
MH Service Use Characteristics											
9	Number recent MH admissions				--						
10	Amount of time in hospital < 31 days	+		++					+		+
11	Amount of time in hospital 31 days-1 yr	-		+					ns		+
12	Amount of time in hospital ≥ 1 yr	ns		++					ns		++
13	Age at first MH hospitalization (0-24 REF)										
	a. 25-44 years					-	ns		-		ns
	b. 45-64 years					-	-		ns		ns
	c. 65 years and older					+	ns		++		++
14	Police intervention > 1 week prior	ns	-	++		+	ns	ns	+	ns	ns
15	Police intervention ≤ 7days	+	++	++		+	++	++	+	++	+

Table 6.2 Summary Table of Multivariate Logistic Regression Modelling for Risk of Control Intervention Use, Ontario (N= 115,384) cont.

		MP			Chair	ACM			Any CI		
		All	Male	Female	All	All	Male	Female	All	Male	Female
MH Clinical Characteristics											
16	Inpatient status at time of assessment (Voluntary - REF)										
	a. Informal	++		++	++	++	++	++	++	++	++
	b. Involuntary	++		++	--	++	++	++	++	++	++
	c. Psychiatric assessmennt	++		++	--	++	++	++	++	++	++
	d. Forensic	++		++	ns	ns	--	--	ns	--	ns
	e. Other	ns		ns	ns	ns	ns	ns	ns	ns	ns
17	Current inpatient type (Acute-REF)										
	a. Longer term MH	--		--	-	--			--		--
	b. Psychogeriatric	ns		ns	++	ns			ns		ns
	c. Forensic	--		ns	++	--			--		ns
18	Incapable consent for treatment	+	++	++		-			-		
19	Incapable consent to disclose health info	++	++	++					++	++	++
20	Substitute decision-maker	-			++	+		+	+		+
21	Substance use disorders	-	-	--		+					
22	Schizophrenia/other psychotic disorders	-				+	+	+			
23	Mood	--		--					-	-	-
24	Anxiety disorders	--	--			+					
25	Eating disorders	--		--		--		--	--		--
26	Impulse disorders					+					
27	Adjustment disorders	--	--	--							
28	Personality disorders	+									

Table 6.2 Summary Table of Multivariate Logistic Regression Modelling for Risk of Control Intervention Use, Ontario (N= 115,384) cont.

	MP			Chair	ACM			Any CI		
	All	Male	Female	All	All	Male	Female	All	Male	Female
RAI-MH Scales										
29 Activities of Daily Living Hierarchy		++	++	++						+
30 ADL x CPS Interaction Term	++				++			++		
31 Aggressive Behaviour Scale	++			++	++			++		
32 Anhedonia Scale	-	-	-							
33 Cognitive Performance Scale		++		++			++			++
34 Depressive Scale Index	-	--	-	--						
35 Instrumental Activities of Daily Living				++	+	++	+	+	+	+
36 Mania	+			++	++		++	++	+	++
37 Positive Signs and Symptoms - Short					+		+	+		+
38 Risk of Harm to Others	++	++		++	++	++	++	++	++	++
39 Self-Care Index					+			+		+
40 Severity of Self-Harm	+		+		+	+	++	+	+	+
Other Health Conditions										
41 Vision impairment								+	+	
42 Intellectual disability	-	--		--	-	-		-	--	-
43 History of falls	++	++	++	++	+	++		++		+
44 Alzheimer's/Dementia/other related disorders								-		+

Legend

- \- = Odds Ratio > 0.8
- \+ = Odds Ratio < 1.20
- -- = Odds Ratio ≤ 0.80
- ++ = Odds Ratio ≥ 1.20
- ns = not significant
- H-L = Hosmer-Lemeshow
- MP = Mechanical/Physical
- ACM = Acute Control Medication
- REF = Reference group
- Chair = Chair Prevents Rising
- Any CI = Any Control Intervention

Two MH Service Use variables were retained in the final MP model. Patients who had spent between >31 days – 1 year in hospital prior to the current admission had slightly lower odds of MP use. In contrast, patient who spent 31 days or less in hospital were at slightly increased risk of MP use. Having spent less more than 1 year in hospital was not significant in the model. The second variable was police intervention. Those patients with recent police intervention (i.e., within the last 7 days) were at greater odds for MP use. Police intervention that occurred more than 7 days prior to assessment was not significant.

Within the MH clinical characteristics category, patients' status at the time of assessment increased the odds of MP use for informal patients by 1.7 times the odds of MP use compared to voluntary patients. Involuntary, psychiatric assessment and forensic status were approximately at 2.4 – 2.7 times greater odds of MP use. Patients admitted for longer term care or forensic assessment had approximately half the odds of MP use versus acute patients. Psychogeriatric patient type was not significant. Patients who were unable to give informed consent to release health information had almost 1.5 times greater odds of MP than those assessed as capable. Capacity to consent for treatment was also significant but only increased the odds by 15%. Those patients with a substitute decision-maker had somewhat lowered odds of MP use (OR = 0.84).

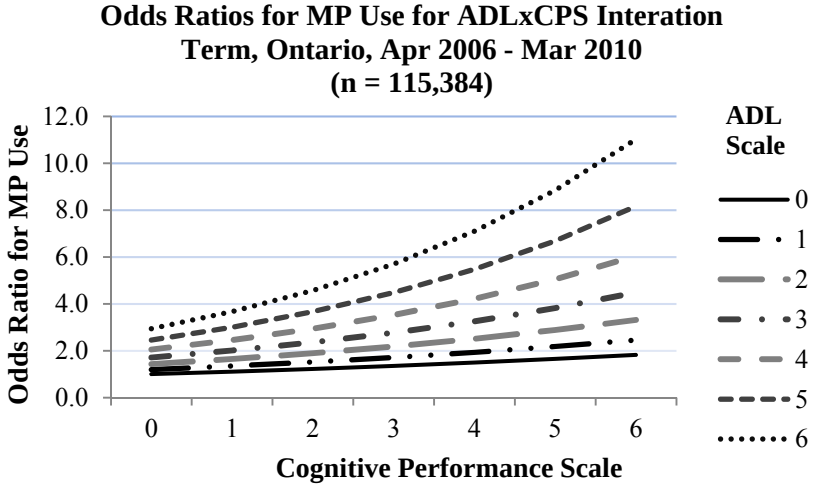
Several psychiatric diagnoses were included in the final multivariate model lower the odds of MP use including: substance use, schizophrenia and other psychotic, mood, anxiety, eating, and adjustment disorders. Eating disorders in particular reduced the odds of MP use by more than half. Patients with personality disorders had increased odds of MP use, the only diagnosis that increased the odds for MP use.

Figure 6.1 shows the interaction term for ADL x CPS which illustrates that with increasing ADL x CPS loss there is an associated increase in the odds of MP use. This interaction becomes more pronounced with increasing loss of ADL function. For patients with an ADL score of 6 and a

CPS of zero, the odds of Any CI is 2.9 and at CPS 6, the odds increased substantially to 11.0. In contrast, and ADL score equal to 2 and a CPS score of 1, the odds of Any CI use is 1.7 and at CPS score of 6, the odds increase only to 3.3.

Aggressive behaviour (ABS) substantially increased the odds of MP use. For those patients with severe aggression, defined as greater frequency and/or diversity of aggressive behaviour (i.e., scale = 5 - 12), the odds ranged from approximately 4.5 to 40.0 at the most severe end of the scale. The odds ratio for patients who were at risk of harming others (RHO scale) was 1.20 for MP use.

Figure 6.1. Odds Ratio for MP Use for ADLxCPS Interaction Term



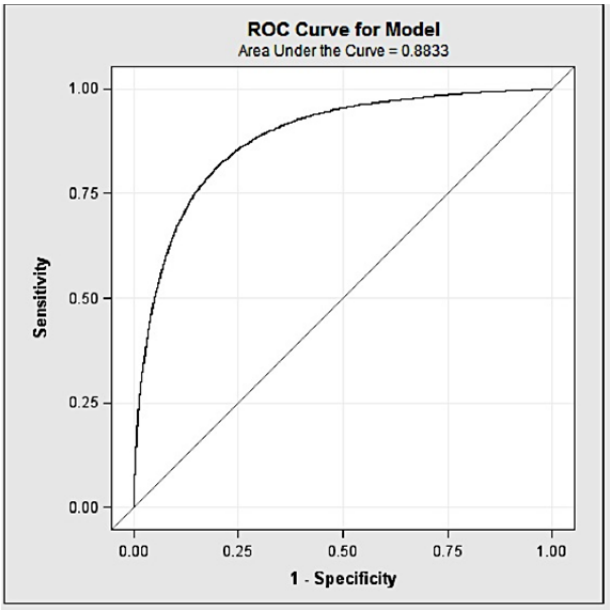
Those patients with an RHO of 5 or 6 were at 2.5 to 3 times greater odds of MP use than those patients with no assessed risk of harm to others. Mania was also a significant risk factor in the model with an odds ratio of 1.05. A score of 5 on the Mania scale increased the odds of MP use to 1.25 and for severe mania (score = 18), the odds increased to 2.5. Patients at risk of self-harm also had slight increased odds of MP use. Patients with depression (DSI) and anhedonia had significant but only slightly lowered odds of MP use.

In the Other Health Conditions category patients with a history of falling had 1.4 greater odds of MP use than those patients without any such history. Those patients diagnosed with an intellectual disability had reduced odds of MP use by 20%.

This model for MP use was assessed as a very good fit based on the c-statistic equal to 0.88 (C.I. = 0.79 – 0.80) (Figure 6.2).

In contrast, the Hosmer Lemeshow statistic showed that there was a lack of fit (H-L $\chi 2$= 120.05, $p < .0001$). A subsequent analysis of the results was undertaken. Stratification of the model by gender and further examination of included explanatory variables improved the fit with minor

Figure 6.2. ROC Curve for MP Use



impacts to the c-statistic (Table 6.10). The model for males retained age, living arrangements, police intervention, capacity to consent for treatment, capacity to consent to release health information, substance disorder, anxiety disorder, adjustment disorder, ADL function, Anhedonia, CPS, DSI, RHO, ID, and falls history. The c-statistic was 0.83 and the H-L $\chi 2$= 12.93, $p = .11$. For females, the model retained age, living arrangements, amount of time in hospital, police intervention, inpatient status at time of assessment, patient care type, capacity to consent for treatment, capacity to consent

to release health information, substance disorder, mood disorder, eating disorder, adjustment disorder, ADL function, Anhedonia, DSI, SoS, and history of falls (c = 0.80, H-L $\chi 2$= 12.36, p = .14).

The ADL and CPS interaction term was not statistically significant in both male and female models. Other explanatory variables eliminated from both the male and female models included marital status, language spoken, income source, residential stability, own decision maker, schizophrenia, personality disorders, ABS, and Mania. The male model did not retain some variables that were retained in the female model, such as amount of time spent in hospital, inpatient status at time of assessment, patient care type, mood disorders, and eating disorders. The female model retained four variables that were not retained in the male model including: anxiety, CPS, RHO, and ID.

There were a number of differences that appeared in the odds ratios of the stratified models compared to the results of the non-stratified model. Where there was a protective factor for patients admitted from a group setting in the non-stratified model, this was also the case for the male model but not for females. For female patients, there was a slight increase in the odds of MP use for those admitted from a group setting. In the non-stratified model, with increasing number of days spent in hospital prior to the current admission, the odds of MP use decreased. In the stratified models, this explanatory variable was eliminated from the male model and for the female model, there was a reversal with the odds increased for MP use. The odds for police intervention was overall similar in the stratified and non-stratified models except for police intervention more than 7 days ago in the female model which had an increased odds for MP use rather than a decreased odds in the non-stratified model.

In the MH Clinical Characteristics category, patient status at the time of assessment for the female model were doubled for those who were assessed as informal, involuntary and psychiatric assessment compared to the odds in the non-stratified model. There was no substantial difference for

forensic status and other was not significant in both the stratified and non-stratified models. Similarly, there were no substantial differences in the odds for patient care type, capacity for consent for treatment, and consent for disclosure of health information between the stratified and non-stratified models. The psychiatric diagnoses retained in the male and female models, like the non-stratified models, had lowered odds for MP use.

Generally, for the RAI-MH scales retained in the stratified models the odds ratios were not changed substantially. There were two noteworthy differences for ADL and RHO. ADL was retained in both the male and female models though the odds in the female model increased substantially from 1.26 to 1.56. This translates to substantial differences in the risk of MP use. For example, at the most severe end of the scale equal to 6, the odds of MP use in the non-stratified model, exponentiating the odds is equal to 4.0 whereas for the female model, the odds are equal to 14.4. The male model also increased but less so than for the female group. For RHO which was retained only in the male model. The odds for MP use increased from 1.20 O.R. to 1.62 O.R. for each one step increase on the continuous scale, which at the severe end of the scale equal to 6, translates to 3.0 and 16.8 odds respectively for the non-stratified and male stratified models.

There were no substantive differences in the odds ratios of the retained variables of the stratified models compared to the non-stratified model in the Other Health Conditions category.

6.7.2.2 Chair Prevents Rising Model

Table 6.11 shows the results of the logistic regression modeling for Chair use. Age and admitted from LTCH were the only sociodemographic variable retained in the multivariate model. Older adults (55 and older) had greater odds of Chair use than the reference age group 18 – 24 years. All other age groups were not significant. Those patients admitted from a LTCH had increased odds of Chair use than admission from other locations. Gender was not statistically significant.

Of the MH Service Use Characteristics, the number of MH recent admissions was retained in the final Chair model. More than one admission was protective of MP use.

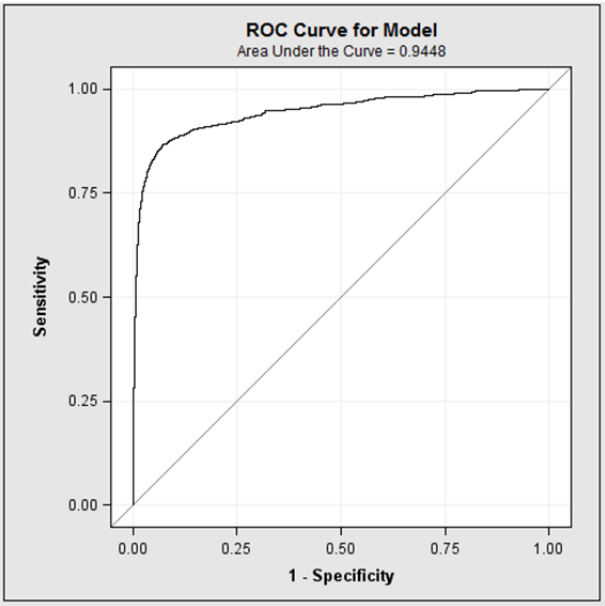
MH clinical characteristics variables that were significantly associated with increased odds of Chair use included patients with an informal status at the time of assessment, admitted for psychogeriatric services, and with a substitute decision-maker. Involuntary and psychiatric assessment status patients had lowered odds of Chair. No provisional psychiatric diagnoses were retained in the final model. Forensic inpatient status was not statistically significant. Patients admitted for longer term care and forensic assessment were also not significant.

Substantially increased odds of Chair use was associated with patients with declining functional performance in ADL and IADL. For ADL, the odds of Chair use was 1.62 for each on step increase on the continuous scale. For example, patients scoring 5 or 6 on the ADL scale have 11.1 – 18.1 increased odds respectively for Chair use. For IADL, the odds at the severe end of loss increased approximately 5 times the odds. CPS similarly raised the odds of Chair use, at the most severe end of loss with a score of 6 on the scale, the odds were tripled. Patients with increasingly aggressive behaviour (ABS), mania, and demonstrated risk of harm to others (RHO) had an increased the odds of Chair use by 1.5 to 2.5 times. Patients with depressive symptoms (DSI) had a slightly lowered risk of Chair use.

Those patients diagnosed with an ID had substantially reduced risk of Chair use (OR = 0.65). A history of falls doubled the risk of Chair use.

The final Chair model was assessed as an excellent fit based on the ROC curves for Chair use (Figure 6.3). The c-statistic or area under the curve was equal to 0.94 (CI = 0.94 - 0.95). The Hosmer Lemeshow statistic showed that there was a good fit also (H-L $\chi 2 = 10.69$, $p = .22$).

Figure 6.3. ROC Curve for Chair Use



6.7.2.3 Acute Control Medication Model

Table 6.12 lists the significant explanatory variables in the multivariate model for ACM use. Middle and older adults were at reduced risk of ACM compared to younger adults. Temporary residential status, age at first hospitalization, police intervention, and those patients with a substitute decision-maker had slightly increased odds of ACM use. Additional significant variables in the model that showed a larger impact on the odds of ACM use (OR > 1.20) included patient status at time of assessment (informal, involuntary and psychiatric assessment). Patients admitted for longer-term care or forensic evaluation had reduced odds of ACM as were patients who were assessed as incapable to give consent for treatment. In contrast to MP use where many of the diagnoses were associated with a reduced risk of MP use, substance disorders, schizophrenia and other psychotic disorders, anxiety disorders, and impulse disorders demonstrated an increased odds for ACM use. Patients with eating disorders were at substantially reduced risk of ACM use (OR = 0.60).

The RAI-MH scales that substantially increased the odds of ACM use were ABS, IADL, Mania PSS-Short, RHO, SCI and SoS. At the most severe level of ABS with a score of 12, patients had an 8-fold increase in the odds of ACM use, Mania had a 4-fold increased odds, and RHO had a 2-fold increased odds. Severe loss of functional independence (IADL and SCI) increased the odds of ACM by approximately 50%. Patients at risk of self-harm (SoS) or displaying positive signs and symptoms (PSS-Short) had significant but less substantial increases in risk of ACM. ADL and CPS was shown to be positive for interaction (See Figure 6.4).

Figure 6.4. Odds Ratios for ACM Use for ADLxCPS Interaction Term

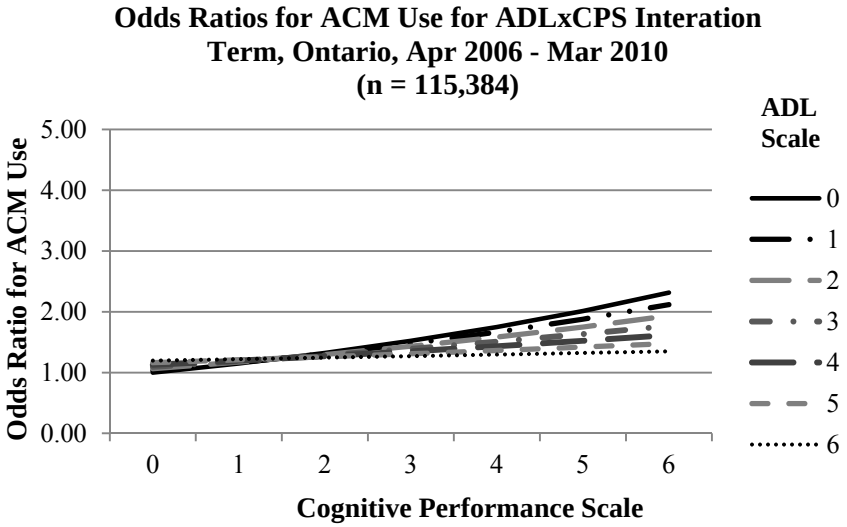
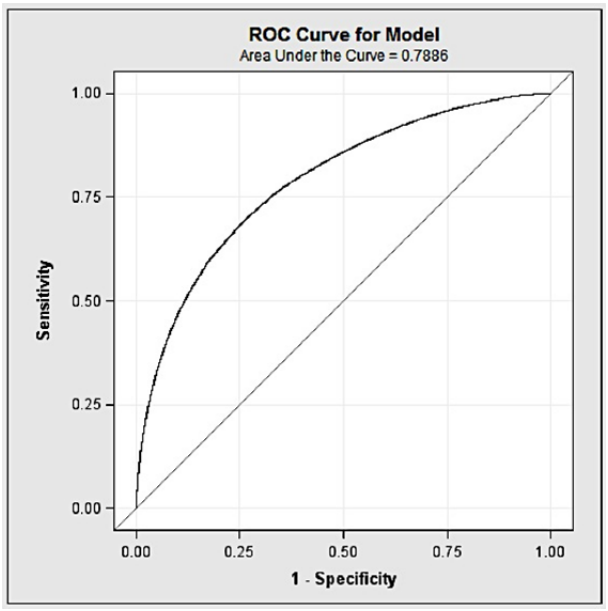


Figure 6.4 illustrates the interaction between ADL and CPS for ACM use. At each step on the ADL scale (i.e., greater loss of function) there is corresponding loss of cognitive function (CPS) with the greatest impact of that interaction at the lower end of the ADL scale impacting on the risk for ACM use. For example, with ADL and CPS both equal to 1 the odds of ACM use is 1.1 and with a 5-point increase in CPS to 6 on the scale, the odds of ACM use are almost doubled to 2.1. For more severe loss of ADL function with a score of 5 and CPS equal 1, the odds of ACM use is 1.2 and at CPS equal 6, the odds increase only slightly to 1.5.

Patients with a history of falling have slightly increased odds of ACM use. Patients diagnosed with ID have a reduced odds of ACM.

This model as illustrated in Figure 6.5 was shown to have an adequate fit (c-statistic = 0.79).

Figure 6.5. ROC Curve for ACM Use



The Hosmer-Lemeshow statistic indicated a poor fit (H-L $\chi 2 = 102.67$, $p < .0001$). Stratification of the model by gender and following additional analysis, with minor compromise to the original c-statistic, two models were created for male and females. Both the male and female models did not retain patient care type, capacity to consent for treatment, substance use disorder, anxiety disorder, impulse disorder, ADL, and SCI. The male model also did not include capacity to make own decisions, eating disorder, CPS, Mania, and PSS-Short. The female model did not retain age at first MH hospitalization, ID, and history of falls. The ADL and CPS interaction term was not significant in either the male or female model. Revised goodness of fit statistics for each stratified model showed that the model was a good fit for the data. Table 6.13 shows the final models for ACM

use stratified by male and female (c= 0.75, H-L $\chi 2$= 10.57, p = .23 and c= 0.77, H-L $\chi 2$= 12.78, p = .12, respectively).

For the Sociodemographic retained variables, there was only minor changes in the odds ratios for the two stratified models. Within the MH Service Use Characteristics for the male model which retained age at first hospitalization, only 45 – 64 years of age for first hospitalization was significant and maintained the same lowered odds for ACM use as the non-stratified model. Police intervention that occurred more than one week ago was not significant in both the male and female models. The odds of ACM use increased slightly for inpatient status at the time of assessment for the male model and less so for the female model for patients assessed as informal, involuntary status, and psychiatric assessment. Forensic gained statistical significance in the stratified model for lowered odds of ACM use. There was very little difference between the female and non-stratified model in the odds of ACM use for capacity for own decision-making and eating disorder. Schizophrenia was retained in the stratified models with similar levels odds of ACM use compared to the non-stratified model. Generally for the retained RAI-MH scales and Other Health Conditions in the male and female models, the odds ratios were not substantially different from the full model except for IADL, Mania, and RHO which had substantially increased odds over those in the non-stratified model.

6.7.2.4 Any Control Interventions Model

Table 6.14 lists the significant results of the logistic regression multivariate modeling for the use of Any CI. With increasing age, the risk of Any CI was reduced with the odds dropping by 50% for the middle and older age adults. Gender was significant in the non-stratified model. Females had slightly lowered risk of Any CI and those living in temporary housing prior to hospital admission had a slight increased risk. Homelessness was not statistically significant.

The significant factors within the MH Service Use category increased the odds of Any CI use including amount of time in hospital (≤ 31 days), age at first hospitalization (65 years and older), and

any police intervention. For patients between the ages of 25-64 at the time of first hospitalization, the odds of Any CI was slightly reduced.

The variables within the MH Clinical characteristics had mixed effects of both increased and decreased odds for Any CI. Patients whose status was informal, involuntary or psychiatric assessment had 50 – 70% increased odds of Any CI use compared to voluntary patients. As well, patients assessed as incapable to consent to release health information or had a substitute decision-makers had greater odds for Any CI use compared to competent patients. In contrast, patients who were incapable of providing informed consent for treatment had lower odds for any CI use as were patients who had admission types for longer term MH care or forensic evaluation. Only two psychiatric diagnoses were retained in the model, mood and eating disorders, both of which reduced the odds of Any CI use. An inpatient status of forensic at the time of assessment and psychogeriatric care inpatient type were not statistically significant.

Patients with reduced independence in function (IADL, and SCI) had increased odds of Any CI use. Patients who were at risk for harming others (RHO) or increased mania had two to three times the odds of Any CI use respectively compared to those patients without RHO symptoms or displays of mania. Patients exhibiting positive signs and symptoms (PSS-Short) or self-harming behaviours (SoS) were also at greater risk of Any CI but to a lesser degree. ADL and CPS interaction term was statistically significant (See Figure 6.6).

Figure 6.6. Odds Ratios for Any CI Use for ADLxCPS Interaction Term

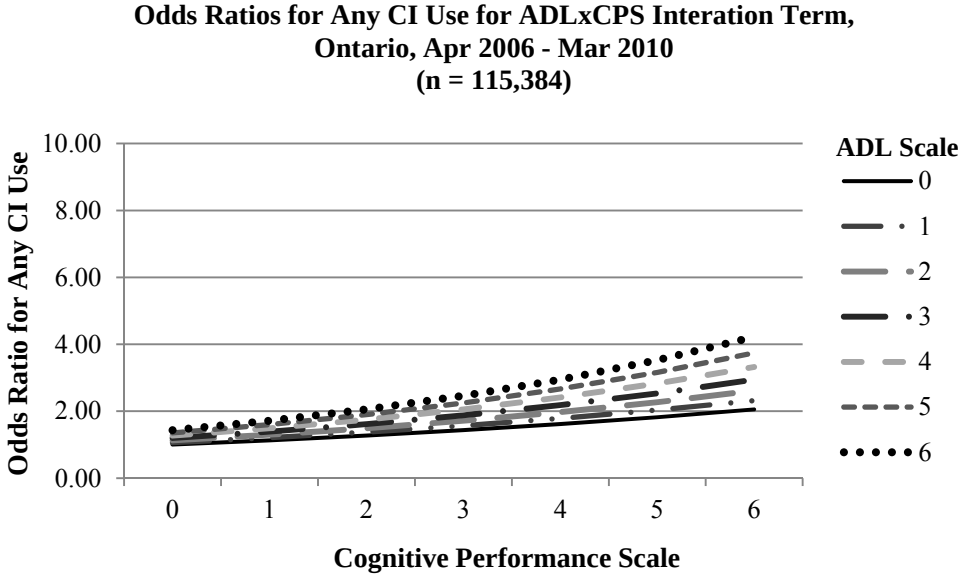
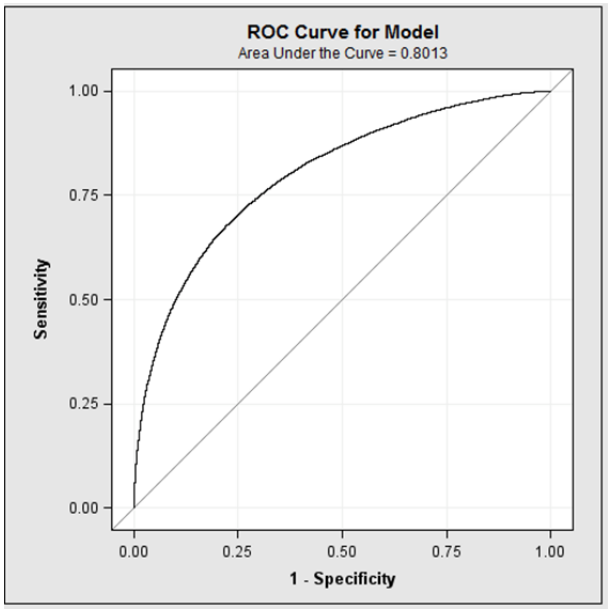


Figure 6.6 illustrates that with increasing ADL x CPS loss there is an increased odds of Any CI use. The impact of this interaction becomes slightly more pronounced with increasing loss of ADL function. For patients with a level 6 ADL score and a CPS of zero, the odds of Any CI is 1.5 and at CPS 6, the odds increased to 4.3. In contrast with lower ADL scores (e.g., ADL = 2) and CPS equal to 1, the odds of Any CI use is 1.2 and at CPS scale score of 6, the odds increase slightly to 2.1. The ADLxCPS interaction term for Any CI is muted compared to MP which saw the odds for MP use increase from 2.9 up to 11.0 with increasing ADL and CPS loss.

Within the Other Health Conditions category, the multivariate analysis identified vision impairment (impaired and highly impaired), history of falls, and presence of ADRD to have greater odds of Any CI use. Those patients with ID had a slightly reduced odds of Any CI use.

The goodness of fit accordingly was assessed. The c-statistic was 0.80 indicating the model was an acceptable fit for the data (Figure 6.7). Secondarily, the Hosmer-Lemeshow statistic indicated conflicting results, identifying a lack of fit (H-L $\chi 2 = 97.51$, $p < .0001$).

Figure 6.7. ROC Curve for Any CI Use



Stratification of the model by gender improved the fit (Table 6.15). The full model was modified only slightly for the female model eliminating capacity to consent for treatment, ABS, ADL-CPS interaction term, and vision impairment with little sacrifice to the c-statistic (c= 0.79, H-L $\chi 2$= 10.25, p = .25). The male model retained a relatively small number of variables in contrast including age, inpatient status as the time of assessment, capacity to give consent to release health information, mood, IADL, Mania, RHO, SoS, vision impairment, and ID (c= 0.78, H-L $\chi 2$= 14.81, p = .06).

Among the retained Sociodemographic variables, age and residential stability, the trend in the odds remained relatively the same between the stratified and non-stratified models with the exception that for the oldest age group in the model for males, this variable was not statistically significant and for the female group, the slight uptick in the odds in the older age group was not present.

Within the stratified model for females, all age groupings for first hospitalization were statistically significant with increased odds of Any CI use, in contrast to the non-stratified model where the 25-44 and 45-64 groups were not significant. The parameter, police intervention that

occurred more than a week prior to the time of assessment was not significant but remained significant for police intervention in the last seven days.

In the MH Clinical Characteristics category for informal, involuntary, and psychiatric assessment, there was an increased odds of Any CI use in both stratified models compared to the non-stratified but more substantially for the male model. Further, the forensic inpatient status for males became statistically significant with lowered odds of Any CI use. Conversely, for inpatient type, forensic was not significant in the female model but was significant in the non-stratified model. The odds for the retained types of capacity, mood disorders, and eating disorders in the stratified models did not change substantially compared to the non-stratified model.

6.8 Discussion

The results of this study show that the use of CIs on adult inpatient mental health units in general hospitals and mental hospitals is a common practice. In Ontario, the experience is that one in five patients will experience CI use in Ontario. The substantial negative patient safety consequences of their use have been documented in the mental health literature although the rigor and volume of studies is low. Collectively with the nursing home and acute care literature, it is commonly acknowledged that CIs can cause substantial physical harm, psychological distress, emotional trauma, and most seriously, death. So although this study has identified risk factors that might explain the last-resort need to use CIs, such as RHO, recent police intervention, and SOS, this study also identified risk factors that would not necessarily intuitively explain the use of CIs, such as loss of functional performance of activities of daily living, impaired cognitive function and having a history of falls. This study has quantified the size of the CI reduction challenge as well as provided comprehensive consideration and examination of the risk for their use.

The current study identified the need to study risk factors for CI use specific to a CI type, in other words, creation of models for MP, Chair and ACM use. The CI specific multivariate models

identified different risk factors and differing effects of those risk factors. For example, within the ACM model, psychiatric diagnoses generally increased the odds of CI use whereas in the MP model for the same diagnoses reduced the odds for MP use. For Chair use, psychiatric diagnoses were not identified as risk factors for Chair use and no diagnoses were retained in the final model. In the final model for Any CI, two diagnoses were retained (mood and eating disorders) which were protective of Any CI use. In the absence of the knowledge of the results of the specific modelling for MP, Chair, and ACM, drawing generalized conclusions about the risk factors of psychiatric diagnoses for Any CI use would have been the natural course of action, though would have been misleading if not erroneous. The study of risk factors for CI use should be completed by specific CI type and not collectively in a general category. This finding may explain some of the variability in previous research which produced conflicting reports of significance or non-significance of various risk factors such as age, gender, schizophrenia diagnosis, and violence and the effects of those risk factors (i.e., increased or decreased the risk of CI use). There is great value in understanding the prevalence of CI use, including the use of Any CI. The overall or provincial prevalence of Any CI use can be used as the baseline which various jurisdictions can then use as a point of reference for improvement efforts.

In addition to the need for differentiating CI type in risk modelling, the current study identified the need to gender stratify the models for MP and ACM. Although there were some common risk factors for MP and ACM use, there were different effects of those risk factors in those instances. As well, there were differing risk factors retained in the male and female models. For example, eating disorders which was protective of MP and ACM use, was retained only in the female models and conversely, ID was protective of MP and ACM use and retained only in the male models.

To the extent that some of the risk factors examined in this current study were pre-existing conditions or non-modifiable characteristics of the patient, it would not necessarily be expected that the patient's current hospital admission would be able to address these as a strategy to reduce CI use.

For example, age at first hospitalization, residential instability, and admission from LTCH are not modifiable but as a proxy, may measure another less apparent stressor or condition. It could be that these risk factors may be more important to flag for community-based care providers and families in the development of early indicators for risk of emergency department visits or admission to hospital. This study points out the importance of the continuum of 'care' for patients with MH illnesses. This has policy implications for successful CI reduction for adult inpatients that are beyond hospitals and inpatient stays. There are implications for primary care and community and social services in areas of housing, life-skills training and support, and earlier identification of symptoms of MH distress. Additionally, the assessment findings from the RAI-MH should be shared with community providers and family for post discharge service planning. The use of a common assessment instrument by hospital and community care providers facilitates a smoother transition from one part of the health care system to the next, be that community agencies, long term care, home care, or primary care. The current study retained the interaction variable ADLxCPS as a significant risk factor for MP and ACM use. As previously described, the interaction variable presented differently for MP and ACM use. For ACM use, as ADL and CPS scores increased the risk of ACM use also increased but the risk was greater for those patients with lower ADL scores rather than those with the higher ADL scores (i.e., more severe loss of function). In other words, the risk of ACM use was greater for more mobile and physically capable patients with corresponding decreasing levels of cognitive function. In contrast, for MP use the risk was inverted. For MP use with worsening ADL and CPS function (higher scores), the risk of MP increased more substantially for those patients with the greatest impairment and loss of independence of physical function. For MP use, these results suggest an approach to the care of physically and cognitively disabled patients based on spurious grounds such as prevention of falls, falls injuries or potentially a rote response to disabled patients(48). It will be important to identify the root cause(s) of MP use with increasing ADL and CPS loss to inform the

development of strategies for CI reduction efforts. Recognizing that the intermittent and closely monitored use of devices for therapeutic positioning to improve independence in self-care, social interaction and activities, physiological functioning (e.g., pulmonary, gastrointestinal), and independence in mobility may be part of an ongoing care plan(49), it would not be reasonable nor considered evidence-informed care to suggest complete elimination of the use of such devices. With this exception, the use of MPs should be considered as last-resort option when all other less restrictive options have been considered and exhausted.

Although not addressed directly in the current study, the identification of non-MH symptoms and conditions that increased the risk for CI use points to the need for additional staff education and/or training. Patients with reduced independence in functional abilities (ADL, IADL, SCI), of older age or younger age, or with a history of falls increased the risk of CI use, after controlling for other explanatory variables such as aggressiveness or violence towards others or self had increased risk of CI use. The current study begins to identify that there are areas of CI use that are not associated with the need to contain a dangerous or imminently dangerous situation. The current study shows that being of an older age and with a falls history increases the risk of Chair use. The skewed pattern of use of Chair with older adults may reflect staff bias to restrain these patients in a 'less restrictive' but more acceptable manner than MP. Further, the use of Chair as a restraint with the intent to prevent falls is well documented in the literature to instead increase the severity of harmful consequence of falling rather than reduce the frequency of falls(50). The reduction in the use of restraints is well documented in the nursing home literature which identifies the need for a comprehensive change management effort to address multi-faceted barriers and enablers(51). More study is required to better understand the prevalence of the use of CIs in situations that would be considered as unnecessary use of CIs.

The use of the Hosmer-Lemeshow (H-L) test statistic for goodness of fit alongside the c-statistic is a relatively new approach to testing the fit or lack of fit for logistic regression models. In achieving an acceptable H-L, the independent variables were further examined resulting in the identification of improved fit of the model to the data when the sample was stratified by gender for MP and ACM (and also Any CI). The variable selection process for each of these stratified models was repeated and in some cases eliminating variables that, from a clinical point of view, would not necessarily appear intuitive. For example, aggressive behaviour (ABS) was eliminated in the stratified MP and ACM models as was in some instances, Mania, PSS-Short, and RHO. These RAI-MH scales would point to some anticipation of behaviours that would lead to CI use such as hyper-arousal, irritability, hallucinations, command hallucinations, verbal abuse, and physical violence. So although there are proponents of the use of the c-statistic and the H-L test statistic together to assess for goodness of fit(52), there is some caution and need for further study of this relatively new test which has been criticized. With the advent of newer technologies allowing for ease of testing previously fixed assumptions in the test, minor changes can cause a reversal of conclusions of a good model fit. For example, the H-L test specifies grouping the sample into 10 groups as a standard of approximate equal size and for each group, comparing the observed number of events to non-events and the expected events and non-events. A Pearson's chi-square is used to compare the observed counts and the expected counts. It has been shown that changing the number of groups by one, can affect the results(53). So although in the current study, there was little sacrifice in the c-statistic to achieve an acceptable H-L test statistic, it will remain important to stage the modelling first with an acceptable c-statistic followed secondarily with the H-L test statistic.

6.9 Limitations

The current study captures all RAI-MH inpatient adult assessments of MoHLTC approved MH hospitals or MH units within general hospitals of the most populous province of Canada with a

census of 13.4 million (http://www.fin.gov.on.ca). This study would have greater generalizability of its findings if the study sample included assessments from other jurisdictions outside Ontario. Although the findings have limited generalizability to Canada and beyond, the findings are representative of the use of CIs in Ontario psychiatric hospital settings without limitation. To that extent, the findings from the current study are directly applicable to Ontario mental health services providers, hospital administrators and government. It would be important for this study to be replicated in other jurisdictions and specifically, in those jurisdictions that use the interRAI Mental Health assessments ensuring the use of standardized definitions of CIs and assessment with the added assurance of standardized training of assessors and thereby improving comparability.

The objective of the current study did not include a full account of the use of CIs in MH units/hospitals. The data source does not inventory the use of CIs over the entire episode of care but instead captures the use of CIs in the three days prior to the completion of the assessments. The current study reports a prevalence rate of CI use based on this three day period and not on the entire length of stay. An inventory or incident reporting system would more likely identify additional 'counts' of use of CIs compared to the RAI-MH. The rates reported in the current study are not directly comparable to those studies with the purpose of reporting on the overall individual patient experience of CI use per hospital admission.

The risk models developed in the current study were limited to consideration of patient characteristics. A comprehensive range of predictors for the use of CI use would include organizational/institutional, provider, and political characteristics(54). It will be important for future study to include these parameters to further understand the risk of use of CI in the context of these additional characteristics(28, 55-58).

6.10 Conclusion

The identification of the risk factors associated with the use of CIs is an important beginning to developing CI use reduction strategies. This study provides a comprehensive examination of MH patient characteristics associated with CI use, covering a four year period using a robust study sample. This study makes a substantial contribution to the literature providing the first comprehensive analysis of risk factors for MP, Chair and ACM use for Ontario adult MH inpatients and aiding the development of CI reduction strategies.

The current study identified the need to consider CI use risk factors separately for MP, Chair and ACM use and further that use of an inclusive model of different CI types could result in misleading conclusions. This finding should guide the decision to develop unique CI reduction strategies for MP, Chair and ACM use by hospital-based quality improvement teams and/or patient safety institutes. Consideration must also be given to gender specific risk factors for CI use, although the findings of the current study are based on a newer statistical test of goodness of fit. Further study of the Hosmer-Lemeshow test with multivariate logistic regression analysis with very large data sets is needed.

An area for future study to augment the current findings would be to examine the use of CIs in situations of imminent danger to the patient or others that may warrant the use of CIs as a last-resort measure to ensure safety of care versus CI use in situations absent of such urgency of need.

It is without doubt that the use of CIs in inpatient MH continues as does the associated harms as a consequence of their use. Having greater knowledge of the characteristics of patients who are at risk of CI use will directly inform the development of pre-emptive intervention strategies or programs to reduce their use.

6.11 Tables

Table 6.3 Use of Control Intervention by Type Among Adult Mental Health Inpatients, Ontario 2006- 2010 (N=115,384)

		Observations of			
		Any CI	MP	Chair	ACM
Year	# Assessments	% (n)	% (n)	% (n)	% (n)
2006/7	28,164	20.8 (5,854)	7.0 (1,965)	1.1 (296)	18.0 (5,058)
2007/8	27,851	22.0 (6,112)	6.7 (1,872)	0.9 (253)	19.5 (5,420)
2008/9	28,074	21.5 (6,037)	6.3 (1,775)	0.9 (240)	19.3 (5,425)
2009/10	31,295	19.8 (6,197)	6.0 (1,864)	0.9 (279)	17.6 (5,519)
Total	115,384	21.0 (24,200)	6.5 (7,476)	0.9 (1,068)	18.6 (21,422)
p-value		< .0001	< .0001	< .08	< .0001

Chi-square statistical test for fiscal year by CI type

Table 6.4 Control Intervention by Sociodemographic Characteristics, Ontario 2006-2010

		Any CI	Mech/Phys	Chair	ACM
		N = 24,200	N = 7,476	N = 1,068	N = 21,422
		% (n)	% (n)	% (n)	% (n)
Age	*p*	< .0001	< .0001	< .0001	< .0001
18-24		25.3 (3,739)	8.9 (1,317)	0.2 (27)	22.9 (3,382)
25-34		22.7 (5,100)	6.8 (1,533)	0.2 (36)	20.6 (4,630)
35-44		20.2 (4,974)	5.6 (1,387)	0.2 (40)	18.3 (4,496)
45-54		18.8 (4,760)	5.2 (1,316)	0.3 (80)	17.1 (4,322)
55-64		17.9 (2,595)	4.9 (706)	0.8 (121)	15.9 (2,313)
65-74		18.6 (1,385)	6.6 (496)	2.7 (204)	15.1 (1,128)
75-84		24.5 (1,170)	10.3 (491)	7.7 (370)	17.6 (842)
85+		32.1 (477)	15.5 (230)	12.8 (190)	20.8 (309)
Sex	*p*	< .0001	< .0001	.001	< .0001
Male		22.4 (12,863)	7.3 (4,174)	1.0 (584)	19.7 (11,309)
Female		19.6 (11,332)	5.7 (3,301)	0.8 (483)	17.5 (10,109)
Marital status	*p*	< .0001	< .0001	< .0001	< .0001
Not partnered		22.4 (18,642)	6.9 (5,759)	0.7 (615)	20.0 (16,617)
Partnered		17.2 (5,558)	5.3 (1,717)	1.4 (453)	14.9 (4,805)
Language	*p*	< .0001	< .0001	< .0001	.009
English		20.8 (22,831)	6.4 (6,963)	0.9 (969)	18.5 (20,259)
Other		23.4 (1,369)	8.8 (513)	1.7 (99)	19.9 (1,163)
Income source	*p*	.0009	< .0001	< .0001	.0008
Income		20.8 (21,549)	6.4 (6,597)	1.0	18.4 (19,064)
No income		22.1 (2,651)	7.34 (879)	0.3 (33)	19.7 (2,358)
Living arrangements	*p*	< .0001	< .0001	< .0001	< .0001
All Others		20.0 (20,444)	6.0 (6,132)	0.5 (532)	17.9 (18,317)
Group		28.5 (3,756)	10.2 (1,344)	4.1 (536)	23.6 (3,105)
Admitted from LTCH	*p*	< .0001	< .0001	< .0001	< .0001
Other		20.5 (23,263)	6.2 (7,001)	0.6 (683)	18.3 (20,774)
LTCH		43.7 (937)	22.2 (475)	18.0 (385)	30.2 (648)
Residence Instability	*p*	< .0001	< .0001	.003	< .0001
Not temporary		20.3 (17,547)	6.3 (5,430)	1.0 (832)	18.0 (15,508)
Temporary		22.6 (6,327)	6.9 (1,945)	0.8 (235)	20.0 (5,608)
Homeless		30.9 (326)	9.6 (101)	0.1 (1)	29.0 (306)

Table 6.5 Control Intervention by Mental Health Services Use Characteristics, Ontario 2006 - 2010

		Any CI	Mech/Phys	Chair	ACM
		N = 24,200	N = 7,476	N = 1,068	N = 21,422
		% (n)	% (n)	% (n)	% (n)
# of Mental Health admits	*p*	< .0001	< .0001	< .0001	< .0001
None		19.0 (9,822)	6.0 (3,094)	1.4 (727)	16.4 (8,529)
One or more		22.6 (14,378)	6.9 (4,382)	0.5 (341)	20.3 (12,893)
# of Mental Health admits life time	*p*	< .0001	.01	< .0001	< .0001
None		18.5 (5,881)	6.2 (1,961)	1.8 (585)	15.7 (4,987)
One or more		21.9 (18,319)	6.6 (5,515)	0.6 (483)	19.7 (16,435)
Time since last discharge	*p*	< .0001	< .0001	0.005	< .0001
No previous admission		18.5 (5,881)	6.2 (1,961)	1.8 (585)	15.7 (4,987)
> 1 year		20.6 (6,983)	6.0 (2,029)	0.6 (212)	18.5 (6,258)
31 days – 1 year		22.3 (7,398)	6.8 (2,243)	0.5 (158)	20.0 (6,656)
< 31 days		23.7 (3,938)	7.5 (1,243)	0.7 (113)	21.2 (3,521)
Amount of time in hospital	*p*	< .0001	< .0001	< .0001	< .0001
None		18.9 (9,822)	6.0 (3,094)	1.4 (727)	16.4 (8,529)
< 31 days		22.5 (8,389)	7.1 (2,657)	0.4 (153)	20.0 (7,488)
31 days – 1 year		22.8 (5,416)	6.5 (1,547)	0.7 (155)	20.7 (4.912)
> 1 year		23.5 (573)	7.3 (178)	1.4 (33)	20.2 (493)
Age at first hospitalization	*p*	< .0001	< .0001	< .0001	< .0001
0 – 24 years		24.5 (10,206)	7.8 (3,238)	0.3 (116)	22.2 (9,234)
25 – 44 years		19.3 (9,111)	5.3 (2,525)	0.3 (151)	17.4 (8,244)
45 – 64 years		15.4 (2,943)	4.4 (849)	0.9 (176)	13.3 (2,548)
65+ years		26.3 (1,940)	11.7 (864)	8.5 (625)	19.0 (1,396)
Police intervention	*p*	< .0001	< .0001	< .0001	< .0001
Never		18.0 (14,354)	5.2 (4,143)	1.1 (900)	15.7 (12,507)
> 1 week – 1 year		24.3 (6,448)	7.4 (1,966)	0.4 (105)	22.0 (5,836)
<1 week		37.8 (3,398)	15.2 (1,367)	0.7 (63)	34.3 (3,079)

Table 6.6 Control Intervention by Mental Health Clinical Characteristics, Ontario 2006 - 2010

		Any CI	Mech/Phys	Chair	ACM
		N = 24,200	N = 7,476	N = 1,068	N = 21,422
		% (n)	% (n)	% (n)	% (n)
Status at time of assessment	*p*	< .0001	< .0001	< .0001	< .0001
Voluntary		11.5 (6,277)	2.0 (1,065)	0.8 (442)	10.3 (5,608)
Informal		30.9 (398)	11.6 (149)	8.5 (109)	23.4 (301)
Involuntary		32.0 (9,556)	11.7 (3,498)	1.1 (323)	28.3 (8,425)
Psych assessment		28.6 (7,557)	9.9 (2,603)	0.7 (182)	25.6 (6,769)
Forensic		11.9 (357)	4.9 (145)	0.2 (6)	9.2 (275)
Unknown		22.9 (55)	6.7 (16)	2.5 (6)	18.3 (44)
Current patient type	*p*	< .0001	< .0001	< .0001	< .0001
Acute		22.2 (21,175)	6.6 (6,352)	0.5 (459)	19.2 (19,038)
Long term		10.5 (1,353)	3.1 (401)	0.6 (79)	9.2 (1,181)
Psychogeriatric		33.2 (1,310)	14.7 (582)	13.2 (523)	23.3 (922)
Forensic		12.2 (362)	4.7 (141)	0.2 (7)	9.4 (281)
Capacity/Competency					
Consent for treatment	*p*	< .0001	< .0001	< .0001	< .0001
Capable		19.5 (20,391)	5.5 (5,793)	0.5 (478)	17.5 (18,380)
Incapable		36.0 (3,809)	15.9 (1,683)	5.6 (590)	28.8 (3,042)
Managing property	*p*	< .0001	< .0001	< .0001	< .0001
Capable		19.9 (21,382)	5.8 (6,275)	0.5 (518)	17.9 (19,210)
Incapable		35.3 (2,818)	15.0 (1,201)	6.9 (550)	27.7 (2,212)
Consent to disclose health info	*p*	< .0001	< .0001	< .0001	< .0001
Capable		20.0 (22,071)	5.9 (6,468)	0.5 (569)	18.0 (19,814)
Incapable		40.7 (2,129)	19.3 (1,008)	9.5 (499)	30.7 (1,608)
Decision-making	*p*	< .0001	< .0001	< .0001	< .0001
Own decision-maker		19.6 (20,580)	5.7 (6,039)	0.4 (399)	17.6 (18,473)
Substitute decision-maker		34.4 (3,620)	13.7 (1,437)	6.4 (669)	28.0 (2,949)

Table 6.6 Control Intervention by Mental Health Clinical Characteristics, Ontario 2006 - 2010 cont.

		Any CI	Mech/Phys	Chair	ACM
		N = 24,200	N = 7,476	N = 1,068	N = 21,422
		% (n)	% (n)	% (n)	% (n)
Psychiatric diagnoses					
Child/Adolescent	*p*	< .0001	< .0001	.58	< .0001
None		20.9 (23,656)	6.4 (7,273)	0.9 (1,047)	18.5 (20,936)
Present		27.1 (544)	10.1 (203)	1.0 (21)	24.2 (486)
Mental disord due to gen	*p*	< .0001	< .0001	< .0001	.03
None		20.9 (23,691)	6.4 (7,289)	0.9 (980)	18.5 (21,027)
Present		26.4 (509)	9.7 (187)	4.6 (1,844)	20.5 (395)
Substance disorders	*p*	< .0001	< .0001	< .0001	< .0001
None		21.6 (19,070)	6.9 (6,054)	1.1 (987)	19.0 (16,765)
Present		19.0 (5,130)	5.3 (1,422)	0.3 (81)	17.3 (4,657)
Schiz/psychotic disorders	*p*	< .0001	< .0001	< .0001	< .0001
None		17.2 (12,485)	5.2 (3,751)	1.2 (872)	15.0 (10,873)
Present		27.5 (11,715)	8.7 (3,725)	0.5 (196)	24.7 (10,549)
Mood disorders	*p*	< .0001	< .0001	< .0001	< .0001
None		25.2 (13,806)	8.6 (4,722)	1.4 (760)	22.0 (12,046)
Present		17.2 (10,394)	4.6 (2,754)	0.5 (308)	15.5 (9,376)
Anxiety disorders	*p*	< .0001	< .0001	< .0001	< .0001
None		21.9 (22,485)	7.0 (7,159)	1.0 (1,018)	19.3 (19,835)
Present		13.5 (1,715)	2.5 (317)	0.4 (50)	12.5 (1,587)
Eating disorders	*p*	< .0001	< .0001	.23	< .0001
None		21.2 (24,074)	6.6 (7,455)	0.9 (1,061)	18.8 (21,307)
Present		7.3 (126)	1.2 (21)	0.4 (7)	6.7 (115)
Sleep disorders	*p*	.02	.11	.001	.06
None		21.0 (24,089)	6.5 (7,444)	0.9 (1,054)	18.6 (21,320)
Present		17.1 (111)	4.9 (32)	2.2 (14)	15.7 (102)
Impulse Control	*p*	< .0001	.002	.84	< .0001
None		20.9 (23,712)	6.5(7,315)	0.9 (1,049)	18.5 (20,989)
Present		24.9 (488)	8.2 (161)	1.0 (19)	22.1 (433)
Adjustment disorders	*p*	< .0001	< .0001	< .0001	< .0001
None		21.2 (23,450)	6.6 (7,306)	1.0 (1,054)	18.7 (20,729)
Present		16.0 (750)	3.6 (170)	0.3 (14)	14.8 (693)
Personality disorders	*p*	.27	.008	< .0001	.74
None		21.0 (21,635)	6.6 (6,738)	1.0 (1,035)	18.6 (19,096)
Present		20.6 (2,565)	5.9 (738)	0.3 (33)	18.7 (2,326)

Table 6.7 Control Intervention by Mental Health Clinical RAI-Mental Health Scales, Ontario 2006 - 2010

		Any CI	Mech/Phys	Chair	ACM
		N = 24,200	N = 7,476	N = 1,068	N = 21,422
		% (n)	% (n)	% (n)	% (n)
Activities of Daily Living Hierarchy (ADL)	*p*	< .0001	< .0001	< .0001	< .0001
None		17.8 (17,061)	4.6 (4,361)	0.1 (133)	16.2 (15,507)
1-2		32.6 (4,250)	12.4 (1,621)	0.9 (113)	29.1 (3,801)
3-4		41.0 (2,273)	20.3 (1,124)	9.6 (533)	32.0 (1,773)
5-6		52.7 (616)	31.6 (370)	24.7 (289)	29.2 (341)
Aggressive Behaviour	*p*	< .0001	< .0001	< .0001	< .0001
None		11.4 (9,179)	1.7 (1,343)	0.3 (202)	10.3 (8,286)
1 - 2		27.6 (3,699)	6.7 (896)	1.0 (134)	24.3 (3,254)
3-4		38.3 (3,720)	12.5 (1,212)	1.9 (189)	33.1 (3,219)
5-12		65.0 (7,602)	34.4 (4,025)	4.6 (543)	57.0 (6,663)
Anhedonia	*p*	.03	< .0001	.98	.002
None		20.8 (9,019)	7.0 (3,019)	0.9 (404)	18.1 (7,850)
1-2		21.0 (2,626)	6.0 (755)	0.9 (113)	18.7 (2,340)
3-4		21.9 (3,440)	6.6 (1,046)	1.0 (149)	19.4 (3,061)
5-12		20.8 (9,115)	6.1 (2,656)	0.9 (402)	18.7 (8,171)
Cognitive Performance Scale	*p*	< .0001	< .0001	< .0001	< .0001
None		14.2 (9,914)	3.5 (2,416)	0.1 (85)	12.7 (8,898)
1-2		26.6 (9,130)	7.6 (2,622)	0.4 (140)	24.2 (8,301)
3-4		43.0 (3,110)	18.0 (1,299)	3.8 (271)	37.2 (2,691)
5-6		52.2 (2,046)	29.1 (1,139)	14.6 (572)	39.1 (1,532)
Depressive Severity Index	*p*	<.0001	< .0001	< .0001	< .0001
None		22.8 (6,565)	8.1 (2,345)	1.2 (353)	19.9 (5,743)
1-2		21.5 (4,996)	6.7 (1,552)	1.0 (228)	18.9 (4,382)
3-5		21.4 (6,884)	6.8 (2,194)	1.0 (338)	19.0 (6,095)
6-15		18.5 (5,755)	4.4 (1,385)	0.5 (149)	16.7 (5,202)
Instrumental Activities of Daily Living	*p*	<.0001	< .0001	< .0001	< .0001
None		14.5 (8,872)	3.8 (2,343)	0.1 (68)	13.0 (7,975)
1-2		22.4 (2,815)	5.9 (6.90)	0.2 (19)	20.5 (2,574)
3-5		25.2 (2,705)	6.9 (741)	0.2 (16)	23.0 (2,469)
6-30		31.9 (9,808)	11.9 (3,649)	3.1 (965)	27.4 (8,404)

Table 6.7 Control Intervention by RAI-Mental Health Scales, Ontario 2006 - 2010 cont.

		Any CI	Mech/Phys	Chair	ACM
		N = 24,200	N = 7,476	N = 1,068	N = 21,422
		% (n)	% (n)	% (n)	% (n)
Mania	*p*	<.0001	< .0001	< .0001	< .0001
None		9.9 (4,780)	1.7 (831)	0.4 (198)	8.7 (4,197)
1-2		15.9 (3,366)	3.7 (782)	0.8 (178)	13.9 (2,943)
3-5		24.8 (5,167)	7.3 (1,519)	1.3 (279)	21.8 (4,542)
6-20		43.2 (10,887)	17.2 (4,344)	1.6 (413)	38.7 (9,740)
Positive Sign/Symptoms (PSS Short)	*p*	<.0001	< .0001	< .0001	< .0001
None		12.4 (7,191)	3.0 (1,738)	0.7 (383)	10.8 (6,280)
1-2		20.3 (2,742)	5.2 (701)	1.1 (143)	17.9 (2,420)
3-8		30.1 (11,402)	10.6 (3,871)	1.3 (470)	27.7 (10,147)
9-12		41.4 (2,865)	16.8 (1,166)	1.0 (72)	37.2 (2,575)
Risk of Harm (RHO)	*p*	<.0001	< .0001	< .0001	< .0001
None		9.0 (2,593)	1.3 (380)	0.3 (84)	8.0 (2,305)
1-2		13.9 (6,919)	2.6 (1307)	0.5 (223)	12.4 (6,160)
3-4		31.1 (6,436)	9.4 (1,942)	1.3 (275)	27.5 (5,693)
5-6		51.3 (8,252)	23.9 (3,847)	3.0 (486)	45.1 (7,264)
Self Care Index (SCI)	*p*	<.0001	< .0001	< .0001	< .0001
None		8.1 (2,248)	1.3 (369)	0.1 (25)	7.4 (2,034)
1-2		19.6 (10,485)	5.8 (3,092)	1.0 (534)	17.1 (9,181)
3-4		25.4 (5,092)	7.4 (1,475)	1.0 (200)	22.3 (4,471)
5-6		45.2 (6,375)	18.0 (2,540)	2.2 (309)	40.7 (5,736)
Severity of Self-harm (SoS)	*p*	<.0001	< .0001	< .0001	< .0001
None		11.0 (2,528)	2.6 (606)	0.1 (31)	20.0 (2,237)
1-2		25.4 (11,872)	8.4 (3,946)	1.4 (671)	22.0 (10,296)
3-4		25.9 (5,056)	9.0 (1,764)	1.5 (301)	23.4 (4,561)
5-6		18.2 (4,744)	4.5 (1,160)	0.3 (65)	16.6 (4,328)

Table 6.8 Control Intervention by Other Health Condition Characteristics, Ontario 2006 – 2010

		Any CI	Mech/Phys	Chair	ACM
		N = 24,200	N = 7,476	N = 1,068	N = 21,422
		% (n)	% (n)	% (n)	% (n)
Hearing	*p*	< .0001	< .0001	< .0001	< .0001
Adequate		20.8 (23,045)	6.3 (7,023)	0.7 (801)	18.3 (20,505)
Min. difficulty		24.2 (784)	9.2 (297)	5.0 (163)	19.4 (629)
Hears in sp. situations		32.3 (192)	13.5 (80)	10.3 (61)	24.9 (148)
Highly impaired		28.6 (179)	12.1 (76)	6.9 (43)	22.3 (140)
Vision	*p*	< .0001	< .0001	< .0001	< .0001
Adequate		20.7 (22,537)	6.3 (6,886)	0.7 (738)	18.5 (20,083)
Impaired		23.8 (1,123)	8.0 (377)	4.3 (202)	19.5 (919)
Mod impaired		24.6 (336)	9.1 (125)	4.7 (64)	19.7 (270)
Highly impaired		35.3 (115)	12.3 (40)	10.7 (35)	26.7 (87)
Severely impaired		34.8 (89)	18.8 (48)	11.3 (29)	24.6 (63)
Making self understood	*p*	< .0001	< .0001	.0001	< .0001
Understood		18.0 (17,459)	5.1 (4,941)	0.3 (323)	16.1 (15,606)
Usually		33.7 (3,740)	10.5 (1,168)	1.7 (191)	30.4 (3,381)
Often		38.9 (1,234)	15.3 (486)	4.6 (145)	33.3 (1,058)
Sometimes		44.3 (1,364)	20.6 (636)	9.1 (280)	35.1 (1,080)
Rarely		49.1 (403)	29.8 (245)	15.7 (129)	36.2 (297)
Intellectual disability	*p*	< .0001	< .0001	< .0001	< .0001
No intellectual disability		20.7 (22,898)	6.3 (7,009)	0.9 (997)	18.3 (20,284)
Present		28.5 (1,302)	10.2 (467)	1.6 (71)	24.9 (1,138)
Falls	*p*	< .0001	< .0001	< .0001	.001
No falls		20.7 (22,665)	6.3 (6,874)	0.7 (769)	18.5 (20,206)
Falls		25.4 (1,535)	10.0 (602)	5.0 (299)	20.2 (1,216)

Table 6.8 Control Intervention by Other Health Condition Characteristics Fiscal Year, Ontario 2006 – 2010 cont.

		Any CI	Mech/Phys	Chair	ACM
		N = 24,200	N = 7,476	N = 1,068	N = 21,422
		% (n)	% (n)	% (n)	% (n)
Alzheimer's/Dementia/other related disorders (ADRD)					
	p	< .0001	< .0001	< .0001	< .0001
None		20.1 (21,613)	5.8 (6,275)	0.3 (314)	18.1 (19,519)
Present		33.5 (2,587)	15.6 (1,201)	9.8 (754)	24.7 (1,903)
Cerebral Palsy	*p*	.14	.33	.003	.03
None		21.0 (24,160)	6.5 (7,463)	0.9	18.6 (21,383)
Present		25.8 (40)	8.4 (13)	3.2 (5)	25.2 (39)
Epilepsy	*p*	.30	< .0001	< .0001	.81
None		21,9 (24,005)	6.5 (7,389)	0.9 (1,048)	18.6 (21,263)
Present		22.4 (195)	10.0 (87)	2.3 (20)	18.3 (159)
Huntington's	*p*	< .0001	< .0001	< .0001	.002
None		21.0 (24,149)	6.5 (7,449)	0.9 (1,058)	18.6 (21,384)
Present		39.2 (51)	20.8 (27)	7.7 (10)	29.2 (38)
Multiple sclerosis	*p*	.06	.24	.04	.08
None		21.0 (24,165)	6.5 (7,466)	0.9 (1,063)	18.6 (21,391)
Present		15.8 (35)	4.5 (10)	2.3 (5)	14.0 (31)
Parkinson's	*p*	.13	.02	< .0001	.19
None		21.0 (24,049)	6.5 (7,419)	0.9 (1,031)	18.6 (21,315)
Present		23.4 (151)	8.8 (57)	5.7 (34)	16.6 (107)
Stroke	*p*	.0007	< .0001	< .0001	.35
None		21.0 (24,093)	6.5 (7,425)	0.9 (1,023)	18.6 (21,344)
Present		28.0 (107)	13.4 (51)	11.8 (45)	20.4 (78)
Traumatic Brain Injury	*p*	.003	.15	.84	.02
None		21.0 (24,144)	6.5 (7,459)	0.9 (1,066)	18.6 (21,375)
Present		29.8 (56)	9.0 (17)	1.1 (2)	25.0 (47)
Any Neuro	*p*	<.0001	< .0001	< .0001	< .0001
None		20.1 (21,530)	5.8 (6,245)	0.3 (314)	18.2 (19,450)
Present		31.5 (2,670)	14.5 (1,231)	8.9 (754)	23.2 (1,972)

Table 6.9 Multivariate Logistic Regression Model Analysis of Any Mechanical/Physical Restraint Use with Adult Mental Health Inpatients in Ontario (N = 115,384)

	MP		
	Parameter Estimate (SE)	Odds Ratio (95%CI)	*p*
Sociodemographic			
Age			
18-24 (REF)		1.00	-
25-34	-0.13 (0.05)	0.88 (0.81 – 0.96)	.005
35-44	-0.26 (0.05)	0.77 (0.70 – 0.85)	< .0001
45-54	-0.40 (0.05)	0.67 (0.61 – 0.73)	< .0001
55-64	-0.68 (0.06)	0.50 (0.45 – 0.57)	< .0001
65-74	-0.78 (0.07)	0.46 (0.39 – 0.53)	< .0001
75-84	-0.80 (0.09)	0.45 (0.38 – 0.53)	< .0001
85+	-0.57 (0.11)	0.57 (0.46 – 0.71)	< .0001
Sex			
Male (REF)		1.00	-
Female	-0.15 (0.03)	0.86 (0.81 – 0.91)	< .0001
Marital Status			
Not partnered (REF)		1.00	-
Partnered	0.09 (0.36)	1.10 (1.02 – 1.18)	.01
Language			
English		1.00	-
Other	0.16 (0.06)	1.18 (1.05 – 1.31)	.005
Income			
Income		1.00	-
No income	0.09 (0.04)	1.10 (1.01 – 1.20)	.03
Living arrangement			
Family/alone		1.00	-
Group	-0.16 (0.04)	0.85 (0.78 – 0.93)	.0001
Residence Stability			
Not temporary (REF)		1.00	-
Temporary	0.13 (0.03)	1.14 (1.07 – 1.22)	< .0001
Homeless	-0.04 (0.122)	0.96 (0.76 – 1.14)	.75
MH Service Use Characteristics			
Amount of time in hospital			
None (REF)		1.00	-
≤ 31 days	0.06 (0.03)	1.07 (1.00 – 1.14)	.05
31 days to 1 year	-0.16 (0.04)	0.85 (0.79 – 0.92)	< .0001
≥ 1 year	-0.04 (0.09)	0.96 (0.80 – 1.15)	.64
Police intervention			
Never (REF)		1.00	-
> 1 week	-0.06 (0.04)	0.94 (0.88 – 1.01)	.09
In the last 7 days	0.17 (0.04)	1.18 (1.09 – 1.27)	< .0001

Table 6.9 Multivariate Logistic Regression Model For MP Use with Adult Mental Health Inpatients in Ontario (N = 115,384) cont.

	MP		
	Parameter Estimate (SE)	Odds Ratio (95%CI)	*p*
MH Clinical Characteristics			
Inpatient status at time of assess			
Voluntary (REF)		1.00	-
Informal	0.51 (0.11)	1.68 (1.35 – 2.10)	< .0001
Involuntary	0.89 (0.04)	2.42 (2.23 – 2.62)	< .0001
Psychiatric assessment	0.93 (0.04)	2.51 (2.31 – 2.73)	< .0001
Forensic	1.01 (0.27)	2.73 (1.62 – 4.60)	.0002
Other	0.53 (0.29)	1.70 (0.95 – 3.02)	.07
Current inpatient type			
Acute (REF)		1.00	-
Longer term	-0.52 (0.06)	0.60 (0.53 – 0.67)	< .0001
Psychogeriatric	0.04 (0.08)	1.05 (0.91 – 1.22)	.51
Forensic	-0.84 (0.27)	0.43 (0.26 – 0.74)	.002
Capacity/Competency			
Consent for treatment (REF)		1.00	-
Incapable	0.14 (0.05)	1.15 (1.04 – 1.27)	.007
Consent to disclose health info		1.00	
Incapable	0.37 (0.06)	1.47 (1.30 – 1.66)	< .0001
Own decision-maker (REF)		1.00	
Substitute decision-maker	-0.18 (0.05)	0.84 (0.76 – 0.93)	.0005
Psychiatric diagnoses			
Substance use disorders			
None (REF)		1.00	-
Present	-0.14 (0.04)	0.87 (0.81 – 0.94)	.0002
Schizophrenia/other psychotic			
None (REF)		1.00	-
Present	-0.19 (0.04)	0.82 (0.76 – 0.89)	< .0001
Mood disorders			
None (REF)		1.00	-
Present	-0.24 (0.04)	0.79 (0.73 – 0.85)	< .0001
Anxiety disorders			
None (REF)		1.00	-
Present	-0.27 (0.07)	0.76 (0.67 – 0.87)	< .0001
Eating disorders			
None (REF)		1.00	-
Present	-0.92 (0.24)	0.40 (0.25 – 0.63)	< .0001
Adjustment disorders			
None (REF)		1.00	-
Present	-0.30 (0.09)	0.74 (0.62 – 0.88)	.0007
Personality disorders			
None (REF)		1.00	-
Present	0.13 (0.05)	1.14 (1.04 – 1.26)	.005

Table 6.9 Logistic Regression Model For MP Use with Adult Mental Health Inpatients in Ontario (N = 115,384) cont.

	MP		
	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	*p*
RAI-MH Scales*			
Activities of Daily Living Hierarchy (0 – 6)	0.18 (0.02)	See Figure 6.1	< .0001
ADL Hierarchy x CPS Scale (interaction term)	0.02 (0.006)	See Figure 6.1	.003
Aggressive Behaviour Scale (0 – 12)	0.26 (0.006)	1.30 (1.29 – 1.32)	< .0001
Anhedonia Scale (0 – 12)	-0.01 (0.004)	0.99 (0.98 – 1.00)	.002
Cognitive Performance Scale (0 – 6)	0.10 (0.01)	See Figure 6.1	< .0001
Depressive Severity Index (0 – 15)	-0.02 (0.005)	0.98 (0.97 – 0.99)	.0001 -
Mania (0 – 20)	0.04 (0.004)	1.05 (1.04 – 1.05)	< .0001
Risk of Harm to Others (0 – 6)	0.18 (0.01)	1.20 (1.17 – 1.22)	< .0001
Severity of Self-harm (0 – 6)	0.02 (0.01)	1.02 (1.00 – 1.04)	.02
Other Health Conditions			
Intellectual disability			
None (REF)		1.00	-
Present	-0.19 (0.06)	0.82 (0.73 – 0.93)	.002
Falls			
None (REF)		1.00	-
Present	0.35 (0.06)	1.41 (1.26 – 1.58)	< .0001
c –statistic = 0.88			

* Note for RAI-MH Scales, the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table).

Table 6.10 Multivariate Logistic Regression Model Analysis of Mechanical/Physical Restraint Use with Adult Mental Health Inpatients Stratified by Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846)

	Mechanical/Physical Restraint					
	Parameter	Male		Parameter	Female	
	Estimate (SE)	Odds Ratio (CI)	p	Estimate (SE)	Odds Ratio (CI)	p
Sociodemographic Characteristics						
Age						
18-24 (REF)		1.00	-		1.00	-
25-34	-0.17 (0.05)	0.85 (0.77 – 0.94)	.002	-0.30 (0.07)	0.74 (0.65 – 0.85)	< .0001
35-44	-0.33 (0.06)	0.72 (0.65 – 0.81)	< .0001	-0.36 (0.07)	0.70 (0.61 – 0.80)	< .0001
45-54	-0.44 (0.06)	0.65 (0.58 – 0.72)	< .0001	-0.51 (0.07)	0.60 (0.53 – 0.69)	< .0001
55-64	-0.60 (0.07)	0.55 (0.48 – 0.63)	< .0001	-0.83 (0,.08)	0.43 (0.37 – 0.51)	< .0001
65-74	-0.97 (0.09)	0.38 (0.32 – 0.45)	< .0001	-0.66 (0.09)	0.52 (0.43 – 0.62)	< .0001
75-84	-0.83 (0.10)	0.44 (0.36 – 0.53)	< .0001	0.72 (0.11)	0.49 (0.40 – 0.60)	< .0001
85+	-0.70 (0.14)	0.50 (0.38 – 0.65)	< .0001	-0.49 (0.14)	0.61 (0.47 – 0.80)	< .0001
Living arrangement						
Family/alone (REF)		1.00	-		1.00	-
Group	-0.28 (0.05)	0.76 (0.69 – 0.84)	< .0001	0.13 (0.06)	1.13 (1.01 – 1.27)	.03
MH Service Use Characteristics						
Amount of time in hospital						
None (REF)					1.00	-
< 31 days				0.24 (0.4)	1.28 (1.17 – 1.39)	< .0001
31 days to 1 year				0.09 (0.05)	1.10 (0.99 – 1.21)	.07
> 1 year				0.35 (0.12)	1.41 (1.11 – 1.80)	.005
Police intervention						
Never (REF)		1.00	-		1.00	-
> 1 week ago	-0.15 (0.04)	0.86 (0.79 – 0.93)	.0003	0.48 (0.54)	1.62 (1.46 – 1.80)	< .0001
In the last 7 days	0.24 (0.05)	1.28 (1.54 – 1.41)	< .0001	0.92 (0.05)	2.50 (2.25 – 2.78)	< .0001

Table 6.10 Multivariate Logistic Regression Model Analysis of Mechanical/Physical Restraint Use with Adult Mental Health Inpatients By Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Mechanical/Physical Restraint					
	Parameter	Male		Parameter	Female	
	Estimate (SE)	Odds Ratio (CI)	p	Estimate (SE)	Odds Ratio (CI)	p
MH Clinical Characteristics						
Inpatient status at time of assess						
Voluntary (REF)					1.00	-
Informal				1.08 (0.15)	2.94 (2.18 – 4.00)	< .0001
Involuntary				1.61 (0.05)	5.00 (4.48 -5.55)	< .0001
Psychiatric assessment				1.49 (0.06)	4.46 (3.99 – 5.00)	< .0001
Forensic				1.03 (0.50)	2.81 (1.06 – 7.47)	.04
Other				0.54 (0.53)	1.72 (0.61 – 4.85)	.30
Current inpatient type						
Acute (REF)					1.00	-
Longer term				-0.53 (0.08)	0.59 (0.50 – 0.69)	< .0001
Psychogeriatric				0.11 (0.10)	1.11 (0.92 – 1.35)	.27
Forensic				-0.46 (0.51)	0.63 (0.24 – 1.70)	.36
Capacity/Competency						
Consent for treatment (REF)		1.00	-		1.00	-
Incapable	0.23 (0.06)	1.26 (1.23 – 1.42)	.008	0.24 (0.06)	1.28 (1.13 – 1.45)	.0001
Consent to disclose health info		1.00			1.00	-
Incapable	0.32 (0.08)	1.38 (1.19 – 1.60)	< .0001	0.31 (0.08)	1.36 (1.16 – 1.61)	.0002
Psychiatric diagnoses						
Substance Disorder						
None (REF)		1.00	-		1.00	-
Present	-0.10 (0.04)	0.91 (0.83 – 0.98)	< .0001	-0.29 (0.06)	0.75 (0.67 – 0.84)	< .0001
Anxiety disorders						
None (REF)		1.00	-			
Present	-0.52 (0.09	0.59 (0.49 – 0.71)	< .0001			
Mood disorders						
None (REF)					1.00	-
Present				-0.27 (0.04)	0.77 (0.71 – 0.83)	< .0001

Table 6.10 Multivariate Logistic Regression Model Analysis of Mechanical/Physical Restraint Use with Adult Mental Health Inpatients By Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Mechanical/Physical Restraint					
	Parameter	Male		Parameter	Female	
	Estimate (SE)	Odds Ratio (CI)	p	Estimate (SE)	Odds Ratio (CI)	p
Psychiatric diagnoses cont.						
Eating disorders						
None (REF)					1.00	-
Present				-1.70 (0.28)	0.18 (0.10 – 0.32)	< .0001
Adjustment disorders						
None (REF)		1.00	-		1.00	-
Present	-0.44 (0.13)	0.64 (0.50 – 0.82)	.0004	-0.45 (0.11)	0.64 (0.52 – 0.80)	< .0001
RAI-MH Scales						
Activities of Daily Living Hierarchy (0 – 6)	0.30 (0.02)	1.36 (1.31 – 1.40)	< .0001	0.44 (0.02)	1.56 (1.51 – 1.60)	< .0001
Anhedonia Scale (0 – 12)	-0.03 (0.005)	0.97 (0.96 – 0.98)	< .0001	-0.03 (0.005)	0.97 (0.96 – 0.98)	< .0001
CPS (0 – 6)	-0.03 (0.005)	1.26 (1.22 – 1.29)	< .0001			
Depressive Severity Index (0 – 15)	-0.03 (0.006)	0.78 (0.96 – 0.99)	< .0001	-0.01 (0.006)	0.99 (0.98 – 1.00)	0.03
Risk of Harm to Others (0 – 6)	0.48 (0.01)	1.62 (1.59 –	< .0001			
Severity of Self-harm (0 – 6)				0.06 (0.01)	1.07 (1.04 – 1.09)	< .0001

Table 6.10 Multivariate Logistic Regression Model Analysis of Mechanical/Physical Restraint Use with Adult Mental Health Inpatients By Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Mechanical/Physical Restraint					
	Parameter	Male		Parameter	Female	
	Estimate (SE)	Odds Ratio (CI)	p	Estimate (SE)	Odds Ratio (CI)	p
Other Health Conditions						
Intellectual Disability						
None (REF)		1.00	-			
Present	-0.50 (0.08)	0.61 (0.52 – 0.71)	< .0001			
Falls						
None (REF)		1.00	-		1.00	-
Present	0.27 (0.07)	1.31 (1.13 – 1.51)	.0003	0.39 (0.07)	1.47 (1.28 – 1.70)	< .0001
c		0.83			0.80	
Hosmer-Lemeshow	χ^2= 12.93, d.f. = 8		*p* = .11	χ^2= 12.36, d.f.= 8		*p* = .14

Table 6.11 Multivariate Logistic Regression Model Analysis of Chair Prevents Rising Use with Adult Mental Health Inpatients in Ontario (N = 115,384)

	Chair		
	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	*p*
Sociodemographic Characteristics			
Age			
18-24 (REF)		1.00	-
25-34	0.08 (0.26)	1.09 (.065 – 1.80)	.75
35-44	0.07 (0.25)	1.08 (0.66 – 1.77)	.77
45-54	0.40 (0.23)	1.49 (0.95 – 2.33)	.08
55-64	0.60 (0.22)	1.82 (1.17 – 2.83)	.008
65-74	0.69 (0.23)	2.00 (1.28 – 3.10)	.002
75-84	0.95 (0.22)	2.60 (1.65 – 4.19)	< .0001
85+	0.97 (0.24)	2.63 (1.65 – 4.19)	< .0001
Admitted from LTCH			
Other (REF)		1.00	-
LTCH	-0.43 (0.08)	1.32 (1.11 – 1.58)	< .0001
MH Service Use Characteristics			
# of MH admits recent			
None (REF)		1.00	-
One or more	-0.38 (0.08)	0.65 (0.56 – 0.76)	< .0001
MH Clinical Characteristics			
Inpatient status at time of assessment			
Voluntary (REF)		1.00	-
Informal	0.30 (0.15)	1.34(1.01 – 1.79)	.04
Involuntary	-0.31 (0.09)	0.73 (0.61 – 0.88)	.0006
Psychiatric assessment	-0.29 (0.11)	0.74 (0.60 – 0.92)	.007
Forensic	-1.25 (0.79)	0.29 (0.06 – 1.36)	.11
Other	0.07 (0.49)	1.03 (0.39 – 2.64)	.89
Current inpatient type			
Acute (REF)		1.00	-
Longer term	-0.18 (0.14)	0.84 (0.63 – 1.10)	.20
Psychogeriatric	0.55 (0.09)	1.74 (1.45 – 2.10)	< .0001
Forensic	0.64 (0.74)	1.96 (0.45 – 8.34)	.39
Capacity/Competency			
Own decision-maker (REF)		1.00	
Substitute decision-maker	0.46 (0.09)	1.58 (1.33 – 1.88)	< .0001

Table 6.11 Multivariate Logistic Regression Model For Chair Use with Adult Mental Health Inpatients in Ontario (N = 115,384) cont.

	Chair		
	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	*p*
RAI-MH Scales*			
Activities of Daily Living Hierarchy (0 – 6)	0.48 (0.030	1.62 (1.53 – 1.72)	< .0001
Aggressive Behaviour Scale (0 – 12)	0.08 (0.01)	1.09 (1.06 – 1.12)	< .0001
Cognitive Performance Scale (0 – 6)	0.19 (0.03)	1.21 (1.15 – 1.28)	< .0001
Depressive Severity Index (0 – 15)	-0.05 (0.01)	0.96 (0.93 – 0.98)	.0002
Instrumental Activities of Daily Living (0 – 42)	0.04 (0.006)	1.04 (1.03 – 1.06)	< .0001
Mania (0 – 20)	0.03 (0.01)	1.03 (1.01 – 1.06)	.004
Risk of Harm to Others (0 – 6)	0.09 (0.03)	1.10 (1.05 – 1.15)	.0002
Other Health Conditions			
Intellectual disability			
None (REF)		1.00	-
Present	-0.49 (0.14)	0.61 (0.49 – 0.87)	.0006
Falls			
None (REF)		1.00	-
Present	0.70 (0.09)	2.01 (1.70 – 2.39)	< .0001
c-statistic = 0.94			

* Note for RAI-MH Scales, the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table).

Table 6.12 Multivariate Logistic Regression Model Analysis of Acute Control Medication Use with Adult Mental Health Inpatients in Ontario (N = 115,384)

	Acute Control Medication		
	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	p
Sociodemographic Characteristics			
Age			
18-24 (REF)		1.00	-
25-34	0.008 (0.03)	1.01 (0.95 – 1.07)	.79
35-44	-0.06 (0.03)	0.95 (0.89 – 1.01)	.08
45-54	-0.14 (0.03)	0.88 (0.82 – 0.94)	< .0001
55-64	-0.31 (0.04)	0.74 (0.69 – 0.80)	< .0001
65-74	-0.67 (0.05)	0.52 (0.47 – 0.58)	< .0001
75-84	-0.79 (0.07)	0.46 (0.40 – 0.53)	< .0001
85+	-0.79 (0.10)	0.46 (0.38 – 0.55)	< .0001
Residence Stability			
Not temporary (REF)		1.00	-
Temporary	0.14 (0.02)	1.15 (1.10 – 1.19)	< .0001
Homeless	0.15 (0.08)	1.16 (0.99 – 1.35)	.06
MH Service Use Characteristics			
Age at first hospitalization			
0-24 years (REF)		1.00	-
25-44 years	-0.06 (0.02)	0.94 (0.91 –0.98)	.005
44-64 years	-0.10 (0.03)	0.90 (0.95 – 0.96)	.002
65 years +	0.15 (0.06)	1.17 (1.04 – 1.31)	.01
Police intervention			
Never (REF)		1.00	-
> 1 week ago	0.08 (0.02)	1.08 (1.04 – 1.13)	.0004
In the last 7 days	0.15 (0.03)	1.17 (1.11 – 1.24)	< .0001
MH Clinical Characteristics			
Inpatient status at time of assess			
Voluntary (REF)		1.00	-
Informal	0.26 (0.08)	1.29 (1.11 – 1.50)	.0009
Involuntary	0.44 (0.02)	1.55 (1.48 – 1.62)	< .0001
Psychiatric assessment	0.50 (0.02)	1.65 (1.58 – 1.73)	< .0001
Forensic	-0.30 (0.18)	0.75 (0.52 – 1.07)	.11
Other	0.09 (0.18)	1.10 (0.77 – 1.57)	.62
Current inpatient type			
Acute (REF)		1.00	-
Longer term	-0.72 (0.04)	0.49 (0.45 – 0.52)	< .0001
Psychogeriatric	0.07 (0.05)	1.05 (0.94 – 1.17)	.21
Forensic	-0.62 (0.18)	0.54 (0.38 – 0.77)	.0008
Capacity/Competency			
Consent for treatment (REF)		1.00	-
Incapable	-0.12 (0.03)	0.89 (0.84 – 0.95)	.0007
Own decision-maker (REF)		1.00	
Substitute decision-maker	0.15 (0.03)	1.15 (1.08 – 1.23)	< .0001

Table 6.12 Multivariate Logistic Regression Model For ACM Use with Adult Mental Health Inpatients in Ontario (N = 115,384) cont.

	Acute Control Medication		
	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	*p*
Psychiatric diagnoses			
Substance disorders			
None (REF)		1.00	-
Present	0.06 (0.02)	1.06 (1.01 – 1.10)	.01
Schizophrenia and other psychotic			
None (REF)		1.00	-
Present	0.10 (0.02)	1.11 (1.07 – 1.16)	< .0001
Anxiety disorders			
None (REF)		1.00	-
Present	0.07 (0.03)	1.08 (1.01 – 1.14)	.02
Eating disorders			
None (REF)		1.00	-
Present	-0.51 (0.10)	0.60 (0.49 – 0.74)	< .0001
Impulse disorders			
None (REF)		1.00	-
Present	0.14 (0.06)	1.15 (1.02 – 1.31)	.02
RAI-MH Scales*			
Activities of Daily Living Hierarchy			
(0 – 6)	0.03 (0.02)	See Figure 6.4	.05
ADLxCPS			
Interaction term	-0.02 (0.005)	See Figure 6.4	< .0001
Aggressive Behaviour Scale			
(0 – 12)	0.18 (0.004)	1.19 (1.18 – 1.20)	< .0001
Cognitive Performance Scale			
(0 – 6)	0.14 (0.001)	See Figure 6.4	< .0001
Instrumental Activities of Daily Living			
(0 – 42)	0.009 (0.002)	1.01 (1.00 – 1.01)	< .0001
Mania			
(0 – 20)	0.06 (0.002)	1.06 (1.06 – 1.07)	< .0001
Positive Signs and Symptoms –Short			
(0 -12)	0.01 (0.004)	1.01 (1.01 – 1.02)	.0002
Risk of Harm to Others			
(0 – 6)	0.12 (0.006)	1.13 (1.12 – 1.14)	< .0001
Self-Care Index			
(0 – 6)	0.05 (0.007)	1.06 (1.04 – 1.07)	< .0001
Severity of Self-harm			
(0 – 6)	0.05 (0.005)	1.05 (1.04 – 1.06)	< .0001
Other Health Conditions			
Intellectual disability			
None (REF)		1.00	-
Present	-0.12 (0.04)	0.89 (0.82 – 0.97)	.003
Falls			
None (REF)		1.00	-
Present	0.10 (0.04)	1.11 (1.03 – 1.19)	.007
c-statistic = 0.79			

* Note for RAI-MH Scales, the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table).

Table 6.13 Multivariate Logistic Regression Model Analysis of Acute Control Medication Use with Adult Mental Health Inpatients By Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846)

	Acute Control Medication					
	Parameter	Male		Parameter	Female	
	Estimate (SE)	Odds Ratio (CI)	p	Estimate (SE)	Odds Ratio (CI)	p
Sociodemographic Characteristics						
Age						
18-24 (REF)		1.00	-		1.00	-
25-34	-0.01 (0.04)	0.99 (0.92 – 1.07)	.84	-0.07 (0.05)	0.93 (0.85 – 1.02)	.52
35-44	-0.12 (0.04)	0.90 (0.83 – 0.97)	.009	-0.91 (0.04)	0.91 (0.84 – 1.00)	.53
45-54	-0.14 (0.04)	0.87 (0.80 – 0.95)	.002	-0.19 (0.04)	0.82 (0.76 – 0.90)	.02
55-64	-0.27 (0.05)	0.77 (0.69 – 0.85)	< .0001	-0.34 (0.05)	0.72 (0.65 – 0.79)	< .0001
65-74	-0.61 (0.08)	0.55 (0.47 – 0.64)	< .0001	-0.55 (0.06)	0.58 (0.51 – 0.65)	< .0001
75-84	-0.66 (0.10)	0.53 (0.43 – 0.64)	< .0001	-0.61 (0.07)	0.55 (0.47 – 0.63)	< .0001
85+	-0.63 (0.14)	0.54 (0.41 – 0.71)	< .0001	-0.60 (0.11)	0.55 (0.45 – 0.68)	< .0001
Residence Stability						
Not temporary (REF)		1.00	-		1.00	-
Temporary	0.09 (0.03)	1.09 (1.04 – 1.15)	.0005	0.15 (0.03)	1.16 (1.09 – 1.22)	< .0001
Homeless	0.22 (0.09)	1.24 (1.03 – 1.50)	.02	0.31 (0.13)	1.37 (1.07 – 1.75)	.01
MH Service Use Characteristics						
Age at first hospitalization						
0-24 years (REF)		1.00	-			
25-44 years	-0.05 (0.03)	0.95 (0.90 – 1.00	.09			
45-64 years	-0.16 (0.05)	0.85 (0.77 – 0.93)	.0005			
65 years +	0.10 (0.09)	1.10 (0.93 – 1.37)	.28			
Police intervention						
Never (REF)		1.00	-		1.00	-
> 1 week ago	0.04 (0.03)	1.04 (0.99 – 1.10)	.12	0.02 (0.03)	1.02 (0.94 – 1.08)	.75
In the last 7 days	0.24 (0.04)	1.27 (1.18 – 1.36)	< .0001	0.18 (0.04)	1.20 (1.11 – 1.31)	< .0001

Table 6.13 Adjusted Multivariate Logistic Regression Model Analysis of Acute Control Medication Use with Adult Mental Health Inpatients By Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Acute Control Medication					
	Parameter Estimate (SE)	Male Odds Ratio	*p*	Parameter Estimate (SE)	Female Odds Ratio (CI)	*p*
MH Clinical Characteristics						
Inpatient status at time of assessment						
Voluntary (REF)		1.00	-		1.00	-
Informal	0.44 (0.10)	1.55 (1.28 – 1.88)	< .0001	0.26 (0.11)	1.29 (1.04 – 1.59)	.02
Involuntary	0.68 (0.03)	1.98 (1.87 – 2.09)	< .0001	0.53 (0.03)	1.71 (1.61 – 1.81)	< .0001
Psychiatric assessment	0.74 (0.03)	2.10 (1.98 – 2.23)	< .0001	0.57 (0.03)	1.77 (1.67 – 1.88)	< .0001
Forensic	-0.77 (0.08)	0.47 (0.40 – 0.54)	< .0001	-0.32 (0.15)	0.73 (0.54 – 0.97)	.03
Other	0.20 (0.22)	1.22 (0.80 – 1.87)	.36	-0.03 (0.30)	0.96 (0.53 – 1.74)	.89
Capacity/Competency						
Own decision-maker (REF)					1.00	-
Substitute decision-maker				0.12 (0.04)	1.12 (1.03 – 1.21)	.008
Psychiatric diagnoses						
Schizophrenia and other psychotic						
None (REF)		1.00	-		1.00	-
Present	0.03 (0.002)	1.18 (1.13 – 1.24)	< .0001	0.10 (0.03)	1.10 (1.04 – 1.16)	.001
Eating disorders						
None (REF)					1.00	-
Present				-0.65 (0.11)	0.52 (0.42 – 0.64)	< .0001
RAI-MH Scales						
Cognitive Performance Scale (0 – 6)				0.18 (0.01)	1.20 (1.17 – 1.22)	< .0001
Instrumental Activities of Daily Living (0 – 42)	0.03 (0.002)	1.04 (1.03 – 1.04)	< .0001	0.01 (0.002)	1.01 (1.01 – 1.02)	< .0001
Mania (0 – 20)				0.09 (0.003)	1.10 (1.09 – 1.10)	< .0001

Table 6.13 Adjusted Multivariate Logistic Regression Model Analysis of Acute Control Medication Use with Adult Mental Health Inpatients By Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Acute Control Medication					
	Parameter	Male		Parameter	Female	
	Estimate (S.E)	Odds Ratio (CI)	*p*	Estimate (S.E.)	Odds Ratio (CI)	*p*
RAI-MH Scales cont.						
Positive Signs and Symptoms –Short (0 -12)						
None (REF)					1.00	-
> 0				0.03 (0.005)	1.03 (1.02 – 1.04)	< .0001
Risk of Harm to Others (0 – 6)						
None (REF)		1.00	-		1.00	-
> 0	0.32 (0.007)	1.38 (1.36 – 1.40)	< .0001	0.23 (0.008)	1.25 (1.24 – 1.27)	< .0001
Severity of Self-harm (0 – 6)						
None (REF)		1.00	-		1.00	-
> 0	0.04 (0.007)	1.04 (1.03 – 1.06)	< .0001	0.07 (0.007)	1.07 (1.05 – 1.08)	< .0001
Other Health Conditions						
Intellectual disability						
None (REF)		1.00	-			
Present	-0.19 (0.05)	0.83 (0.75 – 0.92)	.0006			
Falls						
None (REF)		1.00	-			
Present	0.20 (0.05)	1.23 (1.10 – 1.36)	.0001			
c		0.75			0.77	
Hosmer-Lemeshow		χ^2= 10.57, d.f. = 8	*p* = .23		χ^2= 12.78, d.f.= 8	*p* = .12

Table 6.14 Multivariate Logistic Regression Model For Any Control Intervention (MP/Chair/ACM) Use with Adult Mental Health Inpatients in Ontario (N = 115,384)

	Any CI		
	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	*p*
Sociodemographic			
Age			
18-24 years (REF)		1.00	-
25-34 years	0.003 (0.03)	1.00 (0.95 – 1.06)	.93
35-44 years	-0.003 (0.03)	0.94 (0.88 – 1.00)	.51
45-54 years	-0.06 (0.03)	0.84 (0.78 – 0.89)	< .0001
55-64 years	-0.18 (0.03)	0.69 (0.64 – 0.74)	< .0001
65-74 years	-0.38 (0.04)	0.48 (0.44 – 0.54)	< .0001
75-84 years	-0.72 (0.05)	0.46 (0.41 – 0.53)	< .0001
85 years +	-0.77 (0.07)	0.52 (0.43 – 0.62)	< .0001
Sex			
Male (REF)		1.00	-
Female	-0.06 (0.02)	0.93 (0.90 – 0.97)	.001
Residence Stability			
Not temporary (REF)		1.00	-
Temporary	0.14 (0.02)	1.14 (1.10 – 1.19)	< .0001
Homeless	0.09 (0.08)	1.10 (0.94 – 1.28)	.25
MH Service Use Characteristics			
Amount of time in hospital			
None (REF)		1.00	-
≤ 31 days	0.07 (0.02)	1.07 (1.03 – 1.11)	.0005
> 31 days and < 1 year	0.007 (0.02)	1.01 (0.96 – 1.05)	.81
≥ 1 year	0.09 (0.06)	1.10 (0.98 – 1.23)	.11
Age at first hospitalization			
0-24 years (REF)		1.00	-
25-44	-0.06 (0.02)	0.94 (0.90 – 0.98)	.005
45-64 years	-0.06 (0.03)	0.94 (0.88 – 1.00)	.06
65 years +	0.18 (0.06)	1.21 (1.07 – 1.35)	.002
Police Intervention			
None (REF)		1.00	-
> 1 week ago	0.05 (0.02)	1.06 (1.01 – 1.10)	.01
In the last 7 days	0.15 (0.03)	1.16 (1.09 – 1.22)	< .0001
MH Clinical Characteristics			
Inpatient status at time of assess			
Voluntary (REF)		1.00	-
Informal	0.36 (0.07)	1.43 (1.24 – 1.65)	< .0001
Involuntary	0.48 (0.02)	1.62 (1.55 – 1.69)	< .0001
Psychiatric assessment	0.54 (0.02)	1.71 (1.64 – 1.78)	< .0001
Forensic	-0.12 (0.17)	0.89 (0.63 – 1.25)	.49
Other	0.20 (0.17)	1.22 (0.87 – 1.72)	.25
Current inpatient type			
Acute (REF)		1.00	-
Longer term	-0.74 (0.03)	0.47 (0.44 – 0.51)	< .0001
Psychogeriatric	0.08 (0.05)	1.09 (0.98 – 1.21)	.12
Forensic	-0.62 (0.17)	0.54 (0.38 – 0.75)	.0004

Table 6.14 Multivariate Logistic Regression Model For Any Control Intervention (MP/Chair/ACM) Use with Adult Mental Health Inpatients in Ontario (N = 115,384) cont.

	Any CI		
	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	*p*
Capacity/Competency			
Consent for treatment (REF)		1.00	
Incapable	-0.10 (0.04)	0.91 (0.85 – 0.98)	.008
Consent to disclose health info		1.00	
Incapable	0.26 (0.05)	1.30 (1.19 – 1.42)	< .0001
Own decision maker (REF)		1.00	
Substitute decision maker	0.08 (0.03)	1.09 (1.02 – 1.16)	.02
Psychiatric diagnoses			
Mood disorders			
None (REF)		1.00	-
Present	-0.07 (0.02)	0.94 (0.91 – 0.98)	.0004
Eating disorders			
None (REF)		1.00	-
Present	-0.60 (0.10)	0.55 (0.45 – 0.67)	< .0001
RAI-MH Scales*			
Activities of Daily Living Hierarchy (0 – 6)	0.06 (0.02)	See Figure 6.6	< .0001
ADL Hierarchy x CPS Interaction Term	0.01 (0.004)	See Figure 6.6	< .0001
Aggressive Behaviour Scale (0 – 12)	0.20 (0.004)	1.22 (1.21 – 1.23)	< .0001
Cognitive Performance Scale (0 – 6)	0.12 (0.01)	See Figure 6.6	< .0001
Instrumental Activities of Daily Living (0 – 42)	0.006 (0.002)	1.01 (1.00 – 1.01)	< .0001
Mania (0 – 20)	0.06 (0.002)	1.07 (1.06 – 1.07)	< .0001
Positive Signs and Symptoms –Short (0 -12)	0.12 (0.003)	1.02 (1.01 – 1.02)	< .0001
Risk of Harm to Others (0 – 6)	0.12 (0.006)	1.13 (1.12 – 1.15)	< .0001
Self-Care Index (0 – 6)	0.05 (0.007)	1.05 (1.03 – 1.06)	< .0001
Severity of Self-harm (0 – 6)	0.04 (0.005)	1.04 (1.03 – 1.05)	< .0001

* Note for RAI-MH Scales, the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table).

Table 6.14 Multivariate Logistic Regression Model For Any Control Intervention (MP/Chair/ACM) Use with Adult Mental Health Inpatients in Ontario (N = 115,384) cont.

	Any CI		
	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	*p*
Other Health Conditions			
Vision			
Adequate (REF)		1.00	-
< Adequate	0.11 (0.04)	1.11 (1.04 – 1.20)	.003
Intellectual disability			
None (REF)		1.00	-
Present	-0.18 (0.04)	0.83 (0.77 – 0.90)	< .0001
Falls			
None (REF)		1.00	-
Present	0.20 (0.04)	1.22 (1.14 – 1.32)	< .0001
Alzheimer's Disease and related			
None (REF)		1.00	-
Present	0.09 (0.04)	1.10 (1.02 – 1.20)	.02
c-statistic = 0.80			

Table 6.15 Multivariate Logistic Regression Model For Any Control Intervention Use with Adult Mental Health Inpatients by Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846)

	Any Control Intervention					
	Parameter	Male		Parameter	Female	
	Estimate (S.E.)	Odds Ratio (C.I.)	*p*	Estimate (S.E.)	Odds Ratio (CI)	*p*
Sociodemographic Characteristics						
Age						
18-24 (REF)		1.00	-		1.00	-
25-34	-0.03 (0.04)	0.97 (0.90 – 1.04)	.32	-0.03 (0.05)	0.97 (0.88 – 1.07)	.53
35-44	-0.14 (0.04)	0.87 (0.81 – 0.94)	.0001	-0.03 (0.05)	0.97 (0.89 – 1.07)	.58
45-54	-0.24 (0.04)	0.79 (0.73 – 0.85)	< .0001	-0.14 (0.05)	0.87 (0.79 – 0.96)	.005
55-64	-0.37 (0.05)	0.69 (0.63 – 0.75)	< .0001	-0.33 (0.06)	0.72 (0.65 – 0.81)	< .0001
65-74	-0.56 (0.06)	0.57 (0.51 – 0.64)	< .0001	-0.58 (0.07)	0.56 (0.49 – 0.64)	< .0001
75-84	-0.31 (0.07)	0.73 (0.64 – 0.84)	< .0001	-0.68 (0.09)	0.51 (0.43 – 0.61)	< .0001
85+	-0.08 (0.11)	0.93 (0.75 – 1.14)	.47	-0.59 (0.12)	0.56 (0.44 – 0.71)	< .0001
Residence Stability						
Not temporary (REF)					1.00	-
Temporary				0.17 (0.03)	1.18 (1.12 – 1.25)	< .0001
Homeless				0.19 (0.13)	1.21 (0.95 – 1.55)	.13
MH Service Use Characteristics						
Amount of time in hospital						
None (REF)					1.00	-
< 31 days				0.08 (0.03)	1.08 (1.03 – 1.15)	.004
31 days to 1 year				0.07 (0.03)	1.07 (1.01 – 1.14)	.03
> 1 year				0.21 (0.08)	1.23 (1.04 – 1.45)	.01
Age at first hospitalization						
0 – 24 years (REF)					1.00	-
25-44 years				-0.09 (0.03)	1.06 (0.94 – 1.19)	.38
45-64 years				-0.10 (0.04)	0.95 (0.85 – 1.07)	.43
65 years +				0.15 (0.0.08)	1.22 (1.02 – 1.46)	.03
Police intervention						
Never (REF)		1.00	-		1.00	-
> 1 week ago	0.01 (0.03)	1.01 (0.96 – 1.07)	.60	0.01 (0.03)	1.01 (0.95 – 1.08)	.71
In the last 7 days	0.19 (0.04)	1.21 (1.12 – 1.30)	< .0001	0.17 (0.04)	1.18 (1.09 – 1.28)	< .0001

Table 6.15 Multivariate Logistic Regression Model For Any Control Intervention (MP/Chair/ACM) Use with Adult Mental Health Inpatients by Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Any CI					
	Parameter	Male		Parameter	Female	
	Estimate (S.E.)	Odds Ratio (CI)	*p*	Estimate (S.E.)	Odds Ratio (CI)	*p*
MH Clinical Characteristics						
Inpatient status at time of assessment						
Voluntary (REF)		1.00	-		1.00	-
Informal	0.47 (0.09)	1.61 (1.34 – 1.94)	< .0001	0.39 (0.10)	1.48 (1.21 – 1.81)	.0002
Involuntary	0.62 (0.03)	1.87 (1.77 – 1.98)	< .0001	0.57 (0.03)	1.77 (1.67 – 1.87)	< .0001
Psychiatric assessment	0.70 (0.03)	2.00 (1.89 – 2.13)	< .0001	0.57 (0.03)	1.77 (1.66- 1.87)	< .0001
Forensic	-0.57 (0.07)	0.57 (0.49 – 0.65)	< .0001	-0.27 (0.36)	0.77 (0.38 – 1.55)	.46
Other	0.37 (0.21)	1.45 (0.96 – 2.18)	.07	-0.006 (0.29)	1.00 (0.57 – 1.75)	.99
Current inpatient type						
Acute (REF)					1.00	-
Longer term				-0.61 (0.05)	0.54 (0.49 – 0.60)	< .0001
Psychogeriatric				-0.004 (0.07)	1.00 (0.87 – 1.14)	.95
Forensic				-0.06 (0.36)	0.94 (0.46 – 1.92)	.87
Capacity/Competency						
Consent to disclose health info (REF)		1.00			1.00	-
Incapable	0.40 (0.05)	1.50 (1.36 – 1.65)	< .0001	0.20 (0.06)	1.22 (1.09 – 1.37)	.0005
Own decision-maker (REF)					1.00	-
Substitute decision-maker				0.11 (0.04)	1.12 (1.02 – 1.22)	.01
Psychiatric diagnoses						
Mood disorders						
None (REF)		1.00	-		1.00	-
Present	-0.16 (0.02)	0.85 (0.81 – 0.89)	< .0001	-0.10 (0.03)	0.91 (0.86 – 0.95)	.0002
Eating disorders						
None (REF)					1.00	-
Present				-0.66 (0.11)	0.52 (0.42 – 0.64)	< .0001

Table 6.15 Logistic Regression Model For Any Control Intervention (MP/Chair/ACM) Use with Adult Mental Health Inpatients by Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Any CI					
	Parameter	Male		Parameter	Female	
	Estimate (S.E.)	Odds Ratio (CI)	*p*	Estimate (S.E.)	Odds Ratio (CI)	*p*
RAI-MH Scales						
Activities of Daily Living Hierarchy (0 – 6)				0.11 (0.01)	1.11 (1.08 – 1.14)	< .0001
Cognitive Performance Scale (0 – 6)				0.16 (0.01)	1.17 (1.14 – 1.20)	< .0001
Instrumental Activities of Daily Living (0 – 42)	0.04 (0.002)	1.04 (1.04 – 1.04)	< .0001	0.009 (0.002)	1.01 (1.00 – 1.01)	< .0001
Mania (0 – 20)	0.12 (0.003)	1.13 (1.12 – 1.14)	< .0001	0.10 (0.003)	1.10 (1.10 – 1.11)	< .0001
Positive Signs and Symptoms –Short (0 -12)				0.01 (0.005)	1.01 (1.00 – 1.02)	.005
Risk of Harm to Others (0 – 6)	0.24 (0.007)	1.27 (1.26 – 1.29)	< .0001	0.23 (0.007)	1.26 (1.24 – 1.28)	< .0001
Self-Care Index (0 – 6)				0.05 (0.009)	1.05 (1.03 – 1.07)	< .0001
Severity of Self-harm (0 – 6)	0.05 (0.007)	1.05 (1.04 – 1.06)	< .0001	0.05 (0.007)	1.06 (1.04 – 1.07)	< .0001

Table 6.15 Logistic Regression Model For Any Control Intervention (MP/Chair/ACM) Use with Adult Mental Health Inpatients by Gender in Ontario (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Any CI					
	Parameter	Male		Parameter	Female	
	Estimate (S.E.)	Odds Ratio (CI)	*p*	Estimate (S.E.)	Odds Ratio (CI)	*p*
Other Health Conditions						
Vision						
Adequate (REF)		1.00	-			
< Adequate	0.11 (0.03)	1.11 (1.05 – 1.18)	.0003			
Intellectual disability						
None (REF)		1.00	-		1.00	-
Present	-0.23 (0.05)	0.80 (0.72 – 0.88)	< .0001	-0.15 (0.06)	0.87 (0.77 – 0.97)	.02
Falls						
None (REF)					1.00	-
Present				0.15 (0.05)	1.16 (1.06 – 1.28)	.002
Alzheimer's Disease and related disorders						
None (REF)					1.00	-
Present				0.15 (0.06)	1.17 (1.05 – 1.30)	.005
c		0.78			0.79	
Hosmer-Lemeshow	χ^2= 14.81, d.f. = 8		.06	χ^2= 10.25, d.f.= 8		.25

7.0 IDENTIFICATION OF RISK FACTORS FOR THE USE OF MECHANICAL/PHYSICAL RESTRAINT AND ACUTE CONTROL MEDICATIONS IN THE ABSENCE OF PSYCHIATRIC EMERGENCY SITUATION

7.1 Introduction

The use of control interventions (CI) in adult mental health (MH) inpatient services in Ontario is not a rare practice. Ontario's rate of CI use is 24%(1). Internationally, the rates range from 8 – 28% although the direct comparability of these other studies is questionable due to important variations in study design, data collection methods, and reporting.

The most frequent reason given for the use of CIs was violence towards others followed by self-harm, damage of property, threats to others, abusiveness towards others, and to a lesser extent, agitation, disorientation, and restlessness (1-23). The objectives of the use of CIs were to prevent harm to the patient or others, prevent damage to property, maintain order on the nursing unit, prevent absconding, and in some cases they were used as a punishment/consequence. Many studies measured increased acuity of patient mental illness by identifying the non-voluntary status of patients (i.e., those patients admitted without patients' consent)(24, 25). Other studies included diagnoses although there is variability in the effect of diagnosis as a risk factor for CI use(26).

There is scant research in the use of CI in mental health despite the known risks of unintended consequence of harm to patients. Patients may suffer temporary or permanent physical, psychological, and emotional trauma, with the most severe consequence being death. Physical injuries may include coma, fractures, soft tissue injury, physical/muscle deconditioning, dehydration, circulatory problems and incontinence(4, 27, 28). The psychological and emotional harms may include the trauma of perceived re-enactment of past abuse and confinement in additional to the experience of the current CI use as punitive and aversive(28). The result can be an exacerbation of the behaviours that are intended to be controlled. Potential factors contributing to patient death

associated with CI use include restraint asphyxia, cardiac arrest/complication, blunt trauma, strangulation, aspiration, catecholamine rush, thrombosis, and biochemical physiological responses to extreme exertion such as catecholamine rush, and rhabdomyolosis(28). There are highly publicized reports of death in MH in the Western media which have raised the awareness of the public, and government/agencies about the potential dangers of CI use in MH. Some jurisdictions have made substantial reductions in CI use(14, 18) but it is generally accepted that there is much room for improvement in many other jurisdictions.

There is little evidence of the therapeutic efficacy of the use of CIs as a 'treatment' in MH or that the negative consequences of their use are outweighed by their conceivable therapeutic benefit. To that end, CI use is largely considered a last resort measure by policy makers, hospital administrators and clinicians and to be used only after all other less coercive measures have been attempted and/or considered.

7.2 Purpose

The current study examines the use of control interventions with adult inpatient mental health units/hospitals absent of behaviours typically associated with the use of CIs referred to here as "no psychiatric emergency situation" (NoPES). This study will profile the NoPES group (with and without CI use) and produce a risk profile for NoPES with CI use.

7.3 Methods

7.3.1 Data Source

In 2005, the Ontario Ministry of Health and Long Term Care (MOHLTC) mandated the use of the Resident Assessment Instrument for Mental Health (RAI-MH) by all MH hospitals or MH units within general hospitals serving adult inpatients(29). The MOHLTC, Ontario Hospital Association and the Joint Policy and Planning Committee with interRAI, collaborated to develop the

RAI-MH(30). interRAI is a 32-country collaborative network of researchers that "promotes evidence-informed clinical practice and policy decision-making through the collection and interpretation of high-quality data about the characteristics and outcomes of persons served across a variety of health and social services settings" as described in the organization's mission and vision statement (www.interrai.org). The MOHLTC mandate requires hospitals to make quarterly submissions of completed assessments to the Canadian Institute for Health Information (CIHI), a not-for-profit organization that collects and analyzes information on health and health care in Canada. CIHI developed the Ontario Mental Health Reporting System (OMHRS) to manage the collection of RAI-MH data submitted from hospitals. Trained clinical professionals complete a RAI-MH assessment for each adult inpatient following three days of an inpatient stay, which includes the collection of the dependent and independent variables of the current study. The completion of the full admission clinical RAI-MH assessment is a part of everyday typical operations of inpatient adult mental health services in Ontario.

The RAI-MH is a proven reliable and valid assessment system. Previous studies have documented the reliability and validity of the RAI-MH assessment system following substantial national and international testing achieving acceptable to excellent results with values ranging from Kappa > 0.06 to 1.00 with a median of 0.87 across thirteen items for inter-rater reliability and convergent validity(31, 32). Within the interRAI-suite of instruments, there are various scales that are also compatible within multiple interRAI instruments including the RAI-MH such as the Cognitive Performance Scale (CPS), Aggressive Behaviour Scale (ABS), ADL Hierarchy (ADL), IADL Capacity (IADL), Risk of Harm to Others (RHO). Previous validation testing of CPS, depression, and disability within other interRAI instruments has been completed(33, 34). Additionally, more recent testing of the CPS against external standards such as the Mini-Mental State Examination (MMSE) ($r = 10.69$, $p < .001$) and the Montreal Cognitive Assessment (MoCA) (r = -

0.69, $p < .001$) has further reinforced earlier findings of strong validity(35). The ABS was also recently tested against the Cohen Mansfield Agitation Inventory (CMAI) showing a strong relationship between the two measures ($r= 0.72$, $p < .0001$)(36). The Depressive Severity Index was found to have good internal consistency (Cronbach's alpha = 0.77)(37). A recent study demonstrated support for the predictive validity of the RHO for predicting inpatient aggression differentiating between high and moderate levels of risk of harming others when validated against an institution-based database of incidents of inpatient physical assaults(38).

An integral part of the interRAI system of instruments is the accompanying Clinical Assessment Protocols (CAPs). The CAPs provide standardized triggering algorithms and protocols intended to support clinicians in the development of individualized care plans. The CAPs are triggered, i.e. brought to the attention of clinicians, based on the results of the completed assessment. The interRAI MH Clinical Assessment Protocols manual (version 9.1 Canadian Edition) includes a Control Intervention CAP that triggers for the elimination of control interventions. The criteria include the use of a CI, but used in the absence of a psychiatric emergency situation. A NoPES description is derived from items in the RAI-MH assessment or scales. The interRAI-MH Control Intervention CAP for NoPES is triggered when a control intervention is in use and in the absence of any of the items or scales shown in Table 7.1. In other words, the list in Table 7.1 describes items in the RAI-MH that constitute the thresholds for a psychiatric emergency situation (PES). Those who do not meet this threshold are considered NoPES.

Table 7.1. Psychiatric Emergency Situation RAI-MH Items or Scales Triggers

Psychiatric emergency situation is defined as present with one or more of the following:

1. Suicide attempt in the 3 days prior to the assessment
2. Violence towards others in the 3 days prior to the assessment
3. Scored 13 or higher on the Positive Symptoms Scale (Long)

   Indicators of psychosis: hallucinations, command hallucinations, delusions, and abnormal thought process/form

   Mood disturbance: inflated self-worth, hyper-arousal, pressured speech

   Other: unusual or abnormal physical movements
4. Extreme behaviour disturbance in the 7 days prior to the assessment
5. Command hallucination in the 3 days prior to the assessment
6. Aggressive behaviour scale (ABS) score of 6 or higher

   Verbal abuse, physical abuse, socially inappropriate/disruptive behaviour, and resistance to care.

Prior to 2009, RAI CAPs in MH were referred to as MHAPs. A recent validation study of the embedded RAI-MH Mental Health Assessment Protocols (MHAPS) for physical restraint, seclusion and ACM MHAPs demonstrated positive results(39). For the physical restraint and seclusion MHAP, the sensitivity rate was 93% and the specificity rate was 97.5%. For the ACM MHAP, the sensitivity rate was 90.8% and specificity rate 94.7%. As a part of the same study, an international expert panel was convened to evaluate the validation results. The expert panel confirmed the findings and further recommended the combination of the physical restraints/seclusion and ACM MHAPs, which constitutes the interRAI Control Intervention CAP used in the current study. This recommendation

from the expert panel was based on the "overlap in content, risk factors/correlates and consequences" as reported in the study.

The University of Waterloo's Office of Research Ethics provided full ethics approval for the use of de-identified data for the current study.

7.3.2 Sample

The current study includes adults admitted to a mental health hospital or mental health unit within a general hospital in Ontario from April 1, 2006 to March 31, 2010 who did not have a psychiatric emergency situation as defined by interRAI's Control Intervention Clinical Assessment Protocol (CI CAP) associated with the use of a control intervention.

There were 85,154 NoPES assessments included in the study submitted from 13 MH hospitals and 59 MH units within general hospitals.

7.4 Data Analysis

Four CI types were included in this study: mechanical/physical (MP), chair prevents rising (Chair), acute control medication (ACM), and an inclusive category, Any CI, which enumerates any one type of MP, Chair, or ACM used. These variables were dichotomized as in-use or not in-use. The use of Chair that Prevents Rising is a mechanical restraint but specialized in that it is typically used with the older adult population(40, 41). Older adults are an understudied subpopulation within MH services. Some studies cited excluded the older adult from samples(11, 24) and only one study included a range of restraints more typically used with older adults, such as chair prevents rising, bed rails, lap trays(2). The RAI-MH data provide an opportunity to examine this subpopulation more closely in the context of overall MH service delivery to all adults without discrimination.

The Ontario Mental Health Reporting System Resource Manual 2011-2012 Module 1 – Clinical Coding provides the following definitions for M/P, Chair, and ACM:

1. **Mechanical/Physical Restraint (MP)**

> **"Mechanical restraint:** The person is placed in mechanical restraints and is unable to ambulate (for example, restrained in bed), or the person is placed in mechanical restraints but is able to ambulate (for example, wrist restraints only)."
>
> **"Physical or manual restraint by staff:** Physically holding a person to restrict his or her movement. This refers to a technique where the person is manually held or restricted for a brief period of time in order to restore calm to the individual and he or she is released when calm. This does not refer to holding a person in order to apply a mechanical restraint."

2. "**Chair prevents rising:** Any type of chair with a locked lab board, a chair that places the person in a recumbent position that restricts rising or a char that is soft and low to the floor (for example, a bean bag chair). This includes "comfort cushions" (for example, the "lap buddy" and "merry walker"). "

3. "**Acute control medication (ACM):** Psychotropic medication administered as an immediate response to control agitation or threatening, destructive or assaultive behaviours in order to prevent harm to self or others. This is typically used in situations where the person has already lost behavioural control or where the person is displaying behaviours that have the potential to escalate to loss of control and/or harm to self or others. This definition excludes the use of psychotropic medication for treatment purposes where a diagnosis has been identified and an ongoing course of treatment has been prescribed. It also excludes the use of PRN medication as part of an ongoing treatment plan."

An additional inclusive category of CI use, Any CI, was created for the current study.

4. **Any control intervention (Any CI):** Any type of CI used with a patient. The CI type could be mechanical/physical, chair prevents rising, or acute control medication.

The dependent variables were not mutually exclusive. Patients may have exposure to more than one type of CI.

The World Health Organization (WHO) conceptual framework for the classification of patient incidents standardizes important concepts related to definitions, terminology and relationships between core issues related to patient safety (42). This framework was designed to facilitate and support work to improve patient care. The framework identifies four classes of patient safety information: patient characteristics, incident characteristics, contributing factors/hazards, and organizational outcomes. The categories of patient characteristics include patient demographics, reason for encounter and other diagnostic procedures (Appendix A). The WHO Drafting Group explicitly identifies the use of the framework in conjunction with existing reporting systems, mapping data elements to the concepts of the framework. To this end, the current study used this framework with a focus on patient characteristics, as well as findings in the literature, to guide the selection of variables for inclusion.

The following independent variables were included in the current study:

Sociodemographic characteristics

Age

Age was collapsed into eight groups: 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, and 85+. Age 18-24 was used as the reference group. The continuous age variable was converted to an ordinal variable to address the presence of a curvilinear relationship to the dependent variables.

Sex

Male was used as the reference group and female was the comparison group.

Marital Status

Marital status was collapsed into two groups. "Not partnered" (never married, separated, divorced, or widowed) was used as the reference group with "partnered" (married, in a common-law relationship, or living with a partner or significant other) as the comparison group.

Language

Language was collapsed into two groups. English was used as the reference group and all other languages were identified as "other" and used as the comparison group.

Income Source

This dichotomous variable assessed the patient's condition of "no income" in the form of benefits, assistance, and employment. Having income was used as the reference group and "no income" was the comparison group.

Living Arrangements

The patients' living arrangement prior to admission was dichotomized by collapsing the types of living arrangements to Family/Alone and group setting (boarding home, long-term care home, jail or shared accommodation with non-relatives). Living with Family/Alone was used as the reference group.

Admitted from Long Term Care Home (LTCH)

This dichotomous item was derived from the RAI-MH collapsing all locations (private home, hospital, and congregate living setting) except LTCH into the "other" category and comparing to those patients admitted from a LTCH. The "other" category was used as the reference group.

Residential Stability

There were three categories included in the assessment of stability of patients' living arrangements. "Not temporary" was used as the reference group, comparing it to patients who had temporary residential arrangements (such as a shelter or hostel), and patients who were homeless.

Mental Health Service Use

Number of mental health hospital admissions (recent)

This dichotomized variable indicates patients' history of previous admissions to a MH facility or psychiatric unit within a general hospital with the previous admission(s) occurring within the last two years. No previous hospitalization was used as the reference group.

Number of mental health hospital admissions (life time)

This dichotomized variable indicates patients' history of any previous admissions to a MH facility or psychiatric unit within a hospital without regard to any time constraints. No previous hospitalization was used as the reference group.

Time since last discharge from mental health admission

The time since the discharge from a previous MH admission was collapsed into four categories: no previous admission, greater than one year, between 31 days and one year, and less than 31 days. Patients with no previous admission were used as the reference group.

Amount of time hospitalized

There were four categories enumerating the number of days in hospital in the last two years: no hospital stay, less than 31 days, between 31 days and one year, and greater than one year. Patients with no hospital admission to a MH facility or MH unit within a general hospital was used as the reference group.

Age at first hospitalization for mental health reason

There were four collapsed categories for age at first hospitalization for a MH reason: 0-24 years, 25 – 44 years, 45 – 65, and greater than 65 years old. The category 0 – 24 years was used as the reference group.

Police Intervention

Police intervention was collapsed into three categories: no history of intervention by police, police involvement more than one week ago and up to a year, and within the last 7 days. Having no history of police intervention was used as the reference group.

Mental health clinical characteristics

Status at time of initial assessment

The inpatient status at the time assessment was reported across five categories: voluntary, informal, involuntary, psychiatric assessment, forensic, and unknown. Voluntary patients are admitted by consent of the patient; involuntary patients are those patients who are detained in a psychiatric facility under a Certificate of Involuntary Admission or certificate of Renewal *(*as described in the *Ontario Mental Health Act*) absent of the consent of the patient; informal patients are those admitted with consent of the patients' designated decision-maker; psychiatric assessment order describes patients admitted to and detained in a psychiatric facility for the purposes of assessment based on a Form 1 or Form 2 of the *Ontario Mental Health Act* as completed by a physician or justice of the peace; and forensic patients are admitted for assessment and designations of not criminally responsible or unfit to stand trial or judicial treatment orders. The group, voluntary patients, was used as the reference group.

Current Patient Type

Four categories described the patients' general type of admission (i.e., the type of care anticipated to be provided): acute, longer term, psychogeriatric, and forensic evaluation. As described in the OMHRS resource manual, an acute patient was described as a patient admitted with a new problem or an acute flare-up of an existing problem and is expected to stay less than 14 days in hospital; a longer-term patient was one that had a persistent mental illness and was expected to have a length of stay in hospital longer than 14 days; psychogeriatric patients were patients with a chronic

condition typically associated with aging (such as Alzheimer's disease or multi-infarct dementia) regardless of the anticipated duration of length of stay; patients in hospital for forensic evaluation were those admitted specifically for a forensic assessment or because of a designation of unfit to plead or not criminally responsible. Patients in the acute category were used as the reference group.

Capacity/Competency

This item makes an assessment of the patients' ability to demonstrate adequate understanding of information to enable informed decision-making including the consequences of the decision being made in three types of decisions. The patient was assessed as competent or not competent to make decisions independently. The three types of decision-making categories included consent to treatment, managing property (including real estate, insurance, income sources, and personal property), and disclosure of information related to personal health records. Having competency in these three areas of decision-making were used as the reference group.

The final measure in the capacity/competency section is a dichotomous variable identifying whether the patient had a guardian and/or substitute decision-maker responsible for the financial or personal care needs of the person. The absence of a guardian and/or substitute decision-maker was used as the reference group.

Psychiatric Diagnosis

At the time of assessment, patients are assessed and provided with a provisional diagnosis. Eleven groupings of psychiatric diagnoses were included in this research: 1) disorders of childhood/adolescence, 2) mental disorders due to general medical conditions, 3) substance-related disorders, 4) schizophrenia and other psychotic disorders, 5) mood disorders, 6) anxiety disorders, 7) eating disorders, 8) sleep disorders, 9) impulse-control disorders not classified elsewhere, 10) adjustment disorders, and 11) personality disorders. These diagnostic groups were each dichotomized as present or not present. Patients may have more than one type of provisional diagnosis. Within each

diagnostic group, the patients not diagnosed with that particular diagnosis were used as the reference group.

RAI-Mental Health Scales

Eleven mental health scales, derived from the RAI-MH assessment items, were included as explanatory variables in the current study, including: Activities of Daily Living Hierarchy (ADL), Aggressive Behaviour Scale (ABS), Anhedonia, Cognitive Performance Scale (CPS), Depressive Severity Index (DSI), Instrumental Activities of Daily Living Capacity (IADL), Mania, Positive Signs/Symptoms Short (PSS-Short), Risk of Harm to Others (RHO), Self-Care Index (SCI), and Severity of Self-harm (SoS). These scales were treated as continuous variables in the analysis. Table 7.2 describes each RAI-MH scale and the measurement scale. Higher scores on the scale indicate greater loss or severity of condition.

Table 7.2. Resident Assessment Instrument-Mental Health Scales

Variable	Description	Measurement Scale
Aggressive behaviour scale (ABS)	Measure of frequency and diversity of aggressive behaviours. Includes verbal abuse, physical abuse, socially inappropriate or disruptive and resists care.	0 - 12
Activities of Daily Living (ADL) Hierarchy	Measures functional performance, reflecting a person's ability to carry out activities of everyday living. Includes personal hygiene, locomotion, toilet use, and eating.	0 - 6
Anhedonia	Reflects frequency of symptoms related to anhedonia. Includes Anhedonia, withdrawal from activities of interest, lack of motivation, and reduced social interactions.	0 – 6
Cognitive Performance Scale (CPS)	Describes the person's cognitive status. Includes short-term memory, daily decision-making, self-performance in eating, and ability to make self understood by others.	0 – 6
Depressive Severity Index (DSI)	An alternative measure to Depression Rating Scale for symptoms of depression. Includes sad and pained facial expressions, negative statements, self-deprecation, guilt/shame, hopelessness	0 - 15
Instrumental Activities of Daily Living (IADL) Capacity	An estimate of higher-level function, reflecting others' perception of a person's ability to carry out IADLs. Includes meal preparation, ordinary housework, managing finances, managing medications, phone use, shopping, and transportation (does not include using stairs)	0 - 42
Mania	A measure of frequency of symptoms of mania. Includes inflated self-worth, hyper-arousal, irritability, increased sociability/hyper-sexuality, pressured speech, labile affect, and sleep problems due to hypomania	0 – 20
Positive Symptoms Scale (PSS): short	A measure of the frequency of positive symptoms. The short form includes hallucinations, command hallucinations, delusions, and abnormal thought process.	0 – 12
Risk of Harm to Others (RHO)	A measure that reflects the risk of harm to others. Includes aggressive behaviour scale, positive symptoms scale (PSS) long, violence summary scale (VSS), sleep problems, insight into mental health, delusions, and difficulty sleeping.	0 – 6
Self-care Index due to psychiatric symptoms (SCI)	Reflects risk of inability to care for self due to psychiatric symptoms. Includes decline in cognitive skills for decision-making, insight into mental health, making self understood, abnormal thought process, poor hygiene, mania, anhedonia, positive symptoms scale, and decreased energy	0 – 6
Severity of Self-harm (SoS)	Reflects risk of harm to oneself. Includes history of suicide attempts, positive symptoms scale, depressive severity scale, family concerned re: self-injury, cognitive performance scale, and suicide plan.	0 – 6

From: interRAI Mental Health Clinical Assessment Protocols (CAPs): For Use With Community and Hospital-Based Mental Health Assessment Instruments Version 9.1 Canadian Edition, 2011

Other health conditions

Generally other health conditions were dichotomized as present or not present with "not present" as the reference group.

Hearing impairment

Hearing impairment was dichotomized identifying adequate hearing ability or less than adequate hearing. Adequate hearing ability was used as the reference group.

Vision impairment

Vision impairment was dichotomized identifying adequate or less than adequate vision with adequate vision used as the reference group.

Intellectual disabilities

Intellectual disabilities (ID) was dichotomized as present or not present. The presence of ID is defined as a confirmed diagnosis in the DSM-IV negatively affecting cognitive ability, conceptual, social, and practical skills, and further, present before the age 18 (e.g. Down's Syndrome). The absence of an ID was used as the reference group.

Falls

Falls was dichotomized to no falls and >0 falls in the past 30 days with no falls as the reference group.

Neurological conditions

Alzheimer diseases and related dementias (ADRD), cerebral palsy (CP), epilepsy, Huntington's, Multiple Sclerosis (MS), Parkinson's, stroke, and traumatic brain injury (TBI). These conditions were dichotomized for the presence of each condition or absence. An absence of the condition was used as the reference group. These diagnoses were recorded as present if they were deemed to require active treatment and monitoring at the time of assessment.

"Any Neurological"

Any Neurological was a variable that recorded the presence of any-one of the following: ADRD, CP, epilepsy, Huntington's, MS, Parkinson's, stroke, TBI, spinal cord injury, amyotrophic lateral sclerosis (ALS), and muscular dystrophy (MD). This item was dichotomized for the presence of any type of neurological condition. An absence of any neurological condition was used as the reference group.

Descriptive statistics at the univariate and bivariate level were performed including count and percentage for the sample comparing NoPES with CI use with NoPES without CI use. Bivariate analysis of independent variables (categorical and ordinal) was conducted to determine their association with CI types using Chi-square statistics (significance level $p < .01$).

For the NoPES sample, multivariate logistic regression was used to model MP, Chair, ACM and Any CI with selected RAI-MH assessment items included in the Sociodemographic Characteristics, MH Services Use, MH Clinical Characteristics, RAI-MH Scales and Other Health Conditions categories. For the multivariate analysis, significant variables from the bivariate analysis were loaded into the model in a single step then a process of staged backward selection was used, retaining only significant variables ($p < .05$). Additional modeling using forward and stepwise selection processes were conducted to rule out possible entry and deletion effects not detected with the backward selection process. In addition, manual selection of candidate variables was done as a dual check for specification for final models. Odds ratios and 95% confidence intervals were produced representing the association between the CI type used and the independent variables. Age was retained as a main effect variable within all models to reflect consistency with variables examined in the literature. Age was included in the model grouped into 10-year increments (as ordinal values) to address a detected curvilinear relationship to the dependent variables. Potential statistical interactions were explored between ADL and CPS, as these variables have been shown to

interact in previous work(43). The RAI-MH scales were treated as continuous variables. An examination of potential influential outliers was completed for all covariates in the models and none were found. Regression diagnostics were undertaken for each of the final models to ensure appropriate data fit. The Receiver Operating Characteristic Curves (ROC curves) were used to evaluate the model fit to the data. The c-statistic (or area under the curve -AUC) corresponds to the accuracy of the model with responses of 0.5 reflecting a model that randomly predicts the data and 1.0 perfectly discriminating the response(44). A c-statistic of 0.7 is generally considered to be reasonable and 0.8 is strong. The Hosmer and Lemeshow (HL) Goodness-of-fit statistic was secondarily used to determine the model's adequacy of fit where large values of chi-square and small p-values indicate a lack of fit of the model(45).

All the analyses were completed using SAS 9.2, Cary, NC, USA.

7.5 Results

7.5.1 Descriptive Analysis Findings

From April 1, 2006 to March 31, 2010, there were 85,154 RAI-MH assessments that identified patients as having no psychiatric emergency situation (Table 7.4). Of these assessments, 12,097 (14.2%) had recorded CI use.

Table 7.5 shows the univariate descriptive analysis of the study NoPES sample. The mean age was 45.0 (S.D. = 16.3) with 50.8% being female and 30% partnered (married or common-law). The main language spoken was English with 5% reporting an "other" main language. Most of the NoPES sample lived with family or alone (90%) as opposed to a group setting which included boarding home, long term care, group home, shared accommodation with non-relatives, or jail. Twenty-four percent of the sample reported having a temporary residential status in a shelter or hostel setting prior to admission to hospital and just under 1% were homeless.

Just over half the NoPES sample had one or more previous MH hospital admissions in the two years prior to the current admission and of those with prior admissions, 32% had spent less than 31 days in hospital, 20% had 31 days to 1 year in hospital, and 2% were in hospital for more than a year in the two years prior to the current admission. Approximately one quarter of the sample had police intervention/contact prior to admission to hospital, not including events where the patient was the victim of crime or civil litigation.

Just over half (55%) of the NoPES sample were voluntary admissions to hospital. All other admissions were non-voluntary: informal (1%), involuntary (22%), psychiatric assessment (20%), and forensic (3%). Of these admissions, 81% were for acute care treatment, 13% for longer term care, and 3% each respectively for psychogeriatric care or forensic evaluation. For the items assessing capacity or competency, less than 10% of the sample was deemed to have lack of capacity or competency for providing consent for treatment, managing property, disclosure of health information, or decisions about financial/personal care needs.

The majority of NoPES patients had a provisional diagnosis of mood disorders at the time of assessment (55%) followed by schizophrenia and other psychotic disorders (34%), substance disorders (24%), anxiety disorders (13%), and personality disorders (10%). Other provisional diagnoses included, but substantially less frequently were adjustment disorders, eating disorders, child/adolescent disorders, mental disorders due to general medical conditions, impulse control disorders and sleep disorders.

Table 7.5 also shows the results of the NoPES sample in the RAI-MH functional performance and behaviour scales. Almost 25% of the sample had substantial loss of capacity to perform instrumental activities of daily living. Loss of function in ADLs and SCI was less severe (1% and 8% respectively at the high end of the scales. Similarly with CPS, 35% of the sample had some loss of cognitive function and 2% with severe loss. The majority of the sample scored low on ABS, PSS-

Short and RHO with less than 6% at the severe end of the scale. The sample had somewhat higher scores at the severe end for Mania (15%), SoS (18%), and more so for DSI (26%) and Anhedonia (37%). Approximately 5% of the sample had a history of falls in the 30 days prior to the RAI-MH assessment and 6% had ADRD. Collectively, 7% of the sample were diagnosed and were receiving active treatment for a neurological condition with ADRD representing the greatest numbers but also including CP, epilepsy, Huntington's, MS, Parkinson's, stroke, and TBI, each with less than 1% in the sample (not included in Table 7.5).

Table 7.6 shows the results of bivariate descriptive analysis of the sociodemographic characteristics of the NoPES sample by Any CI use. The patients with Any CI use were more typically in the younger (< 35 years old) or older (≥ 75 years old) compared to the No CI group. The Any CI group was also more likely to be male, not partnered, speak a language other than English, living in a group setting prior to admission to hospital, and having greater residential instability versus the No CI group. Table 7.7, shows results of the bivariate analysis for the mental health service use characteristics. Overall, the Any CI group, proportionately had slightly greater use of MH services across all variables. The Any CI group were a slightly more likely be in the younger age group (less than 25 years old) or oldest age group (65 years and older) at the time of first MH hospital admission compared to the No CI group. The CI group also had a higher likelihood of having a history of police intervention than the No CI group. The results of the MH clinical characteristics (Table 7.8) show that the Any CI group was substantially more likely to be non-voluntary at the time of assessment except in the forensic category and slightly more likely to be admitted for acute or psychogeriatric care, rather than longer term care or forensic evaluation. The Any CI group also had greater tendency to be assessed as incompetent to give consent to treatment, management property, disclose health information and making decisions about finances and self-care. There was no significant difference using < .01 as a threshold between the Any CI vs. No CI groups in prevalence

of child/adolescent disorders, sleep disorders, impulse control disorders, and personality disorders. There were significant findings that showed the Any CI group was proportionately more often diagnosed with schizophrenia and other psychotic disorders and less often with substance use disorders, mood disorders, and anxiety disorders.

Table 7.9 shows the bivariate analysis of NoPES patients and performance on the RAI-MH scales. Patients with Any CI proportionately scored higher, in other words were worse off in areas of ADL, ABS, CPS, IADL, Mania, PSS-Short, RHO, SCI, and SoS. There were minor differences between the Any CI and No CI groups for Anhedonia and DSI, although the findings were significant.

In the Other health conditions category (Table 7.10), there were small but significant differences with the Any CI group more likely to have impairment disability with hearing, vision, intellectual disability, and falls as well as proportionately greater prevalence of ADRD, Huntington's and stroke.

Table 7.11 shows the results of the sociodemographic characteristics bivariate analysis for MP use. Similarly to the Any CI group, those patients with MP use were also typically younger (< 35 years old) or older (≥ 75 years old) compared to those No MP group. Compared to the No MP group, those with MP use were more likely to be male, not partnered, speak a language other than English, have no income source, live in a group setting, be admitted from LTCH, and have greater residential instability.

Table 7.12 shows the results of MH service use characteristics for MP use. There were significant although small differences noted between the MP and No MP group for recent MH admissions, time since last discharge, and amount of time spent in hospital, with the MP group with proportionately slightly more MH service use. The MP group were more typically younger (≤ 25 years older) or older (≥ 65 years old) at the time of first hospitalization. The MP group were more

likely to have police intervention than the No MP group. The number of life time hospital admissions was not significant.

The MP analysis of MH clinical characteristics (Table 7.13) showed that when comparing the MP group to the No MP group, MP use patients were more typically with a non-voluntary status except for forensic assessment status, slightly more likely to be acute and psychogeriatric patient types, and be assess as incompetent give consent to treatment, management property, disclose health information and making decisions about finances and self-care. The MP group was more often diagnosed with schizophrenia and other psychotic disorders and less often with substance disorders, mood disorders, anxiety disorders, and personality disorders. There were findings of significance for other psychiatric diagnoses, (i.e., child/adolescent disorders, mental disorders due to general medical conditions, eating disorders, sleep disorders, and adjustment disorder) but the proportional differences were very slight (0.4 – 1.5%). Sleep disorders and impulse control disorders were not significant.

Table 7.14 shows the results of the RAI-MH Scales analysis. Overall, patients with MP use typically scored higher on the ADL, ABS, CPS, IADL, Mania, PSS-short, RHO, and SCI scales at all levels compared to the No MP group. The pattern was different for SoS where the No MP group had more patients with an SoS score of zero and scores of five to six than the MP group. The exception of the lowest scores of Mania score and RHO and mid-score for SoS, although for SoS, the difference was rather minor.

Table 7.15, Other Health Conditions, shows that the MP group tended to have slightly more impairment in hearing, vision, intellectual disability, and falls and greater prevalence neurological conditions, most substantially ADRD and less so for epilepsy, Huntington's, Parkinson's and stroke.

Table 7.16 shows the results for the Sociodemographic Characteristics bivariate analysis for Chair use. For the Chair use group, those patients tended to be older, to be partnered, have an income source, and have greater residential stability compared to the No Chair group, unlike the findings for

MP and Any CI use. Similar to MP and Any CI, the Chair use group were more likely to be male, speak a language other than English, live in a group setting and be admitted from LTCH.

The patients with Chair use were less likely to have a history of MH services use (Table 7.17). The Chair use group were proportionately more likely to have no previous MH hospital admissions, have fewer previous admission (recent and lifetime), less time in hospital with the exception of a slightly higher proportion in hospital for more than a year, and less police intervention compared to the No Chair group. For those with Chair use, those patients were substantially more likely to have their first admission to hospital at the age of 65 years and older compared to the No Chair group.

Table 7.18 shows the results of the MH clinical characteristics bivariate analysis. Those with Chair use were only slightly more likely to be non-voluntary patients compared to the No Chair group with the higher tendency for informal status and lower tendency for psychiatric assessment, a reversal from the pattern seen in the MP and Any CI analysis. The Chair group tended not to be admitted for acute care and substantially higher likelihood admitted for psychogeriatric care compared to the No Chair group. Similar to the MP and Any CI results, the Chair group was assessed as incapable or incompetent to give consent to treatment, management of property, disclosure of health information and own decision make, although the proportionate differences between the Chair group and No Chair group was more substantial with almost 50% of the Chair group incapable across all categories.

The Chair group was slightly more likely to have a diagnosis of mental disorders due to general medical conditions and sleep disorders and substantially less likely to have a diagnosis of substance disorders, schizophrenia and other psychotic disorders, mood disorders, anxiety disorders, and personality disorders. Child/Adolescent disorders, eating disorders, and impulse control disorders were not significant.

Table 7.19 show the results of the RAI-MH Scales analysis. The Chair group was substantially worse off in functional abilities compared to the No Chair group (ADL, CPS, IADL, and SCI) at all levels of loss. The Chair group also generally scored higher on the scales for ABS, Mania, PSS-Short, RHO, and SoS with the exception of the highest scores for SoS and lowest score for RHO. The Chair group was slightly worse off for all levels except for the most severe DSI. Anhedonia was not significant.

The examination of Other Health Conditions (Table 7.20) show that those in the Chair group were worse off in terms of impairment of hearing, vision, intellectual disability, falls, and neurological conditions compared to the No Chair group. Within the neurological conditions, ADRD was substantially more prevalent in the Chair group than in the No Chair group whereas the differences for epilepsy, Huntington's, Parkinson's, and stroke were minor between the two groups, although significant. CP, MS, and TBI were not significant.

The final set of results of the bivariate analysis for ACM begin at Table 7.21 with the sociodemographic characteristics. For ACM use, those patients were more likely in the younger age groups (<45 years old) compared to the No ACM group, in contrast to the trend seen in the MP and Chair use analyses. Although significant, the ACM group were only slightly more likely to be male, not be partnered, speak a language other than English, have no income source, living in a group setting, be admitted from LTCH, and have more residential instability compared to the No ACM group.

There were minimal differences in the MH service use characteristics between the ACM and No ACM group with the ACM group with slightly more service use (MH recent and lifetime admissions, amount of time in hospitals, time since last discharge and police intervention). Those in the ACM group were more likely to have had their first admission at a younger age (< 25 years old) compared to the No ACM group.

Table 7.23 shows the results of the MH clinical characteristics analysis. The ACM group were more typically non-voluntary compared to the No ACM group with the status of involuntary and psychiatric assessment and less often as informal, and forensic. The ACM group were proportionately more likely to be acute patient type than the No ACM group and less often longer term care and forensic. There was little difference in the psychogeriatric care type. ACM patients were more often determined to lack capacity or competency to provide consent for treatment, manage property, disclose health information or act as their own decision-maker. For patients with ACM, proportionately, there was a greater frequency of schizophrenia and other psychotic disorders than for the No ACM group. There was a slightly lower tendency for the ACM group to be diagnosed with substance disorders, mood disorder, anxiety disorders, eating disorders and adjustment disorders. Child/adolescent disorders, mental disorders due to general medical conditions, sleep disorders, impulse control disorders, and personality disorders were not significant.

Table 7.24 lists the results of the RAI-MH Scales bivariate analysis. Patients with ACM were more likely to have impairment at all levels along the scale for ADL, ABS, Anhedonia, CPS, IADL, PSS-Short, and SCI compared to the No ACM group. Patients with ACM were more likely to score in the moderate to severe end of the scale for RHO and less so at the mild end of the scale compared to the no ACM group. The ACM group was less likely to score in the moderate or severe range for DSI, Mania, and SoS.

The final grouping, other health conditions (Table 7.25) shows that the ACM group were slightly more likely to have impaired hearing, vision, intellectual disability, and to have a diagnosis of ADRD. All other neurological diagnoses were not significant.

7.5.2 Multivariate Analysis Findings

The results of the multivariate logistic regression modeling analyses was conducted for MP, Chair, ACM and Any CI use. The overall results of the modeling are summarized in Table 7.3 which

shows each CI type modelled and lists the retained independent variables. Additionally, this summary table indicates the magnitude of the odds ratio for risk of CI use as well as the direction of the risk. Tables 7.26 – 7.32 lists the detailed results of the final multivariate models for MP, Chair, ACM, and Any CI use.

7.5.2.1 Multivariate Model – Risk Factors for MP Use

The MP model retained the largest number of significant explanatory variables over all other CI types (Table 7.26). Older age, female sex and living in a group setting were associated with lowered odds of MP use. The older adults (65 years and older) had approximately 50% lowered odds of MP use compared to the 18 – 24 year old adults but there was some evidence of curvilinearity as the odds increased after age 75. Lack of income and temporary residential status both slightly increased the odds of MP use in hospital.

Patients with recent police intervention had 20% higher odds of MP use. The other MH Service Use characteristic variable that raised the odds of MP use was age at first hospitalization (65 years and older). Increased odds was found for patients who had spent up to 30 days in hospital in the two years prior to the current admission compared to those patients who had spent no time in hospital. Patients with total days hospitalized greater than 30 days were not significantly different.

Patients with inpatient status of informal, involuntary and psychiatric assessment had substantially increased odds of MP with involuntary and psychiatric assessment patients with 2.5 times the odds of MP use. Informal patients had 70% increased odds of MP use. Patients incapable of giving consent for treatment and disclosure of health information were also at moderately increased risk of MP use. Patients admitted for longer-term MH care had lowered odds of Any CI use as did patients with a substitute decision-maker. The provisional psychiatric diagnoses that were retained in the model were all protective of MP use, including substance use, schizophrenia and other psychotic disorders, mood disorders, anxiety disorders and most substantially for eating disorders.

Table 7.3 Summary Table of Multivariate Logistic Regression Modelling for NoPES Risk of Control Intervention Use, Ontario (N=85,134)

		MP			Chair	ACM			Any CI		
		All	Male	Female	All	All	Male	Female	All	Male	Female
Socio-demographic Characteristics											
1	Older Age	--	--	--	++	--	--	--	--	--	--
2	Female	--			-						
3	Partnered (Marital Status)	+									
4	Language Other Than English										
5	No Source of Income	++	+	++							
6	Living In Group Setting	-		--	++						
7	Residential Instability Temp	+				+	+		+		
8	Residential Instability Homeless	ns				ns	ns		ns		
MH Service Use Characteristics											
9	Number recent MH admissions										
10	Amount of time in hospital < 31 days	+	++						+		
11	Amount of time in hospital 31 days-1 yr	ns	ns						ns		
12	Amount of time in hospital ≥ 1 yr	ns	ns						ns		
13	Age at first MH hospitalization (0-24 REF)										
	a. 25-44 years	ns				ns	ns		ns		
	b. 45-64 years	ns				ns	ns		ns		
	c. 65 years and older	++				++	++		++		
14	Police intervention > 1 week prior	ns	ns			+	++	ns	+	++	++
15	Police intervention ≤ 7days	++	++			+	++	++	+	++	++

Table 7.3 Summary Table of Multivariate Logistic Regression Modelling for NoPES Risk of Control Intervention Use, Ontario (N=85,134) cont.

		MP			Chair	ACM			Any CI		
		All	Male	Female	All	All	Male	Female	All	Male	Female
MH Clinical Characteristics											
16	Inpatient status at time of assessment (Voluntary - REF)										
	a. Informal	++				++	++	++	++	++	++
	b. Involuntary	++				++	++	++	++	++	++
	c. Psychiatric assessmennt	++				++	++	++	++	++	++
	d. Forensic	ns				ns	--	--	ns	--	ns
	e. Other	ns				ns	ns	ns	ns	ns	ns
17	Current inpatient type (Acute-REF)										
	a. Longer term MH	--	--	--	ns	--			--		
	b. Psychogeriatric	ns	ns	ns	++	ns			ns		
	c. Forensic	ns	--	ns	ns	--			--		
18	Incapable consent for treatment	++	++	++							
19	Incapable consent to disclose health info	++	++						++	++	++
20	Substitute decision-maker	--	--	--							
21	Substance use disorders	-	-	--							
22	Schizophrenia/other psychotic disorders	--			--	+	+		+	+	++
23	Mood	--	--	--							
24	Anxiety disorders	--	--	--		+					
25	Eating disorders	--		--		--			--		
26	Impulse disorders										
27	Adjustment disorders										
28	Personality disorders										

Table 7.3 Summary Table of Multivariate Logistic Regression Modelling for NoPES Risk of Control Intervention Use, Ontario (N=85,134) cont.

		MP			Chair	ACM			Any CI		
		All	Male	Female	All	All	Male	Female	All	Male	Female
RAI-MH Scales											
29	Activities of Daily Living Hierarchy		++	++	++	++				++	++
30	ADL x CPS Interaction Term	++							++		
31	Aggressive Behaviour Scale	++		++	++	++			++		
32	Anhedonia Scale										
33	Cognitive Performance Scale		++	++	++			++		++	++
34	Depressive Scale Index										
35	Instrumental Activities of Daily Living				++	+	++	+	+	+	
36	Mania	++		++	++	++	++	++	++	++	
37	Positive Signs and Symptoms - Short	++		++	++	+	++		+	++	
38	Risk of Harm to Others	++	++	++	++	++		++	++		
39	Self-Care Index					+		++	+		
40	Severity of Self-Harm	-	-	-		+			+	+	
Other Health Conditions											
41	Vision impairment										
42	Hearing impairment				--						
43	Intellectual disability				--				-		
44	History of falls	++	++	++	++				++	++	++
45	Any neurological condition				++						
46	Alzheimer's/Dementia/other related disorders								+		

Legend

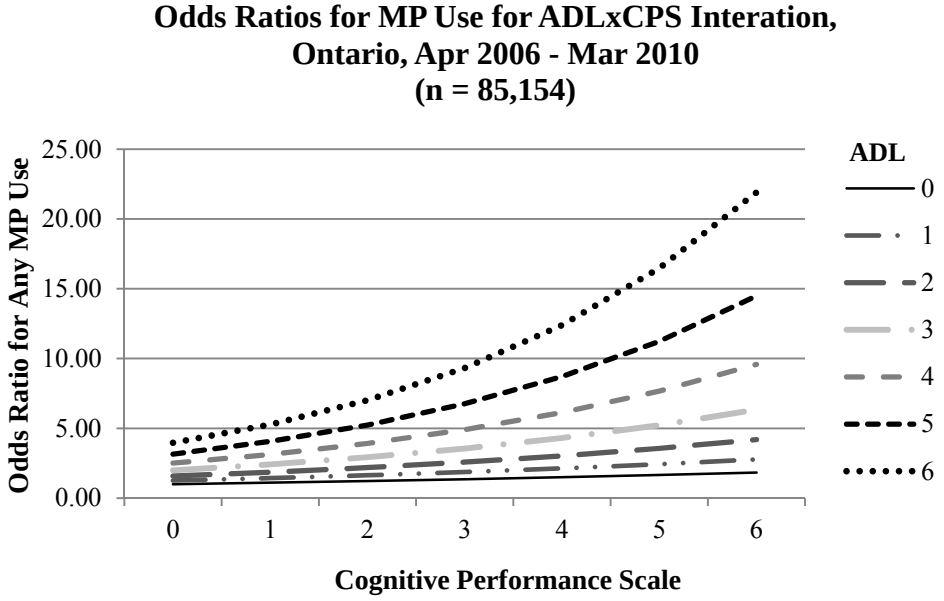
- = Odds Ratio > 0.8
+ = Odds Ratio < 1.20
MP = Mechanical/Physical
Chair = Chair Prevents Rising

-- = Odds Ratio ≤ 0.80
++ = Odds Ratio ≥ 1.20
ACM = Acute Control Medication
Any CI = Any Control Intervention

ns = not significant
H-L = Hosmer-Lemeshow
REF = Reference group

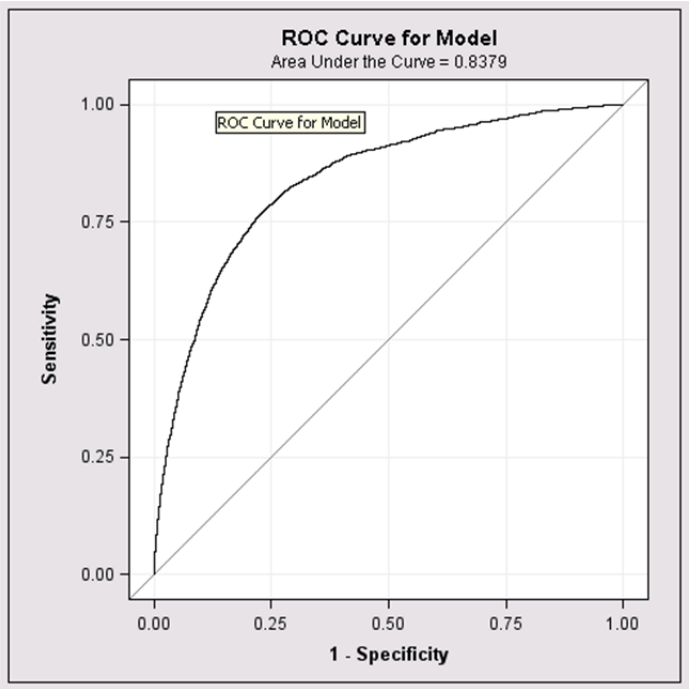
The RAI-MH scales demonstrated substantially increased odds of MP use with loss of functional performance in ADLs and CPS. There was interaction between ADL and CPS for MP use. Figure 7.1 illustrates that with increasing ADL and CPS there is corresponding increase in the risk of MP use. This interaction is most pronounced with an ADL and CPS scores equals 6 CPS; the odds of MP use increase from 4.0 to 21.9 (ADL equals 6 and CPS equals zero). In contrast with lower levels of physical functional loss (e.g., ADL equals 1) the odds of MP increased from 1.3 where CPS equals zero and at CPS scale score of 6, the odds increased relatively modestly to 2.8.

Figure 7.1. Odds Ratios for MP Use for ADLxCPS Interaction Term



The remaining scales are moderated by the PES criteria being excluded from the sample but even so, ABS, Mania, PSS Short, and RHO were associated with increased odds of MP use, and most substantially for ABS. At a moderate severity score on the ABS, the odds of MP use were more than quadrupled. On the other hand, SoS was associated with reduced odds of MP use. The final explanatory variable included in the model in the Other Health Conditions category was history of falls which was associated with a 73% increased odds of MP use. This final model was assessed as a good fit based on the ROC curves for MP use. The c-statistic (or Area Under the Curve) was 0.84 (CI = 0.83 – 0.85) for the MP model (Figure 7.2).

Figure 7.2. ROC Curve for MP Use



The Hosmer Lemeshow statistic indicated there was a lack of fit with a large chi-square ($\chi 2$ = 43.4, df = 8) and small *p*-value ($p < .0001$). Secondarily, further examination demonstrated that there was improved model fit when the observations were stratified by gender. With minor compromise in the c-statistic from 0.84 for the full final MP model, stratified by gender, for males all variables were retained except living arrangement, residential stability, age at first MH hospitalization, inpatient status at time of assessment, diagnoses of schizophrenia and other psychotic disorders and eating disorders, ABS, Mania, and PSS-short (c = 0.79, HL $\chi 2$ = 14.24, df = 8 and $p = .08$). For females, all variables were retained except residential stability, amount of time in hospital, police intervention, inpatient status at the time of assessment, and diagnosis of schizophrenia (c = 0.81, HL $\chi 2$ = 10.51, df = 8 and $p = .23$). No mental health service use characteristics were retained in the female group whereas amount of time in hospital and police intervention were significant for the male group. Living arrangements, eating disorders, ABS, Mania, and PSS-Short were retained only in the model for the female group and not for the male group. For both male and female models, the interaction

between ADL and CPS was not significant. Table 7.27 shows the results of the gender stratified model.

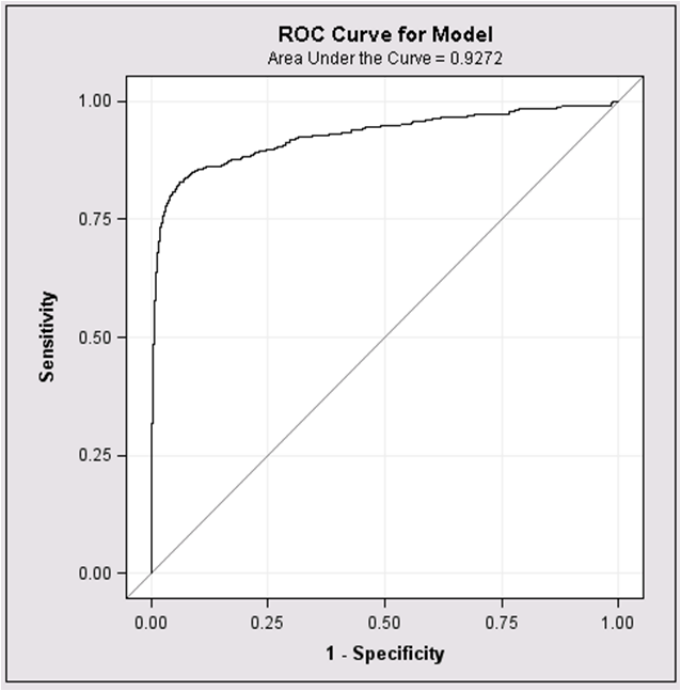
7.5.2.2 Multivariate Model – Risk Factors for Chair Use

The final NoPES model in Table 7.28 identified that the oldest adults (75 – 84 and 85 – older) were at significantly greater risk of Chair use with odds doubled compared to the reference group, 18 – 24 year old group. Females had 30% lower odds of Chair use compared to males. Those who lived in a group institutional setting prior to admission to hospital had greater odds of Chair use than those who were living with family or alone. Among the MH clinical characteristics, two significant variables were retained in the model, current inpatient type and schizophrenia. Patients admitted for psychogeriatric care had 63% greater odds of Chair use than patients admitted for acute care. Patients with a provisional diagnosis of schizophrenia had lower odds of Chair use than those without a diagnosis of schizophrenia.

Several of the RAI-MH scales were retained in the final model. Loss of independence in the performance of activities of daily living (ADL Hierarchy) substantially increased the odds of Chair use, more so than aggressive behaviour (ABS), mania, positive signs and symptoms (PSS-Short), and risk of harm to others (RHO), although each also increased the risk of Chair use. At the highest score of the ADL Hierarchy, the odds of Chair use increased by 34 times. Reduced cognitive function (CPS) was found to increase the risk of Chair use, and at the most severe end of the scale for loss, the odds increased 3.5 times. There was no significant interaction between CPS and ADL for Chair use. Other health conditions variables retained in the final model included history of falls which more than doubled odds of Chair use, Any Neuro also almost doubled the odds of Chair use and hearing loss was protective of Chair use reducing the odds by 30%.

This model was assessed as an excellent fit based on the ROC curves for Chair use (Figure 7.3). The AUC = 0.93 (CI = 0.91 – 0.94) for the Chair model.

Figure 7.3. ROC Curve for Chair



The Hosmer Lemeshow statistic concurred there was a good fit with a relatively small chi-square (HL $\chi 2 = 8.4$, df = 8) and large *p*-value (< .40).

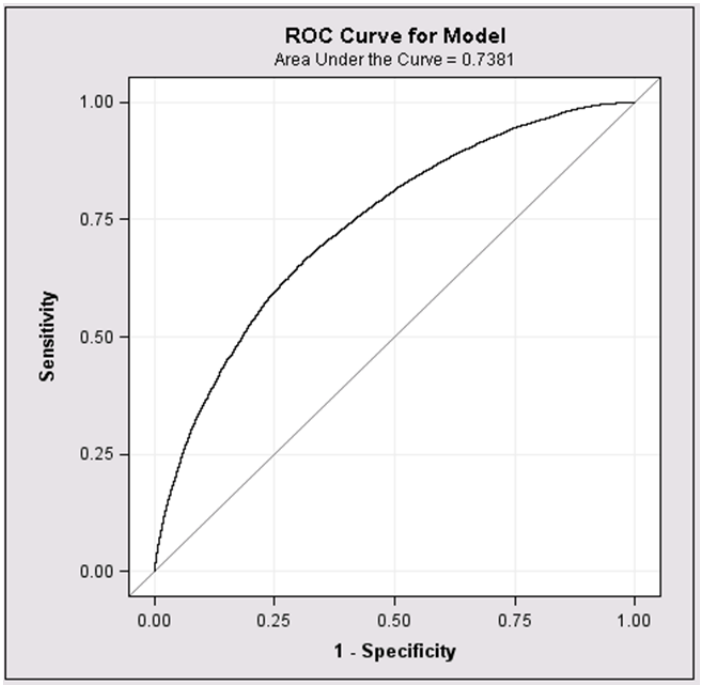
7.5.2.3 Multivariate Model – Risk Factors for ACM Use

The NoPES model for ACM shown in Table 7.29 identified those in the younger age groups at greatest risk of ACM with diminishing odds through to the older age groups with only a minor uptick for the oldest age group (85 years and older). Gender was not significant. Patients with temporary residential status raised the odds slightly for ACM use. Two MH Service Use characteristics were retained in the final model. Patients admitted at the age of 65 and older had increased odds of ACM. All other admission age groups were not significant risk factors. Police intervention increased the odds of ACM use with slightly higher odds for those patients with intervention in the 7 days prior to assessment. The patients' status at the time of assessment was retained in the model identifying those patients with a status of informal, involuntary and psychiatric

assessment with increasing odds of ACM use in the order listed. Patients admitted for longer-term care and forensic evaluation had 50% lowered odds of ACM compared to those admitted for acute care. Psychogeriatric care was not significant. The provisional diagnoses, schizophrenia and other psychotic disorders and anxiety disorders, increased the odds of ACM use in the model. Eating disorders were protective of ACM use. Moderate levels of aggressive behaviour (ABS) tripled the odds of ACM use as did impaired cognitive function, which doubled the odds at the most severe level of loss. Other behavioural scales associated with increased odds of ACM use included Mania, PSS Short, RHO, and SoS. These scales were moderated based on the PES criteria, meaning that at moderate scores of Mania, PSS Short, RHO and SoS, the odds for ACM use were still increased in the NoPES model. Functional performance in IADL and SCI were also significant risk factors for ACM use increasing the odds by 50% at the most severe levels of loss of independence. There was no significant interaction between CPS and ADL. No variables within the Other Health Conditions category were significant in the final ACM NoPES model.

The ACM NoPES model demonstrated an adequate fit according to the ROC curve goodness of fit test (Figure 7.4). The AUC for the ACM model was 0.74 with CI = 0.73 – 0.74.
The Hosmer Lemeshow statistic indicated there was a lack of fit ($\chi 2 = 79.1$, df = 8, $p < .0001$). A secondary examination of the observations stratified by gender resulted in an improved model fit. Table 7.30 shows the results of the stratified analysis. With minor compromise in the c-statistic from 0.74 for the full final ACM model, for males, all variables were retained except current patient type, diagnoses of anxiety and eating disorders, ABS, CPS, RHO, SCI, and SoS (c = 0.72, HL $\chi 2 = 14.6$, df = 8 and $p = .07$). For females, all variables were retained except residential stability, current patient type, diagnoses of schizophrenia and other psychotic disorders, anxiety, and eating disorders, ABS, Mania, and SoS (c = 0.70, HL $\chi 2 = 12.1$, df = 8 and $p = .15$). There were only minor changes in the odds ratios of retained variables in both the male and female models compared to those in the full non-stratified final model.

Figure 7.4. ROC Curve for ACM



7.5.2.4 Multivariate Model – Risk Factors for Any CI

The final model for Any CI use identified significant variables within each of the categories of explanatory variables (Table 7.31). Within the Sociodemographic Characteristics, generally with increasing age from middle to older age adults the odds of Any CI use were lower. There was a minor uptick in the odds for the oldest age group (85 years and older). Those patients with temporary residential status prior to admission to hospital were at slightly greater risk of Any CI use than those with stable residency.

Within the MH Service Use characteristics category, amount of time in hospital (< 31 days), age at first hospitalization (65 years and older), and any police intervention increased the odds of Any CI use. Patients whose age at first hospitalization was 65 years and older had 30% increased odds of Any CI use.

Of the MH Clinical Characteristics retained in the final model nonvoluntary inpatient status at time of assessment, impaired capacity to consent to disclose health information, and a provisional diagnosis of schizophrenia and other psychotic disorders increased the odds of Any CI. . Patients

with an inpatient status of informal, involuntary and psychiatric assessment had 50%, 60%, and 72% increased odds of Any CI use, respectively. Patients incapable of providing consent to release health information had 32% increased odds of Any CI use.

Functional loss in the areas of IADL and SCI increased the odds of Any CI use. The analysis identified interaction between ADL and CPS with CI use (Figure 7.5).

Figure 7.5. Odds Ratio for Any CI for ADLxCPS Interaction Term

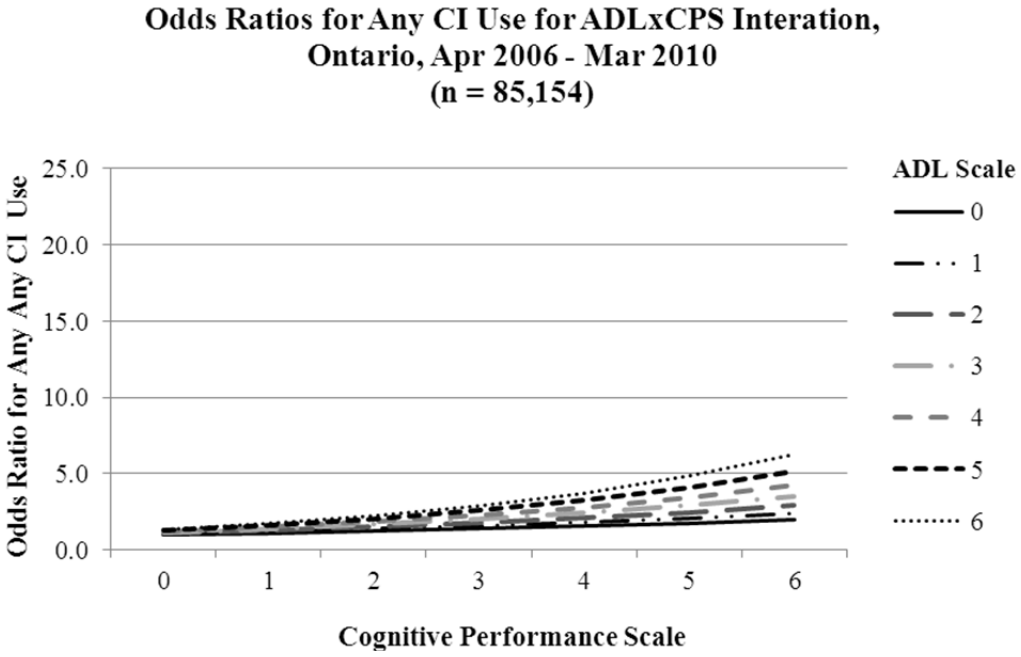


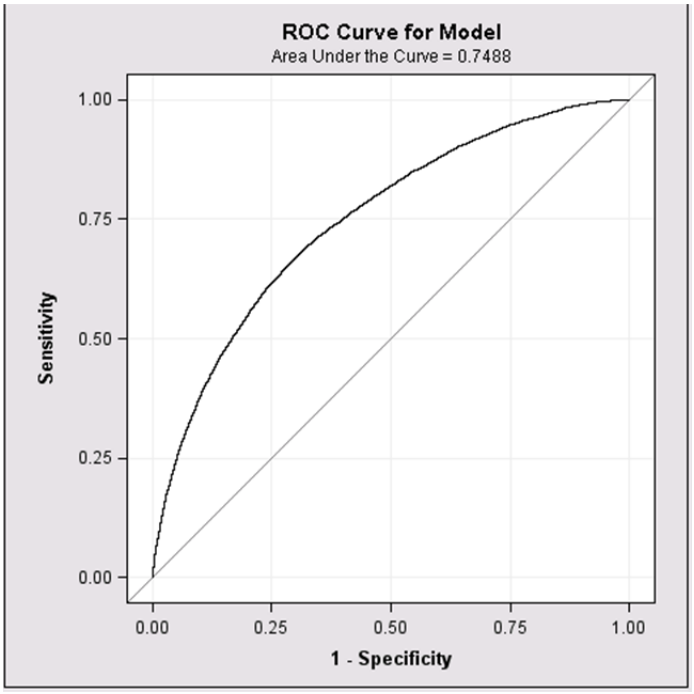
Figure 7.5 illustrates that with increasing ADL and CPS loss there is an associated increase in the odds of Any CI use. This interaction is most pronounced with increasing loss of ADL function. For patients with a level 6 ADL score and a CPS of zero, the odds of Any CI is 1.3 and at CPS 6, the odds increase to 6.3. In contrast at the lower level of ADL loss (ADL = 2), at CPS score of 1, the odds of Any CI use is 1.2 and at CPS score of 6, the odds increase only to 2.9.

Increased severity of behavioural symptoms also increased the odds of Any CI use for the NoPES sample. For NoPES with aggressive behaviour (ABS) the maximum score was 5 (on a scale of 12) increased the odds of Any CI use 2.8 times. Patients with the highest scores for RHO equal to 6

(but did not exhibit violence towards others in the three days prior to the assessment) had 75% increased odds of Any CI. Other behavioural scales retained in the model modestly increased the odds of Any CI use were PSS-Short and SoS. Mania raised the odds of Any CI use by 4.7 times at the highest score equal to 18.

This model was assessed as a moderate fit based on the ROC curves for Any CI use. The c-statistic (or Area Under the Curve) was 0.75 (CI = 0.74 – 0.75) for the Any CI model (Figure 7.6).

Figure 7.6. ROC Curve for Any CI



Secondarily, the Hosmer Lemeshow (H-L) statistic was examined indicating the contrasting result that there was a lack of fit with a large chi-square ($\chi 2 = 63.7$, df = 8) and small *p*-value ($p < .0001$). To examine the potential that the fit was better for a subset of the observations, stratified models were run by age and gender. The final model for Any CI was shown to have an improved fit when stratified by gender (Table 7.32). For males, retained variables in the model included age, police intervention, inpatient status at the time of assessment, capacity to consent to release health information, diagnosis of schizophrenia and other psychotic disorders, ADL, CPS, IADL, Mania, PSS-Short, SoS, and history of falls (c = 0.74, H-L $\chi 2 = 14.7$, df = 8 and $p = .07$) with no sacrifice in

the c-statistic compared to the non-stratified model. Variables eliminated included: residential stability, amount of time in hospital, age at first hospitalization, current patient type, eating disorders, ABS, RHO, SCI, ID, ADRD, and ID. For females, the eliminated variables were the same variables as the male model but additionally eliminated IADL, Mania, PSS, and SoS. The retained variables included age, police intervention, inpatient status at the time of assessment, diagnosis of schizophrenia, ADL, CPS, and history of falls (c = 0.68, H-L $\chi 2 = 14.7$, df = 8 and $p = .07$). Of the retained variables there were minor only changes in the odds ratios in both male and female compared to the full non-stratified final model. The most striking difference between the male and female groups was the lack of significance of the IADL, Mania, PSS-Short, and SoS for the female group.

7.6 Discussion

This study included 85,154 completed RAI-MH assessments that identified the absence of a psychiatric emergency situation (NoPES) as defined by the RAI-MH Control Intervention Client Assessment Protocol (CAP)(46). Of these 85,154 NoPES observations, 12,097 had control interventions use without a corresponding psychiatric emergency situation. An immediate focus on the reduction of CI use with NoPES patients will bring about an improvement in the quality and safety of care in MH.

This study, to the awareness of the researcher, is the first to examine the use of control interventions with patients with a documented absence of a psychiatric emergency situation (NoPES), and additionally, where the NoPES condition is explicitly defined and quantified in a standardized manner and applied across the entire study sample. The approach of this study is in contrast to previous studies, which focused on the examination of risks that predict CI use and the identification of high-risk subpopulations(1, 2, 7, 9-11, 13, 16, 19, 24, 47-49). This study sought to identify patients described as NoPES but yet had CI use, providing the evidence of a serious problem and creating awareness of the necessity for change and improvement; a foundational step in quality improvement(50).

No jurisdiction has reported complete eradication of CI use in MH though there is evidence of great strides in the reduction of the use of CIs(14, 18). It is questioned whether a complete cessation of CI use is realistic, viable, or even best practice given a holistic assessment of the efficacy of CI use and its full impacts not only to the patient, but to other patients, family/friends, staff, and the institutions themselves(51). It is irrefutable that the use of CIs can cause substantial secondary harm and death(28, 52-55), and for that reason, reduction of their use is warranted although consideration must also be given to the rights and moral obligations to ensure a safe treatment environment for other patients and staff(3, 51, 56). CI use reduction with NoPES patients is a good starting point.

The current paper quantified the potential to reduce the use of CI through the examination of CI use when there is an absence of a PES. The RAI-MH CI CAP quantifies PES to include displays of violence toward others or self, severe escalation of positive symptoms, extreme behaviour disturbance and severe aggressive behaviour. Previous studies similarly reported the reasons for the use of CI to include situations of harm or potential for harm to self, others and/or property(1-23). There is a need to understand the risks of CIs use with NoPES patients as a means to provide evidence to support the development of effective best practices and target CI reduction strategies, such as CI use with the older adult patient, education/training in the care of patients with cognitive decline and physical functional impairment, and education/training in de-escalation techniques and other therapeutic calming approaches(57).

The multivariate models for MP, Chair and ACM included sociodemographic and MH Service Use Characteristics as explanatory variables were similarly included in the studies cited in the current paper. Although these variables are generally not modifiable factors from the perspective of clinical treatment, they provide descriptive evidence of populations at risk for CI use and support the necessary discussion with community-based care and service providers, identification of the prevalence of these patient characteristics in the patients served, and the associated use rates of CIs. To the extent that variables within the sociodemographic and MH service use characteristics categories were retained in the final risk models for CI use, these pre-existing distal factors were

significant risk of CI use absent of more proximal psychiatric factors (e.g., behavioural expression of extreme aggressiveness, threats of violence, imminent danger) in several instances such as partnered marital status and no income source for MP use, and older age and living in a group setting for Chair and residential instability for ACM. As well, a history of recent police intervention substantially increased the risk of MP and ACM use. Future study of the attitudes and beliefs of clinicians regarding the use of CIs in MH will be an important facet of study to undertake to inform the anticipated training and education needs of clinicians which should be a cornerstone to a CI reduction program which will be important to address potential bias or systematic approach to "types" of people rather than proximal circumstances and symptoms(58-61).

The multivariate model of risk for Any CI may not be as informative as the models for each of the individual CI types. The risk factors for the individual CI types (MP, Chair, and ACM) were not the same and also the influences of the risk factors were not always aligned. Not unexpectedly, the Any CI model showed that increasing age was associated with lowered odds of Any CI, whereas the analysis of Chair use clearly showed that older age was associated with greater odds of Chair use. Another example of conflicting results include psychiatric diagnosis where schizophrenia and other psychotic disorders was an increased risk for Any CI (and ACM) in contrast to MP use where schizophrenia was not significant, and for Chair use where schizophrenia reduced the risk. This inconsistent pattern of risk factors was also present in the RAI-MH scales further pointing to the importance of isolating CI types and stratifying by gender. The utility of an overall risk model for Any CI type is of questionable value and may potentially misdirect development efforts for CI reduction.

The benefit of including Any CI use in the descriptive analysis is evident for benchmarking purposes. The summative results of Any CI type provides a high-level view of use rates of CI across the entire jurisdiction based on provincial, regional and hospital rollups in a standardized and rational manner. In other words, hospitals can develop strategies to reduce CI use in any one or more types of CI as determined by the local circumstances and participate in benchmarking based on a rolled up

performance metric of Any CI use. This type of benchmarking is contingent on the comparability of the CIs measured, definitions, and data collection methods, and in the case of Ontario, these ideal conditions have been in place since 2005.

A key finding identified secondarily in the testing of model fit using the Hosmer-Lemeshow test was the gender differences in the risk factors for MP, ACM and Any CI use. The findings of earlier studies largely reported that gender was not a significant factor for the use of MP and ACM(10, 11, 18, 24, 47, 62). There was a minority of studies that identified gender as significant(13, 21). Changes in statistical analysis tools may potentially explain this difference. For example, the initial results of the current study identified gender as significant in the non-stratified multivariate logistic regression modeling reducing the risk of MP and Chair use but not significant for ACM and Any CI. Each of the four models was shown to have good to excellent goodness of fit according to the c-statistic indicating that the probability of the models can predict an outcome better than by chance. There is a growing opinion that when developing models for risk prediction, that measures such as the c-statistic which is an indices of discrimination, be used together with the Hosmer-Lemeshow (H-L) test, a measure which compares observed and predicted risk within grouped data(63). When these statistics indicate differing results, one possible explanation, as was shown in the current study, is that the model is a better fit for a subgroup of the sample. The use of the H-L applied secondarily to the current research resulted in identifying a result not otherwise apparent, that being, the models for MP, ACM, and Any CI were not as good a fit as originally concluded and stratification by gender significantly improved the models. The finding that gender does impact the risk of use of MP, ACM and Any CI is perhaps not novel but certainly the robust nature of the data source and the large sample size increases the level of confidence one may have in the interpretation of the results compared to those of previous studies. The application of the H-L test needs further study to better understand its utility prior to systematic adopted in model fit testing. If proven to be robust and a valid test, the impact of gender on the risk for CI use and consequently the importance of

refinement of CI reduction strategies specific to gender differences should be an important consideration.

The development of strategies for reducing the use of CIs in MH would likely have greater likelihood of success if those strategies were individualized to MP, Chair and ACM and not collectively as CIs. This current study identified that although Chair is a type of MP restraint, there were differentiating risk factors that necessitate separate consideration, including older age, living in a group setting, and psychogeriatric focus of care. For MP and ACM use there were common risk factors including younger age, residential instability, older age at first MH hospital admission, non-voluntary status at time of assessment, current inpatient type (except forensic), and eating disorders, although schizophrenia and other psychotic disorders and anxiety disorders variables had contrasting effects on risk of CI use; lowered odds of MP use and raised odds for ACM use. Consistent for MP, Chair and ACM use models, ABS, Mania, PSS-Short, and RHO substantially increased the risk of CI use. This was somewhat of an unexpected result for the NoPES study because it excludes all assessments with a PES, in other words, assessments retained in the NoPES sample would exclude conditions warranting the use of CIs, (e.g., command hallucinations or violence towards others in the seven days prior to assessment) or the higher extreme scores of the scales were truncated as per the PES criteria of the Control Intervention CAP in the interRAI MH Clinical Assessment Protocols manual (version 9.1 Canadian Edition) for example, ABS. The reduction in the use of CIs with NoPES ABS, Mania, PSS-Short and RHO through education and training on the use of alternative less restrictive methods to manage lower risk of harm behaviours/symptoms is an opportunity to improve the quality of care for patients.

The results of the current study provide new evidence that is not encumbered by the limitations of previous studies in the methods, data sources, and sample size. The current study covers a large geographical area, inclusion of 72 hospitals, based on a large sample (> 85,000), standardized definitions of CI types, multiple years of data collection, and standardized data collection methods, tools, and training, and further data collection that is part of the normal daily

clinical practice for inpatient mental health practitioners. This study overcame limitations of previous studies through the use of data collected by trained clinical professionals using an evidence-based standardized assessment system that was embedded into the everyday practice of every MOHLTC approve MH hospital/MH unit of a general hospital serving adult patients in Ontario since 2005. Research findings validated the RAI-MHAP (recently renamed "CAP") for physical restraints/seclusion and ACM(39) against a gold standard, being clinician judgement. An international expert panel further reinforced these findings(39). And further, hospitals have ongoing support from CIHI, a nationally recognized health information management institution, providing standardized training and education and maintaining a centralized data repository with systemic data quality audit procedures. The long-standing establishment of such a system in MH is unique in Ontario and not found in any other province, although pilot testing has occurred in British Columbia, Alberta, Manitoba and Newfoundland(64). The RAI-MH has been implemented in Iceland, Finland (www.interRAI.org).

The standardized platform of the RAI-MH data has enabled regional aggregate reporting and comparative peer groups which will hopefully lead to collaborative discussion on CI reduction strategies and not merely data collection issues. This achievement requires leadership from the highest levels of government in Canada, Ontario, LHIN and local jurisdictions as has been demonstrated in past successful efforts to reduce restraint use such as in long term care home settings. As other provinces and countries adopt the RAI-MH, national and international comparisons will be made possible, generating even more momentum for CI use reduction. Ontario should not be deterred in its efforts by the lack of national and international comparisons because the province is in a unique position to move forward now with all the foundational systems in place necessary make care better for MH patients in Ontario and to be the national leader in CI reduction in adult MH inpatient services.

7.7 Limitations

Although this study points out potential opportunities for Ontario hospitals to reduce the use of CIs with adult MH patients, the data used to complete this study only included Ontario hospitals and therefore the results are not generalizable to other provinces and territories or other jurisdictions. Future work should include MH hospitals/MH units within general hospital from other provinces and possibly international participation. As a risk model for CI use, it is important to point out that this study only included one aspect of the WHO framework for the International Classification for Patient Safety, namely, patient characteristics. The current study makes a significant contribution to the field in better understanding the rates of use of CI when there is NoPES and additionally, the patient characteristics that pose as risk factors for CI use when there is NoPES and gender differences in the risk of CI use. This work is only the beginning of gaining a better understanding of what influences the use of CI in MH. There are additional contributing factors such as organizational culture and policies, leadership priorities, team composition/staffing levels, clinician preferences and attitudes, patient input on CI use, and layout and lighting considerations in treatment space, inpatient rooms, common areas, and access to out-of-doors(8, 14, 18, 65, 66) and there is a need for ongoing work to gain a full understanding of CI use in MH.

In terms of prevalence of CI use, the clinicians completing the RAI-MH report on the use of CI for the three days prior. It would be reasonable to assume the reported rates of use are conservative because the entire period of the patient's stay is not considered. The RAI-MH was not intended to be used as a CI use data collection system. Its primary purpose is to support clinical practice. Very importantly, by capturing CI use in the three days prior the clinical observations captured throughout the rest of the assessment have direct relevancy to the use of the CI and also reduces recall error, but additionally, minimizes the assessment burden on the RAI-MH assessor.

7.8 Conclusion

The use of CIs with patients in adult MH inpatient hospitals/units is a sensitive issue. MH serves a complex patient population with challenging mix of behaviours inherent to the MH issues for which patients are admitted to hospital. It may be unrealistic to completely avoid the use of CI with the MH patient population especially with those who display severe violence toward others, threatening and abuse towards others, or displaying escalating extreme behaviours that could harm him/herself or property. This current study examined the use of CIs in the absence of such extreme behaviours. Among a sample of 85,154 assessments of NoPES adult MH patients, 12,097 had CI use. It is conceivable to consider that these 12,000 events of CI use as avoidable, yet conceivably controversial. There is demonstrable evidence from other jurisdictions serving adult MH patients, as well as work in long term care and acute care sector that have achieved substantial reductions in CI use. Their efforts show that these changes in CI use require a considerable level of government, organizational and individual commitment of leadership, and of resources and time to plan, implement, evaluate and sustain the gains. Continual efforts to reduce the use of CIs in MH is an achievable quality of care improvement goal and it is more than reasonable to target that effort to patients who do not display behaviours constituting a psychiatric emergency situation but nevertheless have control intervention use. These CI reduction efforts should be developed with consideration of gender specific risks. In the process of delivering care intended to bring recovery and increased quality of life, hospitals need do everything that is reasonably possible to eliminate unsafe care practices.

7.9 Tables

Table 7.4 Use of Control Interventions by Type Among Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 - 2010 (N=85,154)

		Observations of			
		Any CI	**MP**	**Chair**	**ACM**
Year	# Assessments	% (n)	% (n)	% (n)	% (n)
2006/7	28,164	14.2 (2,936)	3.4 (693)	0.7 (149)	12.2 (2,511)
2007/8	27,851	14.8 (3,028)	2.9 (584)	0.6 (118)	13.1 (2,679)
2008/9	28,074	14.4 (2,995)	2.6 (533)	0.5 (96)	13.0 (2,704)
2009/10	31,295	13.4 (3,138)	2.5(591)	0.6 (131)	12.0 (2,794)
Total	85,154	14.2 (12,097)	2.8 (2,401)	0.6 (494)	12.6 (10,688)
p-value		< .0001	< .0001	< .08	< .0001

Chi-square statistical test for fiscal year by CI type

Table 7.5 Descriptive Univariate Analysis of Adult Mental Health Inpatients Without a Psychiatric Emergency Situation (NoPES), Ontario 2006 – 1020 (N = 85,154)

Sociodemographic Characteristics	
Age (years); mean (SD)	45.0 (16.3)
Age Min/Max (years)	18.0/108.8
Distribution by age group (%)	
18 – 24	11.7
25 – 34	19.1
35 – 44	21.4
45 – 54	22.4
55 - 64	13.1
65 – 74	6.8
75 – 84	4.2
85 and older	1.3
Female (%)	50.8
Marital Status (%)	
Partnered	29.7
Not partnered	70.3
Language spoken other than English (%)	5.1
No income source (%)	10.3
Living Arrangement (%)	
Living with Family/Alone	89.7
Living in group setting	10.3
Residential stability (%)	
Temporary (Shelter)	24.4
Homeless	0.8
MH Service Use Characteristics	
Recent MH hospital admissions (in last 2 years) (%)	
1 – 2	36.0
3 or more	17.8
Time since last discharge from MH admission (%)	
> 1 year	29.7
31 days – 1 year	28.0
< 31 days	13.8
Amount of time hospitalized in last 2 years (%)	
< 31 days	31.8
31 days – 1 year	19.9
> 1 year	2.1

Table 7.5 Descriptive Univariate Analysis of Adult Mental Health Inpatients Without a Psychiatric Emergency Situation (NoPES), Ontario 2006 – 2010 (N = 85,154) cont.

MH Service Use Characteristics cont.	
Police intervention (%)	
> 1 week	22.1
< 1 week	5.5
MH Clinical Characteristics	
Status at time of assessment (%)	
Voluntary	54.7
Informal	1.0
Involuntary	21.6
Psychiatric Assessment	19.5
Forensic	2.9
Current patient type (%)	
Acute	80.9
Longer term	13.0
Psychogeriatric	3.3
Forensic Evaluation	2.9
Incapacity/Incompetent (%)	
Consent for treatment	7.7
Managing property	6.1
Consent to disclose health info	3.8
Own decision-maker	8.1
Provisional psychiatric diagnosis at time of assessment (%)	
Child/Adolescent disorders	1.6
Mental disorder due to gen medical conditions	1.6
Substance disorders	24.0
Schizophrenia and other psychotic disorders	33.7
Mood disorders	54.8
Anxiety disorders	12.6
Eating disorders	1.8
Sleep disorders	0.6
Impulse Control	1.6
Adjustment disorders	4.0
Personality disorders	10.3

Table 7.5 Descriptive Univariate Analysis of Adult Mental Health Inpatients Without a Psychiatric Emergency Situation (NoPES), Ontario 2006 – 2010 (N = 85,154) cont.

RAI-MH Scales % (N)		
Activities of Daily Living Hierarchy (ADL)	1-2	9.6 (8,210)
	3-4	3.8 (3,195)
	5-6	0.8 (654)
Aggressive Behaviour Scale (ABS)	1-2	11.9 (10,091)
	3-4	7.6 (6,459)
	5-12	1.6 (1,326)
Anhedonia	1-2	11.2 (9,561)
	3-4	13.5 (11,529)
	5-12	36.9 (31,408)
Cognitive Performance Scale (CPS)	1-2	28.2 (24,005)
	3-4	4.7 (4,014)
	5-6	2.2 (1,869)
Depressive Severity Index (DSI)	1-2	21.0 (17,900)
	3-5	27.6 (23,472)
	6-15	26.0 (22,139)
Instrumental Activities of Daily Living (IADL)	1-2	10.9 (9,296)
	3-5	8.1 (7,590)
	6-42	23.3 (19,868)
Mania	1-2	20.1 (17,096)
	3-5	18.0 (15,306)
	6-20	14.5 (12,311)
Positive Signs and Symptoms Short (PSS Short)	1-2	12.9 (10,966)
	3-8	27.6 (23,486)
	9-12	2.0 (1,730)
Risk of Harm to Others (RHO)	1-2	49.3 (42,007)
	3-4	13.6 (11,614)
	5-6	5.8 (4,916)
Self Care Index (SCI)	1-2	47.2 (40,204)
	3-4	16.7 (14,220)
	5-6	7.5 (6,389)
Severity of Self Harm (SoS)	1-2	40.1 (34,115)
	3-4	16.6 (14,141)
	5-6	18.2 (15,489)

Table 7.5 Descriptive Univariate Analysis of Adult Mental Health Inpatients Without a Psychiatric Emergency Situation (NoPES), Ontario 2006 – 2010 (N = 85,154) (p <.0001) cont.

Other Health Conditions (%)		
Any falls in the past 30 days	5.1	(4,335)
Alzheimer's Disease and other related disorders (ADRD)	6.1	(5,217)
Any neurological condition	6.8	(5,805)

Table 7.6 Sociodemographic Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency Situation, Ontario 2006 – 2010 (N = 85,154) by Any Control Intervention (Any CI)

		Any CI N = 12,097	No CI N = 73,057
		% (n)	% (n)
Age	*p*	< .0001	
18-24		13.9 (1,683)	11.4 (8,317)
25-34		21.0 (2,534)	18.8 (13,713)
35-44		21.0 (2,540)	21.5 (15,668)
45-54		20.2 (2,445)	22.8 (16,636)
55-64		11.5 (1,389)	13.4 (9,759)
65-74		5.7 (694)	7.0 (5,111)
75-84		4.8 (581)	4.1 (3,021)
85+		1.9 (231)	1.1 (832)
Sex	*p*	< .0001	
Male		52.7 (6,368)	48.7 (35,548)
Female		47.4 (5,727)	51.3 (37,491)
Marital status	*p*	< .0001	
Not partnered		74.7 (9,039)	69.6 (50,822)
Partnered		25.3 (3,058)	30.4 (22,235)
Language	*p*	< .0001	
English		94.1 (11,388)	95.1 (69,469)
Other		5.9 (709)	4.9 (3,588)
Income	*p*	< .0001	
Income		88.5 (10,705)	89.9 (65,707)
No income		11.5 (1,392)	10.1 (7,350)
Living arrangements	*p*	< .0001	
Family/Alone		86.7 (10,486)	90.2 (65,893)
Group		13.3 (1,611)	9.8 (7,164)
Admitted from LTCH	*p*	< .0001	
Other		97.1 (11,744)	98.9 (72,226)
LTCH		2.9 (353)	1.1 (831)
Residential stability	*p*	< .0001	
Not temporary		71.4 (8,636)	75.3 (55,024)
Temporary		27.5 (3,331)	23.9 (17,479)
Homeless		1.1 (130)	0.8 (554)

Table 7.7 Mental Health Services Use Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency Situation, Ontario 2006 – 2010 (N = 85,154) by Any Control Intervention (Any CI)

		Any CI N = 12,097	No CI N = 73,057
		% (n)	% (n)
# of MH admits recent	*p*	< .0001	
None		42.9 (5,192)	46.8 (34,182)
One or more		57.1 (6,905)	53.2 (38,875)
# of MH admits life time	*p*	< .0001	
None		26.5 (3,202)	28.8 (21,067)
One or more		73.5 (8,895)	71.2 (51,990)
Time since last discharge	*p*	< .0001	
No previous admission		26.5 (3,202)	28.8 (21,067)
> 1 year		29.3 (3,547)	29.7 (21,700)
31 days – 1 year		29.5 (3,569)	27.8 (20,307)
< 31 days		14.7 (1,779)	13.7 (9,983)
Amount of time in hospital	*p*	< .0001	
None		42.9 (5,192)	46.8 (34,182)
< 31 days		33.9 (4,100)	31.4 (22,972)
31 days – 1 year		20.9 (2,527)	19.7 (14.409)
> 1 year		2.3 (278)	2.0 (1,494)
Age at first hospitalization	*p*	< .0001	
0 – 14 years		3.7 (446)	3.8 (2,807)
15 – 24 years		35.8 (4,336)	29.2 (21,322)
25 – 44 years		38.6 (4,668)	42.2 (30,842)
45 – 64 years		14.0 (1,689)	18.6 (13,563)
65+ years		7.9 (958)	6.2 (4,523)
Police intervention	*p*	< .0001	
Never		65.6 (7,937)	73.5 (53,675)
> 1 week		24.7 (2,987)	21.7 (15,843)
<1 week		9.7 (1,173)	4.8 (3,539)

Table 7.8 Mental Health Clinical Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Any Control Intervention

		Any CI N = 12,097	No CI N = 73,057
		% (n)	% (n)
Status at time of assessment	*p*	< .0001	
Voluntary		35.2 (4,257)	58.0 (42,355)
Informal		1.6 (192)	0.9 (653)
Involuntary		33.8 (4,094)	19.6 (14,336)
Psych assessment		27.6 (3,342)	18.2 (13,261)
Forensic		1.5 (178)	3.2 (2,311)
Unknown		0.3 (34)	0.2 (141)
Current patient type	*p*	< .0001	
Acute		87.8 (10,615)	79.7 (58,234)
Long term		5.6 (678)	14.2 (10,349)
Psychogeriatric		5.2 (625)	3.0 (2,188)
Forensic evaluation		1.5 (179)	3.1 (2,286)
Capacity/Competency			
Consent for treatment	*p*	< .0001	
Capable		86.9 (10,509)	93.2 (68,067)
Incapable		13.1 (1,588)	6.8 (4,990)
Managing property	*p*	< .0001	
Capable		89.6 (10,837)	94.6 (69,108)
Incapable		10.4 (1,260)	5.4 (3,949)
Consent to disclose health info	*p*	< .0001	
Capable		92.5 (11,194)	96.8 (70,736)
Incapable		7.5 (903)	3.2 (2,321)
Decision-making	*p*	< .0001	
Own decision-maker		87.4 (10,568)	92.7 (67,707)
Substitute decision-maker		12.6 (1,529)	7.3 (5,350)

Table 7.8: Mental Health Clinical Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Any Control Intervention (Any CI) (cont.)

Psychiatric diagnoses			
Child/Adolescent disorders	*p*	.03	
None		98.2 (11,878)	98.5 (71,929)
Present		1.8 (219)	1.5 (1,128)
Mental disord due to gen med	*p*	.003	
None		98.4(11,859)	98.0 (71,895)
Present		2.0 (238)	1.6 (1,162)
Substance disorders	*p*	< .0001	
None		79.1 (9,565)	75.5 (55,186)
Present		20.9 (2,532)	24.5 (17,871)
Schiz/psychotic disorders	*p*	< .0001	
None		55.6 (6,724)	68.1 (49,761)
Present		44.4 (5,373)	31.9 (23,296)
Mood disorders	*p*	< .0001	
None		53.1 (6,420)	44.0 (32,105)
Present		46.9 (5,677)	56.1 (40,952)
Anxiety disorders	*p*	< .0001	
None		90.9 (11,001)	86.9 (63,455)
Present		9.1 (1,096)	13.1 (9,602)
Eating disorders	*p*	< .0001	
None		99.4 (12,025)	98.0 (71,626)
Present		0.6 (72)	2.0 (1,431)
Sleep disorders	*p*	.21	
None		99.5 (12,032)	99.4 (72,594)
Present		0.5 (65)	0.6 (463)
Impulse Control	*p*	.19	
None		98.3 (11,891)	98.5 (71,929)
Present		1.7 (206)	1.5 (1,128)
Adjustment disorders	*p*	< .0001	
None		96.8 (11,705)	95.9 (70,042)
Present		3.2 (392)	4.1 (3,015)
Personality disorders	*p*	.24	
None		90.0 (10,885)	89.6 (65,483)
Present		10.0 (1,212)	10.4 (7,574)

Table 7.9 RAI-MH Scales for Adult Mental Health Inpatients Without a Psychiatric Emergency Situation, Ontario 2006 – 2010 (N = 85,154) by Any Control Intervention

		Any CI N = 12,097	No CI N = 73,057
		% (n)	% (n)
Activities of Daily Living Hierarchy	*p*		< .0001
None		77.5 (9,380)	87.2 (63,715)
1-2		13.3 (1,604)	9.0 (6,606)
3-4		7.0 (850)	3.2 (2,345)
5-6		2.2 (263)	0.5 (391)
Aggressive Behaviour Scale (ABS)	*p*		< .0001
None		56.1 (6,785)	82.8 (60,493)
1-2		20.9 (2,523)	10.4 (7,568)
3-4		18.0 (2,172)	5.9 (4,287)
5-12		5.1 (617)	1.0 (709)
Anhedonia	*p*		.0003
None		36.7 (4,436)	38.6 (28,220)
1-2		11.7 (1,418)	11.2 (8,143)
3-4		14.2 (1,713)	13.4 (9,816)
5-12		37.5 (4,530)	36.8 (26,878)
Cognitive Performance Scale	*p*		< .0001
None		48.2 (5,832)	67.7 (49,434)
1-2		37.1 (4,492)	26.7 (19,513)
3-4		9.1 (1,103)	4.0 (2,911)
5-6		5.5 (670)	1.6 (1,199)
Depressive Severity Index (DSI)	*p*		< .0001
None		26.4 (3,199)	25.3 (18,444)
1-2		22.6 (2,738)	20.8 (15,162)
3-5		27.5 (3,324)	27.6 (20,148)
6-15		23.4 (2,836)	26.4 (19,303)
Instrumental Activities of Daily Living	*p*		< .0001
None		42.6 (5,147)	59.2 (43,253)
1-2		12.9 (1,561)	10.6 (7,735)
3-5		11.1 (1,340)	8.6 (6,250)
6-42		33.5 (4,049)	21.6 (15,819)
Mania	*p*		< .0001
None		28.3 (3,425)	50.7 (37,016)
1-2		18.6 (2,249)	20.3 (14,847)
3-5		24.4 (2,946)	16.9 (12,360)
6-20		28.7 (3,477)	12.1 (8,834)

Table 7.9 RAI-MH Scales for Adult Mental Health Inpatients Without a Psychiatric Emergency Situation, Ontario 2006 – 2010 (N = 85,154) by Any Control Intervention (Any CI) cont.

Positive Sign/Symptoms (PSS Short)	*p*		< .0001
None		39.2 (4,736)	60.6 (44,236)
1-2		14.6 (1,761)	12.6 (9,205)
3-8		42.8 (5,173)	25.1 (18,313)
9-12		3.5 (427)	1.8 (1,303)
Risk of Harm (RHO)	*p*		< .0001
None		8.8 (2,333)	33.2 (24,284)
1-2		42.4 (5,133)	50.5 (36,874)
3-4		24.3 (2,934)	11.9 (8,680)
5-6		14.0 (1,697)	4.4 (3,219)
Self Care Index (SCI)	*p*		< .0001
None		14.1 (1,703)	31.0 (22,638)
1-2		48.3 (5,845)	47.0 (34,359)
3-4		21.9 (2,645)	15.8 (11,575)
5-6		15.7 (1,904)	6.1 (4,485)
Severity of Self-harm (SoS)	*p*		< .0001
None		16.0 (1,930)	26.7 (19,479)
1-2		49.3 (5,967)	38.5 (28,148)
3-4		18.5 (2,241)	16.3 (11,900)
5-6		16.2 (1,959)	18.5 (13,530)

Table 7.10 Other Health Conditions for Adult Mental Health Inpatients Without a Psychiatric Emergency Situation, Ontario 2006 – 2010 (N = 85,154) by Any Control Intervention (Any CI)

		Any CI N = 12,097	No CI N = 73,057
		% (n)	% (n)
Hearing	*p*	< .0001	
Adequate		95.2 (11,514)	96.3 (70,374)
< Adequate		4.8 (583)	3.7 (2,683)
Vision	*p*	< .0001	
Adequate		93.1 (11,259)	94.5 (69,012)
< Adequate		6.9 (838)	5.5 (4,045)
Intellectual disability	*p*	< .0001	
No intellectual disability		95.4 (11,538)	96.3 (70,734)
Intellectual disability		4.6 (559)	3.3 (2,423)
Falls	*p*	< .0001	
No falls		93.8 (11,349)	95.1 (69,470)
Falls		6.2 (748)	4.9 (3,587)
Alzheimer's/Dementia/other related disorders (ADRD)			
	p	< .0001	
None		90.2 (10,908)	94.5 (69,029)
Present		9.8 (1,189)	5.5 (4,028)
Cerebral Palsy	*p*	.56	
None		99.84 (27,127)	99.9 (72,969)
Present		0.16 (44)	0.1 (88)
Epilepsy	*p*	.72	
None		99.3 (12,010)	99.3 (72,553)
Present		0.7 (87)	0.7 (504)
Huntington's	*p*	.0005	
None		99.8 (12,075)	99.9 (73,000)
Present		0.2 (22)	0.1 (57)
Multiple sclerosis	*p*	.39	
None		99.8 (12,077)	99.8 (72,909)
Present		0.2 (20)	0.2 (148)
Parkinson's	*p*	.40	
None		99.4 (12,022)	99.4 (72,649)
Present		0.6 (75)	0.6 (408)

Table 7.10 Other Health Conditions for Adult Mental Health Inpatients Without a Psychiatric Emergency Situation, Ontario 2006 – 2010 (N = 85,154) by Any Control Intervention (Any CI) cont.

Stroke	*p*	.0005	
None		99.5 (12,036)	99.7 (72,833)
Present		0.5 (61)	0.3 (224)
Traumatic Brain Injury	*p*	0.34	
None		99.8 (12,076)	99.9 (72,956)
Present		0.2 (21)	0.1 (101)
Any Neuro	*p*	< .0001	
None		89.8 (10,864)	93.7 (68,485)
Present		10.2 (1,233)	6.3 (4,572)

Table 7.11 Sociodemographic Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Mechanical/Physical Restraint (MP)

		MP N = 2,401	No MP N = 82,753
		% (N)	
Age	*p*		< .0001
18-24		16.0 (385)	11.6 (9,615)
25-34		20.0 (479)	19.1 (15,760)
35-44		18.7 (450)	21.5 (17,758)
45-54		17.1 (411)	22.6 (18,670)
55-64		10.4 (249)	13.2 (10,899)
65-74		6.9 (166)	6.8 (5,639)
75-84		7.3 (176)	4.1 (3,426)
85+		3.5 (85)	1.2 (978)
Sex	*p*		< .0001
Male		58.3 (1,399)	49.0 (40,517)
Female		41.7 (1,001)	51.0 (42,217)
Marital status	*p*		< .0001
Not partnered		74.5 (1,788)	70.2 (58,073)
Partnered		25.5 (613)	29.8 (24,680)
Language	*p*		< .0001
English		91.7 (2,202)	95.1 (78,655)
Other		8.3 (199)	5.0 (4,098)
Income source	*p*		< .0001
Income		86.0 (2,064)	89.8 (74,348)
No income		14.0 (337)	10.2 (8,405)
Living arrangements	*p*		< .0001
Family/Alone		83.6 (2,008)	97.4 (74,371)
Group		16.4 (393)	10.1 (8,382)
Admitted from LTCH	*p*		< .0001
Other		94.3 (2,265)	98.7 (81,705)
LTCH		5.7 (136)	1.3 (1,048)
Residential stability	*p*		< .0001
Not temporary		70.5 (1,693)	74.9 (61,967)
Temporary		28.5 (684)	24.3 (20,126)
Homeless		1.0 (24)	0.8 (660)

Table 7.12 Mental Health Services Use Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Mechanical/Physical Restraint (MP)

		MP N = 2,401	No MP N = 82,753
		% (n)	% (n)
# of MH admits recent	*p*	.05	
None		44.3 (1,063)	46.3 (38,311)
One or more		55.7 (1,338)	53.7 (44,442)
# of MH admits life time	*p*	.08	
None		30.1 (722)	28.5 (23,547)
One or more		69.9 (1,679)	71.6 (59,206)
Time since last discharge	*p*	.03	
No previous admission		30.1 (722)	28.5 (23,547)
> 1 year		27.0 (649)	29.7 (24,598)
31 days – 1 year		28.3 (680)	28.0 (23.196)
< 31 days		14.6 (350)	13.8 (11,412)
Amount of time in hospital	*p*	.003	
None		44.3 (1,063)	46.3 (38,311)
< 31 days		34.8 (835)	31.7 (26,237)
31 days – 1 year		18.5 (443)	19.9 (16,493)
> 1 year		2.5 (60)	2.1 (1,712)
Age at first hospitalization	*p*	< .0001	
0 – 14 years		3.7 (88)	3.8 (3,165)
15 – 24 years		37.0 (889)	29.9 (24,769)
25 – 44 years		32.6 (783)	42.0 (34,727)
45 – 64 years		13.8 (332)	18.0 (14,920)
65+ years		12.9 (309)	6.3 (5,172)
Police intervention	*p*	< .0001	
Never		64.3 (1,543)	72.6 (60,069)
> 1 week		23.5 (565)	22.1 (18,265)
<1 week		12.2 (293)	5.3 (4,419)

Table 7.13 Mental Health Clinical Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Mechanical/Physical Restraint (MP)

		MP N = 2,401	No MP N = 82,753
		% (n)	% (n)
Status at time of assessment	*p*	< .0001	
Voluntary		22.2 (532)	55.7 (46,080)
Informal		2.1 (50)	1.0 (795)
Involuntary		43.8 (1,052)	21.0 (17,378)
Psych assessment		29.3 (704)	19.2 (15,899)
Forensic		2.4 (58)	2.9 (2,431)
Unknown		0.2 (5)	0.2 (170)
Current patient type	*p*	< .0001	
Acute		83.8 (2,013)	80.8 (66,836)
Long term		5.4 (130)	13.2 (10,897)
Psychogeriatric		8.4(202)	3.2 (2,611)
Forensic evaluation		2.3 (56)	2.9 (2,409)
Capacity/Competency			
Consent for treatment	*p*	< .0001	
Capable		78.0 (1,872)	92.7 (76,704)
Incapable		22.0 (529)	7.3 (6,049)
Managing property	*p*	< .0001	
Capable		83.4 (2,002)	94.2 (77,943)
Incapable		16.6 (399)	5.8 (4,810)
Consent to disclose health info	*p*	< .0001	
Capable		86.4 (2,075)	96.5 (79,855)
Incapable		13.6 (326)	3.5 (2,898)
Decision-making	*p*	< .0001	
Own decision-maker		82.5 (1,981)	92.2 (76,294)
Substitute decision-maker		17.5 (420)	7.8 (7,459)

Table 7.13 Mental Health Clinical Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Mechanical/Physical Restraint (MP) cont.

		MP N = 2,401	No MP N = 82,753
		% (n)	% (n)
Psychiatric diagnoses			
Child/Adolescent disorders	*p*	.10	
None		98.0 (2,353)	98.4 (81,454)
Present		2.0 (48)	1.6 (1,299)
Mental disord due to gen med	*p*	< .0001	
None		97.3 (2,336)	98.4 (81,418)
Present		2.7 (65)	1.6 (1,335)
Substance disorders	*p*	< .0001	
None		82.5 (1,980)	75.9 (62,771)
Present		17.5 (421)	24.2 (19,982)
Schiz/psychotic disorders	*p*	< .0001	
None		53.1 (1,276)	66.7 (55,209)
Present		46.9 (1,125)	33.3 (27,544)
Mood disorders	*p*	< .0001	
None		62.3 (1,495)	44.8 (37,030)
Present		37.7 (906)	55.3 (47,723)
Anxiety disorders	*p*	< .0001	
None		95.7 (2,297)	87.2 (72,159)
Present		4.3 (104)	12.8 (10,594)
Eating disorders	*p*	< .0001	
None		99.7 (2,394)	98.2 (81,257)
Present		0.3 (7)	1.8 (1,496)
Sleep disorders	*p*	.31	
None		99.5 (2,390)	99.4 (82,236)
Present		0.5 (11)	0.6 (517)
Impulse Control	*p*	.12	
None		98.0 (2,354)	98.4 (81,466)
Present		2.0 (47)	1.6 (1,287)
Adjustment disorders	*p*	.0002	
None		97.5 (2,340)	96.0 (79,407)
Present		2.5 (61)	4.0 (3,346)
Personality disorders	*p*	<.0001	
None		92.2 (2,213)	89.6 (74,155)
Present		7.8 (188)	10.4 (8,598)

Table 7.14 RAI-MH Scales for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Mechanical/Physical Restraint (MP)

		MP N = 2,401	No MP N = 82,753
		% (n)	% (n)
Activities of Daily Living Hierarchy (ADL)	*p*		< .0001
None		58.3 (4,361)	84.6 (92,261)
1 - 2		21.7 (1,621)	10.6 (11,430)
3-4		15.0 (1,124)	4.1 (4,417)
5-6		5.0 (370)	0.7 (800)
Aggressive Behaviour Scale (ABS)	*p*		< .0001
None		38.5 (925)	80.2 (66,353)
1-2		24.4 (585)	11.5 (9,506)
3-4		27.8 (668)	7.0 (5,791)
5-12		9.3 (223)	1.3 (1,103)
Anhedonia	*p*		.008
None		41.3 (992)	38.3 (31,664)
1-2		11.5 (276)	11.2 (9,285)
3-4		13.2 (318)	13.6 (11,211)
5-12		33.9 (815)	37.0 (30,593)
Cognitive Performance Scale (CPS)	*p*		< .0001
None		40.4 (971)	65.6 (54,295)
1-2		35.2 (845)	28.0 (23,160)
3-4		12.3 (295)	4.5 (3,719)
5-6		12.1 (290)	1.9 (1,579)
Depressive Severity Index (DSI)	*p*		< .0001
None		31.7 (761)	25.2 (20,882)
1-2		24.3 (584)	20.9 (17,316)
3-5		27.7 (664)	27.6 (22,808)
6-15		16.3 (392)	26.3 (21,747)
Instrumental Activities of Daily Living	*p*		< .0001
None		36.2 (869)	54.4 (47,531)
1-2		11.4 (273)	10.9 (9,023)
3-5		10.0 (241)	8.9 (7,349)
6-42		42.4 (1,018)	22.8 (18,850)
Mania	*p*		< .0001
None		21.3 (511)	48.3 (39,930)
1-2		17.9 (430)	20.1 (16,666)
3-5		25.7 (617)	17.8 (14,689)
6-20		35.1 (843)	13.9 (11,468)

Table 7.14 RAI-MH Scales for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Mechanical/Physical Restraint (MP) cont.

		MP N = 2,401	No MP N = 82,753
		% (n)	% (n)
Positive Sign/Symptoms (PSS Short)	*p*		< .0001
None		32.9 (791)	58.2 (48,181)
1-2		13.1 (314)	12.9 (10,652)
3-8		50.2 (1,204)	26.9 (22,282)
9-12		3.8 (92)	2.0 (1,638)
Risk of Harm (RHO)	*p*		< .0001
None		14.7 (352)	31.7 (26,265)
1-2		34.7 (832)	49.8 (41,175)
3-4		28.9 (693)	13.2 (10,921)
5-6		21.8 (524)	5.3 (4,392)
Self Care Index (SCI)	*p*		< .0001
None		8.8 (210)	29.2 (24,131)
1-2		50.2 (1,204)	47.1 (39,000)
3-4		22.3 (535)	16.5 (13,685)
5-6		18.8 (452)	7.2 (5,937)
Severity of Self-harm (SoS)	*p*		< .0001
None		15.1 (363)	25.4 (21,046)
1-2		59.4 (1,425)	39.5 (32,690)
3-4		15.0 (361)	16.7 (13,780)
5-6		10.5 (252)	18.4 (15,237)

Table 7.15 Other Health Conditions for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Mechanical/Physical Restraint (MP)

		MP N = 2,401	No MP N = 82,753
		% (n)	% (n)
Hearing	*p*	< .0001	
Adequate		93.6 (2,248)	96.2 (79,640)
< Adequate		6.4 (153)	3.8 (3,113)
Vision	*p*	< .0001	
Adequate		91.5 (2,197)	94.4 (78,0744)
< Adequate		8.5 (204)	5.7 (4,679)
Intellectual disability	*p*	< .0001	
No intellectual disability		94.3 (2,264)	96.6 (79,908)
Intellectual disability		5.7 (137)	3.4 (2,845)
Falls	*p*	< .0001	
No falls		90.9 (2,182)	95.0 (78,637)
Falls		9.1 (219)	5.0 (4,116)
Alzheimer's/Dementia/other related disorders (ADRD)			
	p	< .0001	
None		82.6 (1,983)	94.2 (77,954)
Present		17.4 (418)	5.8 (4,799)
Cerebral Palsy	*p*	.98	
None		99.9 (2,398)	99.9 (82,651)
Present		0.1 (3)	0.1 (102)
Epilepsy	*p*	.02	
None		98.9 (2,375)	99.3 (82,188)
Present		1.1 (26)	0.7 (565)
Huntington's	*p*	< .0001	
None		99.7 (2,393)	99.9 (82,682)
Present		0.3 (8)	0.1 (71)
Multiple sclerosis	*p*	.20	
None		99.9 (2,399)	99.8 (82,587)
Present		0.1 (2)	0.2 (166)
Parkinson's	*p*	.0002	
None		98.9 (2,374)	99.5 (82,297)
Present		1.1 (27)	0.6 (456)

Table 7.15 Other Health Conditions for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Mechanical/Physical Restraint (MP) cont.

		MP N = 2,401	No MP N = 82,753
		% (n)	% (n)
Stroke	*p*	< .0001	
None		99.1 (2,379)	99.7 (82,490)
Present		0.9 (22)	0.3 (263)
Traumatic Brain Injury	*p*	.16	
None		99.8 (2,395)	99.9 (82,637)
Present		0.3 (6)	0.1 (116)
Any Neuro	*p*	< .0001	
None		82.2 (1,973)	93.5 (77,376)
Present		17.8 (428)	6.5 (5,377)

Table 7.16 Sociodemographic Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Chair-Prevents-Rising (Chair)

		Chair N = 494	No Chair N = 84,660
		% (N)	% (N)
Age	*p*		< .0001
18-24		2.8 (14)	11.8 (9,986)
25-34		4.5 (22)	19.2 (16,225)
35-44		3.9 (19)	21.5 (18,189)
45-54		6.3 (31)	22.5 (19,050)
55-64		12.4 (61)	13.1 (11,087)
65-74		18.8 (93)	6.8 (5,712)
75-84		34.4 (170)	4.1 (3,432)
85+		17.0 (84)	1.2 (979)
Sex	*p*		.001
Male		57.4 (283)	49.2 (41,633)
Female		42.6 (210)	50.8 (43,008)
Marital status	*p*		< .0001
Not partnered		57.9 (286)	70.4 (59,575)
Partnered		42.1 (208)	29.6 (25,085)
Language	*p*		< .0001
English		90.3 (446)	95.0 (80,411)
Other		9.7 (48)	5.0 (4,249)
Income source	*p*		< .0001
Income		95.8 (473)	89.7 (75,939)
No income		4.3 (21)	10.3 (8,721)
Living arrangements	*p*		< .0001
Family/Alone		53.9 (266)	89.9 (76,1130
Group		46.2 (228)	10.1 (8,547)
Admitted from LTCH	*p*		< .0001
Other		70.7 (349)	98.8 (83,621)
LTCH		29.4 (145)	1.2 (1,039)
Residential stability	*p*		.003
Not temporary		78.3 (387)	74.7 (63,273)
Temporary		21.7 (107)	24.5 (20,703)
Homeless		0.0 (0)	0.8 (684)

Table 7.17 Mental Health Services Use Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Chair-Prevents-Rising (Chair)

		Chair N = 494	No Chair N = 84,660
		% (n)	% (n)
# of MH admits recent	*p*	< .0001	
None		67.2 (332)	46.1 (39,042)
One or more		32.8 (162)	53.9 (45,618)
# of MH admits life time	*p*	< .0001	
None		53.0 (262)	28.4 (24,007)
One or more		47.0 (232)	71.6 (60,6530
Time since last discharge	*p*	< .0001	
No previous admission		53.0 (262)	28.4 (24,007)
> 1 year		20.5 (101)	29.7 (25,146)
31 days – 1 year		15.6 (77)	28.1 (23,799)
< 31 days		10.9 (54)	13.8 (11,708)
Amount of time in hospital	*p*	< .0001	
None		67.2 (332)	46.1 (39,042)
< 31 days		16.8 (83)	31.9 (26,989)
31 days – 1 year		13.0 (64)	19.9 (16,872)
> 1 year		3.0 (15)	2.1 (1,757)
Age at first hospitalization	*p*	< .0001	
0 – 14 years		1.2 (6)	3.8 (3,247)
15 – 24 years		10.7 (53)	30.2 (25,605)
25 – 44 years		14.2 (70)	41.9 (35,440)
45 – 64 years		17.6 (87)	17.9 (15,165)
65+ years		56.3 (278)	6.2 (5,203)
Police intervention	*p*	< .0001	
Never		86.2 (426)	72.3 (61,186)
> 1 week		10.1 (50)	22.2 (18,780)
<1 week		3.6 (18)	5.54 (4,694)

Table 7.18 Mental Health Clinical Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Chair-Prevents-Rising (Chair)

		Chair N = 494	No Chair N = 84,660
		% (n)	% (n)
Status at time of assessment	*p*	< .0001	
Voluntary		51.6 (255)	54.8 (46,357)
Informal		8.9 (44)	1.0 (801)
Involuntary		24.7 (122)	21.6 (18,308)
Psych assessment		13.4 (66)	19.5 (16,537)
Forensic		0.6 (3)	2.9 (2,486)
Unknown		0.8 (4)	0.2 (171)
Current patient type	*p*	< .0001	
Acute		43.1 (213)	81.1 (68,636)
Long term		8.7 (43)	13.0 (10,984)
Psychogeriatric		47.6 (235)	3.1 (2,578)
Forensic evaluation		0.6 (3)	2.9 (2,462)
Capacity/Competency			
Consent for treatment	*p*	< .0001	
Capable		48.8 (241)	92.5 (78,335)
Incapable		51.2 (253)	7.5 (6,325)
Managing property	*p*	< .0001	
Capable		50.2 (248)	94.1 (79,697)
Incapable		49.8 (246)	5.9 (4,963)
Consent to disclose health info	*p*	< .0001	
Capable		56.3 (278)	96.5 (81,652)
Incapable		43.7 (216)	3.6 (3,008)
Decision-making	*p*	< .0001	
Own decision-maker		42.1 (208)	92.2 (78,067)
Substitute decision-maker		57.9 (286)	7.8 (6,593)

Table 7.18 Mental Health Clinical Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Chair-Prevents-Rising (Chair) cont.

		Chair N = 494	No Chair N = 84,660
		% (n)	% (n)
Psychiatric diagnoses			
Child/Adolescent disorders	*p*	.51	
None		98.8 (488)	98.4 (83,319)
Present		1.2 (6)	1.6 (1,341)
Mental disord due to gen med	*p*	< .0001	
None		91.3 (451)	98.4 (83,303)
Present		8.7 (43)	1.6 (1,357)
Substance disorders	*p*	< .0001	
None		91.3 (451)	76.0 (64,300)
Present		8.7 (43)	24.1 (20,360)
Schiz/psychotic disorders	*p*	< .0001	
None		83.0 (410)	66.2 (56,075)
Present		17.0 (84)	33.8 (28,585)
Mood disorders	*p*	< .0001	
None		66.0 (326)	45.1 (38,199)
Present		34.0 (168)	54.9 (46,461)
Anxiety disorders	*p*	< .0001	
None		96.0 (474)	87.4 (73,982)
Present		4.1 (20)	12.6 (10,678)
Eating disorders	*p*	.11	
None		99.2 (490)	98.2 (83,161)
Present		0.8 (4)	1.8 (1,499)
Sleep disorders	*p*	.02	
None		98.6 (487)	99.4 (87,139)
Present		1.4 (7)	0.6 (521)
Impulse Control	*p*	.41	
None		98.0 (484)	98.4 (83,336)
Present		2.0 (10)	1.6 (1,324)
Adjustment disorders	*p*	.002	
None		98.8 (488)	96.0 (81,259)
Present		1.2 (6)	4.0 (3,401)
Personality disorders	*p*	< .0001	
None		97.0 (479)	89.6 (75,889)
Present		3.0 (15)	10.4 (8,771)

Table 7.19 RAI-MH Scales for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Chair-Prevents-Rising (Chair)

		Chair N = 494	No Chair N = 84,660
		% (n)	% (n)
Activities of Daily Living Hierarchy (ADL)	*p*		< .0001
None		16.8 (83)	86.2 (73,012)
1 - 2		9.7 (48)	9.6 (8,162)
3-4		46.4 (229)	3.5 (2,966)
5-6		27.1 (134)	0.6 (520)
Aggressive Behaviour Scale (ABS)	*p*		< .0001
None		35.0 (173)	79.3 (67,105)
1-2		24.1 (119)	11.8 (9,972)
3-4		30.2 (149)	7.5 (6,310)
5-12		10.7 (53)	1.5 (1,273)
Anhedonia	*p*		.21
None		41.1 (203)	38.3 (32,453)
1-2		12.6 (62)	11.2 (9,499)
3-4		14.0 (69)	13.5 (11,460)
5-12		32.4 (160)	36.9 (31,248)
Cognitive Performance Scale (CPS)	*p*		< .0001
None		11.9 (59)	65.2 (55,207)
1-2		16.0 (79)	28.3 (23,926)
3-4		28.7 (142)	4.6 (3,872)
5-6		43.3 (214)	2.0 (1,655)
Depressive Severity Index (DSI)	*p*		< .0001
None		35.4 (175)	25.4 (21,468)
1-2		22.7 (112)	21.0 (17,788)
3-5		28.5 (141)	27.6 (23,331)
6-15		13.4 (66)	26.1 (22,073)
Instrumental Activities of Daily Living (IADL)	*p*		< .0001
None		9.5 (47)	57.1 (48,353)
1-2		2.6 (13)	11.0 (9,283)
3-5		2.0 (10)	9.0 (7,580)
6-42		85.8 (424)	23.0 (19,444)
Mania	*p*		< .0001
None		32.2 (159)	47.6 (40,282)
1-2		23.3 (115)	20.1 (16,981)
3-5		25.1 (124)	17.9 (15,182)
6-20		19.4 (96)	14.4 (12,215)

Table 7.19 RAI-MH Scales for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Chair-Prevents-Rising (Chair) cont.

		Chair N = 494	**No Chair N = 84,660**
		% (n)	% (n)
Positive Sign/Symptoms (PSS Short)	*p*		< .0001
None		44.1 (218)	57.6 (48,754)
1-2		15.8 (78)	12.9 (10,888)
3-8		38.3 (189)	27.5 (23,297)
9-12		1.8 (9)	2.0 (1,721)
Risk of Harm (RHO)	*p*		< .0001
None		15.8 (78)	31.4 (26,539)
1-2		35.8 (177)	49.4 (41,830)
3-4		30.2 (149)	13.5 (11,465)
5-6		18.2 (90)	5.7 (4,826)
Self Care Index (SCI)	*p*		< .0001
None		4.3 (21)	28.7 (24,320)
1-2		53.9 (266)	47.2 (39,938)
3-4		24.1 (119)	16.7 (14,101)
5-6		17.8 (88)	7.4 (6,301)
Severity of Self-harm (SoS)	*p*		< .0001
None		5.9 (29)	25.3 (21,380)
1-2		69.6 (344)	39.9 (33,771)
3-4		19.8 (98)	16.6 (14,043)
5-6		4.7 (23)	18.3 (15,466)

Table 7.20 Other Health Conditions for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Chair-Prevents-Rising (Chair)

		Chair N = 494	No Chair N = 84,660
		% (n)	% (n)
Hearing	*p*	< .0001	
Adequate		77.7 (384)	96.3 (81,504)
< Adequate		22.3 (110)	3.7 (3,156)
Vision	*p*	< .0001	
Adequate		69.6 (344)	94.4 (79,927)
< Adequate		30.4 (150)	5.6 (4,733)
Intellectual disability	*p*	.004	
No intellectual disability		94.1 (465)	96.5 (81,707)
Intellectual disability		5.9 (29)	3.5 (2,953)
Falls	*p*	< .0001	
No falls		71.05 (351)	95.1 (80,468)
Falls		29.0 (143)	5.0 (4,192)
Alzheimer's/Dementia/other related disorders (ADRD)			
	p	< .0001	
None		33.4 (165)	94.2 (79,772)
Present		66.6 (329)	5.8 (4,888)
Cerebral Palsy	*p*	.62	
None		99.8 (493)	99.9 (84,556)
Present		0.2 (1)	0.1 (104)
Epilepsy	*p*	.01	
None		98.4 (486)	99.3 (84,077)
Present		1.6 (8)	0.7 (583)
Huntington's	*p*	< .0001	
None		99.0 (489)	99.9 (84,586)
Present		1.0 (5)	0.1 (74)
Multiple sclerosis	*p*	0.30	
None		99.6 (492)	99.8 (84,494)
Present		0.4 (2)	0.2 (166)
Parkinson's	*p*	< .0001	
None		95.8 (473)	99.5 (84,198)
Present		4.3 (21)	0.6 (462)

Table 7.20 Other Health Conditions for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Chair-Prevents-Rising (Chair) cont.

		Chair N = 494	No Chair N = 84,660
		% (n)	% (n)
Stroke	*p*	< .0001	
None		95.6 (472)	99.7 (84,397)
Present		4.5 (22)	0.3 (263)
Traumatic Brain Injury	*p*	.73	
None		99.8 (493)	99.9 (84,539)
Present		0.2 (1)	0.1 (121)
Any Neuro	*p*	< .0001	
None		32.8 (162)	93.5 (79,187)
Present		67.2 (332)	6.5 (5,473)

Table 7.21 Sociodemographic Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 by Acute Control Medication (ACM)

		ACM N = 10,688	No ACM N = 74,466
		% (n)	% (n)
Age	*p*		< .0001
18-24		14.3 (1,526)	11.4 (8,474)
25-34		21.6 (2,313)	18.7 (13,934)
35-44		21.5 (2,294)	21.4 (15,914)
45-54		20.8 (2,223)	22.6 (16,858)
55-64		11.5 (1,232)	13.3 (9,916)
65-74		5.3 (563)	7.0 (5,242)
75-84		3.7 (394)	4.3 (3,208)
85+		1.3 (143)	1.2 (920)
Sex	*p*		< .0001
Male		52.0 (5,559)	48.8 (36,357)
Female		48.0 (5,128)	51.2 (38,090)
Marital status	*p*		< .0001
Not partnered		75.3 (8,043)	69.6 (51,818)
Partnered		24.8 (2,645)	30.4 (22,640)
Language	*p*		.009
English		94.4 (10,093)	95.0 (70,764)
Other		5.6 (595)	5.0 (3,072)
Income source	*p*		.0008
Income		88.6 (9,467)	89.9 (66,945)
No income		11.4 (1,221)	10.1 (7,521)
Living arrangements	*p*		< .0001
Family		87.9 (9,394)	90.0 (66,985)
Group		12.1 (1,294)	10.1 (7,481)
Admitted from LTCH	*P*		< .0001
Other		98.0 (10,470)	98.7 (73,500)
LTCH		2.0 (218)	1.3 (966)
Residential stability	*p*		< .0001
Not Temporary		71.3 (7,620)	75.3 (56,040)
Temporary		27.6 (2,948)	24.0 (17,862)
Homeless		1.1 (120)	0.8 (564)

Table 7.22 Mental Health Services Use Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Acute Control Medication (ACM)

		ACM N = 10,688	No ACM N = 74,466
		% (n)	% (n)
# of MH admits recent	*p*	< .0001	
None		42.2 (4,513)	46.8 (34,861)
One or more		57.8 (6,175)	53.2 (39,605)
# of MH admits life time	*p*	< .0001	
None		25.5 (2,724)	28.9 (21,545)
One or more		74.5 (7,964)	71.1 (52,921)
Time since last discharge	*p*	< .0001	
No previous admission		25.5 (2,724)	28.9 (21,545)
> 1 year		29.7 (3,176)	29.6 (22,071)
31 days – 1 year		29.9 (3,199)	27.8 (20,677)
< 31 days		14.9 (1,589)	13.7 (10,173)
Amount of time in hospital	*p*	< .0001	
None		42.2 (4,513)	46.8 (34,861)
< 31 days		34.2 (3,659)	31.4 (23,413)
31 days – 1 year		21.3 (2,277)	19.7 (14,659)
> 1 year		2.2 (239)	2.1 (1,533)
Age at first hospitalization	*p*	< .0001	
0 – 14 years		3.7 (398)	3.8 (2,855)
15 – 24 years		36.8 (3,929)	29.2 (21,729)
25 – 44 years		39.7 (4,242)	42.0 (31,268)
45 – 64 years		13.5 (1,447)	18.5 (13,805)
65+ years		6.3 (672)	6.5 (4,809)
Police intervention	*p*	< .0001	
Never		65.0 (6,946)	73.4 (54,666)
> 1 week		25.2 (2,691)	21.7 (16,139)
<1 week		9.8 (1,051)	4.9 (3,661)

Table 7.23 Mental Health Clinical Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency Situation, Ontario 2006 – 2010 (N=85,154) by Acute Control Medication (ACM)

		ACM N = 10,688	No ACM N = 74,466
		% (n)	% (n)
Status at time of assessment	*p*	< .0001	
Voluntary		35.7 (3,813)	57.5 (42,799)
Informal		1.3 (139)	83.6 (706)
Involuntary		33.5 (3,584)	19.9 (14,846)
Psych assessment		28.0 (2,990)	18.3 (13,613)
Forensic		1.2 (133)	3.2 (2,356)
Unknown		0.3 (29)	0.2 (146)
Current patient type	*p*	< .0001	
Acute		89.3 (9,541)	79.6 (59,308)
Long term		5.5 (592)	14.0 (10,435)
Psychogeriatric		3.9 (420)	3.2 (2,393)
Forensic evaluation		1.3 (135)	3.1 (2,330)
Capacity/Competency			
Consent for treatment	*p*	< .0001	
Capable		88.6 (9,467)	88.0 (69,109)
Incapable		11.4 (1,221)	7.2 (5,357)
Managing property	*p*	< .0001	
Capable		91.1 (9,735)	94.3 (70,210)
Incapable		8.9 (953)	5.7 (4,256)
Consent to disclose health info	*p*	< .0001	
Capable		94.0 (10,050)	96.5 (71,880)
Incapable		6.0 (638)	3.5 (2,586)
Decision-making	*p*	< .0001	
Own decision-maker		88.8 (9,492)	92.4 (68,783)
Substitute decision-maker		11.2 (1,196)	7.6 (5,683)

Table 7.23 Mental Health Clinical Characteristics of Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Acute Control Medication (ACM) cont.

		ACM N = 10,688	No ACM N = 74,466
		% (n)	% (n)
Psychiatric diagnoses			
Child/Adolescent disorders	*p*	.30	
None		98.2 (10,493)	98.5 (73,314)
		1.8 (195)	1.6 (1,152)
Mental disord due to gen med	*p*	.89	
None		98.4 (10,514)	98.4 (73,240)
Present		1.6 (174)	1.7 (1,226)
Substance disorders	*p*	< .0001	
None		78.3 (8,372)	75.7 (56,379)
Present		21.7 (2,316)	24.3 (18,087)
Schiz/psychotic disorders	*p*	< .0001	
None		54.8 (5,859)	68.0 (50,626)
Present		45.2 (4,829)	32.0 (28,840)
Mood disorders	*p*	< .0001	
None		52.1 (5,572)	44.3 (32,953)
Present		47.9 (5,116)	55.8 (41,513)
Anxiety disorders	*p*	< .0001	
None		90.4 (9,658)	87.0 (64,798)
Present		9.6 (1,030)	13.0 (9,668)
Eating disorders	*p*	< .0001	
None		99.4 (10,622)	98.1 (73,029)
Present		0.6 (66)	1.9 (1,437)
Sleep disorders	*p*	.41	
None		99.4 (10,628)	99.4 (73,998)
Present		0.6 (60)	0.6 (468)
Impulse Control	*p*	.30	
None		98.3 (10,508)	98.5 (73,312)
Present		1.7 (180)	1.6 (1,154)
Adjustment disorders	*p*	.0002	
None		96.7 (10,330)	95.9 (71,417)
Present		3.4 (358)	4.1 (3,049)
Personality disorders	*p*	.86	
None		89.6 (9,580)	89.7 (66,788)
Present		10.4 (1,108)	10.3 (7,678)

Table 7.24 RAI-MH Scales for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Acute Control Medication (ACM)

		ACM N = 10,688	No ACM N = 74,466
		% (n)	% (n)
Activities of Daily Living Hierarchy (ADL)	*p*		< .0001
None		80.1 (8,565)	86.7 (64,530)
1 - 2		13.2 (1,412)	9.1 (6,798)
3-4		5.6 (598)	3.5 (2,597)
5-6		1.1 (113)	0.7 (541)
Aggressive Behaviour Scale (ABS)	*p*		< .0001
None		57.2 (6,111)	82.1 (61,167)
1-2		20.6 (2,196)	10.6 (7,895)
3-4		17.3 (1,847)	6.2 (4,612)
5-12		5.0 (534)	1.1 (792)
Anhedonia	*p*		< .0001
None		36.0 (3,849)	38.7 (28,807)
1-2		11.8 (1,258)	11.2 (8,303)
0		14.4 (1,536)	13.4 (9,993)
5-12		37.9 (4,045)	36.8 (27,363)
Cognitive Performance Scale (CPS)	*p*		< .0001
None		49.3 (5,267)	67.1 (49,999)
1-2		38.1 (4,075)	26.8 (19,930)
3-4		8.5 (904)	4.2 (3,110)
5-6		4.1 (442)	1.9 (1,427)
Depressive Severity Index (DSI)	*p*		< .0001
None		25.9 (2,767)	25.4 (18,876)
1-2		22.3 (2,388)	20.8 (15,512)
3-5		27.5 (2,942)	27.6 (20,530)
6-15		24.2 (2,591)	26.3 (19,548)
Instrumental Activities of Daily Living	*p*		< .0001
None		43.7 (4,670)	58.7 (43,730)
1-2		13.4 (1,227)	10.6 (7,869)
3-5		11.5 (1,227)	8.5 (6,363)
6-42		31.5 (3,364)	22.2 (16,504)
Mania	*p*		< .0001
None		50.3 (37,432)	28.2 (3,009)
1-2		20.3 (15,122)	18.5 (1,974)
3-5		17.1 (12,697)	24.4 (2,609)
6-20		12.4 (9,215)	29.0 (3,096)

Table 7.24 RAI-MH Scales for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Acute Control Medication (ACM) cont.

		ACM N = 10,688	No ACM N = 74,466
		% (n)	% (n)
Positive Sign/Symptoms (PSS Short)	*p*	< .0001	
None		39.0 (4,168)	60.2 (44,804)
1-2		14.7 (1,571)	12.6 (9,395)
3-8		42.7 (4,559)	25.4 (18,927)
9-12		3.7 (390)	1.8 (1,340)
Risk of Harm (RHO)	*p*	< .0001	
None		19.3 (2,063)	33.0 (24,554)
1-2		42.8 (4,573)	50.3 (37,434)
3-4		24.2 (2,582)	12.1 (9,032)
5-6		13.8 (1,470)	4.6 (3,446)
Self Care Index (SCI)	*p*	< .0001	
None		14.5 (1,554)	30.6 (22,787)
1-2		48.0 (5,126)	47.1 (35,078)
3-4		21.6 (2,308)	16.0 (11,912)
5-6		15.9 (1,700)	6.3 (4,689)
Severity of Self-harm (SoS)	*p*	< .0001	
None		16.0 (1,711)	26.5 (19,698)
1-2		47.9 (5,115)	38.9 (29,000)
3-4		19.2 (2,056)	16.2 (12,085)
5-6		16.9 (1,806)	18.4 (13,683)

Table 7.25 Other Health Conditions for Adult Mental Health Inpatients Without a Psychiatric Emergency, Ontario 2006 – 2010 (N = 85,154) by Acute Control Medication

		ACM	No ACM
		% (n)	% (n)
Hearing	*p*	.005	
Adequate		95.7 (10,226)	96.2 (71,662)
< Adequate		4.3 (462)	3.8 (2,804)
Vision	*p*	.01	
Adequate		93.8 (10,020)	94.3 (70,251)
< Adequate		6.3 (668)	5.7 (4,215)
Intellectual disability	*p*	< .0001	
No intellectual disability		95.5 (10,202)	96.7 (71,970)
Intellectual disability		4.6 (486)	3.4 (2,496)
Falls	*p*	.21	
No falls		94.7 (10,117)	95.0 (70,702)
Falls		5.3 (571)	5.1 (3,764)
Alzheimer's/Dementia/other related disorders (ADRD)			
	p	< .0001	
None		92.2 (9,858)	94.1 (70,079)
Present		7.8 (830)	5.9 (4,387)
Cerebral Palsy	*p*	.03	
None		99.8 (10,671)	99.9 (74,378)
Present		0.2 (17)	0.1 (88)
Epilepsy	*p*	.44	
None		99.4 (10,620)	99.3 (73,943)
Present		0.6 (68)	0.7 (523)
Huntington's	*p*	.08	
None		99.9 (10,673)	99.9 (74,402)
Present		0.1 (15)	0.1 (64)
Multiple sclerosis	*p*	.63	
None		99.8 (10,669)	99.8 (74,317)
Present		0.2 (19)	0.2 (149)
Parkinson's	*p*	.06	
None		99.6 (10,641)	99.4 (74,030)
Present		0.4 (47)	0.6 (436)
Stroke	*p*	.14	
None		99.6 (10,644)	99.7 (74,225)
Present		0.4 (44)	0.3 (241)
Traumatic Brain Injury	*p*	.46	
None		99.8 (10,670)	99.9 (74,362)
Present		0.2 (18)	0.1 (104)
Any Neuro	*p*	< .0001	
None		91.9 (9,825)	93.4 (69,524)
Present		8.1 (863)	6.6 (4,942)

Table 7.26 Multivariate Analysis of Mechanical/Physical Restraint Use With Adult Mental Health Inpatients With No Psychiatric Emergency Situation, Ontario 2006-2010 (n=85,154)

	MP		
Covariates	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	*p*
Sociodemographic			
Age			
18-24 (REF)		1.00	-
25-34	-0.05 (0.08)	0.96 (0.82 – 1.12)	.56
35-44	-0.11 (0.09)	0.90 (0.76 – 1.07)	.22
45-54	-0.32 (0.09)	0.73 (0.61 – 0.87)	.0006
55-64	-0.49 (0.11)	0.60 (0.48 – 0.73)	< .0001
65-74	-0.70 (0.14)	0.48 (0.37 – 0.63)	< .0001
75-84	-0.59 (0.16)	0.54 (0.39 – 0.73)	< .0001
85+	-0.51 (0.20)	0.59 (0.40 – 0.86)	.006
Sex			
Male (REF)		1.00	-
Female	-0.23 (0.05)	0.79 (0.72 – 0.87)	< .0001
Income source			
Income (REF)		1.00	-
No income	0.25 (0.07)	1.29 (1.13 – 1.47)	.0001
Living arrangement			
Family/alone (REF)		1.00	-
Group	-0.15 (0.07)	0.85 (0.75 – 0.97)	.02
Residence Stability			
Not temporary (REF)		1.00	-
Temporary	0.14 (0.05)	1.15 (1.05 – 1.27)	.004
Homeless	-0.12 (0.22)	0.89 (0.58- 1.36)	.59
MH Service Use Characteristics			
Amount of time in hospital			
None (REF)		1.00	-
< 31 days	0.13 (0.05)	1.14 (1.03 – 1.26)	.01
≥ 31 days and < 1 year	-0.12 (0.06)	0.89 (0.78 – 1.00)	.06
≥ 1 year	0.12 (0.14)	1.13 (0.85 – 1.49)	.41

Table 7.26 Multivariate Analysis of Mechanical/Physical Restraint Use With Adult Mental Health Inpatients With No Psychiatric Emergency Situation, Ontario 2006-2010 (n=85,154) cont.

	MP		
Covariates	Parameter Estimate (S.E.)	Odds Ratio (95% CI)	*p*
MH Service Use Characteristics cont.			
Amount of time in hospital			
None (REF)		1.00	-
< 31 days	0.13 (0.05)	1.14 (1.03 – 1.26)	.01
≥ 31 days and < 1 year	-0.12 (0.06)	0.89 (0.78 – 1.00)	.06
≥ 1 year	0.12 (0.14)	1.13 (0.85 – 1.49)	.41
Age at first hospitalization			
0 – 14 years (REF)		1.00	-
15-24	0.13 (0.12)	1.14 (0.90 – 1.44)	.28
25-44	-0.04 (0.12)	0.96 (0.76 – 1.22)	.75
45-64	0.18 (0.13)	1.20 (0.92 – 1.56)	.17
65 years +	0.35 (0.17)	1.40 (1.02 – 1.96)	.04
Police intervention			
None (REF)		1.00	-
> 1 week	-0.04 (0.06)	0.96 (0.85 – 1.07)	.45
In last 7 days	0.21 (0.07)	1.21 (1.05 – 1.40)	.004
MH Clinical Characteristics			
Inpatient status at time of assessment			
Voluntary (REF)		1.00	-
Informal	0.55 (0.17)	1.72 (1.24 – 2.39)	.001
Involuntary	0.93 (0.06)	2.49 (2.21 – 2.79)	< .0001
Psychiatric assessment	0.89 (0.06)	2.41 (2.14 – 2.73)	< .0001
Forensic	0.08 (0.43)	2.24 (0.96 – 5.24)	.06
Unknown	0.19 (0.48)	1.21 (0.48 – 3.09)	.69
Current inpatient type			
Acute (REF)		1.00	-
Longer term	-0.72 (0.10)	0.48 (0.40 – 0.59)	< .0001
Psychogeriatric	-0.11 (0.11)	0.90 (0.72 – 1.12)	.33
Forensic	-0.59 (0.44)	0.86 (0.24 –	.18

Table 7.26 Multivariate Analysis of Mechanical/Physical Restraint Use With Adult Mental Health Inpatients With No Psychiatric Emergency Situation, Ontario 2006-2010 (n=85,154) cont.

	MP		
Covariates	Parameter Est (S.E.)	Odds Ratio (CI)	*p*
MH Clinical Characteristics cont.			
Inpatient status at time of assessment			
Capacity/Competency			
Consent for treatment		1.00	-
Incapable	0.30 (0.08)	1.35 (1.15 – 1.59)	.0002
Consent to disclose health info (REF)		1.00	
Incapable	0.42 (0.10)	1.54 (1.28 – 1.86)	< .0001
Own decision-maker		1.00	
Substitute decision-maker	-0.37 (0.09)	0.70 (0.59 – 0.82)	< .0001
Psychiatric diagnoses			
Substance use disorders			
None (REF)		1.00	-
Present	-0.17 (0.06)	0.84 (0.78 – 0.95)	.004
Schizophrenia/other psychotic disorders			
None (REF)		1.00	-
Present	-0.25 (0.06)	0.78 (0.69 – 0.88)	< .0001
Mood disorders			
None (REF)		1.00	-
Present	-0.32 (0.060	0.74 (0.66 – 0.83)	< .0001
Anxiety disorders			
None (REF)		1.00	-
Present	-0.47 (0.11)	0.63 (0.52 – 0.78)	< .0001
Eating disorders			
None (REF)		1.00	-
Present	-1.26 (0.39)	0.28 (0.13 – 0.59)	.0009
RAI-MH Scales*			
Activities of Daily Living Hierarchy (0 – 6)	0.23 (0.03)	See Figure 7.1	< .0001
ADL Hierarchy x CPS (interaction term)	0.03 (0.009)	See Figure 7.1	.0004
Aggressive Behaviour Scale (0 – 12)	0.28 (0.02)	1.33 (1.29 – 1.37)	< .0001
Cognitive Performance Scale (0 – 6)	0.10 (0.02)	See Figure 7.1	< .0001

Table 7.26 Multivariate Analysis of Mechanical/Physical Restraint Use With Adult Mental Health Inpatients With No Psychiatric Emergency Situation, Ontario 2006-2010 (n=85,154) cont.

	MP		
Covariates	Parameter Estimate (S.E.)	Odds Ratio (CI)	*p*
RAI-MH Scales cont.*			
Mania			
(0 – 20)	0.08 (0.006)	1.08 (1.07 – 1.09)	< .0001
Positive signs and symptoms short			
(0 – 12)	0.04 (0.009)	1.04 (1.02 – 1.06)	.0001
Risk of Harm to Others			
(0 – 6)	0.11 (0.02)	1.11 (1.08 – 1.15)	< .0001
Severity of Self-harm			
(0 – 6)	-0.07 (0.01)	0.94 (0.92 – 0.97)	< .0001
Other Health Conditions			
History of Falls			
None (REF)		1.00	-
Present	0.56 (0.08)	1.73 (1.47 – 2.04)	< .0001
c-statistic = 0.84			

* Note for RAI-MH Scales the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table)

Table 7.27 Multivariate Logistic Regression Model for MP Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N = 85,154)

	Mechanical/Physical					
	Male			Female		
Covariate	Parameter Est.	Odds Ratio (95%	*p*	Parameter Est.	Odds Ratio (95% CI)	*p*
Sociodemographic Characteristics						
Age						
18-24 (REF)		1.00	-		1.00	-
25-34	-0.08 (0.09)	0.92 (0.77 – 1.11)	.38	-0.12 (0.14)	0.89 (0.68 – 1.16)	.38
35-44	-0.22 (0.11)	0.80 (0.65 – 0.99)	.04	-0.08 (0.14)	0.92 (0.70 – 1.21)	.57
45-54	-0.45 (0.12)	0.64 (0.50 – 0.80)	.0001	-0.34 (0.14)	0.71 (0.54 – 0.94)	.02
55-64	-0.57 (0.14)	0.56 (0.43 – 0.74)	< .0001	-0.61 (0.16)	0.54 (0.39 – 0.75)	.0002
65-74	-1.02 (0.20)	0.36 (0.25 – 0.54)	< .0001	-0.67 (0.19)	0.51 (0.35 – 0.75)	.0005
75-84	-0.87 (0.23)	0.42 (0.27 – 0.66)	.0002	-0.63 (0.22)	0.53 (0.34 – 0.82)	.005
85+	-0.80 (0.23)	0.45 (0.26 – 0.78)	.004	-0.42 (0.27)	0.66 (0.39 – 1.12)	.12
Income Source						
Income (REF)		1.00	-		1.00	-
No income	0.30 (0.08)	1.35 (2.26 – 1.59)	.0003	0.29 (0.11)	1.34 (1.09 – 1.64)	.006
Living arrangement						
Family/alone (REF)					1.00	-
Group				-0.31 (0.11)	0.74 (0.59 – 0.92)	.008

Table 7.27 Multivariate Logistic Regression Model for MP Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N = 85,154) cont.

	Mechanical/Physical					
	Male			Female		
Covariate	Parameter Est.	Odds Ratio (95%	*p*	Parameter Est.	Odds Ratio (95% CI)	*p*
MH Service Use Characteristics						
Amount of time in hospital						
None (REF)		1.00	-			
≤ 31 days	0.21 (0.07)	1.23 (1.08 – 1.40)	.002			
31 days – 1 year	-0.12 (0.08)	0.89 (0.76 – 1.05)	.15			
> 1 year	-0.05 (0.19)	0.96 (0.66 – 1.38)	.80			
Police intervention						
None (REF)		1.00	-			
> 1 week	-0.11 (0.07)	0.89 (0.78 – 1.02)	.11			
In last 7 days	0.37 (0.09)	1.45 (1.21 – 1.74)	<			
MH Clinical Characteristics						
Current inpatient type						
Acute (REF)		1.00	-			-
Longer term	-0.92 (0.12)	0.40 (0.31 – 0.51)	<	-0.79 (0.16)	0.46 (0.34 – 0.62)	< .0001
Geriatric	-0.20(0.15)	0.82 (0.61 – 1.10)	.18	-0.10 (0.16)	0.91 (0.66 – 1.24)	.54
Forensic	-0.74 (0.16)	0.48 (0.35 – 0.65)	<	-0.19 (0.35)	0.83 (0.41 – 1.66)	.59
Capacity/Competency						
Consent to treatment (REF)		1.00	-		1.00	-
Incapable	0.55 (0.11)	1.73 (1.40 – 2.13)	<	0.53 (0.11)	1.70 (1.37 – 2.12)	< .0001
Consent to disclose health		1.00	-			
Incapable	0.40 (0.13)	1.49 (1.17 – 1.91)	.002			
Own decision maker (REF)		1.00	-		1.00	-
Incapable	-0.39 (0.11)	0.68 (0.54 – 0.84)	.0005	-0.38 (0.13)	0.69 (0.53 – 0.88)	.004

Table 7.27 Multivariate Logistic Regression Model for MP Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N = 85,154) cont.

	Mechanical/Physical					
	Male			Female		
Covariate	Parameter Est.	Odds Ratio (95%	*p*	Parameter Est.	Odds Ratio (95% CI)	*p*
MH Clinical Characteristics cont.						
Psychiatric diagnoses						
Substance disorder						
None (REF)		1.00	-		1.00	-
Present	-0.17 (0.07)	0.85 (0.74 – 0.97)	.02	-0.22 (0.11)	0.80 (0.65 – 0.99)	.04
Mood disorder						
None (REF)		1.00	-		1.00	-
Present	-0.26 (0.07)	0.77 (0.68 – 0.87)	<	-0.17 (0.07)	0.84 (0.73 – 0.97)	.02
Anxiety disorder						
None (REF)		1.00	-		1,00	-
Present	-0.64 (0.15)	0.53 (0.40 – 0.70)	<	-0.61 (0.15)	0.54 (0.41 – 0.72)	< .0001
Eating disorder						
None (REF)					1,00	-
Present				-1.74 (0.51)	0.18 (0.07 – 0.48)	.0006

Table 7.27 Multivariate Logistic Regression Model for MP Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N = 85,154) cont.

	Mechanical/Physical					
	Male			Female		
Covariate	Parameter	Odds Ratio (95% CI)	*p*	Parameter Est.	Odds Ratio (95% CI)	*p*
RAI-MH Scales						
Activities of Daily Living						
(0 – 6)	0.34 (0.03)	1.41 (1.33 – 1.49)	< .0001	0.25 (0.03)	1.28 (1.21 – 1.36)	< .0001
Aggressive Behaviour Scale						
(0 – 12)				0.29 (0.02)	1.34 (1.28 – 1.40)	< .0001
Cognitive Performance Scale						
(0 – 6)	0.20 (0.02)	1.22 (1.16 – 1.28)	< .0001	0.17 (0.03)	1.19 (1.13 – 1.26)	< .0001
Mania						
(0 – 20)				0.09 (0.009)	1.09 (1.07 – 1.11)	< .0001
Positive Signs and Symptoms Short						
(0-12)				0.04 (0.01)	1.04 (1.02 – 1.07)	.002
Risk of Harm to Others						
(0 – 6)	0.30 (0.02)	1.35 (1.31 – 1.40)	< .0001	0.14 (0.02)	1.16 (1.10 – 1.21)	< .0001
Severity of Self-Harm						
(0 – 6)	-0.09 (0.02)	0.91 (0.88 – 0.94)	< .0001	-0.05 (0.02)	0.95 (0.91 – 0.99)	.02
Other Health Conditions						
History of Falls						
No falls (REF)		1.00	-		1.00	-
Falls	0.52 (0.11)	1.69 (1.35 – 2.10)	< .0001	0.44 (0.12)	1.56 (1.23 – 1.97)	.0002
c		0.79			0.81	
Hosmer-Lemeshow		χ^2= 14.24, d.f. = 8	.08		χ^2=10.51, d.f.= 8	.23

* Note for RAI-MH Scales the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table)

Table 7.28 Multivariate Analysis of Chair Prevents Rising Use With Adult Mental Health Inpatients With No Psychiatric Emergency Situation, Ontario 2006-2010 (n=85,154)

Covariate	Chair Prevents Rising		
	Parameter Est. S.E.	Odds Ratio (95% CI)	*p*
Sociodemographic			
Age			
18-24 (REF)		1.00	-
25-34	0.12 (0.35)	1.13 (0.58 – 2.23)	.72
35-44	-0.23 (0.36)	0.80 (0.40 – 1.60)	.52
45-54	-0.12 (0.33)	0.89 (0.46 – 1.69)	.71
55-64	0.36 (0.31)	1.44 (0.78 – 2.65)	.24
65-74	0.39 (0.31)	1.47 (0.80 – 2.73)	.22
75-84	0.76 (0.31	2.13 (1.15 – 3.95)	.02
85 and older	0.75 (0.34)	2.13 (1.10 – 4.12)	.03
Sex			
Male (REF)		1.00	-
Female	-0.35 (0.11)	0.71 (0.57 – 0.87)	.001
Living arrangement			
Family/alone (REF)		1.00	-
Group	0.43 (0.12)	1.54 (1.23 – 1.93)	.0002
MH Clinical Characteristics			
Current inpatient type			
Acute (REF)		1.00	-
Longer Term	-0.19 (0.19)	0.83 (0.57 – 1.19)	.31
Psychogeriatric	0.49 (0.13)	1.63 (1.26 – 2.12)	.0002
Forensic	-0.55 (0.59)	0.58 (0.18 – 1.85)	.36
Psychiatric diagnoses			
Schizophrenia and other psychotic disorders			
None (REF)		1.00	-
Present	-0.49 (0.14)	0.61 (0.46 – 0.81)	.0007
RAI-MH Scales*			
Activities of Daily Living Hierarchy (0 – 6)	0.59 (0.04)	1.80 (1.66 – 1.95)	< .0001
Aggressive Behaviour Scale (0 – 12)	0.12 (0.04)	1.13 (1.06 – 1.22)	.0005

* Note for RAI-MH Scales the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table)

Table 7.28 Multivariate Analysis of Chair Prevents Rising Use With Adult Mental Health Inpatients With No Psychiatric Emergency Situation, Ontario 2006-2010 (n=85,154) cont.

Covariate	Chair Prevents Rising cont.		
	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*
RAI-MH Scales cont.			
Cognitive Performance Scale (0 – 6)	0.21 (0.008)	1.23 (1.14 – 1.32)	< .0001
Instrumental Activities of Daily Living (0 – 42)	0.03 (0.008)	1.03 (1.01 – 1.04)	.002
Mania (0 – 20)	004 (0.02)	1.04 (1.00 – 1.08)	.04
Positive signs and symptoms short (0 – 12)	0.05 (0.02)	1.06 (1.01 – 1.10)	.02
Risk of Harm to Others (0 – 6)	0.09 (0.04)	1.10 (1.02 – 1.18)	.01
Other Health Conditions			
Hearing			
Adequate (REF)		1.00	-
< Adequate	-0.35 (0.14)	0.70 (0.54 – 0.92)	.01
History of Falls			
None (REF)		1.00	-
Present	0.83 (0.12)	2.29 (1.81 – 2.91)	< .0001
Any Neurological Condition			
None (REF)		1.00	-
Present	0.65 (0.14)	1.91 (1.45 – 2.51)	< .0001
c-statistic = 0.93			

* Note for RAI-MH Scales the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table)

Table 7.29 Multivariate Analysis of Acute Control Medication Use With Adult Mental Health Inpatients With No Psychiatric Emergency Situation, Ontario 2006-2010 (n=85,154)

Covariate	Acute Control Medication		
	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*
Sociodemographic			
Age			
18-24 (REF)		1.00	-
25-34	0.04 (0.04)	1.04 (0.96 – 1.12)	.12
35-44	-0.04 (0.04)	0.96 (0.89 – 1.05)	.09
45-54	-0.10 (0.04)	0.91 (0.83 – 0.99)	.0002
55-64	-0.22 (0.05)	0.80 (0.73 – 0.89)	< .0001
65-74	-0.63 (0.07)	0.53 (0.47 – 0.61)	< .0001
75-84	-0.71 (0.09)	0.49 (0.41 – 0.59)	< .0001
85+	-0.67 (0.12)	0.51 (0.40 – 0.65)	< .0001
Residence Stability			
Not temporary (REF)		1.00	-
Temporary	0.15 (0.02)	1.16 (1.10 – 1.22)	< .0001
Homeless	-0.01 (0.11)	0.99 (0.80 – 1.22)	.93
MH Service Use Characteristics			
Age at first hospitalization			
0-14 years (REF)		1.00	-
15-24 years	0.10 (0.06)	1.10 (0.98 – 1.24)	.10
25-44 years	-0.003 (0.06)	0.99 (0.80 – 1.22)	.96
45-64 years	-0.05 (0.07)	0.96 (0.84 – 1.09)	.50
65 years +	0.27 (0.09)	1.32 (1.10 – 1.57)	.003
Police intervention			
None (REF)		1.00	-
> 1 week	0.08 (0.03)	1.09 (1.03 – 1.15)	.004
In last 7 days	0.16 (0.04)	1.17 (1.08 – 1.27)	.0001
MH Clinical Characteristics			
Inpatient status at time of assessment			
Voluntary (REF)		1.00	-
Informal	0.31 (0.10)	1.37 (1.23 – 1.66)	.002
Involuntary	0.43 (0.03)	1.54 (1.46 – 1.63)	< .0001
Psychiatric assessment	0.51 (0.03)	1.67 (1.58 – 1.77)	< .0001
Forensic	-0.39 (0.25)	0.68 (0.41 – 1.10)	.12
Other	0.37 (0.22)	1.44 (0.94 – 2.20)	.09

Table 7.29 Multivariate Analysis of Acute Control Medication Use With Adult Mental Health Inpatients With No Psychiatric Emergency Situation, Ontario 2006-2010 (n=85,154) cont.

		Acute Control Medication	
Covariate	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*
Inpatient status at time of assessment			
Current inpatient type			
Acute (REF)		1.00	-
Longer term	-0.85 (0.05)	0.43 (0.39 – 0.47)	< .0001
Psychogeriatric	0.08 (0.07)	1.09 (0.95- 1.24)	.24
Forensic	-0.60 (0.03)	0.55 (0.34 – 0.89)	.02
Psychiatric diagnoses			
Schizophrenia and other psychotic disorders			
None (REF)		1.00	-
Present	0.11 (0.03)	1.11 (1.06 – 1.17)	< .0001
Anxiety disorders			
None (REF)		1.00	-
Present	0.12 (0.04)	1.13 (1.05 – 1.22)	.001
Eating disorders			
None (REF)		1.00	-
Present	-0.64 (0.13)	0.52 (0.41 – 0.67)	< .0001
RAI-MH Scales*			
Aggressive Behaviour Scale			
(0 – 12)	0.20 (0.009)	1.22 (1.20 – 1.24)	< .0001
Cognitive Performance Scale			
(0 – 6)	0.13 (0.01)	1.14 (1.12 – 1.17)	< .0001
Instrumental Activities of Daily Living Scale			
(0 – 42)	0.006 (0.002)	1.01 (1.00 – 1.01)	.002
Mania			
(0 –20)	0.08 (0.003)	1.08 (1.07 – 1.09)	< .0001
Positive signs and symptoms short			
(0 – 12)	0.02 (0.006)	1.02 (1.01 – 1.03)	.003
Risk of Harm to Others			
(0 – 6)	0.09 (0.008)	1.10 (1.08 – 1.11)	< .0001
Self-care Index			
(0 – 6)	0.06 (0.009)	1.06 (1.04 – 1.08)	< .0001
Severity of Self-harm			
(0 – 6)	0.04 (0.006)	1.05 (1.03 – 1.06)	< .0001

c-statistic = 0.74

* Note for RAI-MH Scales the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table)

Table 7.30 Multivariate Logistic Regression Model for ACM Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N_{Males} = 57,511, $N_{Females}$ = 57,846)

	Acute Control Medication					
	Male			Female		
Covariate	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*
Sociodemographic Characteristics						
Age						
18-24 (REF)		1.00	-		1.00	-
25-34	.006 (0.05)	1.01 (0.91 – 1.11)	.91	0.02 (0.06)	1.02 (0.90 – 1.16)	.71
35-44	-0.11 (0.06)	0.90 (0.81 – 1.00)	.06	0.01 (0.07)	1.01 (0.89 – 1.15)	.86
45-54	-0.18 (0.06)	0.83 (0.74 – 0.94)	.002	-0.03 (0.07)	0.97 (0.85 – 1.10)	.61
55-64	-0.29 (0.07)	0.75 (0.65 – 0.86)	< .0001	-0.13 (0.07)	0.88 (0.76 – 1.01)	.07
65-74	-0.67 (0.11)	0.51 (0.42 – 0.63)	< .0001	-0.50 (0.09)	0.60 (0.50 – 0.73)	< .0001
75-84	-0.69 (0.14)	0.50 (0.38 – 0.66)	< .0001	-0.57 (0.11)	0.56 (0.45 – 0.71)	< .0001
85+	-0.47 (0.19)	0.62 (0.43 – 0.90)	.01	-0.62 (0.16)	0.54 (0.39 – 0.74)	.0001
Residential Stability						
Not temporary (REF)		1.00	-			
Temporary	0.08 (0.03)	1.09 (1.02 – 1.16)	.01			
Homeless	0.08 (0.13)	1.09 (0.84 – 1.40)	.52			
None (REF)		1.00	-		1.00	-
> 1 week	0.24 (0.03)	1.28 (1.19 – 1.36)	< .0001	-0.007 (0.05)	0.99 (0.91 – 1.09)	.88
In last 7 days	0.39 (0.05)	1.48 (1.33 – 1.64)	< .0001	0.21 (0.06)	1.23 (1.09 – 1.38)	.0008

Table 7.30 Multivariate Logistic Regression Model for ACM Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Acute Control Medication					
	Male			Female		
Covariate	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*
MH Service Use Characteristics						
Age at first hospitalization						
0-14 years (REF)		1.00	-			
15-24 years	0.03 (0.08)	1.03 (0.87 – 1.21)	.76			
25-44	-0.04 (0.08)	0.96 (0.82 – 1.14)	.65			
45-64 years	-0.06 (0.09)	0.94 (0.78 – 1.13)	.49			
65 years and older	0.40 (0.14)	1.49 (1.14 – 1.94)	.004			
Police intervention						
MH Clinical Characteristics						
Inpatient status at time of assess						
Voluntary (REF)		1.00	-		1.00	-
Informal	0.55 (0.13)	1.73 (1.35 – 2.23)	< .0001	0.30 (0.15)	1.35 (1.01 – 1.81)	.05
Involuntary	0.60 (0.04)	1.83 (1.70 – 1.97)	< .0001	0.57 (0.04)	1.77 (1.64 – 1.91)	< .0001
Psychiatric assessment	0.69 (0.04)	1.99 (1.84 – 2.14)	< .0001	0.64 (0.04)	1.90 (1.76 – 2.05)	< .0001
Forensic	-0.89 (0.11)	0.41 (0.33 – 0.51)	< .0001	-0.53 (0.21)	0.59 (0.39 – 0.89)	.01
Other	0.44 (0.26)	1.55 (0.92 – 2.60)	.10	0.34 (2.42)	1.70 (0.87 – 3.32)	.12
Psychiatric diagnoses						
Schizophrenia and other						
None (REF)		1.00	-			
Present	0.11 (0.04)	1.12 (1.04 – 1.20)	.002			

Table 7.30 Multivariate Logistic Regression Model for ACM Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Acute Control Medication					
	Male			Female		
Covariate	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*
RAI-MH Scales						
Cognitive Performance Scale (0 – 6)				0.14 (0.02)	1.15 (1.11 – 1.19)	< .0001
Instrumental Activities of Daily Living (0 – 42)	0.03 (0.002)	1.03 (1.03 – 1.04)	< .0001	0.006 (0.003)	1.01 (1.00 – 1.01)	.04
Mania (0 – 20)	0.12 (0.004)	1.13 (1.12 – 1.14)	< .0001			-
Positive Signs and Symptoms Short (0 – 12)	0.07 (0.006)	1.08 (1.06 – 1.09)	< .0001	0.04 (0.007)	1.04 (1.02 –	< .0001
Risk of Harm to Others (0 – 6)				0.20 (0.01)	1.22 (1.19 – 1.24)	< .0001
Self Care Index (0 – 6)				0.09 (0.01)	1.10 (1.07 – 1.12)	< .0001
c		0.72			0.70	
Hosmer-Lemeshow		χ^2= 14.61, d.f. = 8	.07		χ^2=12.13, d.f.= 8	.15

* Note for RAI-MH Scales the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table)

Table 7.31 Multivariate Logistic Regression Model for Any CI Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation (N = 85,154)

	Any CI		
Covariates	Parameter Estimate (S.E.)	Odds Ratio (CI)	p
Sociodemographic			
Age			
18-24 (REF)		1.00	-
25-34	0.03 (0.04)	1.02 (0.95 – 1.11)	.55
35-44	-0.04 (0.04)	0.96 (0.88 – 1.04)	.30
45-54	-0.14 (0.04)	0.86 (0.79 – 0.94)	.0004
55-64	-0.28 (0.05)	0.74 (0.67 – 0.82)	< .0001
65-74	-0.68 (0.07)	0.50 (0.44 – 0.57)	< .0001
75-84	-0.66 (0.08)	0.51 (0.43 – 0.60)	< .0001
85+	-0.58 (0.11)	0.56 (0.45 – 0.69)	< .0001
Residence Stability			
Not temporary (REF)		1.00	-
Temporary	0.143 (0.02)	1.16 (1.10 – 1.21)	< .0001
Homeless	-0.03 (0.11)	0.97 (0.79 – 1.19)	.78
MH Service Use Characteristics			
Amount of time in hospital			
None (REF)		1.00	-
< 31 days	0.05 (0.02)	1.06 (1.01 – 1.11)	.02
≥ 31 days and < 1 year	-0.02 (0.03)	0.99 (0.93 – 1.04)	.60
≥ 1 year	0.12 (0.07)	1.13 (0.98 – 1.30)	.10
Age at first hospitalization			
0-14 years (REF)		1.00	-
15-24	0.10 (0.06)	1.06 (1.01 – 1.11)	.06
25-44	-0.005 (0.06)	0.99 (0.93 – 1.04)	.99
45-64	0.009 (0.06)	1.13 (0.98 – 1.30)	.82
65 years +	0.26 (0.09)	1.31 (1.10 – 1.55)	.002
Police intervention			
None (REF)		1.00	-
> 1 week ago	0.08 (0.03)	1.08 (1.02 – 1.14)	.01
In the last 7 days	0.17 (0.04)	1.18 (1.09 – 1.28)	< .0001
MH Clinical Characteristics			
Inpatient status at time of assessment			
Voluntary (REF)		1.00	-
Informal	0.43 (0.09)	1.55 (1.30 – 1.85)	< .0001
Involuntary	0.47 (0.03)	1.60 (1.52 – 1.68)	< .0001
Psychiatric assessment	0.54 (0.03)	1.72 (1.63 – 1.81)	< .0001
Forensic	-0.23 (0.23)	0.79 (0.50 – 1.24)	.30
Other	0.36 (0.21)	1.43 (0.95 – 2.14)	.09

Table 7.31 Multivariate Logistic Regression Model for Any CI Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation (N = 85,154) cont.

	Any CI		
Covariates	Parameter Estimate (S.E.)	Odds Ratio (CI)	p
MH Clinical Characteristics			
Current inpatient type			
Acute (REF)		1.00	-
Longer term	-0.09 (0.04)	0.42 (0.39 – 0.46)	< .0001
Psychogeriatric	0.04 (0.07)		
Forensic	-0.57 (0.23)	0.57 (0.36 – 0.89)	.01
Capacity/Competency			
Consent to disclose health info (REF)		1.00	
Incapable	0.26 (0.05)	1.32 (1.20 – 1.45)	< .0001
Psychiatric diagnoses			
Schizophrenia and other psychotic disorders			
None (REF)		1.00	-
Present	0.08 (0.03)	1.09 (1.03 – 1.15)	.001
Eating disorders			
None (REF)		1.00	-
Present	-0.71 (0.13)	0.48 (0.37- 0.61)	< .0001
RAI-MH Scales*			
Activities of Daily Living Hierarchy (0 – 6)	0.05 (0.02)	See Figure 7.5	.01
ADL x CPS Interaction Term	0.02 (0.006)	See Figure 7.5	< .0001
Aggressive Behaviour Scale (0 – 12)	0.20 (0.008)	1.23 (1.21 – 1.25)	< .0001
Cognitive Performance Scale (0 – 6)	0.11 (0.01)	See Figure 7.5	< .0001
Instrumental Activities of Daily Living (0 – 42)	0.005 (0.002)	1.01 (1.00 – 1.01)	.02
Mania (0 – 20)	0.08 (0.003)	1.08 (1.07 – 1.09)	< .0001
Positive Signs and Symptoms-Short (0 -12)	0.02 (0.005)	1.02 (1.01 – 1.03)	.0005
Risk of Harm to Others (0 – 6)	0.09 (0.008)	1.10 (1.08 – 1.12)	< .0001
Self-Care Index (0 – 6)	0.05 (0.009)	1.05 (1.03 – 1.07)	< .0001
Severity of Self-harm (0 – 6)	0.03 (0.006)	1.03 (1.02 – 1.05)	< .0001

* Note for RAI-MH Scales the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table)

Table 7.31 Multivariate Logistic Regression Model for Any CI Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation (N = 85,154) cont.

Covariates	Any CI		
	Parameter Estimate (S.E.)	Odds Ratio (CI)	p
Other Health Conditions			
Alzheimer's disease and other related disorders			
None (REF)		1.00	-
Present	0.18 (0.05)	1.20 (1.08 – 1.32)	.0005
Intellectual disability			
None (REF)		1.00	-
Present	-0.16 (0.05)	0.85 (0.77 – 0.94)	.004
History of Falls			
None (REF)		1.00	-
Present	0.27 (0.05)	1.30 (1.19 – 1.43)	< .0001
c-statistic = 0.75			

Table 7.32 Multivariate Logistic Regression Model for Any CI Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N_{Males} = 57,511, $N_{Females}$ = 57,846)

	Any Control Intervention					
	Male			Female		
Covariate	Parameter Est. (S.E.)	Odds Ratio (95% CI)	*p*	Parameter Est. (S.E.)	Odds Ratio 95% CI)	*p*
Sociodemographic Characteristics						
Age						
18-24 (REF)		1.00	-		1.00	-
25-34	-0.03 (0.05)	0.97 (0.89 – 1.06)	.51	-0.03 (0.06)	0.97 (0.87 – 1.09)	.62
35-44	-0.17 (0.05)	0.85 (0.77 – 0.93)	.0004	-0.05 (0.06)	0.95 (0.85 – 1.06)	.36
45-54	-0.31 (0.05)	0.73 (0.67 - 0.81)	< .0001	-0.15 (0.06)	0.86 (0.77 – 0.96)	.008
55-64	-0.45 (0.06)	0.64 (0.57 – 0.72)	< .0001	-0.28 (0.06)	0.75 (0.67 – 0.85)	< .0001
65-74	-0.67 (0.08)	0.51 (0.44 – 0.60)	< .0001	-0.52 (0.07)	0.60 (0.52 – 0.69)	< .0001
75-84	-0.40 (0.09)	0.67 (0.56 – 0.80)	< .0001	-0.44 (0.08)	0.64 (0.55 – 0.76)	< .0001
85+	-0.23 (0.14)	0.79 (0.61 – 1.04)	.09	-0.32 (0.12)	0.73 (0.57 – 0.92)	.007
MH Service Use						
Police intervention						
None (REF)		1.00	-		1.00	-
> 1 week	0.21 (0.03)	1.24 (1.16 – 1.32)	< .0001	0.24 (0.04)	1.28 (1.17 – 1.39)	< .0001
In last 7 days	0.39 (0.05)	1.47 (1.33 – 1.63)	< .0001	0.50 (0.06)	1.64 (1.47 – 1.84)	< .0001

Table 7.32 Multivariate Logistic Regression Model for Any CI Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Any Control Intervention					
	Male			Female		
Covariate	Parameter Est.	Odds Ratio (95%	*p*	Parameter Est.	Odds Ratio (95%	*p*
MH Clinical Characteristics						
Inpatient status at time of assess						
Voluntary (REF)		1.00	-		1.00	-
Informal	0.54 (0.12)	1.71 (1.35 – 2.17)	< .0001	0.63 (0.13)	1.88 (1.45 – 2.43)	< .0001
Involuntary	0.64 (0.04)	1.90 (1.77 – 2.04)	< .0001	0.77 (0.04)	2.15 (2.00 – 2.31)	< .0001
Psychiatric assessment	0.72 (0.04)	2.05 (1.90 – 2.20)	< .0001	0.77 (0.04)	2.16 (2.01 – 2.33)	< .0001
Forensic	-0.61 (0.09)	0.54 (0.45 – 0.65)	< .0001	-0.37 (0.19)	0.69 (0.48 – 1.01)	.06
Other	0.35 (0.26)	1.42 (0.86 – 2.34)	.17	0.59 (0.32)	1.80 (0.96 – 3.40)	.07
Capacity/Competency						
Consent to disclose health info(REF)		1.00	-		1.00	-
Incapable	0.31 (0.07)	1.36 (1.20 – 1.55)	< .0001	0.35 (0.07)	1.42 (1.24 – 1.62)	< .0001
Psychiatric diagnoses						
Schizophrenia and other psychotic disorders						
None (REF)		1.00	-		1.00	-
Present	0.12 (0.03)	1.13 (1.05 – 1.21)	.0006	0.22 (0.03)	1.25 (1.17 – 1.33)	< .0001
RAI-MH Scales*						
Activities of Daily Living						
(0 – 6)	0.16 (0.02)	1.17 (1.12 – 1.21)	< .0001	0.10 (0.02)	1.10 (1.07 – 1.14)	< .0001
Cognitive Performance Scale						
(0 – 6)	0.21 (0.01)	1.23 (1.19 – 1.26)	< .0001	0.26 (0.01)	1.30 (1.27 – 1.34)	< .0001
Instrumental Activities of Daily Living						
(0 – 42)	0.009 (0.003)	1.01 (1.00 – 1.02)	.0007			

* Note for RAI-MH Scales the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table)

Table 7.32 Multivariate Logistic Regression Model for Any CI Use with Adult Mental Health Inpatients in Ontario Without a Psychiatric Emergency Situation Stratified by Gender (N_{Males} = 57,511, $N_{Females}$ = 57,846) cont.

	Any Control Intervention					
	Male			Female		
Covariate	Parameter Est.	Odds Ratio (95%	*p*	Parameter Est.	Odds Ratio (95%	*p*
RAI-MH Scales cont.*						
Mania						
(0 – 20)	0.13 (0.004)	1.14 (1.13 – 1.15)	< .0001			
Positive Signs and						
(0 – 12)	0.06 (0.006)	1.06 (1.05- 1.08)	< .0001			
Severity of Self-Harm						
(0 – 6)	0.03 (0.009)	1.03 (1.01- 1.04)	.002			
Other Health Conditions						
History of Falls						
No falls (REF)		1.00	-		1.00	-
Falls	0.33 (0.07)	1.39 (1.22 – 1.58)	< .0001	0.18 (0.06)	1.20 (1.07 – 1.36)	.002
c		0.74			0.68	
Hosmer-Lemeshow		χ^2=14.70, d.f. = 8	.07		χ^2=14.70 d.f.= 8	.07

* Note for RAI-MH Scales the odds ratios refer to single point increments on a continuous scale score (ranges provided in Table)

8.0 OVERALL DISCUSSION

The use of control interventions with adult MH inpatients is part of everyday practice in inpatient psychiatry. About one in five patients in the current study had a control intervention used around the time of their assessment. Previous studies have reported CI use rates in the range of 8% - 26% with the upper range from a study that only included involuntary patients(1). There are limitations on the direct comparability with previous studies, including differences in definitions, data collection approaches, enumeration methods, and inclusion/exclusion criteria. These variations limit the utility of knowledge gained from previous work.

Within the current study, there were regional differences in prevalence rates ranging from 8% - 30% for Any CI use suggesting wide ranging practice or other factors influencing the use of CIs across the province. These reported differences are not the result of inconsistency in definitions or assessment methods since they were standardized in the current study. Future research on regional differences would be useful to more definitively understand the impact of regional factors or other alternative explanations on CI use rates.

In the study to identify risk factors for the use of MP and ACM in the absence of a psychiatric emergency situation, the sample was restricted to those patient assessments failing to satisfy the criteria for a psychiatric emergency situation (PES). In this sample of 85,154 of NoPES assessments, 12,097 (14%) had Any CI use. These patients did not present in hospital with characteristics that could 'warrant' the use of a CI, such as extreme behaviours that would pose a risk of harm or danger to self or others. In keeping with the intent of current Ontario legislation, that restraints be used as a last resort and in a least restrictive manner(2, 3), the use of CI with the NoPES patients should be the starting point for CI reduction/elimination

strategies. Elimination of NoPES CI use would reduce Ontario's Any CI use rate by more than half to about 9%. Achieving a provincial CI use rate of less than 10% would be a major step to providing higher quality patient care both in terms of clinical outcomes and patient and staff satisfaction with care(4-7). The recent interRAI update to the MH clinical assessment protocols (CAPs) included the introduction of the trigger for NoPES patients within the Control Interventions CAP. This innovation is available to all hospitals using the interRAI-MH instrument, or the earlier RAI-MH version, enabling a built-in quality improvement metric to monitor and report. The MH CAP – Control Interventions introduces a quality improvement innovation and opportunity not available in the previous Mental Health Assessment Protocols (MHAPs).

The findings of this current study can inform the development of CI reduction strategies for Ontario hospitals. Previous studies have examined risk factors for CI use, but lack of generalizability has been a concern. The census-level sample used in the current study leaves little doubt of the applicability of the findings to Ontario hospitals. The current study was conducted using four years of Ontario data, had full participation of MOHLTC approved inpatient MH inpatient facilities, had a representative and very large sample size, and the list of patient characteristics examined was comprehensive. The standardized definitions, assessment, methodology of data collection, training of assessors, and data quality checks demonstrate a robustness of the study sample not seen in other studies. Further, the use of the RAI-MH has been a part of everyday clinical practice since 2005 and there are extensive training opportunities provided by the Canadian Institute for Health Information (CIHI) regarding its use. Therefore, there is a low likelihood of assessor bias in the collection of CI use data that might be anticipated with one-off time limited audits or surveys.

The Canadian Institute for Health Information, in its role to improve the quality of health services by supporting health care providers to use data to make better decisions and as the institute responsible for the RAI-MH data holdings, could readily report on the CI use rates, and specifically, CI with NoPES use rates on a national, provincial, regional and local hospital basis. With the goal of continuous improvement in the quality and safety of care, availability and use of this type of information forms the basis for benchmarking performance with peers and further demonstrate accountability through public reporting of performance by hospitals. As CIHI has completed in the past, publication of peer performance reports within province and between provinces could further support the important work of reducing unnecessary use of CIs in MH.

The independent variables included in this current study were grouped according to the RAI-MH assessment categories. The most proximal variables to the patients' status were the clinical characteristics: MH Clinical Characteristics, RAI-MH Scales, and Other Health Conditions. The variables within these categories reflected the patients' condition(s) in the three days prior to the assessment and would be the focus of inpatient therapy and treatment. The other two categories, Sociodemographic and MH Service Use Characteristics, provide clinically relevant and important information, but they would not necessarily be the focus of inpatient treatment interventions. The MH clinical characteristics that were risk factors for CI use included aggressive behaviour, cognitive impairment, mania, positive symptoms , risk of harm to others, and severity of self-harm. While these risk factors may elevate the risk of harm to self or others, other MH clinical characteristics that have no obvious relation to harm or danger were also significant (e.g., ADL function, self-care index, and IADL).

The results of this study show that the risk factors for CI use differ by the CI type. Therefore, the use of an all-inclusive category of CIs as the dependent variable could obscure patterns of use of specific CI types. There were differences in statistical significance as well as direction of effect of retained variables in the current research. There were several examples where the independent variable was significant for a specific CI type, but not in the Any CI model or vice versa. For example the direction of effect of the independent variables was different in the NoPES study for schizophrenia and other psychotic disorders and severity of self-harm.

The Chair multivariate risk model had significant variables that differentiated it from the MP and ACM models. Chair use was the only CI type where older age and living in a group setting prior to admission increased the risk of CI use. The Chair was used mainly with older adults. This points to some bias or preference of clinicians to use chair as a restraint with the older patient population. A history of falls was also a significant risk factor for Chair use, perhaps highlighting the intent to use a chair restraint to prevent a fall. The literature shows that the use of restraints does not necessarily reduce the rate of falling and conversely, restraint use has been shown to increase the severity of injuries associated with falls(8). The harmful deleterious effects of restraint use with the older adult include psychological and emotional damage, and physical harm such as fractures, pressures ulcers, and cardiac arrest(8-11).

There is little debate that there are negative consequences associated with the use of control interventions although it may be more consistent with current trends in patient safety to consider the use of control interventions themselves as a negative consequence, (i.e., patient safety event) that can arise in the care process. The use of CIs by care providers may more aptly be considered a negative consequence of failed early identification of patient needs. This

perspective would be consistent with the legislation that calls for the use of CI last resort after all other less restrictive alternatives have been considered.

The large sample size of the current study provided adequate power to detect small differences in the independent examination of fifty-five explanatory variables. The statistical analyses produced findings of statistical significance for very small differences, where statistical significance measures the likelihood that the differences found are real or due to chance. Importantly, statistical significance is the precondition for clinical significance; however, statistical significance is not necessarily equivalent to clinical importance. That is, not every statistically significant small difference should necessarily be acted upon, be that a policy change or practice change, if there will be little benefit. The current study established clinical significance thresholds using odds ratios (i.e., ≤ 0.80 and ≥ 1.20) and confidence intervals (95% C.I.) reported alongside with *p*-values as the measure of statistical significance.

In addition to measures of statistical and clinical significance, the current study tested the goodness-of-fit of the data to the models using the Hosmer-Lemeshow (H-L) test in conjunction with the c-statistic. The studies cited by the current study did not use the H-L goodness-of-fit test, although in more recent years, the H-L test appears to be growing in use together with the c-statistic(12). Based on the H-L test, the original models for MP, ACM and Any CI were stratified by gender and further examination of the independent variables resulted in differentiation of significant variables for the male and female groups by CI type. Satisfying the H-L test resulted in small sacrifices in the c-statistic and changes in the number of retained variables and direction of effect. The list of retained variables was reduced in number for each gender specific model, but not always the same variables were rejected. The direction of effects of variables and significance were also affected unevenly by gender further reinforcing

the need to examine risk factors for MP, ACM and Any CI use by gender. Some of the variables that were rejected did not necessarily seem intuitive, such as aggressive behaviour and mania. Although not tested in this current study, it has been shown that the H-L test is relatively unstable and minor changes can introduce contradictory results(13). More study of the use of the H-L test is needed to determine the utility of the test in datasets with very large sample sizes. Although it is suggested that the H-L test be included where samples are large enough to subset data into 10 groups and that it be used together with the c-statistic goodness-of-fit test, it remains important to run the tests sequentially to enable the examination of the differences in the resulting models. To this end, the current study considers the MP, ACM, and Any CI using only the c-statistic as the goodness of fit test primarily and secondarily, the models developed that included the H-L test. Notably, for Chair use, the c-statistic and H-L test both indicated good performance for the first model, so no additional analyses were required in study 2 and study 3.

Although this paper identified risk factors for CI use in hospital, the crisis for the patient leading to the use of CIs likely started prior to admission to hospital. It is imperative for hospital-based health care providers to receive and give information to community providers regarding clinically relevant information, at the point of transfer of care between hospital and other community based health care providers to achieve optimal patient-centre outcomes. Sharing of critical information on the part of each partner at the transition points of care is one of the requirements of seamless care, but in practice, this communication does not happen systematically(14). The current structure of the health care system does not have one primary care provider that moves through the various points of care with the patient and hence the accountability to share information falls directly to the institutions' care providers(14).

Hospital and community-based provider must work together to improve communication between providers at the time of transition from one service to the next to increase the continuity of care for patients.

To achieve a systemic change in the use rates of CIs in mental health in Ontario substantial political and administrative leadership will be required. Ontario appears to be well positioned to advance a quality improvement initiative related to restraint use. Ontario has a long history of publicly reporting health service metrics dating to the introduction of the Ontario Hospital Report in 1999(15). This report and follow up reports garnered considerable attention and action to bring about substantial reductions in the use of restraints in complex continuing care hospitals(16). The necessary infrastructure is in place to introduce CI use rates in MH as a publicly reported patient safety indicator. Health Quality Ontario (HQO) was established in 2005 to support this type of system-level change as an independent government agency charged by the Ontario government to "monitor and report on the performance of publicly funded health services, support continuous quality improvement, and promote health care that is supported by the best available scientific evidence, among several other functions" (www.hqontario.ca). Successful CI reduction in adult inpatient MH services has been achieved in jurisdictions that demonstrated substantial and long term committed leadership at several levels of governance(17, 18).

9.0 FUTURE RESEARCH

The current study provides a comprehensive profile of the adult inpatient MH population of Ontario who are at risk of CI use. It also examines factors associated with CI use with a focus on patient characteristics, including sociodemographic characteristics, MH service use, MH clinical characteristics, and other health conditions. As has been mentioned earlier, there may be other factors that may contribute to the use of CIs including staff, work/environmental, organizational and external factors (e.g., staff attitudes, organizational culture, staff-physician education, organizational policies/practices, and MH unit physical layout)(19). A fuller understanding of these additional contributing factors will serve to better inform clinicians, administrators and policy makers in identifying effective strategies to reduce CI use through policy and practice change, additional training, and/or mitigation strategies(17, 20-23).

Improved continuity of care between service settings may help to reduce CI use in hospitals. Jurisdictions using the interRAI instruments in the community and hospital settings should examine the potential use of a longitudinal record for improving understanding and management of persons moving between the community and hospital. On a larger scale, examination of the transition points of care in MH is needed to quantify the perceived gaps, be they issues of the sending/receiving care providers, the structure of the delivery system or the patient(14) and creation of the necessary elements for effective management of the transition points in care of patients. Future research could further examine the outcomes of control intervention use in psychiatry as patients are discharged from hospital to community or long term care with an important focus on patient outcomes including agitation, hopelessness, pain, and quality of life. Another area of research could investigate whether the use of control

interventions is a cross-sector problem, through record linkage between hospital and long term care. If the reduction in the use rates of CIs is to be accomplished, more research is needed to advance our understanding of their use.

There is a scarcity of cross-national studies of the use of CIs in MH. The interRAI consortium with its international representation has the unique opportunity to compare CI use rates between countries using the RAI-MH which currently include Canada, Iceland, Finland, Netherlands and the USA. Importantly, the examination of CI use rates cross-nationally and associated patient characteristic risk factors is needed to provide more evidence and knowledge to inform the practice of psychiatry and specifically the reduction in the use of CIs.

There is a need to better understand the risks associated with the use of CIs with older adults separately from the study of younger and middle-age adult patients. Importantly, the development of CI reduction strategies must be fully informed of the risk factors associated with the use of specialized types of CIs typically used with older adults versus younger and middle-age adults. There was an apparent bias for Chair use with older patients, raising a serious issue with care practices and consequently an urgent need to determine the sources of that bias. The reverse bias of greater use of CIs with younger adults is also cause for urgency of need to understand those biases and identify effective strategies to reduce the use of MPs and ACMs.

In conclusion, the use of CIs in adult MH inpatient services in Ontario requires the attention of policy makers and hospital administrators. Ontario has an overall 21% use rate for Any CI (e.g., MP, Chair, or ACM). Complete eradication of CI use may not be possible, but the evidence shows that 74% of the study sample would not meet the definition of a "psychiatric emergency" and that 14% of those without a psychiatric emergency situation

experienced the use of at least one control intervention. Eradication of CI for the NoPES patients would be a logical starting point for Ontario to reduce its overall use of CIs. In addition, independent study of the risk factors for CI use identified unexpected risk factors such as ADL, IADLs, residential instability and income. Other factors such as falls history and Alzheimer's disease and other related disorders may be indicative of inappropriate use of CIs .

If CI use in adult MH services was identified as a priority patient safety concern by government (as it has done for hand hygiene, hospital mortality, and medication safety), Ontario could use readily available data on CI use to immediately measure prevalence, establish performance targets, and report on the progress of improving the quality and safety of care of adult MH inpatients.

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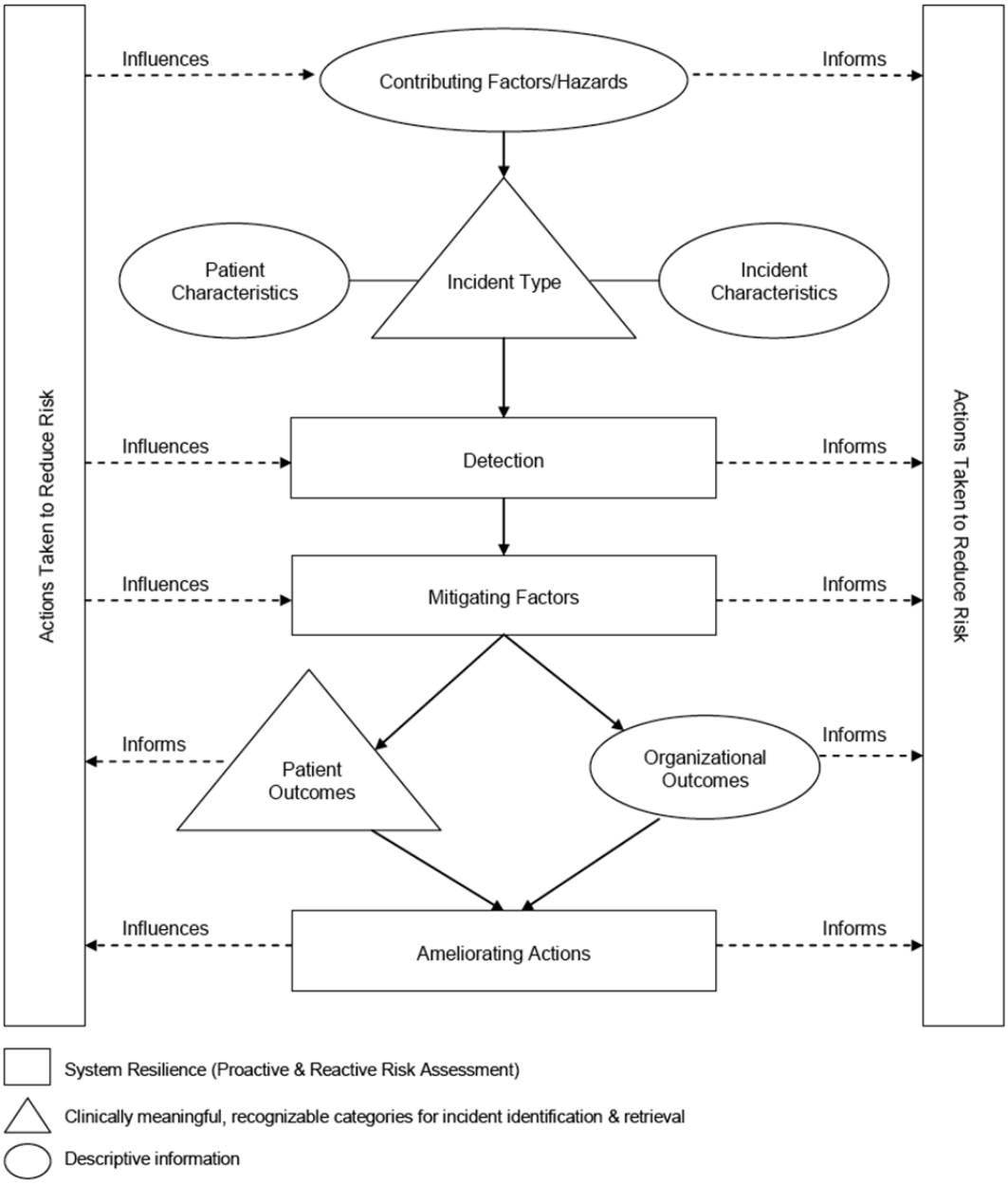
APPENDICES

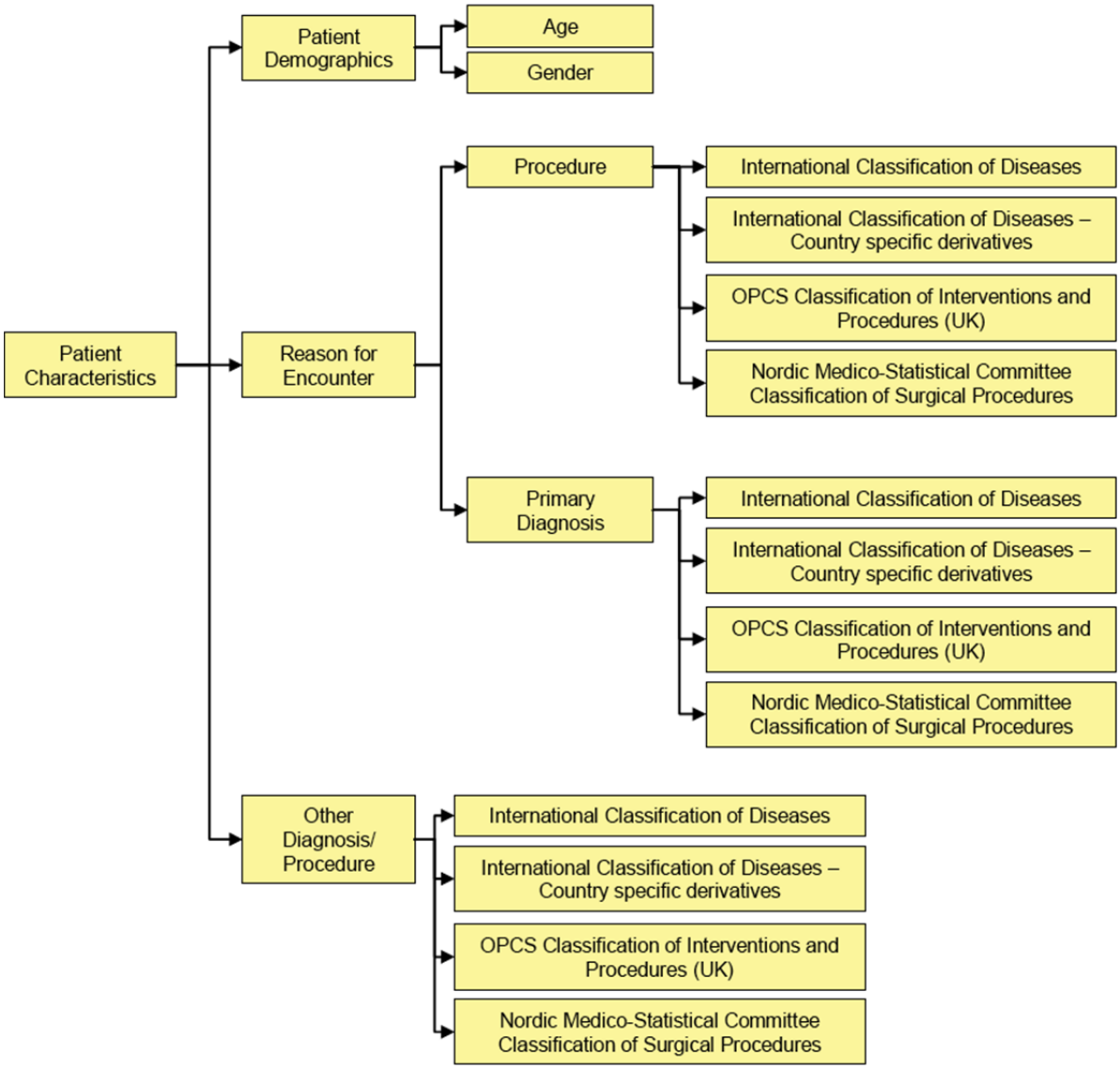
A. World Health Organization Conceptual Framework for the International Classification for Patient Safety Version 1.1 (Final Technical Report, January 2009)



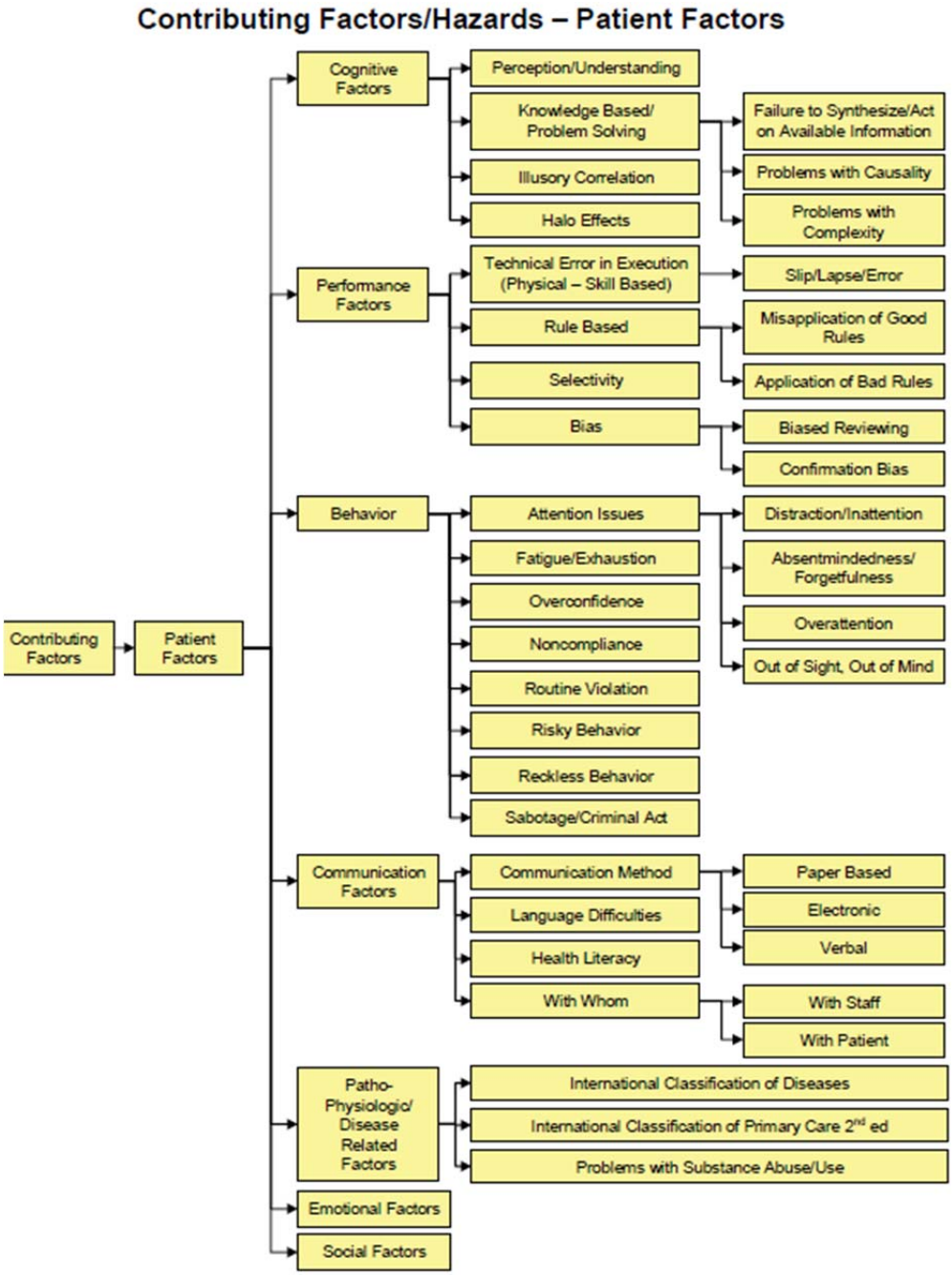
The solid lines represent the semantic relationships between the classes. The dotted lines represent the flow of information.

A. World Health Organization Conceptual Framework for the International Classification for Patient Safety Version 1.1 (Final Technical Report, January 2009) cont.

Patient Characteristics



A. World Health Organization Conceptual Framework for the International Classification for Patient Safety Version 1.1 (Final Technical Report, January 2009) cont.



B. Resident Assessment Instrument – Mental Health

Minimum Data Set for Mental Health (MDS-MH) ©