Guiding Clinical Judgment and Management: An Evaluation of a Screening Tool for Short-term Inpatient Violence

by

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Abstract

Historically, the focus on inpatient units has not been the prevention or management of violence risk, but reacting to the violence after an incident. Violence on these units leads to physical, emotional, and economic consequences for perpetrators, victims, and the mental health system. Although short-term risk assessments have been developed to specifically address the risk for inpatient violence, these measures have only been implemented on the inpatient units and not in the Emergency Department (ED), which is often the first point of contact for the mentally ill. The purpose of the present study was to determine if a framework that uses structured professional judgment (SPJ) principles in the Emergency Department (ED) could predict violence within an inpatient unit.

The Inpatient Violence Screening Tool (IPVST) SPJ framework was comprised of several pre-existing measures and four additional items culled from a literature review. These measures include the Brøset Violence Checklist (BVC; Almvik & Woods, 1998) and the Dynamic Appraisal of Situational Aggression (DASA-IV; Ogloff & Daffern, 2006a). A third short-term risk assessment, the McNiel Violence Checklist Revised (VSC and VSC-R; McNiel & Binder 1994), was coded based on files. Participants were 697 individuals who presented to the psychiatric ED at a general hospital and were interviewed by the Psychiatric Triage Nurses (PTNs). The follow-up sample was 207 patients who were subsequently admitted to an inpatient unit. The IPVST was completed by the PTNs after their interview; the VSC, VSC-R and outcome data were collected from files of the follow-up sample.

The results of this study partially supported the use of the IPVST as a risk assessment framework in the ED to prevent inpatient violence. There was consistency in SPJ ratings amongst the majority of the PTNs. The IPVST total score and SPJ rating were significantly related to management strategies as well as significantly related to inpatient violence. The AUCs of the total scores of the IPVST and the individual measures were between .62-.65, except for the BVC, which was not a significant predictor of inpatient violence. The AUCs for the categorical risk rating of the BVC, DASA, VSC, and VSC-R were between .54-.64. Implications for risk assessment and management are discussed.

Keywords: Risk assessment; violence; BVC; DASA; VSC-R; risk management

Dedication

To my husband Michael, my two sons Nathaniel and Nolan, and to Baby #3 – I'm finally done!

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Overview

The introduction is separated into four chapters. The first chapter will provide a brief overview of civil commitment and pertinent case law regarding the criterion of danger to others, as well as the prevalence and consequences of inpatient violence. The second chapter will describe the various approaches to assessing and managing violence risk, in addition to current risk assessment measures that have been applied to inpatient violence. The third chapter will describe the risk screens that were specifically developed to assess and aid in the management of inpatient violence. The shortcomings of the current risk screens, how inpatient violence is currently managed on mental health units, and how the current study attempts to improve upon prevention of inpatient violence will be discussed. The final chapter will detail the current study.

Chapter 1.

Introduction

When individuals are civilly committed, it is generally for the purposes of treatment of the individual, protection of the individual, and/or protection of society (Melton, Petrila, Poythress, & Slobogin, 2007). Although placed on a secure mental health unit, the individual may continue to pose a threat to others, including other patients, visitors, and mental health staff. It is the responsibility of the mental health staff to manage the patient; despite staff acknowledging and receiving the benefit of training in the prevention of patient violence (e.g., de-escalation strategies, Duxbury & Whittington, 2005; Roberton, Daffern, Thomas, & Martin, 2012), a considerable amount of inpatient violence continues to occur on mental health units (e.g., Cornaggia, Beghi, Pavone, & Barale, 2011). The consequences of inpatient violence - physical, psychological, and financial are substantial.

1.1. A Brief History of Civil Commitment[1]

Being detained against one's will is a violation of s.7 of the Canadian Charter of Rights and Freedoms. Involuntary detainment is sanctioned in the context of immigration, criminal proceedings, and civil commitment under s.1 of the Charter despite still being a violation under s.7. The origin of involuntary commitment is based on the *parens patriae* model in which the State acts as a parent and in the best interests of the individual who is thought to be incapable of providing for his or her own welfare (Mrad & Nabors, 2006; Winick, 2005). Under this model, it is the assumption of the State that individuals with mental illness need to be involuntarily committed to receive care for their

[1]For the purposes of the dissertation, I will not be reviewing sexually violent predator laws, long-term offender or dangerous offender designations.

own protection or for the protection of others (Perlin, 2000). One of the first US legal cases to espouse this view was *In re Oakes* (1845), which held that involuntary treatment is justified both when a person is dangerous to others, but also for the individual's own safety. During this time period, medical professionals made commitment decisions, yet the criteria for commitment were vague and the commitment procedures themselves were informal with no right to counsel and little to no input from the individual (Guy, Douglas, & Hart, 2015). This changed, however, as a result of several court decisions that established safeguards for patients and identified that treatment alone is not a reason for commitment. One such landmark case is *Lessard v. Schmidt* (1972), where the court found that civil confinement is justified if "dangerousness is based upon a finding of a recent overt act, attempt or threat to do substantial harm to oneself or another" (p.1094). As a result of this case, the patient was afforded many of the rights of individuals in the criminal justice system, such as the right to counsel, mandatory notice of the right to a jury trial, and mandatory notice of the reason for detainment. This was the beginning of the shift away from *parens patriae,* as the court focused more on dangerousness and criminal protections for the individual, instead of the traditional focus on treatment (Conroy & Murrie, 2007).

The policy of police power is the power of the State to protect society from disturbance of the peace (Perlin, 2000). That is, instead of the focus being on protecting and treating the mentally ill individual, there was a shift to protecting society from potentially violent behaviour of that individual (Harvard Law Review, 1974). In the US case, *Addington v. Texas* (1979), the Supreme Court rejected the "beyond a reasonable doubt" standard of proof and shifted the standard of proof to "clear and convincing" (between preponderance of the evidence and beyond a reasonable doubt) (p. 441). The Court also reaffirmed the right of the State to commit individuals under police power and *parens patriae*. Individual states, however, began to tighten their legislation and adopt the policy of police power to the exclusion of *parens patriae*. Currently, civil commitment proceedings are a blend of the two philosophies (Melton et al., 2007).

1.2. Civil Commitment in British Columbia

All of North America has criteria for civil commitment, although the details and definitions vary. In Canada, all of the provinces include dangerousness to others as one of the involuntary commitment criteria, but they differ regarding the strictness of the definition (Douglas & Koch, 2001). The Mental Health Act of British Columbia section 22(2)(c) states: (c) a statement, separate from that under paragraph (a), by the physician that the physician is of the opinion that the person to be admitted, or the patient admitted, under subsection (1)

(i) requires treatment in or through a designated facility,

(ii) requires care, supervision and control in or through a designated facility to prevent the person's or patient's substantial mental or physical deterioration or for the protection of the person or patient or the protection of others, and

(iii) cannot suitably be admitted as a voluntary patient.

Thus, an individual can be involuntary committed for “the protection of others.” Usually that decision is made by a medical resident who has received little or no training in violence risk assessments (e.g., McNiel, Chamberlain, Weaver, Hall, Fordwood, & Binder, 2008) and/or a physician using unstructured clinical judgment (i.e., the decision is not guided by established guidelines; Ryan, Nielssen, Paton, & Large, 2010; Teo, Holley, Leary, & McNiel, 2012; Woods, 2013). It is for this very reason that risk assessment tools were developed; to standardize and formalize decision-making regarding the risk of an individual to the larger public (Melton et al., 2007; Monahan, 1988). These risk assessments are usually conducted when a patient is due to be released or to justify committing an individual (McNiel et al., 2008). Assessments of risk of inpatient violence occur frequently, but are not guided by a structured framework (McNiel & Binder, 1994) until the more recent development of specific risk tools (described below; e.g., Almvik & Woods, 1998; Ogloff & Daffern, 2006a).

1.3. Legal Precedent for Dangerousness

Risk assessments help the assessor to make sound decisions regarding violence risk potential and to be compliant with the law. In *O'Connor v. Donaldson*, a landmark mental health case in the United States, the court found that "a State cannot constitutionally confine, without more, a non-dangerous individual who is capable of surviving safely in freedom by himself or with the help of willing and responsible family members or friends" (*O'Connor v. Donaldson*, 422 U.S. 563 1975, p.573). In *McCorkell v. Riverview Hospital* (1993), the court upheld the dangerousness language of the Mental Health Act of BC ("supervision and control of the person necessary for his protection or for the protection of others") and declared it not vague (*McCorkell v. Riverview Hospital (Director)* (1993), 81 B.C.L.R. (2d) 273 (S.C.)). Those individuals who are committed based on a need to protect others will potentially be dangerous to the staff and other co-patients within an inpatient ward. If a patient has violent ideation or voiced threats, it demonstrates the potential to act on that thought, fantasy or plan when on an inpatient unit or threaten violence toward the staff or co-patients. Even individuals who are committed due to protection of others or for the possibility of deterioration if not hospitalized are potentially dangerous to others on the inpatient unit; for example, impulsivity, paranoia, and irritability are features of several psychiatric disorders and can contribute to violent incidents (e.g., Caprara et al., 2013; Link, Stueve, & Phelan, 1998; Rogers, Moeller, Swan, & Clark, 2010).

Chapter 2. Inpatient Violence

Given that a large subset of patients on mental health units in North America have been civilly committed (Crisanti & Love, 2001), and the reason for some of these commitments is dangerousness, it is not surprising there is a risk of inpatient violence on these units. Inpatient violence on mental health units is a pervasive and persistent problem (Rippon, 2000), impacting the staff, patients, family members of the injured, and the mental health system (Caldwell, 1992; Lanza 2006; LeBel & Goldstein, 2005; Kraus & Sheitman, 2004). The primary victims of this violence are most often the mental health staff (Cornaggia, Beghi, Pavone, & Barale, 2011; Rodriguez-Acosta, Myers, & Richardson, 2010), although other patients can also be injured (Khadivi, Patel, Atkinson, & Levine, 2004; Kraus & Sheitman, 2004). Globally, research suggests that healthcare workers reported experiencing violence at their place of employment more than any other type of setting (Islam, Edla, Mujuru, Doyle, & Ducatman, 2003).

Although physical injury is a less common consequence of workplace violence (e.g., 10-20% bruises/welts; 1-5% severe injury; Nijman, Palmstierna, Almvik, & Stolker, 2005; Noble & Roger, 1989), the emotional impact of the aggressive acts can be significant (e.g., PTSD; Ketelsen, Zechert, Driessen, & Schulz, 2007; Pearson, Wilmot, & Padi, 1986). The psychological and physical injuries that result from inpatient violence decrease staff health (Gerberich et al., 2004; Miranda, Punnett, Gore, & Boyer, 2011; Spector, Coulter, Stockwell, & Matz, 2007; Winstanley & Whittington, 2002), which often leads to an increase in workers' compensation costs, healthcare costs, and worker absenteeism or turnover (e.g., Lanza, 2006; LeBlanc & Barling, 2005; Schat, Frone, & Kelloway, 2006).

2.1. Prevalence of Inpatient Violence

The prevalence of violence against mental health staff has been difficult to quantify due to diverse definitions of violence, settings, countries, follow-up periods, and measurement strategies (Cornaggia, Beghi, Pavone, & Barale, 2011; Davis, 1991; Needham, Abderhalden, Halfens, Fischer, & Dassen, 2005). Often in empirical literature, the terms aggression and violence are used interchangeably resulting in ambiguity regarding the acts that are being committed by inpatients. Because of this ambiguity, it is difficult to compare prevalence rates because it unknown whether the same behaviours are being compared between studies. When violence is reported in the literature, the definition usually includes physical attacks, fear-inducing behaviour (e.g., attacks on objects or threats to attack individuals), and verbal aggression (McNiel & Binder, 1991). For the purpose of this review, the wording used in the original study will be repeated here. Prevalence rates of physical acts against mental health staff reported in the literature of Western countries have ranged from 7% to 15% in psychiatric hospitals (Cornaggia, Beghi, Pavone, & Barale, 2011). Several population-based European studies have also reported similar rates of inpatient physical violence (7.5% to 9.5%; Grassi, Peron, Marangoni, Zanchi, & Vanni, 2001; Ketelsen et al., 2007; Salamin, Schuwey-Hayoz, & Bickel, 2010). Studies in Australia and New Zealand were similar, with reported prevalence rates between 11% and 15% (Carr et al., 2008; El-Badri & Mellsop, 2006; Gale, Pellett, Coverdale & Simpson, 2002). A systematic review by Davis (1991), found that episodes are more frequent in the United States than in other countries; prevalence rates of inpatient violence are reported to be between 30% and 76% (Campbell et al., 2011; Hatch-Maillette, Scalora, Bader, & Bornstein, 2007; Poster and Ryan, 1994). In a meta-analysis including several European countries and Asia, the number of observed aggressive incidents committed by adult patients residing in acute psychiatric wards during a 12 month period ranged from 0.4 to 33.2 per patient, with a mean rate of 9.2 incidents per patient per year (Nijman et al., 2005).

While there is little published in Canada about workplace violence generally, a 1995 national study found that 80% of surveyed Canadian nurses reported experiencing some form of violence victimization during their career (Whitehorn, 1996). It was reported that approximately 40% of all violence-related claims in British Columbia (BC)

came from healthcare workers, although these workers make up less than five percent of the workforce in the province (WorkSafe BC, 2005). In a study of 106 healthcare staff working in the Emergency Department (ED) of a Vancouver hospital, 57% of respondents were physically assaulted, 76% witnessed verbal abuse, and 86% witnessed physical threats or assaults committed by patients (Fernandes et al., 1999). Not only was the prevalence of violence in the ED significant in this study, moreover, healthcare workers also reported an increase in the frequency (68%) and severity (60%) of the perpetration of violence over time (Fernandes et al., 1999). Within the last year, there have been several serious assaults of mental health staff in BC (Clancy, 2015, March 3). The BC Health Minister reported that the province is spending "tens of millions of dollars on violence prevention and de-escalation training for medical staff" (Clancy, 2015, March 3).

2.2. Consequences

Violence in healthcare settings (e.g., ED, psychiatric units) results in physical and emotional injuries to healthcare workers, as well as third parties such as co-workers, family, and friends (for a review, see Lanctôt & Guay, 2014). In several studies, staff who were physically injured as a result of inpatient violence on psychiatric units required more than one week to recover (Nijman et al., 2005; Lanza, 1983). One of the more serious psychological consequences of workplace violence generally was Post-Traumatic Stress Disorder (PTSD). Reported rates in the literature ranged from 5% to 32% of assaulted mental health staff (Gates, Gillespie, & Succop, 2011; Panos, Panos, & Dulle, 2007; Wykes & Whittington, 1998; Richter & Berger, 2006). Other common psychological consequences for victimized healthcare workers were: anger and frustration (Arnetz & Arnetz, 2001; Atan et al., 2012; Celik, Celik, Ağirbaş, & Uğurluoğlu, 2007; Gerberich et al., 2004; Magnavita & Heponiemi, 2011; May & Grubbs, 2002; O'Connell, Young, Brooks, Hutchings, & Lofthouse, 2000; Samir, Mohamed, Moustafa, & Saif, 2012; Talas et al., 2011; Wykes & Whittington, 1998; Williams, 1996), anxiety, fear, and stress (Atan et al., 2012; Belayachi et al., 2010; Bishop, 2006; Magnavita & Heponiemi, 2011; May & Grubbs, 2002; McKenna et al., 2003; O'Connell et al., 2000; Ryan et al., 2008; Talas, Kocaöz, & Akgü, 2011; Williams, 1996; Winstanley & Whittington, 2002), sadness and depression (Arnetz & Arnetz, 2001; Atan et al., 2012;

Atawneh, Zahid, Al-Sahlawi, Shahid, & Al-Farrah, 2003; Celik et al., 2007; Gerberich et al., 2004; McKenna, Poole, Smith, Coverdale, & Gale, 2003; Talas et al., 2011, Zahid, Al-Sahlawi, Shahid, Awadh, & Abu-Shammah, 1999), disbelief and denial, resignation and hopelessness, self-blame, a feeling of threatened personal integrity, a negative transformation of one's world view, insecurity at work, and a loss of confidence in one's professional competence and appropriateness for the job (Lanza, 1983). In one study in an emergency department at a large urban hospital in Vancouver, BC (Fernandes et al., 1999), 48% of healthcare worker respondents reported impaired job performance for the rest of their shift or work week after experiencing an incident of violence. Additionally, 73% of respondents reported being afraid of patients after a violent incident occurred and, as a result, nearly half chose to subsequently hide their identities from patients. Lastly, 74% reported reduced job satisfaction because of violence in the workplace generally (Fernandes et al., 1999, 2000).

The economic costs of workers' compensation claims as a result of violence are substantial. Unfortunately, Canadian data focused on the costs of violence in the wider workforce and, thus, healthcare specifically was not available; instead costs in the US were used as a proxy for Canadian costs. Beyond healthcare settings, the lifetime costs of non-disabling workplace injuries have been estimated at $10,032 USD and disabling injuries at $31,183 USD per person (Marquis & Manning, 1999). In 1998, employers paid $41.7 billion USD for workers' compensation benefits (including medical, indemnity, and rehabilitation; Mont, Burton, & Reno, 2000). This does not include the cost of lost work days, overtime, retraining, or other costs incurred (Reville, Bhattacharya, & Weinstein, 2001). Specific costs of workplace violence were not available for Canada.

Even when focusing solely on the healthcare sector as opposed to the wider workforce, the costs are significant. In a US Veteran Affairs hospital the estimated cost of lost staff work days was $113,456 USD approximately 15 years ago (Lanza & Milner, 1989). Workers' compensation claims due to patient assault among 530 employees of psychiatric hospitals in Los Angeles County cost an estimated $3 million USD between 1986–1990 and $4,879 USD per claim (Sullivan & Yuan, 1995). Specific to BC, healthcare violence reportedly accounts for $35 million per year for loss of time at work (WorkSafeBC, 2005). In 2010, nurses lost over 45,000 work days and over $6.5 million was paid in claim costs; 11% of those claims were due to violence (WorkSafeBC, 2013).

2.3. Management

The consequences of inpatient violence are substantial, impacting at the micro (personal) and macro (economic) level. Healthcare workers are particularly at risk for victimization, because they provide direct patient care. However, it is also important to recognize that the patient him or herself may be adversely impacted. That is, generally, the majority of mental health units are reactionary, using broad based management strategies to immobilize individuals in an attempt to neutralize violence risk during or after a violent incident; prevention via a management plan is rare or not a consistent practice. The management strategies that do tend to be used are de-escalation of the potentially aggressive situation, to more restrictive measures including chemical restraint (e.g., antipsychotic medications), physical restraint, and seclusion. De-escalation has been implemented by mental health nurses for many years (Hastings, Thompson-Heisterman, & Farrell, 1999; Paterson, Leadbetter, & McComish, 1997; Stevenson 1991; Sullivan 1998). In fact, de-escalation is constantly used by nurses in their daily practice (Cowin et al., 2003). There are times, however, when incidents escalate beyond the point that non-violent crisis intervention techniques are useful, with more invasive and restrictive measures (i.e., chemical restraint) being implemented instead (Taxis, 2002). If "as needed" medication has not been successful in reducing agitation, anxiety, or other symptoms that are often precursors to aggression and violence (Haglund et al., 2004), the next strategy is to seclude the patient and/or use physical or chemical restraints. These are considered coercive measures and, thus, are recommended as strategies of last resort due to their questionable therapeutic efficacy (Nelstrop, Chandler-Oatts, & Bingley, 2006), often inappropriate use (Allen, Carpenter, Sheets, Miccio, & Ross, 2003), and potential negative effects on patients, staff, and the therapeutic relationship (Allen, Currier, Carpenter, & Ross Doherty Expert Consensus Panel for Behavioral Emergencies, 2005). Although the literature has advocated the use of seclusion and physical restraints as a last resort, there is evidence that these practices are routine management strategies on acute wards (Canatsey & Roper, 1997; Craig, Ray, & Hix, 1989; D'Orio, Purselle, Stevens, & Garlow, 2004; Hellerstein, Straub, & Lequesne, 2007) and for aggressive patients (Gudjonsson et al., 2004; Wright, 1999).

Given the prevalence rates of inpatient violence, current management strategies are inadequate for two major reasons. First, although training is highlighted as a necessary measure for management, nurses report a lack of knowledge regarding management techniques due to both a lack of training and, in some hospitals, insufficient training (Wand & Coulson, 2006). Second, management techniques such as chemical restraint and seclusion are punitive in nature and are being used in reaction to escalating behaviour or a violent incident. Coercive management techniques can lead to unpleasant side effects for patients (e.g., EPS symptoms; e.g., Satterthwaite et al., 2008), a rupture in rapport between patients and staff (Duxbury & Whittington, 2005; Lee et al., 2003; Meehan, Vermeer, & Windsor, 2000) potentially leading to an unauthorized leave, and an increase in the risk of violence when attempting to implement the management (Fish & Culshaw, 2005) or due to a breakdown in rapport.

Alternatively, a prevention model identifies high risk individuals and those factors that motivate, disinhibit, and destabilize the sound decision-making of high risk individuals. Management can then be targeted at those factors, so that an aggressive incident may be prevented. The mental health team would be prepared with a management plan in advance of any violent incident; this would prevent harm to potential victims, the therapeutic relationship, and the patient. As such, it is critical to examine novel strategies to identify individuals at risk of inpatient violence and manage that risk immediately. The next chapter will outline current approaches to risk assessment for violence and review available risk assessment tools generally and specifically for inpatient settings.

Chapter 3. Risk Assessment

The area of violence risk assessment has flourished over the past 20 years. Risk assessments have been developed for general violence (Historical Clinical Risk Management-20, Webster, Douglas, Eaves, & Hart, 1997; Violence Risk Appraisal Guide, Harris, Rice, & Quinsey, 1993), spousal violence (Spousal Assault Risk Assessment, Kropp, Hart, Webster, & Eaves, 1994, 1995, 1999; Danger Assessment, Campbell, 2005), sexual violence (Risk for Sexual Violence Protocol, Hart et al., 2003; Sexual Violence Risk-20, Boer, Hart, Kropp, & Webster, 1997; STATIC 99, Hanson & Thornton, 1999), and stalking violence (Stalking Assessment and Management Guide; Kropp, Hart, & Lyon, 2008; Stalking Risk Profile, MacKenzie, McEwan, Pathe, James, & Ogloff, 2009). The process of assessing risk includes gathering information regarding the individual's potential for violence and then developing strategies to mitigate the risk of future violence (Douglas, Hart, Webster, & Belfrage, 2013); there is, however, a debate in the field regarding whether these two steps (prediction and prevention) are mutually exclusive. This debate is beyond the scope of this dissertation.

3.1.1. Approaches to Risk Assessment

There are two broad approaches to decision-making with respect to violence risk assessment: discretionary and non-discretionary decision-making. Discretionary decision-making is using professional judgment and opinion to render a decision. There is a continuum within this approach because the assessor uses varying levels of professional judgment from completely unstructured decision-making to using judgment in some aspects (e.g., what information to gather) to providing guidelines to aid professional judgment. The assessor uses professional judgment in all aspects of the assessment process including what information to collect and how to weight and combine the information (Douglas, Hart, Webster, & Belfrage, 2013). Non-discretionary decision-making is also referred to as actuarial decision-making (Hart, 2008a). It is considered "mechanical [and] algorithmic" (Grove & Meehl, 1996, p.293) because the

assessment of risk is determined by an *a priori* statistical model that does not allow for additional information to be considered in the assessment. The assessor uses *a priori* rules to determine what information to collect and how it will be weighted and combined in order to make decisions. The rules for scoring are based on algorithms derived from a particular sample and, thus, are optimized for specific populations, settings, and outcomes (see section on Non-discretionary Approaches for further elaboration; Douglas et al., 2013).

Discretionary Approaches

Under the umbrella of discretionary decision-making, there are three different approaches: 1) unaided clinical judgment, 2) anamnestic risk assessment, and 3) structured professional judgement (SPJ; Hart, 2008b). Unaided clinical judgment (Hanson, 1998) or unstructured professional judgment (Hart, 1998) is clinical judgment based on experience with no structure or rules to guide decisions or there is idiosyncratic structure (i.e., an individual assessor has his or her own "guidelines" for assessing risk). This was the norm for decision-making historically and is still often employed in civil psychiatric settings (Daffern & Howells, 2007). It is well-established in the empirical literature and in the risk assessment community that unaided clinical judgment lacks sufficient inter-rater reliability or validity (e.g., Bonta, Law, & Hanson, 1998; Grove & Meehl, 1996; Harris, Rice, & Cormier, 2002; Lidz, Mulvey, & Gardner, 1993; Quinsey et al., 2006). In anamnestic risk assessment there is limited structure. This approach relies on information regarding past violent incidents to determine what led the individual to act violently (Melton et al., 2007; Otto, 2000). The evaluator can then suggest management strategies to address situational and personal factors that previously led to violence to attempt to prevent future violence. The third – SPJ – approach (Kropp & Hart, 2000) is decision-making assisted by guidelines developed based on empirical research, theory, and professional practice. There is a growing body of empirical literature supporting SPJ decision-making for violence risk as inter-rater reliable and valid (e.g., Guy, 2008; Singh, Grann, & Fazel, 2011).

Non-discretionary Approaches

There are two approaches in this category: 1) actuarial use of psychological tests and 2) actuarial risk assessment instruments (Hart, 2008a). The actuarial use of

psychological tests is simply using psychological measures that were developed to assess an individual's level with respect to particular personality characteristics or psychopathology, but then using this information to predict violence (Douglas et al., 2003). An example would be the Psychopathy Checklist family of measures (e.g., Hare, 2003; Hart, Cox, & Hare, 1995). Research demonstrates that this approach is better than an unstructured approach, but not optimal, in predicting violence (Guy, Douglas, & Hendry, 2010).

Actuarial risk assessment instruments were developed specifically to predict behaviour in the future. Items are usually chosen empirically, meaning the items have significant associations with the outcome of interest in the development sample (e.g., Grove & Meehl, 1996). The items may be weighted based on any number of types of optimizing algorithms (e.g., the iterative tree; Monahan et al., 2006) from the development sample and the algorithm typically yields probability estimates regarding violence over a specific time period (Quincy et al., 1998, 2006). For example, for the revision of the VRAG, the weights for each risk factor were calculated using the Nuffield weighting system (see Rice, Harris, & Lang, 2013 for details). Empirically, research has demonstrated the reliability and validity of the total scores, but the measures tend to experience validity shrinkage when applied to novel samples (Dawes, Faust, & Meehl, 1989; Hart, 1998; Ogloff & Douglas, 2003). Including only those risk factors predictive of violence in the development and validation sample likely leads to the exclusion of relevant risk factors.

There are numerous articles reviewing the pros and cons of SPJ versus actuarial measures (e.g., Ægisdóttir et al., 2006; Gottfredson & Moriarty, 2006; Grove, Zald, Lebow, Snitz, & Nelson, 2000; Guy, 2008) and, as such, this issue will not be reviewed in depth here. It is safe to conclude, however, given the extensive literature, that SPJ instruments, when used as intended, are as accurate if not more accurate than other approaches to risk assessment (e.g., actuarial; Douglas, Hart, Groscup & Litwack., 2014). The most important criticisms for the purpose of this study are that in actuarial measures (1) there is a disconnect between the stated risk of violence and a management plan and (2) a numeric estimate of risk usually over a specified time period is a vague and generally not useful way to communicate risk (Dvoskin & Heilbrun, 2001) as it does not address the presence of risk factors nor, more importantly, the type of

management needed to prevent violence (Heilbrun, Dvoskin, Hart, & McNiel, 1999). In contrast, management strategies are a part of the decision-making process in SPJ instruments and the amount of management needed is directly linked to the overall assessment of risk. In addition, risk is communicated in SPJ tools based on a categorical approach (i.e., a summary risk rating of Low, Moderate, or High; Douglas et al., 2014) avoiding problems with numeric probability estimates (i.e., unstable across samples and validity shrinkage). The SPJ judgments are of equal or superior validity than actuarial measures or using the numeric total score of SPJ instruments (Guy, 2008). Of a total of 34 published studies that investigated the summary risk judgments, 88% concluded that the judgments were predictive of violence (Douglas et al., 2014). In addition, in 15 of 17 studies, the SPJ judgments added incremental validity. For these reasons, the risk framework implemented in this study is based on SPJ principles as opposed to just the current actuarial risk screens available to measure inpatient violence (described below).

3.1.2. Structured Professional Judgment

There are several guiding principles of the Structured Professional Judgment (SPJ) approach: 1) preventive, 2) structured, and 3) flexible (Hart, 2008b). The purpose of the SPJ approach to assessing risk is to prevent violence, not predict violence. The assessment of the risk and management of the risk are not mutually exclusive, and both actions are imperative in determining an individual's level of risk. The SPJ approach structures what information (at a minimum) should be considered in a risk assessment, however, it does not limit the information included. It also provides guidelines regarding formulating the risk, developing possible scenarios of future violence, as well as the types of management that should be considered when developing a plan. The SPJ approach is flexible, so it can be individualized and can consider the context and possibility of future violence for that individual. In addition, it includes dynamic or changeable risk factors (Douglas & Skeem, 2005) that can be targeted for intervention.

There are several elements present in SPJ instruments to structure a risk assessment. There is a standard set of risk factors chosen rationally (i.e., on the basis of theory or experience; Douglas et al., 2013) from the empirical, theoretical, and professional literature. These risk factors must demonstrate an association with the

specific type of violence of interest across numerous settings. Item definitions are provided as coding instructions for the risk factors (Douglas et al., 2014). This increases generalizability of the measures across settings and samples, as well as increases the comprehensiveness of the measures. Guidance for making the summary risk judgment of Low, Moderate, or High risk is based on the presence and relevance of risk factors and the amount of effort required to manage the assessed individual. Research on the predictive validity of SPJ judgments indicate it is as good or better than composite total score or actuarial numeric probability estimates (Guy, 2008), and the summary risk judgment adds incremental validity to the actuarial total score (see Douglas et al., 2014 for a review). Lastly, SPJ instruments provide guidance to facilitate development of an individualized management plan.

The elements of the SPJ approach described above have been quantified and tested empirically. The authors of SPJ measures state that the risk factors should not be summed in an actuarial manner, because an individual could be a high risk to commit violence and only have one risk factor that is critical or highly relevant to risk (Kropp et al., 2008). Instead, the SPJ ratings should be analyzed. Generally, however, the more risk factors that are present and relevant, the higher the risk for future violence (Douglas et al., 2013; Kropp et al., 1995). Research, studies have demonstrated that the total scores and the summary risk ratings are predictive of violence thus demonstrating the validity of the SPJ model. In the validation study of the Spousal Assault Risk Assessment guide (SARA; Kropp et al., 1994, 1995, 1999), the summary risk ratings of the SARA were highly correlated with SARA total scores (r=.67), and the number of risk factors present (r=.63; Kropp & Hart, 2000). Recidivists also had higher total scores and more risk factors present than non-recidivists. In support for the SPJ final judgement, however, recidivists were typically rated as higher risk.

Research on the Stalking Assessment and Management Guidelines (SAM; Kropp et al., 2008), a SPJ tool for assessing risk of stalking violence, significant positive correlations were reported between the three domains (Nature of Stalking; Perpetrator Risk Factors; Victim Vulnerability Factors), the total score, and the summary risk judgments. For the SAM, there are three summary risk judgments: Case Prioritization; Continued Stalking; and Serious Physical Harm. In a study of 109 perpetrators of stalking related offences who had been referred to a forensic psychiatric clinic for

assessment, the SAM was rated from file information (Kropp, Hart, Lyon, & Storey, 2011). There was a significant positive relationship between the Nature of Stalking risk factors and Case Prioritization and Continued Stalking (r=.32; r=.42 respectively), between Perpetrator Risk Factors and the three summary risk judgments (r=.48, r=.33, r=.15), between Victim Vulnerability (VV) Factors and Serious Physical Harm (r=.29), and the between the total score and all three summary risk judgments (r=.40; r=.37; and r=.31). These findings support that an increase in risk factors is associated with an increased risk of stalking violence. Belfrage & Strand (2008) investigated the relationship between the Brief Spousal Assault Form for the Evaluation of Risk (B-SAFER; Kropp, Hart, & Belfrage, 2005, 2010), risk factors, and the summary risk judgments that were completed by Swedish police officers on 540 alleged male perpetrators of intimate partner violence (IPV). The majority of risk factors and VV factors had a strong correlation with the summary risk judgments. In particular for VV factors, the more factors identified, the higher the rated risk for the sample. The same results were reported in a similar study for both risk and VV factors and the summary risk judgments (Belfrage & Strand, 2012). The above studies support that, generally, an increase in the number of risk factors present is associated with an increased risk of violence, one of the elements of the SPJ model.

The relationship between risk factors and management has also been investigated. In the manual for the B-SAFER (Kropp et al., 2005, 2010), it states that once the risk factors are rated as present and relevant, the assessor is to "identify management strategies targeted at them" (p.10). Research on the clinical utility of the HCR-20 found that training psychiatry residents and clinical psychology interns on the HCR-20 resulted in improved case formulations and in more articulate risk management plans for psychiatric patients (McNiel et al., 2008).

Belfrage & Strand (2012) validated the "violence prevention model" that underlies the SPJ framework espoused in Douglas and Kropp (2002) and in Hart (2001a). Police in Sweden completed the B-SAFER on 216 alleged perpetrators of IPV and suggested management strategies for each case (Belfrage & Strand 2012). The results indicated that the higher the rated risk for both imminent violence and severe/fatal violence, the higher the level of intervention suggested. The opposite was also true; lower risk, less intervention. Belfrage et al. (2012) used police officer ratings of the SARA to move the

management literature a step further. They replicated the above reported results, namely that higher risk ratings were associated with more management recommendations. The authors also demonstrated that risk management mediated the association between risk factors and recidivism. Perpetrators rated as high risk and given intense management were less likely to recidivate (28% vs. 37%) and low risk perpetrators with intense suggested intervention had higher rates of recidivism (21% vs. 12%). Both results are consistent with the Risk-Need-Responsivity Model (RNR; Andrews, Bonta, & Hoge, 1990) and SPJ violence prevention models. Briefly, RNR was developed to enhance effectiveness of services offered to offenders with the goal of reducing recidivism. Specific to the Belfrage et al. (2012) study, the Risk principle states that the intensity of management should be matched to the risk level so those who are at a high risk of violence, for example, should be given intense services. These results were partially replicated with the B-SAFER (Storey, Kropp, Hart, Belfrage, & Strand, 2014). The B-SAFER total scores and overall risk ratings were significantly and positively associated with the total number of management strategies recommended (r = .43). Although bivariate analyses between management and recidivism were significant (high risk, intense intervention; low risk, low intervention), the mediation model was not significant. The authors posit these different findings could be the result of different statistical analyses and less power due to a smaller sample size. Generally, the above results support that an increase in the number of risk factors present is related to an increase in the total amount of management recommended or implemented, another assumption of the SPJ model.

The literature suggests risk reduction on inpatient wards is possible by providing sufficient and appropriate treatments, which match an individual's symptoms (Royal College of Psychiatrists, 1998). Being cognizant of those patients who are at an increased risk to be violent before these individuals have even reached the unit will aid in the prevention of inpatient violence. Identifying at risk individuals and developing appropriate management plans will decrease the incidence of physical and psychological injury to staff, patients, and the family of both staff and patients. The key to improved management of inpatient violence is widely recognized to be the early detection and management of individuals at risk of behaving aggressively (Abderhalden et al., 2004; Gaskin et al., 2007; Rippon, 2000) while the patient's behaviour is still

manageable (Rippon, 2000). Gournay (2000) suggests that because these incidents are rarely spontaneous and are more likely to occur as part of a progressive process, opportunities exist to intervene and check that progression. Work by Frans Fluttert and colleagues (2008) emphasized early warning signs of aggression and an individual's "personal signature" (Fluttert et al., 2008, p. 214) or "signature risk sign" (Nicholls, Petersen, Brink, & Webster, 2011, p. 195) that indicates the individual's behaviour is escalating. The Early Recognition Method (ERM) was developed to aid in managing aggressive forensic inpatients (Fluttert et al., 2008). The treatment team, in collaboration with the individual, identifies a list of early warning signs for violence and develops a relapse prevention plan. The onus is put on the individual to recognize the presence of the early warning signs and engage in the relapse prevention plan. The one study using this method as a management strategy resulted in reductions in aggression (frequency and severity) and concluded there were moderate effects for ERM (Fluttert, Meijel, Nijman, Bjorkly, & Grypdonck, 2010). Further, the authors developed the Forensic Early Warning Signs of Aggression Inventory to help nursing staff identify and monitor early warning signs for individuals (Fluttert et al., 2011). The inventory had satisfactory IRR.

Another management strategy referred to as progressive ladders or ProLad is a milieu treatment focused management program that assumes by providing functional lifeskills (e.g., coping with violence risk factors), risk will be reduced (Bjørkly, 2004). It draws on existential psychology, behaviour therapy, cognitive behavioural coping strategies based on a stress-vulnerability model, and intensive relapse prevention to create a multi-focused intervention strategy. This is a new theoretical management strategy that has yet to be tested. The ERM and ProLad show promise in the prevention of violence, however, neither approach provide guidelines for identifying early warning signs or the risk factors to be targeted at the time of admission. The ERM assumes that some daily nursing care has occurred to allow staff to identify the signs (Fluttert et al., 2008). In order to prevent and manage inpatient risk early in admission, current risk measures have been implemented in civil psychiatric settings with positive results. The next section reviews those results and offers critiques of the use of these measures in the short-term.

3.1.3. Risk Assessment in the Short-term

When violence risk assessments were first being developed, actuarial measures (i.e., the VRAG) were developed based on recidivism rates that spanned the next 7 to 10 years. Although immediate risk was technically included in that timeframe, these measures were not developed to speak specifically to violence within the next 24 hours. As more risk assessment measures were developed and the existing ones were validated and tested in different populations, the question of time frames became more pertinent. This is especially true for inpatient settings when the staff is concerned about risk of imminent violence. First, violence risk assessment measures that have been applied to inpatient settings will be reviewed and then a review of tools developed specifically for the short-term inpatient situation will be discussed.

The most common statistic reported in the risk assessment literature is the Area Under the Curve or the AUC (Singh, 2014). The interpretation of the AUC varies by field and by the purpose of the study (Swets, 1988). For example, in medicine, AUCs of .90 or higher would be considered excellent and .70 to .90 good (Swets, 1988). In the risk assessment literature, a consensus has emerged regarding descriptions of AUC magnitude. Rice and Harris (2005) converted AUCs to point-biserial correlations and Cohen's d and used the descriptive labels of those statistics to describe AUC values. For example, a Cohen's d of .5 is a moderate effect size and is approximately an AUC of .64; a Cohen's d value of .8 or large is approximately an AUC of .71. Douglas, Yeomans, and Boer (2005) stated *r* values of approximately .30 (moderate effect size) were roughly an AUC of .65; *r*s of about .50 or large were roughly equivalent to AUC values of .80.

Historical Clinical Risk-20 (HCR-20)

The Historical Clinical Risk-20 (HCR-20^{V2}; Webster et al., 1997) and the recent revision, HCR-20^{V3} (Douglas et al., 2013), is a 20-item risk assessment measure developed for use with adults with or without a mental disorder for whom risk for violence is of clinical or legal relevance. It is comprised of three scales: Historical, Clinical, and Risk Management. The Historical factors are 10 items that address the individual's history of psychosocial adjustment. The 10 Clinical factors address the individual's recent psychosocial adjustment (i.e., the preceding couple of weeks to several months). The 10 Risk Management factors reflect the individual's anticipated psychosocial

adjustment based on the person's plans or goals for the future. The presence of the risk factors (i.e., present, partially present, or absent) and the relevance of each risk factor is determined. The assessor then develops potential violence risk scenarios, a management plan, and finally determines the categorical level of risk of violent recidivism (i.e., Low, Moderate, or High). This measure was developed to assess risk for institutional violence or violence once released into the community from a forensic, civil or correctional setting (Douglas et al., 2014). The HCR-20 was not specifically developed to assess risk of inpatient violence in the short-term (24-48 hours). There have been a number of HCR-20 studies in civil psychiatric settings. The brief review below focuses on peer reviewed publications on the use of the HCR-20 in civil psychiatric settings in the short-term (up to six months) and meta-analyses in civil psychiatric settings.

Several studies have investigated the predictive validity of the HCR-20 on inpatient units. In a meta-analysis of the HCR-20 in inpatient civil psychiatric settings, the Clinical (C) and Risk Management (R) scales outperformed the Historical (H) scale (O'Shea, Mitchell, Picchioni, & Dickens, 2013). In addition, the effect sizes (weighted Cohen's d) for the summary risk judgments, C and R scales were in the moderate to large range (*Cohen's* d_w = .60 - 1.17). The HCR-20's predictive validity in a Spanish civil psychiatric facility was investigated in 78 chronically mentally ill inpatients with a history of violence (Arbach-Lucioni, Andrews-Pueyo, Pomarol-Clotet, & Gomar-Sones, 2011). The AUCs of the HCR-20 total score for physical violence toward others and objects was .75, .69, and .77 for months 1-4, months 5-8, and months 9-12 respectively. The HCR-20 summary risk judgments (.78, .78, and .77) and the C scale (.77, .81, and .76) had the highest predictive validity for all follow-up periods. McNiel, Gregory, Lam, Binder, & Sullivan (2003) rated the HCR-20 on 100 short-term civil psychiatric patients. A case-control method of sampling was used in which 50 individuals who had been physically assaultive were matched with 50 participants who had been nonviolent. Receiver Operator Characteristics (ROC) analyses of the HCR-20 scales resulted in Area Under the Curves (AUC's) of .56 for the H scale, .77 for the C scale and .58 for the R scale. Compared to research using the HCR-20 with long-term community follow-up, the HCR-20 had generally lower levels of sensitivity and specificity in this sample.

Research has supported the predictive validity of the C scale of the HCR-20 for short-term risk of violence among persons undergoing acute episodes of major mental disorder (McNiel, Gregory, et al., 2003; Ogloff & Daffern, 2006a). In forensic samples with follow-ups ranging up to six months, AUC results for the HCR-20 total score ranged between .58-.89 (*M* = .75, *SD* = .10) for any violence, the AUC for the H scale ranged between .28-.77 (*M* = .61, *SD* = .16), the AUC for the C scale ranged between .58-.86 (*M* = .69, *SD* = .09), and the AUC for the R scale ranged between .55-.73 (*M* = .67, *SD* = .08) (Chu, Thomas, Ogloff, & Daffern, 2011). The same authors evaluated the predictive accuracy of the HCR-20 and other risk tools for 1 month, 3 month, and up to 6 month follow-ups in a forensic sample (Chu et al., 2011). The HCR-20 total score, C and R scales were predictive of interpersonal violence and any violence for 1 month and up to 3 months, but not up to 6 months (Chu et al., 2011). In another study in a forensic sample, the C scale was predictive of violence, abuse, or harassment within the first six months of admission based on a retrospective file review of 44 male inpatients (Grevatt, Thomas-Peter, & Hughes, 2004). The HCR-20, however, is not routinely used in acute inpatient settings because the assessment takes time to properly complete and requires substantial reliable sources of information, both of which are rare in these settings (Doyle & Dolan, 2006). One study, however, did investigate the feasibility of completing the HCR-20 (without the PCL-R score) at the time of admission to a civil psychiatric hospital (Smith & White, 2007). The HCR-20 was completed based on medical and nursing notes as well as an interview with the patient. The results of the study indicated that 84% of patients had a completed HCR-20 within 24-48 hours of admission.

Nicholls, Douglas, and Ogloff (2004) compared the HC scale composite of the HCR-20 to the Violence Screening Checklist (VSC; McNiel & Binder, 1991) and to the PCL-SV. The AUCs for the HC composite ranged from .62 to .74 for females; the composite was not significantly predictive for violence in males. The VSC was not predictive for males or females. In a forensic study that compared the ability of the HCR-20 C scale to predict verbal aggression and interpersonal violence to current inpatient violence risk assessment measures, the current measures performed significantly better (Chu, Daffern, & Ogloff, 2013). The Brøset Violence Checklist (BVC; Almvik & Woods, 1998), the Dynamic Appraisal of Situational Aggression – Inpatient Version (DASA-IV; Ogloff & Daffern, 2006), and the HCR-20 C scale were rated by nursing staff every 24

hours. The BVC and the DASA-IV total score performed significantly better than the C scale for predicting verbal aggression (AUCs = .77, .77, and .68, respectively), interpersonal violence (AUCs=.83, .83, and .72, respectively) and any aggression (AUCs=.77, .76, and .68, respectively). There were no differences between the BVC and the DASA-IV total score.

The results of the above studies indicate that the HCR-20 is a robust predictor of inpatient violence in both civil and forensic settings. The time and data needed, however, to complete the HCR-20 exceeds the resources available on most acute civil psychiatric units at admission. This could lead to incorrect implementation of the measure, unacceptable rates of omitted items, or reliance on subpar information. An inaccurate or incomplete assessment will not yield a detailed and useful management plan.

Short Term Assessment of Risk and Treatability (START)

The Short-Term Assessment of Risk and Treatability (START; Webster, Martin, Brink, Nicholls, & Desmarais, 2009), is a risk assessment tool that includes both risk and protective factors for the short-term assessment of risks associated with mental illness, substance use, and personality disorders (Desmarais, Nicholls, Wilson, & Brink, 2012). Version 1.1 of the START was published in 2004 and a text revision of the manual occurred in 2009 (Webster et al., 2009). It contains 20 items which are rated on a 3-point scale (absent, possibly present, present) both as a vulnerability and as a strength for that individual. In the original validation study of 50 forensic inpatients, the ROC analyses demonstrated good predictive ability for the START total score for varying types of violence: verbal aggression (AUC = .72), physical aggression against objects (AUC = .67), physical aggression against others (AUC = .70), and sexually inappropriate behaviour (AUC = .92) over a three month period (Nicholls, Brink, Desmarais, Webster, & Martin, 2006). This review will focus on studies after 2009 when the item definitions were updated and in which risk was assessed over the short-term (less than 12 months or meta-analyses). In a meta-analysis of the START focused on published articles from 2010 to 2013, the predictive validity of the Strength Scale, the Vulnerability Scale, and the Violence Summary Risk Estimates (SREs) was demonstrated (O'Shea & Dickens, 2014). The mean weighted AUC for the Strength Scale for physical violence and verbal

threats was .75 and .71 respectively. Similar results were reported for the Vulnerability Scale (AUC_w=.73, .76) and the Violence SRE (AUC_w=.76, .76).

The predictive validity of the START has been demonstrated for 1 month (Braithwaite, Charette, Crocker, & Reyes, 2010; Chu et al., 2011; Wilson, Desmarais, Nicholls, Hart, & Brink, 2013), 3 month (Chu et al., 2011; Nonstad et al., 2010), and 6 month study periods (e.g., Abidin et al., 2013; Chu et al., 2011; Wilson et al., 2013). In contrast, Quinn, Miles, & Kinane (2013), demonstrated that only Vulnerability scores predicted "aversive incidents" at one month (large effect) and the effect size decreased to a small effect at 6 months. Similarly, Wilson, Desmarais, Nicholls, & Brink (2010) studied the "shelf life" of the START (i.e., how often should it be repeated) and its ability to predict inpatient violence in forensic patients for different follow-up periods. Fifteen participants from a larger study with known aggression were randomly selected and matched to 15 individuals who were not aggressive in the 12 months after the START assessment. The START was coded based on file review four times using information from the preceding 3 months. The follow-up period was the 3 months after the START assessment. When the authors collapsed across assessments (30 participants x 4 assessments), the Strength and Vulnerability scales, as well as the SRE predicted physical violence in the next three months (AUC=.74, .73, and .82 respectively). When the participant was the unit of analysis, the Strength and Vulnerability scales did not predict physical violence at 3 months (AUC=.74 and .70 respectively), but were predictive at 6 months (AUC=.81 and .81).

Whittington et al. (2014) assessed the predictive validity of the START for a 30 day period and whether change in risk scores was associated with violence. The setting was a medium secure unit in a forensic psychiatric hospital in England. Completed STARTs were available for 50 patients, which resulted in 475 START assessments. The base rate of violence was 52%; 275 incidents involving 26 participants. In the first predictive validity analysis, only the first START assessment was entered into the ROC analysis and involvement in violence during the matched follow-up period. The period between assessment and follow-up was on average 231 days. The AUC for Vulnerabilities was .69, and for Strengths it was .75. In the second analysis, all 475 assessments were entered in the ROC analysis to predict violence in the 30 days after the assessment. The AUC for Vulnerabilities was .75 and for Strengths it was .55 (not

significant). A ten-point increase in Vulnerability scores was associated with a threefold increase in the likelihood of violence over a four week period; this elevated likelihood was less than double when within patient associations were examined in 15 participants. Changes in Strength scores were not associated with an increased risk for the entire group, but a ten-point change in Strength scores within patients was associated with an increased risk of subsequent violence (OR=2.26).

Another study employed a pseudo-prospective design using a single START assessment to predict subsequent aggressive incidents in the next 3 months in 200 civil and forensic patients (O'Shea, Picchioni, & Dickens, 2015). The AUCs for Strengths ranged from .66 to .69 for aggression (physical, verbal, any), for Vulnerabilities they ranged from .61 to .64, and for the violence SRE they ranged from .64 to .70. The violence SRE had incremental validity for predicting any aggression over Strength and Vulnerability total scores.

Similar difficulties to the HCR-20 (e.g., time to complete) exist with the START with regards to using the START in the ED for assessing for inpatient violence. In addition, it is recommended that a team approach be used to complete the START, although this is not a requirement.

Violence Risk Appraisal Guide (VRAG)

The Violence Risk Appraisal Guide (VRAG; Webster, Harris, Rice, Cormier, &Quinsey, 1994; Quinsey et al., 2006) is one of the most widely used actuarial measures for the prediction of violence (Singh et al., 2014). It was developed based on data from a sample of patients detained in the Penetanguishene Mental Health Center between 1965 and 1980. Follow-up data regarding violence in the community was recorded from police files and violence within institutions was recorded when a participant was re-institutionalized. The twelve variables that were most predictive of violence during the follow-up period were optimally weighted and became the final items for the VRAG. The total score is used to assign the assessee to one of nine risk "bins" which corresponds to a statistical estimate of the probability of re-offending within a given time period (Quinsey et al., 2006). Most recently, a revised VRAG has been published (Rice, Harris, & Lang, 2013). Since its development, there have been

numerous studies of its predictive validity. In a study of forensic inpatients, the VRAG was predictive of physical aggression during a 20-week follow-up period (AUC=.72; McDermott, Dualan, & Scott, 2011). In a second study of mentally ill offenders, scores for the VRAG were obtained from pre-admission forms and physical violence or any violence resulting in injury, verbal aggression, and property damage were coded from files up to 12 weeks post-admission (Doyle, Dolan, & McGovern, 2002). The VRAG total score significantly predicted physical violence (AUC = .64) and any violence (AUC = .71). The risk bins were also significant predictors of physical violence and any violence (.64 and .70, respectively). In a study of the predictive ability of several risk assessment instruments, including the START, VRAG and COVR (described below) to predict violence in the short and medium term in a forensic inpatient sample, the VRAG was not a significant predictor at any time point (AUC range from .45 to .61) (Chu et al., 2011). The same criticisms of actuarial measures generally apply to the VRAG and the VRAG-R. The static factors on the VRAG and its revision also hamper development of a specific management plan for the individual and the risk estimates are not calibrated for the following days or weeks.

Classification of Violence Risk (COVR)

The Classification of Violence Risk (COVR; Monahan et al., 2006) is another actuarial instrument that was developed to assess the risk of violence in the shorter-term (20 weeks after discharge) by a psychiatric patient being released to the community. Since its development, the COVR has been evaluated for predicting inpatient violence risk as well. It is a computer program that uses a classification tree to guide the interviewer through a series of questions based on an algorithm fitted to each subsequent response by the patient. The result is a numeric estimation of the patient's risk for community violence over the next several months (Monahan et al., 2006). In the same study in which the VRAG was investigated (McDermott et al., 2011), the COVR was also found to be predictive of physical aggression in the short-term (AUC = .73). The authors stated it took 20 minutes to complete this tool, which included a 10 minute interview and a brief file review; this is substantially shorter than a START or HCR-20 assessment. In a second study of the COVR and VRAG in forensic psychiatric patients, violence by patients over a 6 month follow-up period was recorded from files (Snowden, Gray, Taylor, & Fitzgerald, 2009). Both measures were predictive of physical aggression

(COVR AUC = .73 and VRAG AUC=.77). The COVR has the distinct advantage of a shorter administration time over the other measures reviewed. In the Emergency Department, however, a separate interview and a 20 minute file review would still be a challenge to complete during busy periods and the amount and accuracy of data available would be questionable. In addition, the COVR was designed to assess risk post-discharge and not during a hospitalization.

All of these measures require a detailed interview, the availability of background information and/or dedicated time to complete the assessment instrument (with the exception of the COVR). In acute settings, especially the Emergency Department, often neither of these requirements would be met due to limited time and information. In addition, the VRAG and HCR-20^{v2} use the PCL-R total score and this would very rarely be available for an acute patient prorating is not the preferred method of completing the measure. The HCR-20^{v3} and the VRAG-R have simplified that item; the HCR-20 no longer requires the PCL-R and the VRAG-R instead includes an "antisocial" item that includes Facet 4 items from the PCL-R (Rice et al., 2013). Still, this item would be difficult to code without criminal records and accurate collateral information. Lastly, none of these measures were developed for short-term prediction (days) despite the average admission on an inpatient unit lasting approximately two weeks.

Several risk assessment measures include dynamic risk factors with the assumption these factors are amenable to treatment. It has been demonstrated in the literature that dynamic risk factors do change after treatment (e.g., Belfrage & Douglas, 2002; Viljoen et al., 2012) and those changes are related to violence (e.g., McDermott, Edens, Quanbeck, Busse, & Scott, 2008; Wilson et al., 2013). The research has not, however, investigated these changes for time periods less than one month (Chu et al., 2011). Studies that have focused on time periods of one month or less have demonstrated predictive validity of risk assessment measures for inpatient violence, but have not linked changes in dynamic risk factors to decreases in violence.

The aforementioned reasons (i.e., lack of time and sufficient information for complete risk assessments, lack of research on predicting violence in the next hours or few days) are why specific risk assessments were developed to assess violence risk in the short-term in acute settings. These instruments are the McNiel-Binder Violence

Screening Checklist and its revision (VSC; McNiel & Binder, 1994; VSC-R; McNiel et al., 2003), the Brøset Violence Checklist (BVC; Almvik & Woods, 1998), and the Dynamic Appraisal of Situational Risk Inpatient Version (DASA-IV; Ogloff & Daffern, 2006a).

Chapter 4. Current Risk Schemes for Inpatient Violence

Generally, a competent comprehensive assessment of violence risk requires time and sufficiently reliable information to determine the presence of risk factors. On inpatient units, there are multiple patients who have the potential to become violent based on their initial presentation to emergency. Short-term risk schemes have been developed as an attempt to still assess and prevent inpatient violence, but do so in a more efficient manner. The first risk schemes for acute inpatient violence were actuarial in nature with historical items that could be coded from files (McNiel & Binder, 1994). More recent attempts have tried to incorporate dynamic risk factors because these have stronger associations with violence (e.g., Douglas & Skeem, 2005; Dvoskin & Heilbrun, 2001; McNiel, 2009) and observable items (i.e., can be rated based on observing the individual alone), instead of relying solely on chart information (Almvik & Woods, 1998; Ogloff & Daffern, 2006a).

4.1.1. McNiel-Binder Violence Screening Checklist

The McNiel-Binder Violence Screening Checklist (VSC-R; McNiel & Binder, 1991; McNiel et al., 2003) is a four item actuarial measure used to screen for inpatient violence (see Table 5.2). The original version (VSC; McNiel & Binder, 1994) included five items, but the fifth item (Currently married or living together with a partner) was subsequently dropped when it was determined upon cross-validation that it was not predictive of violence in the new sample suggesting it could have been specific to the development sample (McNiel, Gregory et al., 2003).

The validation sample for the VSC was 338 civil psychiatric patients (McNiel & Binder, 1991). The VSC was completed based on file review and the outcome was aggression as measured by the Overt Aggression Scale (Yudofsky, Silver, Jackson, Endicott, & Williams, 1986), which was completed by nurses at the end of each eight

hour shift. Physical aggression and fear-inducing behaviour (including verbal threats, attacking objects, and verbal aggression) were recorded daily over a 20-month study period. The results of this study indicated that the sensitivity of the VSC was 55% and the specificity was 64% with a physical aggression base rate of 24%, a positive predictive value of .41 and a negative predictive power of .82. The calibration sample was 238 civil psychiatric patients who engaged in physical aggression (18%) and fear inducing behaviour (40%). The sensitivity of the measure was 57% and the specificity was 70% for any aggression. In a third study of civil psychiatric patients (McNiel et al., 2003) 50 civil psychiatric patients with known inpatient physical violence histories were chosen and 50 patients with no physical violence were randomly chosen. Both the VSC and VSC-R were significant predictors of inpatient violence with AUCs of .74 and .77, respectively. The authors chose a score of 2 as the optimal cut-off score to indicate a high risk for violence. This score was associated with a sensitivity of .74 and a specificity of .70 and a positive predictive value of .71 and a negative predictive value of .73. In a subsequent study of the HCR-20, the PCL:SV, and the original VSC in a sample of 268 civil psychiatric inpatients, the VSC did not significantly predict any acts of aggression (physical aggression, threats, and intimidating behaviour; Nicholls, Ogloff, & Douglas, 2004).

For the next two measures, the majority of the studies use multiple ratings of a single participant as independent observations (i.e., all ratings should be uncorrelated because each participant only contributes one score). Each rating is matched with aggressive incidents during the follow-up time period. Comments on this analytical strategy will be provided at the end of this section.

4.1.2. The Brøset Violence Checklist

The Brøset Violence Checklist (BVC; Almvik& Woods, 1998) is a six item actuarial measure developed to predict violence within a 24-hour period (see Table 5.2). Linaker and Busch-Iverson (1995) studied daily nursing reports of inpatients over a five year period. The six most frequently occurring behaviours within the 24-hour period prior to a violent incident became the items on the Brøset Violence Checklist (Almvik & Woods, 1998). It is the most extensively studied short-term risk scheme.

In a study of inter-rater reliability (IRR), sensitivity, and specificity (Almvik, Woods, & Rasmussen, 2000), the authors sampled 109 inpatients from four different acute wards within four different hospitals in Norway. The BVC was rated at admission and during the next three days at the end of each nursing shift. The Staff Observation Aggression Scale (Palmstierna & Wisted, 1987) was used to record violent incidents. At the end of a 2 month period, there were 33 violence incidents committed by 12 patients. The IRR for the items of the BVC ranged from a kappa of .48 to 1.00[2] (*moderate* to *almost perfect*); the kappa for the BVC total score was .44 (*moderate*). The sensitivity of the BVC was .63 and the specificity was .92. In a second study of sensitivity and specificity, the BVC was completed three times daily on 156 Danish forensic psychiatric inpatients (Hvidhjelm, Sestoft, Skovgaard, Theil, & Bjørner, 2014). For the standard cut-off point of 3, specificity was 0.99 and sensitivity was 0.66. For general violence, the positive predictive value for a BVC score greater than three was 37.2% and the negative predictive value was .1%.

The BVC significantly predicted inpatient violence with an AUC of .82 (Almvik et al., 2000). The rate of violence in this study, however, was considered high and thus a second study of six acute wards across three hospitals using a German version of the BVC was conducted (Abderhalden et al., 2004). The outcome was physical violence against staff, using the Revised Staff Observation of Aggression Scale (SOAS-R; Palmstierna & Wistedt, 1987; Nijman et al., 1999). Participants were 219 male and female patients who had 1203 BVC judgments and who engaged in 47 aggressive incidents. The BVC was again a significant predictor of violence with an AUC of .88. The Visual Analogue Scale (VAS), a clinical judgment made by the nurses based on their perception of a physical attack by a patient in the next 12 hours with anchors of “no risk” and “very high risk” was added in a subsequent study (Abderhalden et al., 2006). This is the first study where the extended version of the BVC is described in detail. With the VAS added to the BVC, the AUC increased from .88 to .93. The VAS was transformed into 6 score points, which when added to the original BVC resulted in a total score ranging from 1 to 12, with a resultant AUC of .94. A slide rule was also introduced for the

[2] Values between .00 and .20 indicate *slight*, .21 and .40 *fair*, .41 and .60 *moderate*, .61 and .80 *substantial* and .81 and 1.00 *almost perfect* agreement (Landis & Koch, 1977).

clinical application phase of the study. A second sample of 300 patients was used as a validation sample (2084 judgments) and the AUC of the new measure was .83; the BVC alone produced an AUC of .86.

In a retrospective study of 73 patients, the predictive ability of the BVC for the entire admission period as opposed to shorter time periods was assessed (Björkdahl, Olsson, & Palmstierna, 2006). The nurses were told that scores of 3 or more on the BVC would warrant preventative measures. A total score for a 24-hr period was calculated based on the highest score for each item over the three assessments. The authors chose not to use a ROC analysis because when all BVC assessment scores are included "this could lead to errors in the analyses, as when the same patient is rated the separate BVC sums will not be independent of each other" (p.226). This total score, along with the violence outcome was entered into a cox proportional hazard analysis with multiple events. The BVC total score of 2 or greater was a statistically significant predictor with a hazard ratio of 4.35. The BVC was also predictive of violence in elderly populations (AUC=.92; Almvik, Woods, & Rasmussen, 2007), but not with drug addicted females (Palmstierna & Olsson, 2007).

The BVC has been linked to reductions in more coercive management strategies (e.g., seclusion; Clarke & Brown, 2010). During a 3 month trial of the BVC on an 11-bed high acuity unit (Psychiatric Intensive Care Unit; PICU), the measure was completed on 48 patients the first three days after admission at the end of each shift. The seclusion rate dropped from an average of 30 per month 2 months prior to the start of the study to 12 per month during the study, and then increased to 22 per month after the trial ended. In a second study on a PICU, the BVC was completed once at admission and aggressive behaviours were reported on the SOAS-R for the following 3 days (Vaaler et al., 2011). The BVC, the physician's judgment of violence potential, and segregation were significant predictors of aggression.

In a prospective nonrandomized trial of two acute psychiatric units using the BVC extended version (Abderhalden et al., 2006 described above), there was a 3-month baseline data collection period, 7-month implementation of the extended BVC and a 3 month management implementation (Needham et al., 2004). Although the extended version is used in this study, it is not described in detail until Abderhalden and

colleagues (2006). Participants were assessed upon admission and then twice daily for the first 72 hours. The outcomes were aggression as measured on the SOAS-R and coercive management measures (e.g., seclusion) without prior aggression and with prior aggression. During the study period, 576 patients were admitted to the units and there were 273 incidents of aggression. Hospitalization days were treated as independent despite analyzing multiple incidents per participant, thus the analyses omitted within-patient colinearity. On one unit, there was a decline in aggression, but not in coercive measures and on the other unit there was a decline in coercive measures, but not in aggression.

As an extension of the study above, discussion of management was linked to scores on the BVC. Nineteen civil psychiatric wards in Switzerland took part in a prospective multi-centre randomised wait-list controlled trial of the extended BVC (BVC-CH; Abderhalden et al., 2008). Four of the wards were randomized to the intervention, five to the control and five requested to be in the intervention group. Outcome data was collected for three months pre-intervention and during three months of intervention. The BVC-CH was completed twice daily by nursing staff and then staff discussed a list of management strategies provided for BVC-CH scores of 7 to 9. For scores of 10 or higher, the team discussed immediate management strategies. The main outcome measures were the changes between the baseline and intervention period for incidence rates of severe aggressive events and the number and amount of coercive measures. Outcome variables were aggression as recorded on the SOAS-R and coercive measures (e.g., seclusion, chemical restraint). Over the study period, 2364 patients were admitted to the 19 units. Over both phases of the study, 770 aggressive incidents were reported involving 314 patients (13.3% of all patients) and 632 coercive measures were recorded. Both aggression (adjusted rate reduction 41%) and coercive management measures (adjusted rate reduction 27%) were reduced at a greater rate on the intervention units compared to the control units. This effect was larger on the units that chose to have the intervention immediately. Although the majority of wards were randomly assigned, the intervention group did have higher levels of baseline aggression and identified aggression as a significant problem on those wards as compared to the control units.

The BVC has also been paired with other risk reduction techniques. The Crisis Monitor is a compilation of several tools that were completed on a Dutch inpatient unit. It includes the BVC and the Kennedy Axis V-Short Version (Kennedy, 2003) that were completed on a daily basis. The Crisis Monitor also included the Kennedy Axis V Full Version (Kennedy, 2003), the Brief Psychiatric Rating Scale (BPRS: Overall & Gorham, 1962, the Dangerousness Scale (van Baars & De Schaal voor Gevaar, 2006), and the Social Dysfunction and Aggression Scale (Wistedt et al., 1990). All of the aforementioned measures were completed once a week. The Crisis Monitor was used to guide a more focused discussion on management of changes in risk factors (van de Sande et al., 2011). During a trial period lasting forty weeks and consisting of data from 597 psychiatric inpatients, the two randomized experimental units experienced reduction in aggressive incidents, reduction in the number of participants engaging in aggression, and a reduction in time spent in seclusion (with the introduction of the Crisis Monitor), as compared to the two control units.

4.1.3. Dynamic Appraisal of Situational Risk- Inpatient Version

The Dynamic Appraisal of Situational Aggression Inpatient Version (DASA-IV; Ogloff & Daffern, 2006a) was designed both to assess for acute risk of violence (within the next 24 hours) among inpatient psychiatric patients and to assist in treatment planning to reduce the risk of violence (see Table 6.2). The development of the DASA-IV was performed on three acute wards of a forensic hospital in Australia (Ogloff & Daffern, 2006). Aggressive incidents were recorded using a modified version of the Overt Aggression Scale (section on physical harm to self was omitted). If more than one type of aggression was perpetrated in a single session, the more serious behaviour was recorded. During the first phase, the authors asked the nurses to make a SPJ judgment based on the likelihood of violence in the next 24 hours. During the second phase, the nurses rated 16 items three times per day and provided a SPJ judgment. Those 16 items were the items from the BVC, the HCR-20^{v2} C scale, one item from the HCR-20 R scale, and four items from Ogloff and Daffern's previous research (2006a) that demonstrated an empirical relationship with inpatient violence. Over the six month study period, multiple ratings of these 16 items were completed for each participant (over 20,000 judgments) by nursing staff. There were 285 aggressive incidents on the inpatient ward.

The DASA comprised the 7 (2 items from the BVC; 2 items from the C scale; 3 original items) out of the 16 items that had the highest AUC values when predicting aggression (AUC=.71-.77; see Measure section for items). Although the nurses' judgments were generally accurate, a SPJ judgment was not added as a standard part of the measure until later (Chu et al., 2013; Griffith, Daffern, & Godber, 2013).

In a study of 58 civil and forensic psychiatric patients in a rehabilitative facility (Barry-Walsh, Daffern, Duncan, & Ogloff, 2009), the nurses completed the DASA-IV once per day and also recorded aggressive incidents by the patients for the proceeding 24 hrs. At the end of the study period, there were over 10,000 DASA-IV ratings with each patient receiving 3 to 406 ratings and 263 aggressive incidents were perpetrated within the 24 hrs after each DASA-IV rating. The AUCs ranged from .57 for verbal aggression toward staff to .80 for physical aggression toward staff and any aggression was .69. In a second study of civil psychiatric patients, the DASA-IV and a DASA-IV SPJ rating were compared to unstructured clinical judgment (UCJ; Griffith, Daffern, & Godber, 2013). In the experimental group, the nurses completed the DASA-IV and SPJ rating at the end of each shift. The control group completed a service-specific mandatory risk tool, which was considered the UCJ at the end of each shift. The base rate of aggression was 22% for a 24 hour period over 1230 DASA-IV or UCJ observations. The AUC for the UCJ for predicting aggression in the next 24 hours was .54, for the SPJ rating the AUC was .68, and the DASA-derived categories resulted in an AUC of .70. The AUCs for each measure were very similar when predicting violence for the next nursing shift. The SPJ rating did not add incrementally to the prediction of aggression over and above the DASA-derived categories. The sensitivity of the DASA-derived categories was .68 and the specificity was .70 to predict aggression in the next 24 hours and for the next shift.

The DASA-IV has been investigated in different settings such as in dangerous and severely personality disordered individuals (Daffern & Howells, 2007). In the Daffern and Howells (2007) study, the DASA-IV and remaining clinical items on the HCR-20^{V2} were coded once per day by nursing staff based on the previous 24 hours. The outcome was "violence, threatening, and self-harm" (p. 139). There were 1029 ratings and 85 incidents of aggression; the AUC for the DASA-IV was .65 and for the C scale the AUC was .63. In a second study in the same setting with an increased number of ratings and

aggressive incidents, the AUC for the DASA-IV was still .65 (Daffern & Howells, 2009). In a validation study of the DASA-IV in Scotland on an inpatient psychiatric ward, there were 181 aggressive incidents and the AUCs ranged from .71 to .78 for verbal, physical, and all aggressive incidents (Vojt, Marshall, & Thompson, 2010). The French version of the measure was validated on civil psychiatric patients within 12 different wards in the province of Quebec (Dumais, Larue, Michaud, & Goulet, 2012). There were 3,798 DASA-IV ratings and 42 patients who were aggressive to staff. The DASA-IV significantly predicted aggression (AUC range .70 to .73).

Although these past attempts to develop screening measures for inpatient violence have promising psychometric properties based on guidelines utilized in the risk assessment literature, the measures have several short-comings. Two of the measures, the BVC and the DASA-IV, are both actuarial and thus suffer from the problems previously discussed. That is, firstly, the items on the measures were chosen empirically based on their statistical association with the outcome of interest in the development sample. Therefore, the tools could exclude relevant items that just were not present in that particular sample at that time; this would limit generalizability, predictive validity, and ability to manage the individual's risk for violence. Secondly, the measures provide total scores that correspond to risk levels instead of allowing the assessor to make a professional judgment regarding the weighting of the items, the relevance of the items, the amount of management needed to prevent future violence, and a final summary judgment regarding the individual's future risk for inpatient violence.

Lastly, the majority of the studies of both of the measures use ROC analyses with multiple ratings of the measures per participant because both measures are to be completed at the end of the nursing shift. The ROC analysis assumes there is independence among the IVs. The authors of the DASA-IV justify this statistical analysis stating, "given the high degree of variability in ratings within individuals over time, the normal assumptions against independence did not hold" (Ogloff & Daffern, 2006b, p. 807). I disagree with the authors of the DASA-IV. Several studies of inpatient violence demonstrate that there are usually two or three individuals who are the most aggressive and who account for a large number of aggressive incidents. Vojt et al. (2010) calculated the AUC for physical aggression both with and without the most assaultive patient. The AUC dropped from .78 to .65. In Wilson et al. (2010) the single rating of START

Vulnerability and Strength scores per participant at the 3 month follow-up for all aggressive incidents was not significant, but the AUC for the multiple judgments matched with incidents in the 3 month follow-up period was significant. Whittington et al. (2014), measured the degree of commonality between multiple START judgments. Intra-class correlation coefficient was used as an estimate of the degree of score stability within the patient. The significance test was to determine when the degree of clustering of START scores within patients was greater than chance. In the overall sample about 85% and 81% respectively of the total variance of Vulnerability and Strength scores was attributable to within patient stability. These results indicate there is concordance between multiple risk assessment judgments for the same individual and a few individuals who may be contributing a large number of high total scores and multiple aggressive incidents. Taken together, these factors suggest there is not independence among multiple judgments and utilizing this method may be inflating AUC values erroneously.

All of the risk schemes reviewed above have demonstrated adequate predictive validity on inpatient units. Given that these measures are premised primarily in the actuarial approach, the items on these measures were chosen empirically. As noted above, this may be problematic in terms of excluding additional risk-relevant items of clinical utility and decrease generalizability. SPJ measures are known to include a canvas of the empirical and clinical literature to remedy this issue. With respect to inpatient aggression, four risk factors were consistently identified across the literature, however, have not been included on the existing risk screens currently in use. These additional factors, as described below, appear to have clear practical utility in assessing risk, and more importantly, in developing management plans.

4.1.4. Additional Risk Factors for Inpatient Violence

Studies of acutely mentally ill patients demonstrate that certain clinical variables, defined as observable variables related to recent psychosocial adjustment (Douglas et al., 2014), are the best predictors of inpatient violence (Amore et al., 2008). As such, it appears that four relevant risk factors, which may be integral in predicting inpatient violence were not included on existing risk schemes. The clinical factors of hostility,

suspiciousness, agitation, and current intoxication (i.e., at time of assessment), which were incorporated in this study, have demonstrated links in the empirical and professional literature to inpatient violence as described below.

Hostility and Suspiciousness

Hostility and suspiciousness are both constructs that have been linked to patient violence within hours or days of admission to psychiatric units (Flannery, Penk, Irvin, & Gallagher, 1998). Hostile attributions, or perceiving the world as a threatening place, are associated with increased rates of violence for psychiatric inpatients (McNiel, Eisner, & Binder, 2003).

Hostility or the hostility-suspiciousness subscale (e.g., Doyle & Dolan, 2006; Gray et al., 2003; McNiel and Binder, 1994, Monahan et al., 2001) as measured by the Brief Psychiatric Rating Scale (Overall & Gorham, 1988), has been predictive of inpatient aggression in several studies with AUC values between .71 and .96 (Amore et al., 2008; Doyle & Dolan, 2006). Hostility-Dominance as measured by the Impact Message Inventory – Circumplex (IMI-C; Kiesler & Schmidt, 2006) was associated with physical aggression by acute psychiatric patients (Daffern et al., 2010). Hostility as measured as an interpersonal style with the Chart of Interpersonal Reactions in Closed Living Environments (CIRCLE; Blackburn & Renwick, 1996) distinguished between violent and nonviolent forensic inpatients (Doyle & Dolan, 2006) and was predictive of violence for prisoners (Dolan & Blackburn, 2006) and forensic psychiatric patients (Blackburn, 1998). In a study by Daffern and colleagues (2010) a combination of hostility and dominance as measured by the CIRCLE was predictive of inpatient violence for personality disordered psychiatric patients. McNiel and Binder (1994) found that a symptom pattern of hostility and suspiciousness was associated with higher rates of violence across diagnostic groups. In addition, hostile attributions as measured by the External Hostile Attributions Scale (McNiel, Eisner, et al., 2003) were predictive of community violence in a sample of acute psychiatric patients even when controlling for other demographic variables (McNiel, Eisner, et al., 2003) and hostile attributions predicted violence severity for civil psychiatric patients (Waldheter, Jones, Johnson, & Penn, 2005).

Agitation

In psychiatric patients, agitation is a common associated feature of mental illness that can quickly escalate and potentially lead to inpatient aggression and violence (Hankin, Bronstone, & Korrin, 2011). A prospective study observing the antecedents of violence in an inpatient psychiatric setting recorded agitation as the most common precursor, present before 30% of 931 violence incidents (verbal and physical; Powell, Caan, & Crowe, 1994). In another prospective study of precursors to severe inpatient violence in civil psychiatric settings, approximately 80% of incidents were preceded by a warning sign, typically agitated behaviour (Owen, Tarantello, Jones, & Tennant, 1998). Agitation was associated with community violence among psychiatric patients diagnosed with schizophrenia, alcohol abuse, or organic brain syndrome (Craig, 1982). In a study comparing assaultive civil psychiatric inpatients to non-assaultive patients three days prior to an assault, abnormal activity level (i.e., agitation) was one of three behaviours (verbal abuse and threatening behaviours being the other two) that differentiated the two groups (Whittington & Patterson, 1996). Agitation-excitement as measured by the BPRS was predictive of inpatient violence in a forensic sample with AUC values ranging between .68 to .81, depending on the type of violence (Doyle & Dolan, 2006).

Current Intoxication

Substance use has long been a risk factor considered in assessments of general violence (Douglas et al., 2013; Webster et al., 1997) in addition to specific types of violence (Hart et al., 2003; Kropp et al., 1998). The relationship between substance use and violence, however, is not always direct. Secondary effects of substance use such as disinhibition, impulsivity, and an increase in already present personality traits such as hostility (Douglas et al., 2013; Pernanen, Cousinea, & Brochu, 2002) may underlie the propensity for violence recidivism. The majority of studies have focused on a substance use diagnoses or historical substance use. Several studies have identified a diagnosis of alcohol abuse or dependence as predictive of inpatient violence in civil psychiatric samples (Amore et al., 2008; Barlow, Grenyer, & Ilkiw-Lavalle, 2000; Biancosino et al., 2009; Bowers et al., 2009; Davis, 1991; Ehmann et al., 2001; Palmstierna & Wistedt, 1990; Raja & Azzoni, 2005; Serper et al., 2005; Soliman & Reza, 2001).

More importantly, current intoxication has been linked to violence. In incidents of physical and sexual assault 36% of male offenders were using alcohol at the time of the offence and 8% were using drugs and alcohol (Felson, Burchfield, & Teasdale, 2007). Similar results were reported for female offenders, but the number of participants who were intoxicated (alcohol and/or drugs) at the time of the violence offence was higher (82%; Weizmann-Henelius, Putkonen, Naukkarinen & Eronen, 2009). High frequency inhalant users were more likely than medium or low frequency users to engage in risky behaviours such as aggression (Garland & Howard, 2011). Nurses' perceptions of current alcohol or drug intoxication has also been linked to inpatient violence (Crilly, Charboyer, & Creedy, 2004; James, Madeley, & Dove, 2006; Knott, Bennett, Rawet, & Taylor, 2005). In a study of secure facilities for women with severe drug abuse, the nurse's judgment of drug intoxication was predictive of severe violent behaviour on the unit with a hazard ratio of 10.1 (Palmstierna, & Olsson, 2007).

The BVC and the DASA-IV are both actuarial measures that include those items that had the strongest relationship to inpatient violence in the development sample. Because relevant risk factors could have been missed on these measures, a review of the empirical and theoretical literature was completed and four additional items were added to the IPVST framework: Hostility, Suspiciousness, Current Intoxication, and Agitation.

In summary, in order to prevent violence in the healthcare setting, risk assessments are consistently needed. Indeed, the *Occupational Health and Safety Regulations, 2006* for BC states a risk assessment must be performed "in any workplace in which a risk of injury to workers from violence arising out of their employment may be present" (section 4.28, part 1). The issue is that in-depth risk assessments require time and information that may not be available in the emergency room of hospitals. Instead, a brief tool is needed to aid healthcare workers to identify those patients likely to be at risk for future violence and place appropriate risk management strategies in place to protect the wellbeing of healthcare workers if the patient is admitted to the facility. A risk assessment that incorporates factors such as intoxication and hostility that have been both empirically and clinically linked to violence will lead to more accurate assessments of risk and thus more comprehensive management plans.

Chapter 5. Current Study

As previously stated, early detection and intervention is imperative to prevent future aggressive incidents. In the present study, a risk assessment framework, the Inpatient Violence Screening Tool (IPVST) is implemented by Psychiatric Triage Nurses (PTNs) in the Emergency Department of a large urban hospital. It is not a new tool, but rather it combines three pre-existing screens and four additional items. All 15 items on the IPVST were rated as present (score of 1) or absent (score of 0). The framework was developed to be consistent with SPJ principles including item selection, gathering of information, weighting of information, and communication of risk (SPJ rating). The PTNs were also given an opportunity to select potential management strategies. For a subset of patients assessed by the PTNs and admitted as inpatients, the files were later reviewed for aggressive incidents and implemented management strategies.

5.1. Hypotheses

The purpose of the present study was to determine if a screening tool for violence risk implemented by nursing staff in the Emergency Department of a large urban hospital could predict aggressive behaviour (including violence) of patients on the inpatient ward up to three months post-admission. Psychometric properties of the risk screen were assessed as part of this study as well as current management of inpatient violence. In addition, the following research questions were examined:

1) Will there be a relationship between the PTNs' ratings of the IPVST items (i.e., the number of items rated as present) and the management strategies suggested by the PTNs and those actually implemented on the inpatient ward?

Hypothesis: The number of suggested management strategies will increase with an increase in the number of items rated as present on the IPVST. The actual

management strategies (implemented by people other than those who conducted the risk assessment measure) that were implemented on the ward will have either no or a small relationship to the presence of the items on the IPVST. A relationship is not expected because the nurses on the unit were unaware of the suggested management strategies in the ED. A small relationship, however, may be present because the implemented strategies on the unit will be in response to immediate symptoms or negative behaviours on the ward in the present moment, some of which will be risk factors on the IPVST (e.g., confusion, agitation).

2) Will there be an association between the PTNs' presence ratings (i.e., the number of items rated as present) of the IPVST items and the summary risk judgment (i.e., Low, Moderate, and High)?

Hypothesis: Each of the items have demonstrated empirical relationships in the literature with violence and as such, should have a relationship with the summary risk judgments of future violence on the ward. There will be a significant positive relationship between all of the items on the IPVST and the summary risk judgments. In addition, those participants judged to be *Low Risk* will have the least number of risk factors present and those participants judged to be *High Risk* will have the most risk factors present. Lastly, the items on the IPVST will predict the summary risk judgments such that the presence of the items will predict a higher summary risk judgment.

3) Will there be an association between the PTN suggested management strategies and the summary risk judgments (i.e., *Low, Moderate*, and *High*) and between the implemented strategies on the unit and the summary risk judgments?

Those participants judged to be *Low Risk* will have the least number of suggested management strategies present, and those participants judged to be *High Risk* will have the most suggested management strategies present. The number of suggested management strategies will predict the summary risk judgments. The summary risk judgments and the implemented management strategies were completed at different points in the study by different nurses. There will be either no relationship or a small relationship between the summary risk ratings and the implemented management strategies such that those participants judged to be *Low Risk* will have the

least number of implemented strategies present, and those participants judged to be *High Risk* will have the most implemented strategies present.

4) Will there be consistency across PTNs with respect to their summary risk judgments of similar clusters of patients?

Hypothesis: The PTNs will rate the risk of violence for similar patients (e.g., based on the presence of the same pattern of risk factors) consistently. In other words, all five PTNs will give the same or similar (e.g., *Low* or *Moderate*; *Moderate* or *High*) risk judgment to a group of patients with the same constellation of risk factors present on the IPVST.

5) Will the PTNs' judgments of the IPVST items, suggested management strategies, and summary risk judgments (i.e., *Low, Moderate*, and *High*) be related to violence on the inpatient ward?

Hypothesis: The total score of the IPVST, number of suggested management strategies, and the summary risk judgments will be predictive of violence on the inpatient ward. The SPJ judgment will add incremental validity to the total score of the IPVST. The relationship between the items and judgments with the outcome will be suppressed by interventions implemented on the inpatient ward.

6) Which individual measure (BVC, DASA, VSC, VSC-R, IPVST) will be the most predictive of violence on the inpatient ward?

Hypothesis: The IPVST will have the largest effect size followed by the BVC and DASA and then the VSC and VSC-R. The SPJ rating will add incrementally to the IPVST total score. In addition, time will impact the relationship between the total score and summary risk judgments with violence. A longer inpatient stay will be associated with more treatment and a decline in total scores on the risk assessments over time (e.g., Belfrage & Douglas, 2002). Therefore, the longer a patient is on the unit, the poorer the predictive ability of all of the measures due to intervening factors between the initial assessment and violence on the unit.

Chapter 6. Method

6.1. Overview

In the current study, the Psychiatric Triage Nurses (PTNs) at a large urban hospital completed a screening tool for inpatient aggression and violence (IPVST) on psychiatric patients presenting to the hospital ED over a nine-month study period. A subset of the patients who were screened were admitted as inpatients; this subset comprised the follow-up sample for the current study. The inpatient files were reviewed after discharge from the inpatient unit to determine if there was an aggressive incident and how it was managed. The relationships amongst the items on the IPVST, the management strategies, the risk judgments, and presence of inpatient violence were investigated and the predictive validity of the IPVST was compared to other screening tools for inpatient violence.

Ethical approval for this study was granted by the Simon Fraser University Office of Research Ethics, the University of British Columbia's Clinical Research Ethics Board, and the Vancouver Coastal Health Research Institute. The study procedure was reviewed by experts in the field and professionals on the units at the target hospital.

6.2. Participants

6.2.1. Setting

Vancouver General Hospital (VGH) is the largest hospital in British Columbia (BC) and services the lower mainland of BC. VGH has two longer-term units, the Brief Intervention Unit (BIU) and the Psychiatric Assessment Unit (PAU). The PAU is a 20-bed inpatient crisis intervention unit for the acutely mentally ill. The BIU is a 12-bed unit for patients in need of crisis management and a brief (1 week) inpatient stay. The other

psychiatric inpatient units (40 beds in total) were for longer-term management of mental illness including individual and group counselling and discharge planning.

When individuals present to the Emergency Department (ED) at VGH, a PTN conducted a face-to-face interview (30 minutes) with each individual who presented to the ED with a psychiatric illness or mental health symptoms (e.g., suicidal ideation) to determine the nature, frequency, and severity of the presenting problem and recommend a disposition. The PTN then presented the case to the psychiatrist or emergency physician and recommended the following possible dispositions: community follow-up, admitted to the BIU, admitted to the PAU, or admitted directly to a longer-stay unit. The disposition was largely based on the recommendation of the PTN, but other considerations impacted the disposition such as the number of beds available and agreement of the physician with the PTN's recommendation.

6.2.2. IPVST Framework Sample

The sample consisted of individuals who presented to the ED of VGH between January 31, 2011 and September 6, 2011. Due to time and staffing constraints, staff only screened participants on the tool of interest on 137 out of 219 days. During that time period 771 patients were screened using the IPVST by the PTNs; 74 screens were duplicate forms (i.e., completed for the same individual on the same day), incomplete (i.e., missing at least 50% of the data), or improperly filed and lost to the study. Thus, the final screening sample consisted of 697 individuals who were screened by the PTNs. The sample represents 27% of the total number of individuals (*N* = 2630) with psychiatric issues who were interviewed by the PTNs in the ED during the study period. There were no significant differences between those screened and those not screened on gender, $\chi^2(1, N=2610)=1.15$, $p=.29$, $phi=.009$, age, $t(2549)=-1.35$, $p=.18$, $d=.05$, or "V" code status[3], $\chi^2(1, N=2610)=0.19$, $p=.66$, $phi=-.02$.

[3]At the time of data collection, the hospital had a violence screening protocol in place and was implementing a new ALERT system. If a patient had a known history of aggression or violence or met criteria for potential aggression or violence based on the violence screening tool developed by the Workplace Violence Prevention team at VGH, the patient was given a "V" on his or her file. This "V" was to alert staff that the patient was at risk for aggression or violence while in the hospital.

For those 697 patients in the final screened sample, 374 (55%) were referred to the PAU by the PTNs, 77 (11%) were referred to other inpatient units, 123 (18%) were referred to community services, 109 (16%) were discharged home, and 7 (1%) were missing a disposition[4]. Of the 296 charts requested for the follow-up portion of the study, 29 participants were not admitted despite the PTNs recommendation of admittance to the hospital (10%).

Little demographic information was available for the screening sample due to the limited information collected during the triage interview and practical considerations in developing the IPVST (e.g., restricting the IPVST to one page). The final screening sample (*n*=697) was equally divided between males (50%) and females (49%), plus five transgendered participants. The mean age of participants was 39.45 years (*SD*=14.83), with a range from 17-years-old to 86-years-old. Five PTNs screened the participants during the study time period and the distribution of participants screened by PTN is as follows: A 30%; B 34%; C 14%; D 13% and E 9%.

6.2.3. Follow-up Sample

The files of 209 patients from the final screened sample (*N*=697) were reviewed after their discharge from an inpatient unit (i.e., the PAU or other inpatient unit). In a previous study at the same hospital, the rate of inpatient violence was 31% (Watt, Levy, & Hart, 2009). The staff at VGH also stated that about 12-16 individuals were triaged in the ED each day and, thus in three months, it would be possible to complete the IPVST on approximately 600 individuals taking into consideration slower days or missed opportunities to complete the form. A review of the literature was conducted to determine the previous AUCs from studies of the BVC and DASA-IV, which were the most frequently studied short-term risk schemes. The average AUC for the BVC was .83 and the average AUC for the DASA was .72. The AUC of .72 was chosen for the power analysis, to be conservative. A power analysis was also conducted using MedCalc for Windows, v.15.4 with the lowest AUC reported which was .65 (Hanley & McNeil, 1982;

[4]These numbers may not reflect the exact number of patients who were actually admitted to the PAU or to an inpatient unit. The PTN's disposition may not have matched the final patient referral.

MedCalc Software, Ostend, Belgium). Based on power of .80, an AUC of .72 and a ratio of negative to positive cases of 2.25 (.31/.69 from the previous study on the PAU), the number of positive cases needed was 19, the number of negative cases was 43 and the total was 62. For an AUC of .65 with all other parameters the same, 42 positive cases were needed, 94 negative cases and 136 cases in total. Two hundred cases were coded to allow for possible missing data and to increase the ability to detect a possible lower ratio of aggressive to non-aggressive participants. The average follow-up was 15.23 days (*SD*=18.1 days) and the range was between 0.5 to 90 days. Data was missing for one case.

The follow-up sample was also equally divided between males and females (48% male; 51% female), plus one transgendered participant. The ethnicity of the follow-up sample was predominantly Caucasian (55%), followed by Asian (21%). The mean age of the participants was 40.17 years (*SD*=14.88), with a range of 17 to 81 years. Approximately half of the participants reported that they were never involved in a marital or common-law relationship. The follow-up sample did not differ significantly from the screening sample on gender or age. However, the follow-up sample (28%, *n*=58; 1 participant had missing data for this variable) had a significantly higher rate of V-code status than the screening sample (19%, *n*=129), $\chi^2(1, N = 692) = 21.4$, $p < .001$, *phi*=.18. Not surprisingly, the majority of participants were suffering from a psychotic disorder or a mood disorder. Ninety percent of the follow-up sample was involuntarily committed. (Table 6.1).

Table 6.1. Sample Demographics for Follow-up Sample

	n	%
Gender		
Male	101	48
Female	107	51
Transgendered	1	1
Ethnicity		
Caucasian	97	55
Asian	37	21
East Indian	11	6
Middle Eastern	5	3
Black	5	3
Aboriginal	10	6
Latino	6	3
Other	4	2
Age		
17-29	60	29
30-39	53	25
40-49	40	19
50-59	29	14
60-69	20	10
70-79	6	3
80-89	1	1
Education		
Less than Grade 12	64	48
More than Grade 12	69	52
Marital Status		
Never Married	63	32
Never Married or Common-Law	47	24
Separated/Divorced	48	24
Widowed	4	2
Married/Common-Law	37	19
Admission Status		

	n	%
Voluntary	20	10
Involuntary	185	90
Danger to Self	84	42
Danger to Others	8	4
Risk of Deterioration	52	26
Combination	46	23
Presentation to ED		
EHS[a]	92	45
Car 87/88	20	10
Police	24	12
Self	38	19
Family/Friends	23	11
Other	6	3
Admission Diagnosis		
Depression	44	21
Bipolar	31	15
Schizophrenia Spectrum	53	25
Psychotic Disorder NOS	30	14
Substance Use Disorder	30	14
Personality Disorders	8	4
Anxiety Disorders	5	2
Other	8	4

Note. EHS=Emergency Health Services; Car87/88=a police and nurse partnership specifically for psychiatric calls; NOS=Not otherwise specified. Ethnicity data was missing for 34 participants; Education data was missing for 76 participants; Marital Status was missing for 10 participants; Admission status was missing for four participants; Presentation was missing for six participants.

[a]In 26 cases, the police attended in conjunction with EHS

6.3. Materials

6.3.1. Assessment of Risk

The Inpatient Violence Screening Tool (IPVST)

The IPVST is a framework that uses SPJ principles in the ED to assess the risk for violence within an inpatient unit. The decision to apply SPJ principles to existing risk schemes for assessing inpatient violence and to add summary risk judgments was done

to facilitate testing how the summary risk judgments are associated with violence and how risk factors and management strategies are associated with violence. The IPVST framework includes the six BVC items and the five non-overlapping DASA-IV items. Each of these measures has its own scoring criteria; for the purpose of this study, the IPVST uses a unit weighted total score and an SPJ judgment instead of individual cut-off scores as recommended by the authors of the original measures. Analyses that compare the individual measures (e.g., the BVC vs. the DASA-IV) with regards to predictive validity use the original scoring guidelines. The remaining four items (Hostility, Current Intoxication, Suspiciousness, and Agitation) were chosen from the empirical literature due to a demonstrated link between the item and inpatient violence (see Table 6.2 for a list of individual measures and items). Item definitions for the last four items originated from established measures of constructs of interest. The item content for Hostility was adapted from the Novaco Anger Scale (Novaco, 1994), the BPRS and the Personality Assessment Inventory (PAI; Morey, 2007) and merged into one definition. The item content for Suspiciousness was adapted from the PAI. The item content for Agitation was adapted from the BPRS. The item content for Current Intoxication was adapted from the Substance Abuse Disorders section of the Diagnostic and Statistical Manual, 4th Edition Text Revised (American Psychiatric Association, 2000).

Each of the 15 items of the IPVST was rated based on information gathered from the triage interview and the rater's observations of the patient. Two ratings were made for each item: (1) an item was marked as *Present* if the PTN observed the behaviour and (2) an item was marked as *Critical* if the item *on its own*, compelled the assessor to believe that the person is at high risk for violence. In the second section, the rater was asked to indicate whether any violence occurred in the Emergency Department before the patient was discharged, admitted, or left without authorization; this item was also rated as *Present* and *Critical*. In the third section, the PTNs recorded whether the individual had to be restrained using either physical or chemical means (i.e., sedation) when in the ED. In the final section, after all the items had been determined to be present or absent and critical or not, the rater made a summary risk judgment of *Low*, *Moderate*, or *High* risk for future inpatient violence. The rater then identified management strategy recommendations from a provided list (e.g., PRN, seclusion, restraints) assuming the person was to become an inpatient in the hospital. The IPVST

was completed in approximately 3 to 5 minutes per case.

Table 6.2. List of measures and additional items used to develop the screening tool.

Measures and Items	Definition
Brøset Violence Checklist (Almvik & Woods, 1998)	
Confused	Appears obviously confused and disoriented. May be unaware of time, place or person
Irritable	Easily annoyed or angered. Unable to tolerate the presence of others.
Boisterous	Behaviour is overtly "loud" or noisy. For example slams doors, shouts out when talking etc.
Physically Threatening	When there is a definite intent to physically threaten another person. For example the taking of an aggressive stance; the grabbing of another person's clothing; the raising of an arm, leg, making of a fist or modeling of a head butt directed at another.
Verbally Threatening	A verbal outburst which is more than just a raised voice and where there is a definite intent to intimidate or threaten another person. For example verbal attacks, abuse, name-calling, verbally neutral comments uttered in a snarling aggressive manner.
Attacking Objects	An attack directed at an object and not an individual. For example the indiscriminate throwing of an object; banging or smashing windows; kicking, banging or head-butting an object; or the smashing of furniture
Dynamic Appraisal of Situational Aggression: Inpatient Version (Ogloff & Daffern, 2006a)	
Irritability[a]	Easily annoyed or angered. Unable to tolerate the presence of others.
Impulsivity	The patient displays behavioural and affective instability (i.e., dramatic fluctuations in mood, or general demeanour; Inability to remain composed and directed.
Unwillingness to Follow Directions	The patient tends to become angry or aggressive when they are asked to adhere to treatment or to the ward's routine
Sensitivity to Perceived Provocation	The patient tends to see other people's actions as deliberate and harmful; they may misinterpret other people's behaviour or respond with anger in a disproportionate manner to the extent of provocation.
Easily Angered When Requests are Denied	The patient tends to be intolerant or is easily angered when they make a request that is denied or when they are asked to wait.
Negative Attitudes	The patient displays antisocial and negative attitudes and beliefs which may relate to violence and aggression
Verbal Threats[b]	A verbal outburst which is more than just a raised voice and where there is a definite intent to intimidate or threaten another person. For example, verbal attacks, abuse, name-calling, verbally neutral comments uttered in a snarling aggressive manner.

Extra Items	
Hostility	An attitude or mental state whereby a person is inclined to have an overly generalized antagonistic appraisal of others and views others negatively. A tendency toward both preemptive or reactive aggression. Displays animosity, contempt, or belligerence to others.
Current Intoxication	Observable behaviours that lead the assessor to determine the individual is intoxicated including slurring of words, stumbling or staggering, smelling of alcohol, blood shot eyes, admission by patient, etc.
Suspiciousness	Expressed or apparent belief that other persons have acted maliciously or with discriminatory intent
Agitation	High energy level evidenced in frequent movement and/or rapid speech- Frequently restless, fidgety, pacing, wagging one's foot etc. Observable physical and motor manifestations of tension, "nervousness" and agitation.

[a]This item is the same as Irritability on the Brøset Violence Checklist

[b]This item is the same as Verbally Threatening on the Brøset Violence Checklist

Brøset Violence Checklist (BVC; Almvik& Woods, 1998)

The BVC includes the six most frequently recorded behaviours in the Linaker and Busch-Iverson (1995) study and are all observable behaviours (i.e., confused, irritable, boisterous, physically threatening, verbally threatening, and attacking objects). Nurses code the presence of items for every 24-hour period (*Present* = 1; *Absent* = 0). The items are added to compute a total score. Scores of 0 are considered *Low Risk*, scores of 1-2 are considered *Moderate Risk* and scores of 3 or greater are considered *High Risk* for violence in the next 24-hour period (Almvik, Woods, & Rasmussen, 2007). The psychometric properties of the BVC were reviewed in the Current Risk Schemes section.

Dynamic Appraisal of Situational Aggression: Inpatient Version (DASA-IV; Ogloff & Daffern, 2006a)

The DASA-IV is a 7 item short-term screen to identify risk for inpatient aggression. It is used to assess risk within a time frame of a few hours to two days for patients on acute psychiatric wards (Ogloff & Daffern, 2006b). The items for the DASA-IV were drawn from the HCR-20 (impulsivity and negative attitudes), the BVC (irritability and verbal threats), and from Ogloff and Daffern's previous research on common

precipitants to inpatient aggression (Sensitivity to Perceived Threats, Unwillingness to Follow Directions, and Easily Angered when Requests are Denied; Ogloff & Daffern, 2006b). Similar to the BVC, the DASA-IV items are rated for every 24 hour period on a dichotomous scale (*Present* = 1; *Absent* = 0), and the items are summed for a total score. A score of 0-1 is considered *Low Risk*, scores of 2-3 are considered *Moderate Risk* and scores of 3 and greater are considered *High Risk*. The measure is intended to be scored by the patient's contact nurse and should take less than five minutes to complete. Psychometric properties of the DASA were reviewed in the Current Risk Schemes section. Since the start of this study, the authors of the DASA-IV have now added a structured professional judgment rating (Low, Moderate, and High) of future inpatient aggression (Griffith, Daffern, & Godber, 2013).

McNiel & Binder Violence Screening Checklist and Checklist-Revised (VSC and VSC-R; McNiel & Binder, 1994; McNiel, Gregory, Lam, Binder, & Sullivan, 2003)

The VSC was designed to screen for short-term risk of violence among patients who are acutely mentally ill and are admitted to short-term inpatient units (McNiel & Binder, 1994). The current version of the measure, the VSC-R (McNiel, Gregory, et al., 2003) includes four items: (a) History of physical attacks and/or fear- inducing behaviour during the 2 weeks before hospital admission, (b) Absence of recent suicidal behaviour, (c) Schizophrenic or manic diagnosis, and (d) Male gender. Items are scored dichotomously and summed for a total score. According to the authors of the VSC–R, the optimal trade-off between sensitivity and specificity appeared to be a score of 2. Thus, a score of 2 or more was considered *High Risk* and a score of less than 2 was considered *Low Risk* (McNiel, Gregory, et al, 2003). The psychometric properties of the VSC and VSC-R were reviewed in the Current Risk Schemes section.

6.3.2. Violence

Two empirically validated instruments developed to record aggressive and violent incidents on inpatient units were employed in this study: 1) The OAS and 2) The SOAS-R. Both tools were used because one recorded only the aggressive act and the other recorded more extensive information about the incident including the provocation, target, and management.

Overt Aggression Scale (OAS; Yudofsky, Silver, Jackson, Endicott, & Williams, 1986)

The OAS is a widely used standardized behavioural checklist for measuring the frequency and severity of four types of aggressive behaviour on inpatient units: verbal, property, physical against others, and physical against self. It was developed in child and adult psychiatric centers in New York and can be coded based on observation or file review. For each participant in the original study, the OAS was rated at the end of each eight-hour shift as a means of monitoring the level of acuity in the hospital. Each aggressive incident is coded as 1 (*least severe*) to 4 (*most severe*). The documented IRR of the measure ranged from an ICC_2 of .67 to an ICC_2 of .84 or good to excellent agreement (Verdun-Jones et al., 2006). The OAS does not have a section that covers sexual aggression. Instead, the sexual aggression section from the START Outcome Scale (SOS; Nicholls, et al, 2007) was added to the existing OAS (see Appendix A for the Aggression Perpetration Incident Form). These items are similar to the categories on the OAS; it includes four sexually inappropriate behaviours ranging from gestures or verbal statements to sexual assault. In addition, previous research at the same hospital as the current study suggested that violent threats and violent ideation were important considerations (Watt, Levy, & Hart, 2009). As such, items from the OAS related to violent threats and violent ideation were moved from their original category (e.g., verbal aggression) and placed in new categories in order to be as specific as possible regarding the type of aggression that was perpetrated by participants.

Staff Observation of Aggression Scale-Revised (Nijman, Muris, Merckelbach, Palmstierna, Wistedt, Vos, Rixten, & Allertz, 1999; Palmstierna & Wistedt, 1987)

The SOAS-R is a tool for monitoring aggression on inpatient units that allows the assessor to rate both the nature and severity of the aggression (Nijman et al., 1999). The original tool was devised based on nurses' observations on inpatient psychiatric and geriatric wards (Palmstierna & Wistedt, 1987). The correlation of the SOAS total scores between observers was 0.87 and the kappa was 0.61, indicating *fair* to *good* agreement (Lambert and Hill, 1994). The revised version does not change the content of the tool, but changes the severity scoring to be empirically valid instead of the original rationally derived scoring (Nijman, Evers, Merckelbach, & Palmstierna, 2002; Palmstierna &

Wistedt, 1987). The columns on the SOAS-R correspond to 1) Provocation of the aggressive incident (scored 0-2); 2) Means used by the patient in the aggressive incident (scored 0-3); 3) Target of aggression (scored 0-4); 4) Consequence(s) for the victim(s) (scored 0-9); and 5) Measures to stop aggression (scored 0-4). The total severity score can range from 0 (*least severe form of aggression)* to 22 (*most severe form of aggression)*. Unfortunately, information regarding the provocation, consequences, and measures to stop aggression (aside from medication, restraints or seclusion), were often not documented or not documented consistently in the charts of participants in this study. Therefore, the OAS was the main measure of aggressive incidents.

6.3.3. Intervention

On inpatient wards there are many types of interventions used when a patient is escalating his or her behaviour or has already acted in an aggressive or violent manner. Healthcare staff are trained in nonviolent crisis intervention techniques, usually as a first response to situations that are escalating. Although nursing staff likely employed these techniques frequently on the inpatient wards under study, the specific techniques were often not documented. In contrast, chemical and physical restraints, as well as general medication administration, was almost always documented for each patient. Therefore, intervention was defined as physical (i.e., seclusion, restraints, security) or chemical restraints (e.g., Loxapine) as documented in the patient's file and a PRN (i.e., as needed) medication given to a patient for the following reasons: "agitation"; “anxiety”; "to help settle"; "escalation"; or in response to a specific aggressive incident. A chemical restraint is a medication given against the patient’s will in reaction to agitated or aggressive behaviour for the purpose of restraint and not treatment (Currier & Allen, 2000). At times, it was difficult to ascertain whether lorazepam (Ativan) was being used as a PRN or a chemical restraint, thus only documentation referring to stronger antipsychotics (Loxapine, Haldol) was coded as a chemical restraint. The intervention variable was measured both dichotomously (e.g., physical restraint present or absent) and continuously (e.g., frequency count of the number of medications given to a participant) over the duration of the inpatient stay.

6.4. Procedure

6.4.1. Training and Reimbursement

I developed training for the PTNs, which addressed general risk assessment principles, structured professional judgment principles, scoring of the items on the screening tool for the study, and how to determine the final risk judgment (see Appendix B). The training was delivered by the author to three of the PTNs as a group and to the last two on an individual basis. I was available to the PTNs for questions or concerns regarding any aspect of the study.

In exchange for the PTNs' participation in the study (i.e., screening the participants using the violence screening tool), they were provided a discounted rate to attend a two day workshop on the use and scoring of the HCR-20 (Webster et al., 1997) or the SARA/B-SAFER (Kropp et al., 1994, 1995, 1998; Kropp et al., 2005, 2010) given by Drs. Stephen Hart and Randy Kropp. This workshop addressed general risk assessment principles as well as specific training on structured professional judgment (SPJ) risk assessment tools. Two PTNs were not eligible to attend because they had not been hired by VGH at the time of the workshop.

6.4.2. IPVST Sample

All individuals who presented with a psychiatric concern to the ED of VGH were triaged by the PTNs (four full-time, one float staff) as part of the usual psychiatric triage process. For purposes of this study, at the end of their interview, the PTNs completed the IPVST framework developed for this project. Inclusion criteria for the study consisted of any individual who presented to the ED at VGH and who was triaged by the PTNs; there was no exclusion criteria. However, as noted above (Participants section), due to the high number of admissions and staffing constraints, the IPVST was completed only on certain days within the study period and was not completed for each individual who presented to the ED. Since the BVC and DASA are included in the IPVST framework, these measures were completed as part of this procedure.

Inter-rater Reliability (IRR)

The goal was to have 10% of cases screened by the PTNs coded during the overlap between the morning and evening PTN so that both could be present for the triage interview and then code the IPVST. In practice, however, it was very difficult to obtain IRR cases. The reasons it was not possible was the high volume of cases in need of a psychiatric triage and nurses coming to work late or leaving early. In total, 22 cases were available for IRR. Cohen's Kappa was calculated to examine agreement between the two raters for each item of the tool. Values between .00 and .20 indicate *slight*, .21 and .40 *fair*, .41 and .60 *moderate*, .61 and .80 *substantial* and .81 and 1.00 *almost perfect* agreement (Landis & Koch, 1977). Due to no or low variability in some items on the IPVST, kappa was only calculated for 8 of the 15 items. The kappa values ranged from .51 (*moderate*) to 1.00 (*almost perfect*). For the remaining 7 items, percentage agreement was calculated.

Table 6.3. Inter-rater Reliability for the IPVST, VSC, and VSC-R

Items	Kappa	% Agreement
IPVST		
Confusion	1.00	
Irritability	.51	
Impulsivity	.78	
Negative Attitudes	.70	
Hostility	.61	
Intoxication	.61	
Suspiciousness	.67	
Agitation	.58	
Boisterous		95
Physically Threatening		100
Verbally Threatening		100
Attacking Objects		100
Unwillingness to Follow Directions		82
Sensitivity to Perceived Provocation		91
Easily Angered When Requests are Denied		95
VSC and VSC-R		
Physical Attacks or Fear Inducing Behaviour	.39	
Absence of Suicidal Behaviour	.90	

Items	Kappa	% Agreement
Diagnosis of Schizophrenia or Mania	.81	
Gender	1.00	
Marital Status	1.00	

Note. IPVST=Inpatient Violence Screening Tool; VSC=Violence Screening Checklist; VSC-R=Violence Screening Checklist Revised

6.4.3. Follow-up Sample

Two Research Assistants (undergraduate honours student; graduate student), and I reviewed the participants' healthcare files to gather psychosocial information, aggressive and violent incidents, and management strategies from the most recent admission only. Due to confidentiality reasons, files of inpatients were not reviewed until after the individual was discharged, which on average was 2 to 3 weeks after admission. Thus, file review was completed at least four weeks after the initial screening date to ensure the patient had been discharged. The time frame for the coding of aggressive incidents was from transfer from the ED to the PAU or other inpatient unit until the time of discharge. If the patient stayed beyond three months, coding of the file stopped at 3 months.

The files were reviewed for the following information: 1) basic demographic information (e.g., sex, age), 2) psychosocial information (e.g., previous hospitalizations for mental health, mental health history, violence history), 3) the presence of a formal or informal risk assessment, 4) information contained on the existing violence screening form (ALERT), 5) any aggressive incidents (defined below) that occurred on any inpatient unit and the details of those incidents (e.g., what occurred, to whom, and any injuries), 6) any management strategies that were used to defuse the situation, including recommended short-term and long-term strategies, 7) the presence or absence of a "V" code on the patient's file from previous hospital visits, and 8) triggers or risk factors that existed prior to the aggressive incident (See Appendix C for the Inpatient Violence Outcome Form). The research assistants and I completed the VSC and VSC-R based on the information obtained from the files.

The outcome variable for the present study was the perpetration of aggressive and violent acts while an inpatient. Violence was defined as "actual, attempted, or

threatened harm to a person or persons" (Webster et al., 1997, p. 24). This definition was chosen to be consistent with the risk assessment literature. The definition of aggression for this study was fairly broad because of the low base rate of aggressive incidents on the ward and thus the definition included aggression, violent ideation and violence. As outlined above in the Measures section, aggression was defined by the categories included on the OAS (Yudofsky et al., 1986) as well as sexual acts from the START Outcome Scale (Nicholls et al., 2007): verbal aggression, physical aggression against objects, and physical aggression against others. Violent ideation was defined as thoughts, fantasies, plans, and intent of committing violent behaviour. This is the same definition used in a previous study in the PAU in 2008 (Watt, Levy, & Hart, 2009).

Inter-rater Reliablity (IRR)

Every 10th case was coded by two researchers for IRR purposes. Detailed information was provided for each aggressive and violent incident including the nature of the incident, who was involved, the level of injury, and any intervention or management strategies that were implemented. The IRR for the VSC and VSC-R Total Scores was almost perfect, $r(21)=.95$, $p<.001$. With regards to the individual items, physical attacks and/or fear inducing behaviour in the two weeks prior to admission had only fair agreement (kappa=.39), but the rest of the items ranged from a kappa of .81 (*substantial*) to a kappa of 1.00 (*almost perfect;* See Table 6.3 above). The kappa for the presence or absence of an aggressive incident was almost perfect (.87).

Chapter 7. Statistical Analyses

The majority of analyses were conducted using IBM SPSS Statistics, Version 21. The tetrachoric correlations were produced with the statistical program TetMat (Ubersax, 2007). Receiver operating characteristics (ROC) analyses were calculated using MedCalc Version 14.12.0.

Descriptive statistics for all of the study measures are provided. This includes individual item frequencies, mean, standard deviation, range of total scores, and frequencies of risk categories. The purpose of these analyses is to provide background information on behaviours of individuals presenting to the Psychiatric Emergency Department and to establish base rate information for further analyses.

7.1. Statistical Analyses for Research Question 1

1) Will there be a relationship between the PTNs' ratings of the IPVST items (i.e., the number of items rated as present) and the management strategies suggested by the PTNs and those actually implemented on the inpatient ward?

Using guidelines of the SPJ approach, the management strategies suggested by the PTNs should be related to the items that were present on the IPVST. Ideally, there should be a direct match, namely if Intoxication is present, management strategies suggested should address this item (e.g., substance use treatment). For this study, however, only those strategies that were available to the PTNs (e.g., talking, medication) were included on the IPVST. Instead, the total number of management strategies suggested by the PTNs was used in analyses. The total score of the IPVST was positively skewed (*skew*=2.36, *SE*=.09). By convention, a sample is not normally distributed if the skew is outside -1 to 1. When data is moderately skewed to the right a square root transformation is suggested (Mertler & Vannatta, 2005). For a substantial

positive skew, a log transformation is suggested. Both a square root and a log 10 transformation were performed, however, the log 10 reduced the skew more for all of the variables. The log transformation decreased the skew for the IPVST (*skew*=.87, *SE*=.09) and the Q-Q plot displayed a mostly straight line (Cohen et al., 2003). The PTN suggested management strategies had an acceptable skew (*skew*=.48, *SE*=.17) and the Q-Q plot displayed roughly a straight line (Cohen et al., 2003). The variables developed to capture the number of implemented management interventions on the inpatient unit were also positively skewed. The variables were transformed using log 10 (see Table 7.1 for the original and transformed variables), but the majority of the variables (with the exception of the total score of all implemented management strategies) were still positively skewed and not normally distributed based on Q-Q plots.

Table 7.1. Skew for Original and Transformed Intervention Variables

Interventions	Original		Log 10 Transformation	
	Skew	SE	Skew	SE
All Interventions	3.67	.17	.75	.17
Chemical Restraints	3.94	.17	1.89	.17
PRNs	3.99	.17	1.12	.17
Seclusion/Restraint	3.31	.17	2.00	.17
Security	4.06	.17	2.84	.17

Note. SE=standard error

Tests of the association between the IPVST and the number of suggested management strategies, as well as between the IPVST and all implemented interventions were calculated with the transformed variables using the Pearson Product Moment Correlation. Due to non-normality even with transformations, Spearman rho was chosen as an appropriate analysis for the remainder of the intervention variables and the original IPVST variable because it is a rank ordered correlation and does not assume normality (Meyers & Well, 2003).

7.2. Statistical Analyses for Research Question 2

2) Will there be an association between the PTNs' presence ratings (i.e., the

number of items rated as present) of the IPVST items and the summary risk judgment (i.e., *Low, Moderate*, and *High*)?

7.2.1. Tetrachoric Correlations

Tetrachoric correlations were calculated to analyze the relationship between the items on the IPVST (rated as *Present* or *Absent*[5]) and the summary risk judgments. A tetrachoric correlation is a measure of association for dichotomous variables that assumes an underlying normal bivariate distribution (Pearson, 1901). Research in the field suggests that, statistically, there is no substantial difference between the phi and tetrachoric correlation and it is only a matter of preference (Ekström, 2008). It is likely that the items on the IPVST have an underlying normal distribution based on the results of studies of psychometric properties of personality and psychopathology measures (Morey, 2001). For example, clinical syndromes, constructs related to treatment considerations, and interpersonal characteristics were normally distributed in the standardization sample of the Personality Assessment Inventory (Morey, 1991). Thus, the tetrachoric correlation was chosen.

7.2.2. Summary Risk Judgments

For the summary risk judgments of the IPVST, the distribution was negatively skewed, meaning there were significantly more participants in the *Low Risk* category than in the *Moderate* or *High Risk* categories. This resulted in sparseness of data (i.e., too few participants in some cells) for the logistic regression analyses when the summary risk rating was the dependent variable (DV). Sparseness can bias tests of model deviance and Wald tests as well as decrease the power of the logistic regression (Cohen et al., 2003). The tetrachoric correlation (described above) analyzes dichotomous variables that are assumed to have an underlying normal distribution. Thus, the *Moderate* and *High Risk* categories were collapsed to create a dichotomous variable (*Low Risk* and *Moderate/High Risk*). Research by Singh, Grann, & Fazel (2011)

[5]A separate item asked about whether the item was considered *Critical*; however, this rating was not used in analyses because the PTNs did not consistently complete this section or there was confusion regarding the meaning of *Critical*.

found minimal statistical differences between collapsing *Moderate* and *High Risk* versus collapsing *Low* and *Moderate Risk* categories. The original three level variable was retained for all other analyses. The *Low Risk* category indicated there were few risk factors for aggression or violence present and that minimal or no management of risk was needed at the time. The *Moderate/High Risk* category indicated there was at least some degree of concern of risk of aggression or violence and management strategies should be implemented.

7.2.3. ANOVA

An ANOVA was planned for this hypothesis to determine if the mean number of IPVST items were statistically different for the original summary risk judgment variable (*Low, Moderate*, and *High*). The assumption of homoscedasticity, however, was violated for the independent variable. Instead, Welch's test of equality of means (Welch, 1951) was calculated. This test is robust to problems with normality and heteroscedasticity, and it provides "excellent Type I error control" (Jan & Shieh, 2014, p.73). The Games-Howell post hoc comparison was chosen because it specifically handles unequal variances and is "more powerful than any of its competitors that have been proposed" (p.252). The issue is family wise error can be inflated with Games-Howell especially for groups less than 50. Therefore, a Dunn-Bonferroni (Dunn, 1959) correction was applied (.05/3=.017).

7.2.4. Principal Component Analysis

Some items on the IPVST had similar definitions. As a result, there were large correlations between several items on the measures. In order to avoid problems of multicollinearity, a principal component analysis (PCA) was computed utilizing the tetrachoric correlation matrix. Research in the field is conflicted with some results stating that the tetrachoric correlation is superior to the phi correlation for PCA (Debelak & Tran, 2013). The tetrachoric correlation matrix, however, was not positive definite, meaning there was at least one negative eigenvalue. The matrix was smoothed using a procedure championed by Knol and ten Berge (1989) that allows for the best fitting, least squares, and "symmetric, unit-diagonal, nonnegative definite matrix " (p. 1). Despite using this

procedure, it was still not possible to obtain PCA results. Upon further examination of the tetrachoric correlation matrix, the item Easily Angered When Requests are Denied was highly correlated with the item, Irritable (r_{rho} = .88). In addition, it was observed that Easily Angered When Requests are Denied was only coded as *Present* when Irritable was coded as *Present.* I decided to delete the Easily Angered When Requests are Denied item from the analysis because it was redundant with Irritable, which was also consistent with the goal of the PCA to reduce items. Of note, Easily Angered When Requests are Denied was included in other analyses that did not use the PCA results.

This analysis was used to extract the principal components followed by an oblique rotation (direct oblimin). An oblique or nonorthogonal rotation was chosen because all of the items on the IPVST are risk factors for violence and have been demonstrated in the literature to have an empirical relationship to violence (e.g., Almvik & Woods, 1998; Ogloff & Daffern, 2006). Thus, it was likely that the reduced components would be correlated. Using this approach (i.e., deleting the troublesome item), it was possible to derive a PCA solution. The steps followed for the PCA are detailed in the Results section.

7.2.5. Logistic Regression

A logistic regression model was calculated to determine if the principal components from the PCA would correctly predict membership in the dichotomous summary risk judgments categories (*Low*, *Moderate/High*). It was decided to use the component-based scores as the IVs as opposed to the component scores. Component-based scores are un-weighted linear composites of the items that had a factor loading of .30 or higher on that principal component (O'Rourke & Hatcher, 2013); each item only contributes to one principal component. Alternatively, component scores could be computed which are the linear composites of the optimally-weighted variables (O'Rourke & Hatcher, 2013). The component-based score was chosen instead of a component score because the weights added to the observed variables in component scores or factor scores are optimized for the current sample and thus could change upon cross validation (Grice & Harris, 1998). The component-based scores are not as sophisticated, but are rooted in the current sample and more ecologically valid than the component

scores (DiStefano, Zhu, & Mîndrilă, 2009). In addition, Dawes (1979) argues that improper linear models developed using non-optimal methods are still robust in predicting a given criterion. Both past violence (V-code) and violence in the Emergency Department were entered as categorical covariates as this information would likely be known by the PTNs and therefore could have influenced the judgements made by them.

7.3. Statistical Analyses for Research Question 3

3) Will there be an association between the PTN suggested management strategies and the summary risk judgments (i.e., *Low, Moderate*, and *High*) and between the implemented strategies on the unit and the summary risk judgments?

7.3.1. ANOVA

Similar to the analyses for Research Question #2, an ANOVA was planned to determine if the mean number of suggested management strategies were statistically different for the original summary risk judgment variable (*Low, Moderate*, and *High*). The assumptions of homoscedasticity, however, were violated for the independent variable. Instead, Welch's test of equality of means was calculated with the Games-Howell post hoc comparison (alpha=.05/3=.017).

A second comparison of means analysis was conducted to determine if there was an association between the implemented strategies on the unit and the summary risk judgments. It was hypothesized that there would be no relationship or a small relationship between these two variables because the summary risk judgments made by the PTNs were based on the risk factors observed in the ED that then lead to the PTNs recommended management strategies. The nurses on the units had no knowledge of the PTN's risk judgments and were implementing strategies based on their own clinical judgment, rules, and guidelines on the unit. Both the PTNs and the unit nurses were, however, a part of the same system meaning the PTNs and the unit nurses saw the same participants in a short amount of time. Thus, the presentations were likely similar between the ED and the unit for many individuals. As such, this analysis is more descriptive of whether the management on the unit is linked to the behaviours observed

and decisions made in the ED, even though different people are making the ratings of risk and implementing the management strategies. The point of the analysis is not to argue that the PTN's risk judgements led to management decisions on the unit. The transformed total number of implemented management strategies was normally distributed, so an ANOVA was conducted using a Tukey HSD post hoc test.

7.3.2. Logistic Regression

A logistic regression model was conducted to determine if the number of suggested management strategies and those that were implemented on the unit would predict membership in the summary risk judgment categories (*Low*, *Moderate/High*). On the first Block only the suggested management strategy variable was entered to determine if they would correctly predict membership in the summary risk judgment categories. The total number of implemented management strategies was entered on the second Block.

7.4. Statistical Analyses for Research Question 4

4) Will there be consistency across PTNs with respect to their summary risk judgments of similar clusters of patients?

Consistency of the PTNs' IPVST judgments was analyzed with a cluster analysis to identify subsets of patients. The Two-Step Cluster procedure (Chiu, Fang, Chen, Wang, & Jeris, 2001; Zhang, Ramakrishnon, & Livny, 1996) was utilized for this analysis. This procedure is ideal with large datasets because it first forms pre-clusters based on distance measures. Those pre-clusters are analyzed using hierarchical clustering procedures. The 15 items from the IPVST framework were the variables in the cluster analysis. First, the order of participants was randomized because different clusters can result based on any patterns already present in the data (Chiu et al., 2001). Five clusters were specified to allow for the possibility of different symptom clusters within the three summary risk judgments (*Low*, *Moderate*, and *High*). This also allowed for rating variability amongst the five PTNs. The log likelihood criterion was used to determine the distances between clusters and assign the variable to a cluster; the log likelihood

analyzes both categorical and continuous variables. To determine which risk factors were members of each of the five clusters pairwise chi-square statistics were calculated between the two clusters with the highest percentage of the risk factor in question. For example, if 56% of participants with the risk factor Confusion were present in Cluster 2 and 20% of participants with the risk factor Confusion were present in Cluster 5, a chi-square analysis was calculated to determine if the association between these two clusters for Confusion was significant. If it was significant, the risk factor was placed in the cluster where it had the highest percentage present. For the example, Confusion would be placed in Cluster 2.

Once the clusters were defined, the consistency of the PTNs' summary risk judgments of these five clusters (i.e., did all five PTNs rate a particular cluster similarly) was subsequently examined. A similar chi-square analysis as above was planned to determine which SPJ rating to assign to each cluster for each PTN. The expected and observed frequencies for many of the cells, however, were less than five and several cells were zero, which can bias the chi-square statistic (McDonald, 2014). Instead, I decided membership by looking at the number of cases for each cluster that were rated as *Low*, *Moderate*, or *High*. If there was more than a five-point difference in the number of cases between the two highest SPJ ratings for that cluster and that rater, then the rating with the higher number of cases was assigned to that cluster for that PTN. If there was a five or less than a five-point difference in the number of cases present in the clusters, both SPJ ratings were assigned to that cluster for that PTN. For example, if Rater 1 rated No Observations as *Low Risk* for 50 participants and *High Risk* for 15 participants, the No Observations cluster would be assigned a *Low Risk* rating for Rater 1. If Rater 2 rated Hostile as *Moderate Risk* for 10 cases and *High Risk* for 15 cases, then Hostile would be given a *Moderate/High Risk* rating for Rater 2.

7.5. Statistical Analyses for Research Question 5

5) Will the PTNs' judgments of the IPVST items, suggested management strategies, and summary risk judgments (i.e., Low, Moderate, and High) be related to violence on the inpatient ward?

7.5.1. Aggression

As mentioned in the Method, the outcome was defined as aggression, with multiple subcategories within each broad domain. Within this study, there were a total of 45 participants who were aggressive on the inpatient ward (21%). The frequencies of the different types of aggression are provided in the Descriptive section below. To maximize power for statistical analyses, all aggressive incidents were collapsed into one dichotomous (yes=aggressive; no=not aggressive) variable called *aggression*.

7.5.2. Phi Correlations and Mann Whitney

First, phi correlations were calculated to examine the relationship between the IPVST items and aggression because both variables were dichotomous. Then the association between the principal components from the PCA and aggression was tested. Similar to the IPVST total score, each component was not normally distributed. The total scores of the BVC and DASA-IV were positively skewed in previous studies (e.g., Almvik et al., 2000; Chu et al., 2013). Assuming that these measures would be positively skewed in this study, a Mann Whitney U test was calculated to determine if the average rank on the principal components would differ for aggressive and non-aggressive participants.

7.5.3. Chi-Square test

A chi-square analysis was completed to examine the association between the summary risk judgments and aggression. Although only one of the expected cell counts was close to five (6.5) when the original summary risk judgment variable was analyzed, I decided to use the collapsed SPJ variable (*Low* vs. *Moderate/High*) to increase the expected and observed cell values to minimize a biased chi-square statistic (Haberman, 1988).

7.5.4. Logistic Regression

A logistic regression analysis was calculated to determine if the IPVST total score and the summary risk judgment would correctly predict membership in the

aggressive or not aggressive category. The categorical variables of violence in the ED and V-Code status were entered as covariates because this information could have influenced the ratings on the IPVST. The dichotomized summary risk judgment was added on the second block to determine if it added incremental validity for predicting aggression.

Finally, a mediation suppression analysis was conducted to account for the possible impact of any intervention (i.e., physical or chemical restraint, seclusion, or security) on the relationship between the IPVST ratings and summary risk judgments with aggression. Only the number of interventions up to the first aggressive incident was included for this analysis. For those participants who were not violent, the number of interventions for the first seven days post admission was included in the analysis. The mean number of days to the first aggressive incident was 6.47 days (*SD*= 14.40). This number was rounded to seven days to be more inclusive.

The intervention variables were positively skewed even after data transformations (see Table 7.2). The number of times security was called to the unit was severely positively skewed (Mertler & Vannatta, 2005), so an inverse transformation was applied.

Table 7.2. Skew for Original and Transformed Intervention to Violence Variables

Interventions	Original		Log 10 Transformation		Ln Transformation	
	Skew	SE	Skew	SE	Skew	SE
All Interventions	2.06	.17	.40	.36	-	-
Chemical Restraints	4.80	.17	2.79	.36	-1.77	.36
PRNs	3.19	.17	.64	.36		
Seclusion/Restraint	2.74	.17	1.27	.36		
Security	7.34	.17	-	-	-1.75	.36

Note. PRN= pro re nata or in the circumstances medication; Ln=inverse transformation; SE=Standard Error

For chemical restraint, a log 10 transformation was first tried because it was substantially skewed and then an inverse transformation was applied. The Q-Q plots were roughly a straight line for the transformed total number of interventions and for the

transformed number of PRNs. The other variables remained not normally distributed. Instead, these variables were dichotomized for the mediation suppression analysis. The steps for mediation outlined by Baron and Kenny (1986) were followed and are explained in the Results section.

7.6. Statistical Analyses for Research Question 6

6) Which individual measure (BVC, DASA, VSC, VSC-R, IPVST) will be the most predictive of aggression on the inpatient ward?

The association between the BVC, the DASA, the VSC, and VSC-R with inpatient aggression was calculated for this Research Question. The BVC (*skew*=1.94,*SE*=.17) and DASA (*skew*=2.11, *SE*=.17) were not normally distributed and transformations were not successful in effectively reducing the skewness of the distribution (*skew*=1.26, *SE*=.09 and *skew*=1.42, *SE*=.09, respectively). A Mann Whitney U test was calculated to compare the mean rank scores for the aggressive and not aggressive groups. An independent sample t-test was calculated to compare the mean total scores for the VSC and VSC-R for the aggressive and not aggressive groups.

Next, Receiver operating characteristic (ROC) analyses were conducted to further examine the accuracy of the risk screening tools in predicting aggression. ROC analyses plot the measure's sensitivity against its specificity for all possible scores on the measure and generates Area under the Curve values (AUC). The ROC analysis and the resulting AUC has been the most reported effect size in risk assessment literature (Mossman, 2013). The AUC is a global indicator of predictive validity for all possible scores on that measure. The AUC is the probability that an individual chosen randomly from those who were aggressive will score higher than an individual chosen randomly from the group of people who were not aggressive (Mossman, 2013). AUC values are thought to provide a measure of association relatively free from influence by base rates of offending (Conroy & Murrie, 2007; Mossman, 1994; Rice & Harris, 1995). AUC values range from 0, a perfect negative correlation, to .5, a chance outcome, to 1.0, a perfect prediction with higher AUC values reflecting better classification accuracy. Rice and Harris (2005) suggest using the AUC to facilitate comparisons against other common

effect size estimates (e.g., Cohen's d). For example, a Cohen's d value of .2 is considered small (Cohen, 1988) and it is equivalent to an AUC of .56. A Cohen's d of .5 (medium) and .8 (large) are equivalent to an AUC of .64 and .71 respectively. The ROC curves between the total scores of the IPVST principal components, the BVC, the DASA-IV, the VSC, and the VSC-R were compared using the DeLong procedure (DeLong, DeLong, & Clarke-Pearson, 1988). This procedure was chosen over the Haney & McNeil (1872) because DeLong does not assume a Gaussian or binormal distribution (DeLong et al., 1988). The total scores were positively skewed (except for the two VSC measures) in both the aggressive and non-aggressive groups. If there is a violation of a Gaussian distribution, the results of the comparison would not be accurate (Stephan, Wesseling, Schink, & Jung, 2003). A Dunn-Bonferroni correction was applied to each family of tests. Three sets of analyses were calculated so the new alpha was .05/3=.017.

A ROC analysis was also calculated to determine of the summary risk ratings for all of the measures were predictive of aggression. The AUC, by definition, uses a curve for its calculations. However, two or three points (i.e., *Low*, *Moderate*, *High* or *Low, High*) do not result in an actual curve. In order to account for this, the sensitivity and specificity of the actual coordinates on the curve for the SPJ rating and categorical ratings for all of the measures were included with 95% confidence intervals. Similarly to other effect sizes, there are no definitive rules or categories to determine what is "good" sensitivity and specificity. What is acceptable varies by setting and the purpose of the test. The decision regarding whether the sensitivity and specificity of the measures was adequate requires a discussion of the benefits of accuracy and the costs of inaccuracies (Mossman, 2013). The sensitivity and specificity of the SPJ ratings will be analyzed in the Discussion section.

Lastly, Cox proportional hazard regression was conducted to determine the relationship of the measures with aggression accounting for the time at risk for aggression. The VSC-R was entered first because I hypothesized that it would have the lowest discriminatory power. Only the revised version was entered because the two measures only differ by one item. Next, the BVC and DASA were entered on the same block because there was no hypothesis distinguishing between these two measures. These two measures share two items (Irritability and Verbally Threatening) so the two

measures without these items were entered and then the overlapping items were entered on the subsequent block to account for multicollinearity. The IPVST components were not entered because they are composed of the BVC and DASA. A second model was calculated with just the IPVST components. All of the cases were included in the model regardless of whether the participant was aggressive or not. The endpoint was discharge from the hospital. For participants who were aggressive on an inpatient unit, the number of days between admission and the first aggressive incident was calculated. For participants who were not aggressive, the number of days between admission and discharge was calculated.

Chapter 8. Results

8.1. Descriptives

8.1.1. IPVST Sample

Central tendency information is provided for all of the measures starting with the IPVST (see Tables 8.1-8.3). The frequency of the presence and absence of the items on the IPVST, as well as the distribution among the summary risk judgments, is also included. As mentioned in the Statistical Analyses section, the summary risk judgment variable was dichotomized for some inferential analyses. Both the original three level variable (*Low, Moderate, and High*) and the dichotomous variable (*Low* and *Moderate/High*) were used for the descriptive analyses.

In-Patient Violence Screening Tool (IPVST)

The mean total score of the IPVST was 1.53 (*SD*=2.29), the median was 0 and the range was 0 to 14. Forty-seven percent of the cases had a total score above 0. The distribution of individuals in the summary risk categories was: *Low Risk* (73%), *Moderate Risk* (17%), *High Risk* (10%), and *Moderate/High Risk* (27%). The frequency of each item is presented in Table 8.1.

Table 8.1. Frequency of Presence and Absence of IPVST items

IPVST Items	Present		Absent	
	N	(%)	N	(%)
Confused	126	(18)	571	(82)
Irritable	120	(17)	577	(83)
Boisterous	40	(6)	657	(94)
Physically Threatening	25	(4)	672	(96)
Verbally Threatening	28	(4)	669	(96)
Attacking Objects	12	(2)	685	(98)
Impulsivity	117	(17)	580	(83)
Unwillingness To Follow Directions	64	(9)	633	(91)
Sensitivity to Perceived Provocation	48	(7)	649	(93)
Easily Angered When Requests Are Denied	25	(4)	672	(96)
Negative Attitudes	51	(7)	646	(93)
Hostility	69	(10)	628	(90)
Current Intoxication	91	(13)	606	(87)
Suspiciousness	66	(10)	631	(91)
Agitation	116	(16)	581	(83)

Note. IPVST=Inpatient Violence Screening Tool

Five items on the IPVST were documented infrequently by nurses (i.e., less than 5%): Physically Threatening, Verbally Threatening, Attacking Objects, and Easily Angered When Requests are Denied. None of the 15 items were documented more than 20% of the time by nurses. The most frequently observed risk factors were Confusion, Irritability, Impulsivity and Agitation.

Brøset Violence Checklist (BVC)

The mean total score on the measure was low (M=.50, SD=.89) and the median was 0 because Verbally Threatening, Physical Threatening, and Attacking Objects were not observed resulting in low counts for those items (see Table 8.2 for descriptive

statistics on all measures). Forty-four percent of participants had a total score above 0. In terms of the risk categories, based on the cut-off scores provided by the developers (Almvik & Woods, 1999), the majority of participants were in the *Low Risk* category (66%), followed by the *Moderate Risk* category (31%), and very few were in the *High Risk* category for future violence (3%).

Dynamic Appraisal of Situational Aggression- Inpatient (DASA-IV)

The DASA-IV had a similarly low mean (*M*=.65, *SD* = 1.26) as the BVC and the median was also 0, but there was more variability in the total score. Thirty-one percent of individuals had a total score greater than zero. The developers of the DASA-IV (Ogloff & Daffern, 2006b) provide interpretation guidelines for the total score[6]. Similarly to the IPVST and the BVC, based on the cut-off scores provided by the developers, the majority of participants were in the *Low Risk* category (69%), followed by *Moderate Risk* (24%) and *High Risk* (8%).

Violence Screening Checklist and Checklist-Revised (VSC and VSC-R)

The mean scores for the VSC and VSC-R were higher than the BVC and DASA-IV (*M*=1.74, *SD*=1.22; *M*=1.56, *SD*=1.21 respectively). The frequency of individuals in the *Low Risk* category is similar to the other tools (VSC, 71%; VSC-R, 52%) and the frequency of individuals in the *High Risk* category is equivalent to the combination of the *Moderate* and *High Risk* categories for the other measures (VSC, 29%; VSC-R, 48%).

[6] The DASA authors have since added a structured professional summary risk judgment to the measure.

Table 8.2. Total Score Means for Violence Risk Screening Measures

Measures	N	Mean	Standard Deviation
BVC	697	.50	.89
DASA	697	.65	1.26
VSC	206	1.74	1.22
VSC-R	209	1.56	1.21
IPVST	697	1.43	2.29

Note. BVC = Brøset Violence Checklist; DASA = Dynamic Appraisal of Situational Aggression; VSC = Violence Screening Checklist; VSC-R = Violence Screening Checklist Revised; IPVST = Inpatient Violence Screening Tool. *The VSC and VSC-R were coded based on files and thus were only coded for those participants in the follow-up sample while the other measures were coded with the full screening sample.

Table 8.3. Frequency of Summary Judgments (Low, Moderate, High) for the Violence Risk Screening Tools

Measures (N)	Low		Moderate		High		Moderate/ High	
	n	%	n	%	n	%	n	%
BVC (697)	460	(66)	213	(31)	24	(3)	237	34
DASA (697)	479	(69)	65	(24)	53	(8)	118	32
VSC (206)	152	(71)			64	(29)		
VSC-R (209)	112	(52)			104	(48)		
IPVST (697)	505	(73)	112	(17)	70	(10)	182	27

Note. BVC = Brøset Violence Checklist; DASA = Dynamic Appraisal of Situational Aggression; VSC = Violence Screening Checklist; VSC-R = Violence Screening Checklist Revised; IPVST = Inpatient Violence Screening Tool. The guidelines in the DASA manual state a score of 4 or more should be considered Very High Risk. For this study, I considered everyone with a score of 3 or more as High Risk.

In summary, there were several low frequency items on the IPVST and therefore on the BVC and the DASA, since both were included on the former measure. None of the item frequencies were greater than 20%. This led to relatively low variability and low means on all of the measures. The distribution of participants among the summary risk judgments was positively skewed.

8.1.2. Outcome Descriptives

Aggression

The outcome was calculated in several different ways: (1) total number of participants who were aggressive, (2) frequency of the most serious aggressive incident, (3) and the total number of different types of aggressive incidents. The total number of participants who displayed aggressive behaviour was 45 (21%). The frequency of the most serious type of aggression was determined based on the scoring employed in the OAS, which ranked the behaviours within each aggressive category. For example, *kicking that resulted in moderate injury* was more serious than *strikes... without injury*. Similarly, *kicks... resulting in mild-moderate injury* was more serious than *cursing mildly*. When behaviours from two different categories with the same score were perpetrated by one participant, the most serious incident was chosen based on the description of the incident and my clinical judgment. Statistical analyses use a single dichotomized aggression variable but, for descriptive purposes, the frequency of the various types of aggression is reported here. The frequency of the most serious aggressive incident was as follows: verbal aggression, 38 % (*n* = 17); physical violence, 29% (*n* = 13); violent threats, 22% (*n* = 10); violent ideation, 9% (*n* = 4); property aggression 2% (*n* = 1).

Intervention

As described in the Method, intervention strategies were suggested by the PTNs on the IPVST and there were intervention strategies employed by staff on the unit to manage violence risk. For those strategies suggested by the PTNs only those that would impact potential aggression on the inpatient unit were included. For example, the PTNs could suggest an inpatient admission or a referral for an assessment, however, these strategies would not immediately impact inpatient aggression. The mean number of suggested management strategies was 2.26 (*SD*=1.94; *n*=695) with a range from 0-9. Distribution information was detailed in the Statistical Analysis section.

On the unit, staff continued to manage patient aggression as usual because they were unaware of the information on the IPVST. The implemented management strategies were: (a) physically restraining the participant via actual restraints, seclusion, or security attending the unit; (b) chemical restraints (i.e., antipsychotic medication such

as Haldol); or (c) PRN medication for reasons related to possible, probable, or completed aggression and violence (e.g., for "agitation"; "to help settle"). Overall, the mean number of interventions used per participant was 4.80 (*SD*=9.61) with a range from 0 to 64. The mean number of chemical restraints administered to a participant over the study period was 1.38 (*SD*= 3.61) with a range from 0 to 24 and the mean number of times physical restraints or seclusion were applied to a participant was 0.37 (*SD*=.89) with a range of 0 to 6. Approximately 34% of participants received chemical restraints and 24% were physically restrained or secluded. The mean number of PRNs administered to a participant was 2.60 (*SD*=5.62) with a range from 0 to 41 (not including chemical restraints). Approximately 53% of participants received a PRN. Security attended the unit on average .39 times per participant (*SD*=1.23) with a range from 0 to 9. Approximately 22% of participants had security called to the unit to assist nursing staff. Distribution information was detailed in the Statistical Analysis section.

8.2. Research Question 1

1) Will there be a relationship between the PTNs' ratings of the IPVST items (i.e., the number of items rated as present) and the management strategies suggested by the PTNs and those actually implemented on the inpatient ward?

Hypothesis: The number of suggested management strategies will increase with an increase in the number of items rated as present on the IPVST. The actual management strategies (implemented by people other than those who conducted the risk assessment measure) that were implemented on the ward will have either no or a small relationship to the presence of the items on the IPVST. A relationship is not expected because the nurses on the unit were unaware of the suggested management strategies in the ER. A small relationship, however, may be present because the implemented strategies on the unit will be in response to immediate symptoms or negative behaviours on the ward in the present moment, some of which will be risk factors on the IPVST (e.g., confusion, agitation).

The first research question was divided into two separate analyses. A Pearson r was calculated for the association between the transformed IPVST and transformed

suggested management strategies and the transformed total number of implemented interventions. A Spearman rank order correlation was calculated for analyses involving chemical restraints, PRNs, seclusion/restraint, and security were still not normal even when transformed. The first analysis examined the relationship between the 15 dichotomous (*Present/Absent*) items on the IPVST and the number of management strategies suggested by the PTNs. The second set of analyses focused on the relationship between the 15 dichotomous (*Present/Absent*) items on the IPVST and the number of interventions actually implemented on the unit.

8.2.1. Risk Factors and Management Strategies

According to Cohen's guidelines (1988), .10 is a small effect size, .30 is a medium effect size, and .50 is large effect size for the Pearson r. There was a statistically significant, moderate, positive relationship between the transformed total score of the IPVST and the transformed total number of suggested management strategies, $r(688)=.41$, $p<.001$.

The transformed number of implemented interventions had a statistically significant, moderate positive relationship with the transformed IPVST total score, $r(200)=.29$, $p<.001$. For guidance purposes, Cohen's guidelines for effect size of the Pearson r were used for the Spearman rank order correlation as it is a special-case version of the Pearson Product Moment Correlation (Cohen et al., 2003). There was a statistically significant small positive relationship between the set of ranks for the IPVST total score and the set of ranks for chemical restraints, $\rho(200)=.28$, $p<.001$), and the set of ranks for the number of PRNs, $\rho(200)=.20$, $p<.001$). There was a statistically significant moderate positive relationship between the set of ranks for the IPVST and the set of ranks for seclusion and restraints, $\rho(200)=.39$, $p<.001$, and security, $\rho(200)=.31$, $p<.001$.

8.3. Research Question 2

2) Will there be an association between the PTNs' presence ratings (i.e., the number of items rated as present) of the IPVST items and the summary risk judgment

(i.e., *Low, Moderate*, and *High*)?

Hypothesis: Each of the items have demonstrated empirical relationships in the literature with violence and as such, should have a relationship with the summary risk judgments of future violence on the ward. There will be a significant positive relationship between all of the items on the IPVST and the summary risk judgments. In addition, those participants judged to be *Low Risk* will have the least number of risk factors present and those participants judged to be *High Risk* will have the most risk factors present. Lastly, the items on the IPVST will predict the summary risk judgments such that the presence of the item will predict a higher summary risk judgment.

This research question was divided into four sections. The first section examined the relationship between the items on the IPVST and the summary risk judgment using tetrachoric correlations and Welch's Test of Equality of Means. The second section reduced the number of items on the IPVST using principal component analysis to minimize multicollinearity and increase power for subsequent analyses. The third section examined the association between the principal component(s) and the summary risk judgments. The fourth section used a logistic regression to determine if the principal components of the IPVST predicted membership in the summary risk judgment categories.

8.3.1. Risk Factors and the Summary Risk Judgments

The relationship between the items on the IPVST and the summary risk judgments (*Low* vs. *Moderate/High*) was explored using tetrachoric correlations (see Table 8.4). All of the associations were statistically significant and positive; the majority of the effect sizes were moderate to large (Cohen, 1988).

Table 8.4. Tetrachoric Correlations between the Dichotomous Summary Risk Judgments and the Items on the IPVST.

	rho	90% CI	SE	p value
Confused	.43	[.32, .53]	.07	.0000
Irritable	.62	[.54-.70]	.08	.0000
Boisterousness	.62	[.50, .74]	.10	.0000
Physically Threatening	.80	[.69, .91]	.12	.0000
Verbally Threatening	.72	[.60, .83]	.12	.0000
Attacking Objects	.58	[.39, .78]	.16	.0000
Impulsivity	.59	[.50, .67]	.08	.0000
Unwillingness to Follow Directions	.84	[78, .90]	.09	.0000
Sensitivity to Perceived Provocation	.61	[.50, .72]	.10	.0000
Easily Angered When Requests are Denied	.64	[.51, .78]	.12	.0000
Negative Attitudes	.61	[.50, .72]	.10	.0000
Hostility	.84	[.78, .90]	.09	.0000
Current Intoxication	.41	[.30, .53]	.08	.0000
Suspiciousness	.58	[.47, .68]	.09	.0000
Agitation	.49	[.39, .59]	.08	.0000

Note. IPVST=Inpatient Violence Screening Tool

It was expected that the mean total score of the IPVST would be greater for individuals rated as *High Risk* compared to those rated as *Moderate Risk* and those rated as *Moderate Risk* would have a higher mean total score on the IPVST than those who were rated as *Low Risk*. Welch's Test of Equality of Means was calculated to compare IPVST total score means because of violations of assumptions of normality and heteroscedasticity as described above. The number of risk factors present did significantly differ based on the level of judged risk, $F_w(2, 123.15)=95.70$, $p<.001$. The Games-Howell post hoc comparison of the three groups indicated that participants who were rated by the PTNs as being *High Risk* had a significantly higher mean total score on the IPVST (M=4.45, SD=3.84) than participants who were rated as *Moderate Risk* (M=3.09, SD=2.25) and *Low Risk* (M=.63, SD=1.22, p<.001). Participants who were rated as *Moderate Risk* (M=3.09, SD=2.25) had a significantly higher mean total score on the IPVST than participants who were rated as *Low Risk* (M=.63, SD=1.22, $p<.001$). There was not a statistically significant difference between the mean total score on the IPVST for participants rated as *Moderate Risk* and *High Risk*.

Table 8.5. Smoothed Tetrachoric Correlations between the Items on the In-Patient Violence Risk Screening Tool

	Confused	Irritable	Boisterous	Physical Threat	Verbal Threat	Attack Obj	Imp	Unwilling	Sensitive	Easily Anger	Negative Attitudes	Hostile	Current Intox	Suspicious	Agitation
Confused	1.00														
Irritable	0.22	1.00													
Boisterousness	0.37	0.60	1.00												
Physically Threatening	0.30	0.53	0.58	1.00											
Verbally Threatening	0.11	0.68	0.67	0.84	1.00										
Attacking Objects	0.29	0.38	0.48	0.73	0.56	1.00									
Impulsivity	0.52	0.59	0.64	0.50	0.56	0.39	1.00								
Unwillingness to Follow Directions	0.45	0.68	0.66	0.73	0.68	0.54	0.54	1.00							
Sensitivity to Perceived Provocation	0.37	0.71	0.39	0.62	0.59	0.44	0.59	0.62	1.00						
Easily Angered	0.15	0.88	0.62	0.73	0.80	0.58	0.57	0.69	0.68	1.00					
Negative Attitudes	0.23	0.62	0.45	0.47	0.64	0.33	0.40	0.55	0.59	0.60	1.00				
Hostility	0.31	0.63	0.59	0.60	0.69	0.59	0.56	0.65	0.73	0.64	0.78	1.00			
Current Intoxication	0.32	0.32	0.35	0.36	0.40	0.29	0.37	0.23	0.48	0.20	0.25	0.39	1.00		
Suspiciousness	0.46	0.53	0.29	0.35	0.31	0.37	0.36	0.62	0.64	0.49	0.62	0.58	0.16	1.00	
Agitation	0.40	0.60	0.56	0.61	0.65	0.39	0.74	0.52	0.71	0.50	0.48	0.56	0.40	0.40	1.00

Note: Boisterous=Boisterousness; Physical Threat=Physically Threatening; Verbal Threat=Verbally Threatening; Attack Obj=Attacking Objects; Imp=Impulsivity; Unwilling=Unwillingness to Follow Directions; Sensitive=Sensitivity to Perceived Provocation; Easily Anger=Easily Angered; Hostile=Hostility; Current Intox=Current Intoxication; Suspicious=Suspiciousness

8.3.2. Principal Component Analysis

A principal component analysis was performed on 14 of the 15 original risk factors of the IPVST[1] using a smoothed tetrachoric correlation matrix (see Table 8.5). This analysis was used to extract the principal components followed by an oblique rotation (direct oblimin). An oblique or nonorthogonal rotation was chosen because all of the items on the IPVST are risk factors for violence and have been demonstrated in the literature to have an empirical relationship to violence (e.g., Almvik & Woods, 1998; Ogloff & Daffern, 2006). Thus, it was likely that the reduced components would be correlated. The Kaiser-Meyer-Olkin measure of sampling adequacy was .64 or mediocre according to Kaiser's (1974) facetious categorization (0.90's as *marvelous*; 0.80's as *meritorious*; 0.70's as *middling*; 0.60's as *mediocre*; 0.50's as *miserable*; and below 0.50 as *unacceptable*). Bartlett's Test of Sphericity led to a rejection of the null hypothesis that the matrix was an identity matrix, $\chi^2(91, N=697)=9575.66$, $p<.001$. This result indicated that it was useful and appropriate to conduct a PCA because there was redundancy or covariance between items on the IPVST.

There are several guidelines to help determine the number of principal components that are to be obtained. Each of these guidelines will be reviewed in the context of the present study and decision regarding the number of principal components to be retained will be provided at the end of this section.

(1) The Kaiser-Guttman rule suggested retaining components with eigenvalues greater than 1.00 (Kaiser, 1960). In a review of studies that investigated the accuracy of this criterion, Stevens (2002) stated that this criterion should be used when fewer than 30 variables are being analyzed and the variable communalities are greater than .70, or when the analysis is based on more than 250 observations and the mean communality is greater than .59. This criterion, however, should be used in conjunction with other criteria because it can lead to retaining too many components.

[1]As noted in the Statistical Analysis section, Easily Angered was dropped from the analysis due to its high correlation with Irritable which rendered the correlation matrix not positive definite.

For this study, there were 697 observations and the mean communality was .71. There were three principal components with eigenvalues above 1.00.

(2) The Scree Test (Cattell, 1966) is a plot of the eigenvalues associated with each component and the scree plot is examined for the “break” or “elbow” in the curve. The components before the break are considered meaningful and are retained. The scree test is relatively accurate as long as the sample is larger than 200 observations and the variable communalities are large (Stevens, 2002).

According to the scree plot for this study, only one component should be retained. This one component, however, only accounts for approximately 50% of the variance.

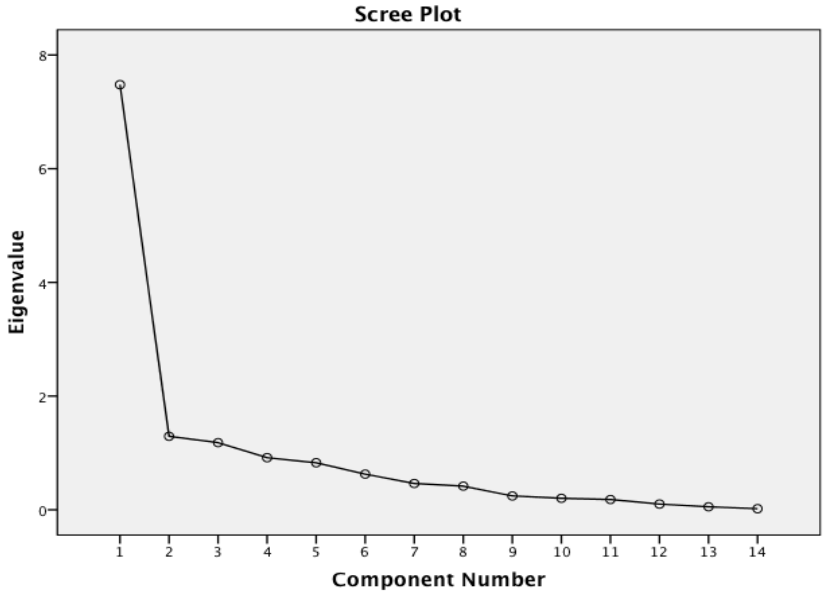

Figure 1. The Scree Plot of the 14 Extracted Eigenvalues

(3) Proportion of variance accounted for by the components. The number of principal components retained should account for at least 70% of the cumulative explained variance (O’Rourke & Hatcher, 2013).

The cumulative explained variance of the three components for this study was 71% (i.e., 53%, 10%, and 8%, respectively).

(4) The interpretability criterion (O'Rourke & Hatcher, 2013). These include the following:

a. Are there at least three variables with significant loadings on each retained component?

b. Do the variables that load on a given component overlap conceptually the same conceptual meaning?

c. Do the variables that load on different components seem to be measuring different constructs?

d. Does the rotated factor pattern demonstrate "simple structure"? This means do most of the variables have relatively high factor loadings on only one component and near zero loadings on the other components. In addition, most components should have relatively high loadings for some variables and near-zero loadings for the remaining variables. The rule of thumb of .40 or larger was utilized to identify a high loading on a given factor (Tabachnick & Fiddel, 2001).

The answer to the four interpretability criteria is yes if three components are retained. In summary, only the Scree Plot indicated one principal component needed to be retained; the other criteria indicated that three principal components should be retained. Therefore, I decided to retain three principal components which are described in more detail below.

The component loadings for each risk factor are presented in Table 8.6. When interpreting the three rotated components, a risk factor was said to load on a particular component if the component loading was .40 or greater for that component and less than .40 for any other component. If an item had a loading of .40 or greater on more than one component, then it was left on the component that conceptually made the most sense. Using these criteria, four items loaded on Component 1, six items loaded on Component 2, and four items loaded on Component 3. Based on which items loaded on the first component, it was interpreted as representing a Belligerent patient. The second

component was interpreted as representing a Paranoid patient and the third component was interpreted as representing a Confused patient.

Table 8.6. Component loadings of the risk factors of the IPVST.

	Component Loadings		
Items	Belligerent	Paranoid	Confused
Confused	-.169	.141	**.896**
Irritable	.374	**.573**	.028
Boisterous	**.672**	.010	.242
Physically Threatening	**.852**	.096	-.015
Verbally Threatening	**.877**	.228	-.190
Attacking Objects	**.713**	-.018	.005
Impulsivity	.387	.102	**.587**
Unwillingness	.420	**.491**	.119
Sensitivity	.210	**.620**	.247
Attitudes	.134	**.851**	-.170
Hostility	.412	**.619**	-.005
Intoxication	.422	-.108	**.432**
Suspiciousness	.283	**.936**	.194
Agitation	.447	.208	**.408**

Note. Component loadings >.40 are in boldface.

The three component-based scores were positively skewed. Belligerent was very positively skewed *(skew*=4.28, *SE*=.09), followed by Paranoid (*skew*=2.35, *SE*=.09), and Confused (*skew*=1.52, SE=.09). Neither a square root or log 10 transformation resulted in a normal distribution; Belligerent, *skew*=3.25, *SE*=.09; Paranoid, *skew*=1.53 *SE*=.09; Confused, *skew*=.93, *SE*=.09. Although the skew for Confused was close to 1, the Q-Q plot still indicated substantial deviation from normality. Therefore, Spearman rank order correlations were calculated. The correlations between the three principal components generated from the principal component analysis and the original summary risk judgment variable (*Low*; *Moderate; High*) were conducted. The set of ranks for all three components had statistically significant moderate to large positive correlations with the set of ranks for the summary risk judgment, (Belligerent, $r_{rho}(692)=.45$, $p<.001$; Paranoid, $r_{rho}(692)=.57$, $p<.001$, and Confused, $r_{rho}(692)=.40$, $p<.001$).

8.3.3. Logistic Regression

A logistic regression was conducted to determine whether the three principal components would predict the summary risk judgment. In the case of dichotomous outcomes, the S-shaped function of logistic regression more accurately models the data than ordinary least squares regression (Cohen, Cohen, West, & Aiken, 2003).

Both Tolerance values and Variance Inflation Factor values were within limits (above .10 and less than 10, respectively). The predictors were entered simultaneously into Block 1 of the model.

Regression results indicated the model was significant and reliably classified summary risk judgments, -2 Log Likelihood=488.57, NagelkerkeR^2=.52, χ^2(4, *n*=688)=298.63, *p*<.001. The model correctly classified 86% of the cases. All three components statistically significantly predicted the summary risk judgments. The odds of those individuals being in the *Moderate/High* group were multiplied by 3.77 (95% CI = 1.87-7.61, *p*<.001) for each additional step on Belligerent; the odds of being in the *Moderate/High* group were multiplied by 2.62, 95% CI[2.05-3.36], *p*<.001), for each additional step on Paranoid; and the odds of being in the Moderate/High group were multiplied by 1.51, 95% CI[1.17-1.94], *p*<.001 for each additional step on Confused; refer to Table 8.7.

In summary, all of the items on the IPVST had statistically significant moderate to large correlations with the dichotomous summary risk judgment. The mean total score on the IPVST was significantly higher for those rated as *High Risk* as compared to participants rated as *Low* or *Moderate Risk*. The mean total score was also significantly higher for those rated as *Moderate Risk* as compared to participants rated as *Low Risk*. There was no significant difference between participants rated as *Moderate Risk* as compared to those rated as *High Risk*. Three principal components were retained (Belligerent, Paranoid, and Confused) and all three were predictive of the dichotomous summary risk judgments.

Table 8.7. Logistic Regression Coefficients for Predictors of the Summary Risk Judgments (Low vs. Moderate/High).

Independent Variables (n=688)	B	Wald	df	OR	95% CI Lower	95% CI Upper	p
Violence in Emerge	2.60	13.32	1	13.41	3.33	54.05	.000
V-Code	1.37	26.34	1	3.92	2.33	6.60	.000
Belligerent	1.33	13.71	1	3.77	1.87	7.61	.000
Paranoid	.96	57.62	1	2.62	2.05	3.36	.000
Confused	.41	10.02	1	1.51	1.17	1.94	.002

8.4. Research Question 3

3) Will there be an association between the PTN suggested management strategies and the summary risk judgments (i.e., *Low, Moderate,* and *High*) and between the implemented strategies on the unit and the summary risk judgments?

Those participants judged to be *Low Risk* will have the least number of suggested management strategies present, and those participants judged to be *High Risk* will have the most suggested management strategies present. The number of suggested management strategies will predict the summary risk judgments. The summary risk judgments and the implemented management strategies were completed at different points in the study by different nurses. There will be either no relationship or a small relationship between the summary risk ratings and the implemented management strategies such that those participants judged to be *Low Risk* will have the least number of implemented strategies present, and those participants judged to be *High Risk* will have the most implemented strategies present.

8.4.1. Risk Management and Summary Risk Judgments

The relationship between the number of suggested risk management strategies[2] and the summary risk judgment was statistically significant, $F_w(2, 134.15)=225.49$, $p<.001$. The Games-Howell post hoc comparison of the three groups indicated that participants who were rated by the PTNs as being *High Risk* had a significantly higher mean number of suggested management strategies (M=5.71, SD=1.82) than participants who were rated as *Low Risk* (M=1.53 SD=1.29, p<.001, Cohen's d=2.65). Participants who were rated as *Moderate Risk* (M=3.41 SD=1.54) had a significantly higher mean number of suggested management strategies than participants who were rated as *Low Risk* (M=1.53 SD=1.29, $p<.001$, Cohen's d=1.32). Lastly, participants who were rated as *Moderate Risk* (M=3.41 SD=1.54) had a significantly lower mean number of suggested management strategies than participants who were rated as *High Risk* (M=5.71 SD=1.82, $p<.001$, Cohen's d=1.36). The posthoc comparisons were still significant after correcting for family-wise error using Dunn-Bonferroni (.05/3=.017).

The relationship between the transformed mean number of implemented management strategies and the summary risk judgment was statistically significant, $F(2, 199)=14.98$, $p<.001$, $\omega^2=.13$. Participants who were rated as *High Risk* (M=.64, SD=.50) had a significantly higher mean number of implemented management strategies than the *Low Risk* group (M=.31, SD=.43). Participants who were rated as *High Risk* (M=.64, SD=.50) did not have a significantly higher mean number of implemented management strategies than the *Moderate Risk* group (M=.68, SD=.47). Participants who were rated as *Low Risk* (M=.31, SD=.43) had a significantly lower mean number of implemented management strategies than the *Moderate Risk* group (M=.68, SD=.47) and the *High Risk* group (M=.64, SD=.50).

8.4.2. Logistic Regression

A logistic regression was conducted to determine whether the suggested number

[2] The risk management strategies variable was positively skewed despite various transformations. The transformed variable was used in earlier studies, but I opted to use a nonparametric test with the original management variable to address this research question.

of management strategies and the implemented management strategies would predict the summary risk judgment. Both Tolerance values and Variance Inflation Factor values were within limits (above .10 and less than 10, respectively).

On Block 1 the suggested management strategies and the categorical covariates (violence in the ED and V-code status) were entered. This Block was significant, -2 Log Likelihood=155.16, Nagelkerke R^2=.58, and, $\chi^2(3, n=200)=111.43$, $p<.001$). The model correctly classified 84% of the cases. The total number of suggested management strategies was a statistically significant predictor of the summary risk judgments, B=1.13, $p<.001$. The odds of those individuals being in the Moderate/High group were multiplied by 3.10, 95% CI [2.12-4.53] for each additional suggested management strategy.

The final model with the implemented interventions was also significant, -2 Log Likelihood=144.81, NagelkerkeR^2=.62, and, $\chi^2(4, n=200)=121.77$, $p<.001$). The model correctly classified 85% of the cases. The total number of suggested management strategies was still a statistically significant predictor of the summary risk judgments, B=1.15, $p<.001$. The total number of implemented management strategies was also a statistically significant predictor of the summary risk judgments, B=.07, $p<.004$. The odds of those individuals being in the Moderate/High group were multiplied by 1.07, 95% CI [1.02-1.12] for each additional implemented management strategy.

Table 8.8. Logistic Regression Coefficients for Predictors of Summary Risk Judgments (Block 1 and Final Model).

Block 1					95% CI		
Independent Variables	**B**	**Wald**	**df**	**OR**	**Upper**	**Lower**	**p**
Violence in Emergency	.95	.63	1	2.55	.25	26.72	.430
V-Code Status	.56	1.45	1	1.75	.70	4.35	.228
PTN Suggested Management Strategies	1.13	33.93	1	3.10	2.12	4.53	.000
Final Model							
Violence in Emergency	1.12	.90	1	3.07	.30	30.99	.340
V-Code Status	.26	.29	1	1.30	.50	3.41	.590

Final Model	B	Wald	df	OR	Upper	Lower	p
PTN Suggested Management Strategies	1.15	33.97	1	3.17	2.15	4.67	.000
Implemented interventions	.07	8.18	1	1.07	1.02	1.12	.004

8.5. Research Question 4

4) Will there be consistency across PTNs with respect to their summary risk judgments of similar clusters of patients?

Hypothesis: The PTNs will rate the risk of violence for similar patients (e.g., based on the presence of the same pattern of risk factors) consistently. In other words, all five PTNs will give the same or similar (e.g., *Low* or *Moderate*; *Moderate* or *High*) risk judgment to a group of patients with the same constellation of risk factors present on the IPVST.

8.5.1. Cluster Analysis and PTN Consistency

Cluster analysis was used to group participants into different clusters based on similar items on the 15 IPVST risk factors (the clustering variables). As explained in the Statistical Analysis section, a chi-square was calculated to determine risk factor membership for each cluster. The two clusters with the majority of participants rated by the PTN as having the risk factor were compared (see Table 8.9 for chi-square analyses). This analysis was not conducted for Unwillingness to Follow Directions because it was equally present in two different clusters.

Table 8.9. Chi-square Analyses to Determine Cluster Membership.

IPVST items	Cluster 2 (n)	Cluster 3 (n)	Cluster 4 (n)	Cluster 5 (n)	χ^2	*p* value
Confused	70			26	9.70	.002
Irritable		50		42	13.30	.000
Boisterousness		14		23	17.10	.000

IPVST items	Cluster 2 (n)	Cluster 3 (n)	Cluster 4 (n)	Cluster 5 (n)	χ^2	*p* value
Verbally Threatening		7		21	25.50	.001
Physically Threatening		9		15	10.26	.001
Attacking Objects		4		5	1.98	.159
Impulsivity		62		43	16.26	.000
Unwilling		32		32	-	-
Sensitivity		13		30	33.69	.000
Angered		5		18	23.53	.000
Negative Attitudes		25		26	9.70	.002
Hostility		32		36	19.08	.000
Current Intoxication			32	22	35.24	.000
Suspiciousness		25		22	4.91	.027
Agitation		56		47	30.39	.000

Note.*n* for all comparisons was 209. Unwilling=Unwillingness to Follow Direction; Sensitivity=Sensitivity to Perceived Provocation; Angered=Easily Angered when Requests are Denied.

The final membership of each risk factor for the five clusters is presented in Table 8.10. If a risk factor was equally split between two clusters (i.e., a nonsignificant chi-square), it was placed in both clusters. For example, Attacking Objects was present in Cluster 3 and in Cluster 5 and the chi-square was not significant, so it was assigned to both clusters.

Table 8.10. Graphical display of distribution of the IPVST risk factors amongst the five clusters.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
	n=368/53%	*n*=131/19%	*n*=105/15%	*n*=39/6%	*n*=54/8%
	IPVST *M*=0	IPVST *M*=1.97	IPVST *M*=2.64	IPVST *M*=1.41	IPVST *M*=7.56
Confused	-	X			
Irritable	-		X		
Boisterousness	-				X
Physically Threatening	-				X
Verbally Threatening	-				X
Attack Objects	-				X
Impulsive	-	X			
Unwillingness	-		X		X
Sensitivity	-				X
Angered	-				X
Negative Attitudes	-		X		X
Hostility	-		X		X
Intoxication	-			X	
Suspiciousness	-		X		
Agitation	-	X			

Note. Unwilling=Unwillingness to Follow Direction; Sensitivity=Sensitivity to Perceived Provocation; Angered=Easily Angered when Requests are Denied.

The following five clusters were identified in this data:

- Cluster 1 – No Observations- this cluster included individuals with no observed items from the IPVST;
- Cluster 2 – Disoriented – this cluster comprised participants with confusion, impulsivity, and agitation;
- Cluster 3 – Hostile – this cluster comprised participants who were hostile, irritable, uncooperative, and suspicious;
- Cluster 4 – Intoxicated – this cluster comprised intoxicated participants; and,
- Cluster 5 – Confrontational – this cluster comprised participants who were similar to Cluster 3 (hostile, suspicious, and uncooperative) and who had acted out aggressively.

The PTNs' summary risk judgments for each cluster were compared. This

analysis would not be impacted by the skewed distribution of the summary risk rating so the three level summary risk judgment variable was used (*Low*, *Moderate*, and *High*). The percentage of each cluster that was rated *Low*, *Moderate*, or *High* by the PTNs is displayed in Table 8.11.

Table 8.11. The percentage of individuals in the five clusters that was rated as *Low*, *Moderate*, and *High* by the PTNs.

Summary Risk Judgments	No Observations	Disoriented	Hostile	Intoxicated	Confrontational
	%	%	%	%	%
Low	93	75	30	79	11
Moderate	3	21	48	16	37
High	4	4	22	5	52

If the clusters are compared to the dichotomous summary risk judgment (*Low* vs. *Moderate/High*) then clusters No Observations, Disoriented, and Intoxicated were rated as *Low Risk* and clusters Hostile and Confrontational were rated as *Moderate/High Risk*.

Each participant was given a summary risk rating by one of the five PTNs and then each participant was grouped into one of the five clusters. The post-hoc summary risk judgment for each cluster by each rater was derived using a procedure laid out in the Statistical Analysis section. There appeared to be consistency amongst the PTNs regarding the summary risk judgments, with the exception of Rater 4, who appeared to be rating participants lower than the other raters (see Table 8.12).

Table 8.12. Clusters via Raters and Summary Risk Judgments.

Raters	No Observations	Disoriented	Hostile	Intoxicated	Confrontational
Rater 1	Low	Low	Moderate/High	Low/Moderate	High
Rater 2	Low	Low	Moderate	Low	High
Rater 3	Low	Low	Low/Moderate	Low/Moderate	-
Rater 4	Low	Low	Low	Low/Moderate	Low/Moderate
Rater 5	Low	Low	Low/Moderate	Low	Moderate/High

Lastly, it was of interest to determine if the clusters differed based on participant demographic information: sex, V-code status, and age. As No Observations did not have

any risk factors present, it was excluded from these analyses. Chi-square analyses indicated that there was a statistically significant association between the clusters and participants' sex, $\chi^2(3, n=328)=9.60$, $p=.022$, *Cramer's V*=.17 and between the clusters and V-code, $\chi^2(3, n=328)=12.61$, $p=.006$, *Cramer's V*=.20. There were significantly more females than expected in Disoriented and more males than expected in Confrontational, $\chi^2(1, n=185)=9.49$, $p=.002$, *Cramer's V*=.23. There were significantly more females than expected in Hostile and significantly more males than expected in Confrontational, $\chi^2(1, n=159)=6.06$, $p=.014$, *Cramer's V*=.20. Both comparisons are still significant after a Dunn-Bonferroni correction (.05/2=.025).

For V-code status, there were significantly more V-codes in Hostile than in Disoriented, $\chi^2(1, n=234)=8.31$, $p=.004$, *Cramer's V*=.19. There were significantly more V-codes in Disoriented than in Confrontational, $\chi^2(1, n=183)=5.82$, $p=.016$, *Cramer's V*=.18. There were significantly more V-codes in Hostile than in Intoxicated, $\chi^2(1, n=143)=5.02$, $p=.025$, *Cramer's V*=.19. There were significantly more V-codes in Confrontational than in Intoxicated, $\chi^2(1, n=92)=4.24$, $p=.039$, *Cramer's V*=.22. Only the association between Hostile and Disoriented remains significant after a Dunn-Bonferroni correction (.05/4=.0125).

In summary, five clusters were specified for the cluster analysis. The five clusters were identified as No Observations, Disoriented, Hostile, Intoxicated, and Confrontational. No Observations, Disoriented and Intoxicated had mostly *Low Risk* individuals, Hostile had mostly *Moderate Risk* individuals and Confrontational had mostly *High Risk* individuals. The post-hoc PTN summary risk rating for the five clusters suggested consistency between 4 of 5 PTNs. The fifth PTN appeared to be rating participants lower than the other raters.

8.6. Research Question 5

5) Will the PTNs' judgments of the IPVST items, suggested management strategies, and summary risk judgments (i.e., *Low, Moderate*, and *High*) be related to violence on the inpatient ward?

Hypothesis: The total score of the IPVST, number of suggested management strategies, and the summary risk judgments will be predictive of violence on the inpatient ward. The SPJ judgment will add incremental validity to the total score of the IPVST. The relationship between the items and judgments with the outcome will be mediated by interventions implemented on the inpatient ward.

The relationship between the items on the IPVST and the presence or absence of aggression was investigated with chi-square and phi correlations to help facilitate comparisons to previous studies using the BVC (see Table 8.13 below.). Verbally Threatening, Unwillingness to Follow Directions, Negative Attitudes, and Hostility had small to moderate statistically significant positive relationships with aggression $\phi(205)= .18$, $p = .012$; $\phi(205)= .18$, $p = .009$; $\phi(205) = .31$, $p<.001$; and $\phi(205)= .17$, $p = .013$, respectively.

Table 8.13. Chi-square Analyses for the IPVST Items and Aggression.

	Violent		Not Violent				
IPVST items	Yes	No	Yes	No	χ^2	Phi	*p* value
Confused	7 (16%)	38 (84%)	42 (26%)	120 (74%)	2.10	-.101	.148
Irritable	13 (29%)	32 (71%)	27 (17%)	135 (83%)	3.38	.128	.066
Boisterousness	5 (11%)	40 (89%)	11 (7%)	151 (93%)	.922	.067	.337
Verbally Threatening	5 (11%)	40 (89%)	4 (3%)	158 (98%)	6.32	.175	.012*
Physically Threatening	2 (4%)	43 (96%)	6 (4%)	156 (96%)	.052	.016	.820
Attacking Objects	2 (4%)	43 (96%)	6 (4%)	156 (96%)	.052	.016	.820
Impulsivity	10 (22%)	35 (78%)	26 (16%	136 (84%)	.93	.067	.334
Unwilling	12 (27%)	33 (73%)	18 (11%)	144 (89%)	6.88	.182	.009*
Sensitivity	7 (16%)	38 (84%)	15 (9%)	147 (91%)	1.47	.084	.225
Angered	4 (9%)	41 (91%)	4 (3%)	158 (98%)	3.91	.137	.048*
Negative Attitudes	13 (29%)	32 (17%)	9 (6%)	153 (94%)	20.17	.312	.000*
Hostility	12 (27%)	33 (73%)	19 (12%)	143 (88%)	6.17	.173	.013*
Current Intoxication	5 (11%)	40 (89%)	15 (9%)	147 (91%)	.138	.026	.710
Suspiciousness	10 (22%)	35 (78%)	20 (12%)	142 (88%)	2.77	.116	.096

Note.*n* for all comparisons was 209. Unwilling=Unwillingness to Follow Direction; Sensitivity=Sensitivity to Perceived Provocation; Angered=Easily Angered when Requests are Denied.

A Mann Whitney U test was conducted to evaluate the hypothesis that aggressive individuals will have higher scores, on average, on each of the three principal components. As detailed above, Belligerent, Confused, and Paranoid are not normally distributed and thus warranted the use of a nonparametric test. The results for Belligerent and Confused were not significant (z=-1.07, p=.29 and z=-.37, p=.71 respectively). Aggressive participants had a higher average rank on Paranoid ($rank_{avg}$=127.23) than nonaggressive participants ($rank_{avg}$ =101.80), z=-2.95, p= .003.

The IPVST summary risk judgments and aggression were compared using a chi-square analysis. There were significantly more aggressive participants in the *Moderate/High Risk* category than in the *Low Risk* category, $\chi^2(1, n=207)=10.42$, p=.001, ϕ=.22. To determine whether the IPVST was predictive of aggression and if the summary risk judgments added incremental validity to the IPVST total score, a logistic regression was calculated with the principal components and summary risk judgments as the predictors and aggression as the criterion. Of the three principal components, however, only Paranoid demonstrated a significant relationship with aggression, so only it was entered into the logistic regression. In addition, the variable that captured whether the participant was violent in the Emergency Department and the dichotomized V-code status were entered as covariates because the presence of either of these situations could lead to a higher risk rating by the PTNs.

Both Tolerance values and Variance Inflation Factor values were within limits (above .10 and less than 10, respectively). Violence in the Emergency Department and Paranoid were entered into Block 1 and the dichotomous summary risk judgment was entered into Block 2 of the model.

For Block 1, results indicated the model was significant and reliably classified regression, -2 Log Likelihood=195.06, NagelkerkeR^2=.13, $\chi^2(3, n=206)=18.63$, p< .001). The model correctly classified 80% of the cases. In Block 1, V-code status was a statistically significant predictor of aggression (B=1.09, p=.003) as well as Paranoid, B=.28, p=.017. Block 2 was also significant and reliably classified aggression, -2 Log

Likelihood=193.32, NagelkerkeR^2=.15, $\chi^2(4,n=206)=20.38$, $p< .001$), but the change to Block 2 was not significant, $\chi^2(3,n=206) = 1.74$, $p=.187$). V-code status was a statistically significant predictor, $B=.98$, $p=.010$. Neither Paranoid nor the summary risk judgments were statistically significant predictors of aggression. Instead, the combination of both variables significantly predicted aggression, but V-code status was the strongest predictor, as indicated by the statistically significant relationship with aggression and the large odd ratio of 2.68 (Table 8.14).

Table 8.14. Logistic Regression Coefficients for Predictors of Aggression (Final Model).

Independent Variables	*B*	Wald	df	OR	95% CI		*p*
					Lower	Upper	
Violence in Emergency	-.30	.24	1	.74	.22	2.51	.627
V-code Status	.98	6.70	1	2.68	1.27	5.64	.010
Paranoid	.19	2.18	1	1.21	.94	1.56	.140
Summary Risk Judgment	.29	1.77	1	1.34	.87	2.07	.184

Note. OR=Odds Ratio

It was hypothesized, however, that the relationship between the IPVST items and the summary risk judgments and aggression could be mediated by interventions implemented on the inpatient ward. Documented interventions on the ward were PRN medication, chemical restraints, seclusion/physical restraints, and the presence of security. A mediation model was tested. The dichotomized Violence in the ED and the dichotomized V-code status continued to be entered as covariates in the models because this information may have been weighed more heavily by the PTNs than the items on the IPVST when making the SPJ risk judgment. Several models for calculating mediation have been developed, but for the purpose of my research, as well as to be consistent with other research in the field, the Baron and Kenny steps were followed for this study. The steps as proposed by Baron and Kenny (1986) resulted in six logistic regression models:

(1) Demonstrate that Paranoid and the summary risk judgments are associated with aggression. This was demonstrated above with a significant chi square test; however, Baron and Kenny also recommend regressing aggression on each predictor. Regression results indicated the model was significant and reliably classified aggression, -2 Log Likelihood = 206.52, Nagelkerke R^2=.07, χ^2(3, *n*=207)=10.25, *p*=006. The model correctly classified 78.3% of the cases. Similarly, for the summary risk judgments, the model was significant and reliably classified aggression, -2 Log Likelihood = 206.53, NagelkerkeR^2=.07, χ^2(3, *n*=207)=10.24, *p*=006). The model also correctly classified 78.3% of the cases.

(2) Demonstrate that Paranoid and the summary risk judgments are correlated with intervention. The linear regression regressing intervention on Paranoid violated assumptions. The normal Q-Q plot and the plot of standardized residuals to the predicted values of the DV displayed violations of normality and homoscedasticity. Instead, logistic regression models were calculated with dichotomized intervention variables for chemical restraint, PRN, Seclusion/Restraint, and Security. Instead of regressing each intervention on Paranoid, first point bi-serial correlations were calculated with the transformed Paranoid variable and the dichotomized intervention variables. There was a moderate positive association between Paranoid and whether a participant was secluded or restrained, ρ(200)=.34, p<.001 and a small positive association between Paranoid and whether security was called to the unit, ρ(200)=.18, p<.011. Regression results indicated the model with seclusion/restraint was significant and reliably classified Paranoid, -2 Log Likelihood=160.39, Nagelkerke R^2=.15, χ^2(1, n=202)=19.48, *p*=.001. The model classified 84% of the cases. Regression results indicated the model with security included was significant and reliably classified Paranoid, -2 Log Likelihood=141.17, Nagelkerke R^2=.06, χ^2(1, n=202)=6.11, *p*=.013. The model classified 88% of the cases. See Table 8.15 for information on the individual predictors.

Table 8.15. Logistic Regressions for Paranoid and Summary Risk Judgements and Interventions.

Independent Variables					95% CI		
Paranoid	**B**	**Wald**	**df**	**OR**	**Upper**	**Lower**	**p**
Seclusion/Restraint	.50	19.02	1	1.65	1.32	2.07	.000
Security	.32	6.67	1	1.37	1.08	1.74	.010
Summary Risk Judgments							
Seclusion/Restraint	1.08	19.32	1	2.95	1.82	4.79	.000
Security	1.22	18.61	1	3.38	1.94	5.87	.000

Note. OR=Odds Ratio

A logistic regression model was also calculated to regress the interventions on aggression. Again, the normal Q-Q plot and the plot of standardized residuals to the predicted values of the DV displayed violations of normality and homoscedasticity. Instead, logistic regression models were calculated with dichotomized intervention variables for seclusion/restraint, and security. Regression results indicated the model with seclusion/restraint was significant and reliably classified the summary risk judgments, -2 Log Likelihood=159.71, Nagelkerke R^2=.16, χ^2(1, n=202)=19.32, p<.001. The model classified 84% of the cases. Regression results indicated the model with security included was significant and reliably classified the summary risk judgments, -2 Log Likelihood=127.36, Nagelkerke R^2=.18, χ^2(1, n=202)=19.92, p<.001. The model classified 88% of the cases. See Table 8.15 for information on the individual predictors.

(3) Prove that intervention impacts aggression. Four mediation models were tested: two for Paranoid and two for the summary risk judgments.

Model 1. Regression results indicated the model predicting aggression with Paranoid and seclusion/restraint as IVs was significant and reliably classified aggression, -2 Log Likelihood = 185.86, Nagelkerke R^2=.14, χ^2(4, n=199)=19.25, p=<.001. The model classified 80% of cases. There was, however, no mediation as Paranoid was still a significant predictor of aggression (there was not a significant drop in the odds ratio) and seclusion/restraint was not a significant predictor of aggression (see Table 8.16 for values).

Model 2. Regression results indicated the model predicting aggression with Paranoid and security as IVs was significant and reliably classified aggression, -2 Log Likelihood=186.05, Nagelkerke R^2=.14, χ^2(4, *n*=199)=19.06, *p*=.001. The model classified 80% of cases. Similarly, there was no mediation as Paranoid was still a significant predictor of aggression (there was not a significant drop in the odds ratio) and security was not a significant predictor of aggression (see Table 8.16 for values).

Model 3. For the summary risk judgments, regression results indicated the model with seclusion/restraint was significant and reliably classified aggression, -2 Log Likelihood=186.81, Nagelkerke R^2=.14, χ^2(4, n=199)=18.30, *p*=.001). The model correctly classified 78% of the cases. Similarly, there was no mediation as the seclusion/restraint was not a predictor of aggression (see Table 8.16 for values).

Model 4. The model with security was significant and reliably classified aggression, -2 Log Likelihood=187.35, Nagelkerke R^2=.13, χ^2(4, n=199)=17.76, *p*=.001). The model correctly classified 78% of the cases. Similarly, there was no mediation as the seclusion/restraint was not a predictor of aggression (see Table 8.16 for values).

Table 8.16. Mediators of the Relationship between the IPVST and Aggression.

Model 1					**95% CI**		
Independent Variables	**B**	**Wald**	**df**	**OR**	**Upper**	**Lower**	**p**
Violence in Emergency	-.11	.03	1	.89	.26	3.09	.859
V-Code Status	1.10	8.29	1	3.01	1.42	6.37	.004
Paranoid	.24	3.87	1	1.28	1.00	1.63	.049
Seclusion/Restraint	.40	.76	1	1.49	.61	3.69	.384
Model 2							
Violence in Emergency	-.15	.06	1	.86	.25	3.00	.82
V-Code Status	1.06	7.24	1	2.90	1.34	6.29	.007
Paranoid	.27	4.96	1	1.30	1.03	1.65	.026
Security	.39	.56	1	1.48	.53	4.09	.455
Model 3							
Violence in Emergency	-.11	.03	1	.89	.26	3.09	.859

V-Code Status	1.03	7.06	1	2.81	1.31	6.01	.008
Summary Risk Judgments	.36	2.92	1	1.43	.95	2.16	.088
Seclusion/Restraint	.42	.85	1	1.53	.62	3.74	.356
Model 4							
Violence in Emergency	-.14	.05	1	.87	.26	2.88	.819
V-Code Status	1.02	6.55	1	2.76	1.27	6.01	.010
Summary Risk Judgments	.39	3.59	1	1.48	.99	2.21	.058
Security	.29	.30	1	1.33	.48	3.69	.581

Note. OR=Odds Ratio

In summary, Verbally Threatening, Unwillingness to Follow Directions, Negative Attitudes, and Hostility had small to moderate statistically significant positive relationships with aggression. Aggressive participants had a higher average rank on Paranoid than nonaggressive participants; there was no significant difference between the average rank on Belligerent and Confused for aggressive and nonaggressive participants. There were significantly more aggressive participants in the *Moderate/High Risk* category than in the *Low Risk* category. Paranoid did significantly predict aggression when controlling for V-code status and violence in the ER. The SPJ rating, however, did not add incremental validity to the prediction of aggression beyond Paranoid and V-code status; instead the combination of Paranoid and the SPJ rating predicted aggression along with V-code status. A mediation model was tested to determine if interventions on the unit would mediate the relationship between the SPJ rating and aggression. There was no mediation because the intervention variable did not predict aggression.

8.7. Results for Research Question 6

6) Which individual measure (BVC, DASA, VSC, VSC-R, IPVST), including the summary risk judgments for each measure, will be the most predictive of aggression on the inpatient ward?

Hypothesis: The IPVST summary risk judgments will have the strongest

predictive relationship followed by the IPVST total score and then the BVC, the DASA and the VSC and VSC-R. In addition, time will impact the relationship between the total score and summary risk judgments with violence. A longer inpatient stay will be associated with more treatment and a decline in total scores on SPJ risk assessments over time (e.g., Belfrage & Douglas, 2002). Therefore, the longer a patient is on the unit, the poorer the predictive ability of all of the measures due to intervening factors between the initial assessment and violence on the unit.

The IPVST was analyzed in Research Question 5 above. As described in the Statistical Analysis section, a Mann Whitney U analysis was conducted to compare the means of the BVC and DASA between the aggressive and not aggressive groups. Aggressive participants had a higher average rank on the DASA-IV (M_{rank}=123.83) than nonaggressive participants (M_{rank}=98.49), z=-2.95, p = .003. The result for the BVC was not significant, z=-.92, p=.359. For the independent t-test, the aggressive participants had a higher mean total score on the VSC (M=2.25, SE=1.30) than in the not aggressive group (M=1.60, SE=1.16), t(202)=-3.21, p=.002. The VSC-R had the same result: the mean total score was significantly higher in the aggressive group (M=2.09, SE=1.35) than in the not aggressive group (M=1.40, SE=1.12), t(205)=-3.49, p=.001.

A ROC analysis was used to evaluate the predictive validity of the IPVST, the BVC, the DASA, and the VSC measures (Table 8.17). For the IPVST, the three component scores were used as predictors of aggression in place of the total score. Paranoid, the DASA, the VSC, and the VSC-R were all significant predictors of aggression with AUCs in the moderate range (AUC = .65, .62, .65, and .65 respectively). The BVC and the other two principal components were not predictive of aggression.

Table 8.17. Predictive Validity of Measures

	Aggression (n=207)*	
Risk Scheme	**AUC(SE)**	**95% CI**
IPVST		
Belligerent	.54 (.03)	.47-.61
Paranoid	.63 (.04)*	.56-.72
Confused	.54 (.04)	.47-.61
BVC	.54 (.04)	.47-.61
DASA	.62 (.05)*	.55-.69
VSC	.65 (.05)*	.58-.72
VSC-R	.65 (.05)*	.58-.72

Note. The *n* is 204 for the VSC because marital status was missing for 3 participants. AUC=Area Under the Curve; SE=Standard Error; CI=Confidence intervals; BVC=Brøset Violence Checklist; DASA=Dynamic Appraisal of Situational Aggression; VSC-R=Violence Screening Checklist Revised.

According to the Rice and Harris (2005) method of comparing AUC values to Cohen's d, the DASA-IV's AUC of .62 was equivalent to a Cohen's d value of .44 which is a near-moderate effect size. The AUC for Paranoid, .63 was a moderate effect size (d=.48). Lastly the AUC for the VSC and VSC-R was .65, which is equivalent to a Cohen's d of .55 and thus was a moderate effect size.

Next, the AUCs for the Paranoid Component, the BVC, DASA, VSC-R were compared using the Delong method as described in the Statistical Analysis section. Only the single principal component was chosen because it was the only one predictive of aggression. The VSC was omitted because it had the same AUC as the revised version. The results are displayed in Table 8.18. The significant comparisons were no longer significant after the Bonferronni correction ($p<.017$).

Table 8.18. Comparison of AUCs for Short-term Risk Schemes

Measures	Comparison Measure	Z score	SE	95% CI of SE	P value
Paranoid	BVC*	2.28	.04	.01-.17	.023
	DASA	.74	.01	-.02-.38	.461
	VSC-R	.11	.04	-.08-.09	.912
BVC	DASA*	2.17	.04	.01-.16	.030
	VSC-R*	2.02	.06	.00-.22	.044
DASA	VSC-R	.585	.05	-.07-.13	.559

Note. The * indicates a significant finding at the .05 level. AUC=Area Under the Curve; SE=Standard Error; CI=Confidence intervals; BVC=Brøset Violence Checklist; DASA=Dynamic Appraisal of Situational Aggression; VSC-R=Violence Screening Checklist Revised.

The categorical risk judgments for all measures were also evaluated; these ratings were calculated using cut-off scores provided by the authors (for the actuarial measures) and the SPJ ratings made by the PTNs based on the IPVST framework (see Table 8.19). The AUCs are similar in magnitude to the AUCs for the components and total scores.

Table 8.19. Predictive Ability of the SPJ and Categorical Ratings for Aggression

Measures	AUC (SE)	95% CI
IPVST SPJ Rating	.63(.04)*	.56-.69
BVC Categorical Rating	.53(.04)	.44-.61
DASA Categorical Rating	.61(.04)*	.54-.68
VSC Categorical Rating	.64(.04)*	.57-.71
VSC-R Categorical Rating	.64(.04)*	.57-.70

Note. The * indicates a significant finding at the .05 level before the Family-wise Error Correction. SE=Standard Error; CI=Confidence intervals; IPVST= Inpatient Violence Screening Tool; SPJ=Structured Professional Judgment; Categorical=Low, Moderate, High ratings derived actuarially; BVC=Brøset Violence Checklist; DASA=Dynamic Appraisal of Situational Aggression; VSC-R=Violence Screening Checklist Revised.

The AUCs for the categorical rating were in the same range as the AUCs for the total scores. The AUCs for the IPVST SPJ rating and the DASA categorical rating were in the near-moderate effect size range, and the AUCs for the VSC and VSC-R were in the moderate effect size range.

Table 8.20. Comparison of the AUCs for the SPJ and Categorical Ratings of the Risk Schemes

Measures	Comparison Measure	Z score	SE	95% CI of SE	P value
IPVST SPJ Rating	BVC Categorical Rating	2.14*	.05	.01-.19	.032
	DASA Categorical Rating	.41	.04	-.06-.09	.685
	VSC-R Categorical Rating	.28	.04	-.06-.08	.776
BVC Categorical Rating	DASA Categorical Rating	2.14*	.04	.01-.16	.034
	VSC-R Categorical Rating	2.43*	.05	.02-.20	.015
DASA Categorical Rating	VSC-R Categorical Rating	.59	.04	-.06-.11	.556

Note. The * indicates a significant finding at the .05 level before the Family-wise Error Correction. SE=Standard Error; CI-Confidence intervals; IPVST= Inpatient Violence Screening Tool; SPJ=Structured Professional Judgment; Categorical=Low, Moderate, High ratings derived actuarially; BVC=Brøset Violence Checklist; DASA=Dynamic Appraisal of Situational Aggression; VSC-R=Violence Screening Checklist Revised.

Similarly to the total score AUC comparisons, the significant pair-wise comparisons are no longer significant after the Bonferroni correction except for the comparison between the BVC categorical rating and the VSC-R categorical rating ($p < .017$). Next, the sensitivity and specificity for the coordinates of the ROC curves for each SPJ and categorical rating above were calculated. The 95% confidence intervals for the sensitivity and specificity are also included in Table 8.21 below.

Table 8.21. Sensitivity and Specificity of the SPJ and Categorical Ratings of the Measures

	Sensitivity	95% CI	Specificity	95% CI
IPVST SPJ Rating				
Low vs. Moderate/High	.58	.42-.72	.69	.61-.76
Low/Moderate vs. High	.20	.10-.35	.88	.82-.92
BVC Categorical Rating				
Low vs. Moderate/High	.44	.30-.60	.61	.53-.69
Low/Moderate vs. High	.04	.05-.15	.96	.91-.98
DASA Categorical Rating				
Low vs. Moderate/High	.51	.36-.66	.69	.61-.76
Low/Moderate vs. High	.20	.10-.35	.92	.87-.96
VSC Categorical Rating				
Low vs. High	.51	.36-.66	.77	.70-.83

	Sensitivity	95% CI	**Specificity**	95% CI
VSC-R Categorical Rating				
Low vs. High	.69	.53-.82	.59	.51-.66

Note. CI-Confidence intervals; SPJ=Structured Professional Judgment; Categorical=Low, Moderate, High ratings derived actuarially; BVC=Brøset Violence Checklist; DASA=Dynamic Appraisal of Situational Aggression; VSC-R=Violence Screening Checklist Revised.

For the IPVST SPJ rating, the *Low Risk* category was accurate in 58% of cases (risk of aggression was low and the individual was not violent) and the *Moderate/High Risk* category was accurate in 69% of cases (risk of aggression was *Moderate/High* and the person was aggressive). The *Low/Moderate Risk* category had lower accuracy, but the *High Risk* category was accurate for 88% of cases (risk of aggression was High and the person was aggressive). In general, the risk judgments had poor sensitivity and specificity for *Low Risk*, but high specificity for *High Risk*.

Next, a Cox proportional hazard regression was conducted to model the relationship between the components of the IPVST, the BVC, the DASA-IV, the VSC, and VSC-R with aggression accounting for the time until either the first aggressive incident or discharge. Although only Belligerent demonstrated a significant relationship with aggression, time was not accounted for in previous models, so all three components were tested in the survival analysis. The Time variable was calculated as the number of days between admission and the first aggressive incident for those who were violent, or time to discharge or 90 days for those who were not. The average time to first aggressive incident was 6.48 days (*SD*=14.40). The average time to discharge was 15.87 days (*SD*=22.41).

Because of the overlap in items between the IPVST, BVC, DASA-IV, and the VSC-R, two different models were calculated -- one for the IPVST alone and one for the BVC, DASA, and VSC-R. Only the VSC-R was included for the same reason. The model for the components of the IPVST was statistically significant, -2 log likelihood=448.92, χ^2(3, n=690)=14.57, *p*=.002. Only Paranoid was a statistically significant predictor, B=.33, SE=.10, Exp(B)=1.40, p=.001, 95% CI=[1.15, 1.70]. For each extra risk factor the odds of being in the aggressive group is 1.40. The model for the BVC, DASA-IV, and VSC-R was statistically significant, -2 log likelihood=438.87, χ^2(3, n=690)=26.92, *p*<.001. All three variables were significant predictors of aggression (see Table 8.22).

Surprisingly, the BVC was inversely related to violence meaning the odds of being in the aggressive group are multiplied by .60 for every step increase on the BVC without the overlapping items.

Table 8.22 Cox Proportional Hazard Models for IPVST, BVC, DASA, and VSC-R

IPVST Model					95% CI		
Independent Variables	B	Wald	df	OR	Upper	Lower	p
Paranoid	.34	11.31	1	1.40	1.15	1.70	.001
Belligerent	-.01	0	1	1.00	.65	1.52	.985
Confused	-.19	1.27	1	.83	.60	1.15	.260
BVC, DASA, VSC-R Model							
BVC	-.52	4.03	1	.60	.36	.99	.045
DASA	.34	4.41	1	1.40	1.02	1.92	.036
VSC-R	.35	6.77	1	1.41	1.09	1.84	.009
Overlap Items	.18	.26	1	1.19	.61	2.32	.607

Note.CI=Confidence intervals; BVC=Brøset Violence Checklist; DASA=Dynamic Appraisal of Situational Aggression; VSC-R=Violence Screening Checklist Revised.

In summary, the average rank on the DASA-IV was significantly higher for aggressive participants than for nonaggressive participants. There was no significant difference between aggressive and nonaggressive participants on the BVC. The mean total score of the VSC and VSC-R was higher for aggressive participants than for nonaggressive participants.

The results of the ROC analysis suggested that the Paranoid principal component, the DASA-IV, the VSC, and the VSC-R had near-moderate and moderate effect sizes. Paranoid, DASA-IV, and the VSC-R had significantly higher AUCs than the BVC, but these differences were no longer significant after a Bonferronni correction. The AUCs for the IPVST SPJ rating, the DASA-IV categorical rating, and the VSC-R categorical rating were significantly higher than the AUC for the BVC categorical rating. After the Bonferronni correction, only the VSC-R categorical rating was significantly higher than the BVC categorical rating.

The sensitivity and specificity of the measures were calculated. In general, the risk judgments had poor sensitivity and specificity for *Low Risk*, but high specificity for *High Risk*. Lastly, a cox proportional hazard model was calculated for the IPVST and for the BVC, DASA-IV, and VSC-R. All of the measures were still predictive of aggression when controlling for time, but the BVC had an inverse relationship with aggression.

Chapter 9. Discussion

Undoubtedly, individuals will continue to meet the dangerousness criteria of the Mental Health Act and be committed involuntarily. Thus, it is not surprising that inpatient aggression toward healthcare staff and other patients is a pervasive problem with serious physical, psychological, and economic costs. Although the risk assessment literature has flourished over the last 20 years and includes specific risk assessment schemes to assess inpatient violence risk, these schemes have a significant disadvantage - they were meant to be completed on the inpatient unit. The Psychiatric ED is the first contact point for mentally ill individuals, so a risk assessment in the ED would allow for a management plan to be suggested, or even implemented, before the individual was admitted to an inpatient unit.

This study examined whether violence risk can be assessed earlier in the admission process, specifically in the ED using the IPVST framework. The IPVST is an amalgamation of short-term risk measures, with additional risk factors culled from the literature, and a summary risk judgment. The IPVST adopts the SPJ decision-making model, which is widely known to predict --- and more importantly manage --- violence (e.g., see Guy et al., 2015 for a review). The ability to identify high-risk patients prior to reaching the unit has significant implications. It will allow the staff to put appropriate management strategies in place to mitigate potential aggression immediately, enhance the treatment milieu for the patient (i.e., avoidance of chemical restraint, physical restraint, seclusion), and prevent the harmful consequences of inpatient aggression. In sum, the current study is the first to use an SPJ risk framework to attempt to predict aggression on an inpatient unit based upon the presence of risk factors identified by nurses in the ED of a large urban hospital.

9.1. Descriptive Analyses

A large consecutive sample of individuals presenting to the largest hospital in the area were assessed for inpatient violence risk using the IPVST framework. Both genders were equally represented and there was ethnic diversity among the participants. There were no significant differences in demographics between those participants who were and were not triaged by the PTNs. The follow-up sample had significantly more participants with a positive V-code (i.e., aggressive in the past) than those who were triaged for the study by the PTNs, but not in the follow-up sample. The study had good ecological validity because the process in the ED remained unchanged; the IPVST was used as an additional framework to capture the PTNs' risk decision-making process, guiding their previously informal clinical judgment regarding the risk of inpatient aggression.

9.1.1. Prevalence of Risk Factors

In general, there was a low prevalence of the IPVST risk factors observed and rated in the ED by the PTNs, especially for Physical Aggression, Verbal Aggression, and Attacking Objects. The prevalence of those three risk behaviours was comparable to the Almvik et al. (2000) study analyzing multiple ratings of the BVC for a single participant. The rates of these three risk factors in a second study of the BVC (Almvik et al., 2007) were higher than in the current study, but the pattern remained the same (i.e., Attacking Objects was the least frequent behaviour observed). Studies on the DASA-IV did not report the prevalence of the individual risk factors, but the total scores were usually positively skewed (e.g., Chu et al., 2013). The methodology of utilizing multiple ratings allowed these other studies to increase the prevalence of identified risk factors. As the BVC and the DASA-IV are completed on the units, the assigned nurse is usually familiar with the patient and is observing and conversing with the patient multiple times per shift. As a result, the inpatient nurse(s) would be in a better position to observe the presence of these risk factors.

Due to the low prevalence of the behaviours on the risk schemes, the mean total scores for the BVC, DASA-IV, and the IPVST were positively skewed. The means were generally lower in this study than what has been reported in the literature for the BVC

and DASA-IV (e.g., Almvik et al., 2000; Ogloff & Daffern, 2006b). The exception is Chu et al. (2013) whereby the mean of the BVC was .41 (SD=1.00). The higher total scores in other studies could be partially explained by: 1) different methodology, 2) different settings, and 3) multiple observers. The BVC and DASA are completed every 24 hours and thus there are multiple ratings for the same individual, sometimes resulting in close to, or more than, 10,000 ratings (e.g., Barry-Walsh et al., 2009). The large volume of ratings allowed for greater variability and a closer approximation to a normal distribution of scores. The percentage of cases with total scores of zero, however, was comparable to past studies of the BVC. The percentage of BVC ratings with a total score of zero was 76% (Almvik et al., 2000), 72% (Abderhalden et al., 2004), and 87% (Abderhalden et al., 2006).

The settings for previous studies of the BVC and DASA-IV were different than the current setting. For example, one potential significant difference would be the country in which the studies took place; BVC studies have mostly been conducted in Europe, DASA-IV studies have mostly been conducted in Australia, and the current study was conducted in Western Canada. The mental health legislation is different, the hospital policies are different, and the training and job roles of nursing staff likely differ as well. Each of these factors could contribute to different patterns of patients admitted to the hospitals under study, the physical environment of the hospitals, and the patient-staff interactions, all of which contribute to patient aggression. The DASA-IV, in addition, was developed for a forensic inpatient sample and the predominant type of setting for the BVC was civil psychiatric, as is the current study. Forensic settings are more restrictive, which can influence prevalence rates of aggression.

Lastly, there was one PTN observing the participant and completing the IPVST in the ED for this study, unless it was an IRR case. In contrast, despite one nurse usually being assigned to a particular patient, there was generally a team approach to risk assessment within an inpatient unit. That is, other nurses or healthcare professionals in the milieu will report back to the primary nurse on any patient who has been aggressive or displaying risk factors. Co-patients will also report intimidating, hostile, or aggressive behaviour to nursing staff. There are multiple observers of the risk factors on an inpatient unit, thereby allowing for more opportunity to rate the risk factor.

Additionally, the percentage of cases rated as *Low*, *Moderate*, and *High Risk* was positively skewed (*Low Risk* = 73%; *Moderate Risk*=17%; and *High Risk*=10%) for the IPVST SPJ rating. This finding is also consistent with summary risk ratings in the literature. For example, research on the BVC using the actuarial equivalent of the SPJ rating provided by the author reported skewed summary risk ratings (e.g., *Low*=76%; *Moderate*=11%; and *High*=2%; Almvik et al., 2007) and for the DASA-IV (e.g., *Low*=72%; *Moderate*=21%; and *High*=6%; Bjorkdahl et al., 2006) as well as other SPJ instruments such as the SARA (Lethal Violence, *Low*=72%; *Moderate*=22%; and *High*=6%; Belfrage & Strand 2008).

The clinical implications are in the ED an assessment of risk by one person may not be sufficient to accurately capture which risk factors were present. Perhaps the first person to have contact with the patient could rate the IPVST framework initially and then the assessment could be added to the patient's chart so that each new care provider could add to the initial assessment. This methodology could help clarify if these risk factors are present in the ED and are just being missed by a single assessor or if the risk factors just are not present or are too hard to assess in the ED. This finding could suggest that an already established risk assessment such as the HCR-20 should be completed on those patients who are voicing homicidal ideation or threats or who have been aggressive in hospital previously. Research has demonstrated that most of the risk factors on the HCR-20 can be rated based on information available and collected in the ED or within 48 hours of admission (McNiel et al., 2003; Seidel & Kilgus, 2014; Smith & White, 2007; Wong, Morgan, Wilkie, & Barbaree, 2012).

9.1.2. Base Rate of Violence

The base rate of violence in the current study was 21% (*n*=45); this is less than the 31% (n=62) base rate of violence on the PAU in 2008 (Watt et al., 2009). This discrepancy is partially explained by the two different methodologies employed. Watt et al. (2009) collected information regarding violent incidents from two different sources: healthcare files and discussions during morning rounds. This study relied upon healthcare files only. Previous inpatient violence research has identified differences between aggression reported on validated outcome forms (e.g., the SOAS-R) in official

databases (i.e., workplace incident tracking systems) and what occurs in reality (e.g., Woods et al., 2008). As such, recording incidents discussed in morning rounds potentially increased the number of incidents that were captured on the outcome form and allowed the researcher to ask directly about aggressive behaviours that may not have been recorded as an adverse incident. In addition, Watt et al. (2009) only included participants from the PAU, whereby in the current study, 83% of participants were admitted to the PAU. The PAU is a more acute ward than the longer-term inpatient units, in which patients are generally more stable and may have appropriate management plans in place. As a result, the base rate of aggression on the longer-term units could be lower than the acute unit. Lastly, there was a time gap between the previous and current study of two to three years. During the intervening time period, it is possible that nursing staff became more efficient at identifying and managing aggressive patients and were able to de-escalate the situation before the patient was aggressive.

It is difficult to compare the base rate of violence in this study with research using the BVC and DASA because those studies were shorter in length (i.e., less time to collect data on incidents) and reported multiple incidents of aggression instead of collapsing across participants (i.e., aggressive or not for the study period). In comparison to base rates of violence for inpatient studies utilizing the HCR-20, there were higher rates of aggression in the HCR-20 studies than the current study (approximately 36%-54%; Arbach-Lucioni et al., 2011; Nicholls, Douglas, & Ogloff, 2004; Wilson, Hart, Webster, & Ross, 2009). Base rates of violence in a forensic inpatient setting using the START were similar to studies of the HCR-20 (53% verbal aggression and 23% physical), which the authors report is a consistent base rate for this population (Desmarais, Nicholls, Wilson, & Brink, 2012). Forensic patients are typically on the units longer than civil psychiatric patients allowing for more time to be aggressive and may result in potentially higher prevalence rates of aggression.

Future studies should collect the outcome data from the nurses at the end of each shift. This can be done by providing education regarding what constitutes aggression or violence and introducing a form such as the OAS or SOAS-R with room for a narrative about the incident. These can be collected at the end of each shift so the nurse who completed the form can be asked for clarification regarding any incident during the shift. This would help ensure that all incidents are being captured as opposed

to only those written in the chart. It will also help to clarify ambiguous situations and allow additional details to be collected for any given incident.

9.1.3. Inter-rater reliability (IRR)

The IPVST framework was reliably rated by the PTNs. The IRR ranged from *fair* (.51) to *substantial* (.78), with the majority of kappa values in the substantial range. Irritability and Agitation had the lowest kappa coefficients for this study. In comparison, the kappa coefficient for the BVC for Irritability was .68 (Almvik et al., 2000), in the substantial range.

As described in an earlier section, the definitions of some of the items in the IPVST framework were similar. This could have resulted in the PTNs having problems differentiating between constructs. For example, differentiating between Irritable and Easily Angered When Requests Are Denied in the span of a 30 minute triage interview was likely difficult for the PTNs. In fact, there was a very high correlation between these two items that led to difficulties with the tetrachoric correlation matrix for the PCA analysis. As another example, Agitation was a term frequently used in the inpatient files to describe a variety of behaviours (e.g., pacing or becoming more demanding at the desk). Although the PTNs were provided a specific definition of Agitation for the purpose of rating this item on the IPVST framework, it is possible that each PTN used his or her own definition based on clinical experience; this would have resulted in a lower kappa value than other items on the IPVST.

The VSC and VSC-R were coded separately from inpatient files after the discharge of the patients. The IRR was in the *substantial* to *almost perfect* range except for Physical Attacks or Fear Inducing Behaviour in the two weeks prior to admission. This information either was not routinely asked by staff at the hospital, it was asked but it was not documented in the file information, or there was vague reference to aggressive incidents prior to admission. Inferences were made by coders of the files for these items. The IRR for the presence of an aggressive incident was .87 in the *almost perfect* range.

9.1.4. Management Strategies

Regarding the implementation of management strategies on the inpatient unit, the number of PRNs and chemical restraints administered in the present study was equivalent to Watt et al. (2009; 88% vs 89%), but seclusion and restraints were recorded significantly less than in the previous study (24% for both vs. 72% seclusion and 62% restraints). Again, this discrepancy could be due a change in policy on the unit in the intervening years between the studies, in an attempt to reduce the number of coercive management strategies.

9.2. The Structured Professional Judgment Framework

Several hypotheses of this study speak to various elements of the SPJ approach to decision-making: In general 1) risk factors are chosen because of demonstrated links to violence in the scientific, theoretical, and professional literature (Hypothesis 3); 2) prevention of aggression stems from addressing identified relevant risk factors at an individual level (Hypothesis 1), and 3) the summary risk judgments are based on the amount of management needed to change those identified risk factors and prevent aggression for a particular individual (Hypotheses 2 and 5; e.g., Guy et al., 2015; Douglas et al., 2013; Douglas et al., 2014).

9.2.1. Risk Factors and Risk Management (Hypothesis 1)

Hypothesis 1: The number of suggested management strategies will increase with an increase in the number of items rated as present on the IPVST. The actual management strategies (implemented by people other than those who conducted the risk assessment measure) that were implemented on the ward will have either no or a small relationship to the presence of the items on the IPVST. A relationship is not expected because the nurses on the unit were unaware of the suggested management strategies in the ED. A small relationship, however, may be present because the implemented strategies on the unit will be in response to immediate symptoms or negative behaviours on the ward in the present moment, some of which will be risk factors on the IPVST (e.g., confusion, agitation).

In the current study, the first part of Hypothesis 1 was supported; there was a statistically significant moderate, positive relationship between the number of items rated as present on the IPVST and the number of suggested management strategies. This result was considered to be a manipulation check for the PTNs, to ensure the management step was not bypassed, that there was understanding of the SPJ model, and that there was reasoning behind the number of strategies suggested to manage the risk of inpatient aggression. Previous research using the SPJ model has identified a relationship between risk factors and suggested management strategies (Belfrage et al., 2010).

The second part of Hypothesis 1 was partially supported; there was a small, positive relationship between the total number of risk management strategies implemented by the unit nurses and the number of items endorsed on the IPVST by the PTNs in the ED. Specifically, there was a statistically significant small, positive relationship between the set of ranks for the IPVST total score and the set of ranks for chemical restraints and the set of ranks for the number of PRNs. There was a statistically significant moderate positive relationship between the set of ranks for the IPVST total score and the set of ranks for the seclusion and physical restraints. The nurses on the inpatient units were unaware of the IPVST risk assessment completed in the ED and would, thus, not have been influenced directly by observed risk factors, the suggested management strategies, or the summary risk judgments. One interpretation of this result is the nurses on the unit were attuned to risk factors for aggression and were managing at risk individuals based on training and general clinical experience. This too, speaks to the SPJ model which seeks to guide clinical judgement through an identified set of risk factors and steps for formulation and management.

As mentioned above, the number of chemical restraints and PRNs administered on the unit had a small positive relationship with the number of items on the IPVST. The use of seclusion/restraint and security, however, had a moderate relationship to the items on the IPVST. The small association for chemical restraints and PRNs underscores that medications are a universal management strategy to treat mental illness and not necessarily specific to the risk of adverse events. Although attempts were made to code only those medications provided for aggression-related behaviours, it was difficult to parse why the medication was being provided and what it was managing. It is

possible that patients who were anxious or medication-seeking were labeled as “agitated” and “irritable” in the chart prompting coding of the medication as a management strategy for those individuals. This situation would lead to an increased number of PRNs administered overall, but not as intended for this study - as PRNs administered for the purpose of specifically managing a potentially aggressive individual. Instead, the nurses would be misattributing nuisance behaviours (e.g., constantly medication seeking at the desk) as risk factors for violence. It also highlights that even if an individual is at risk for aggression or has engaged in inpatient aggression, first and foremost, the individual has a mental disorder and is either voluntary seeking treatment or requires treatment. A PRN given to a participant at Point A for uncontrollable worry, could still be managing a potentially aggressive outburst at Point B due to broad sedation from the PRN.

Lastly, especially for chemical restraints, which are considered a more coercive form of PRN medication, the small relationship with IPVST items could indicate that management was working. That is, the increased number of risk factors present should have prompted or triggered management from the nurses. If the intensity of the management was appropriate, aggression would have been reduced resulting in a small or non-existent correlation. Alternatively, if the relationship was strong between intense management and decreased aggression, a negative correlation would have been the result.

In summary, the PTNs validated the SPJ model vis-a-vis suggesting an increasing number of management strategies to address an increasing number of present risk factors on the IPVST. Despite the implemented strategies being separate from the coding of the IPVST, the nurses were to some degree perceiving and managing patient risk for aggression on the inpatient unit. In practice, providing guidelines of what risk factors to consider in a risk assessment for inpatient aggression does lead to management strategies linked to the risk factors in terms of quantity. Future research should investigate whether management strategies are directly targeting specific risk factors, (e.g., treatment for current intoxication). In addition, nurses could be trained to document all management strategies clearly in the chart to facilitate analyses of risk factors, management, and aggression for future studies.

9.2.2. Risk Factors and Summary Risk Judgments (Hypothesis 2)

Hypothesis 2: Each of the items have demonstrated empirical relationships in the literature with violence and, as such, should have a relationship with the summary risk judgments of future violence on the ward. There will be a significant positive relationship between all of the items on the IPVST and the summary risk judgments. In addition, those participants judged to be *Low Risk* will have the least number of risk factors present and those participants judged to be *High Risk* will have the most risk factors present. Lastly, the items on the IPVST will predict the summary risk judgments such that the presence of the item will predict a higher summary risk judgment.

The first part of Hypothesis 2 was supported; there were statistically significant, positive tetrachoric correlations between all of the items on the IPVST and the dichotomous SPJ rating (*Low* vs. *Moderate/High*). The majority of the effect sizes were in the moderate to large range.

In the SPJ approach, the relevance rating of a risk factor is equally, if not more, important in the determination of management and subsequent level of risk for aggression (Douglas, Hart, Groscup, et al., 2014). Unfortunately, the PTNs did not assign relevance ratings; the feedback provided was that all of the risk factors were relevant in the ED context. To determine the relevance of any risk factor the assessor needs to understand the causal mechanism (i.e., motivator, disinhibitor, destabilizer) of that risk factor requiring time and information for a comprehensive assessment (Douglas, Hart, Webster, et al., 2013). The ED is a very busy and chaotic setting where the goal is to move individuals through the triage process to disposition with the intention to decrease back-log in the ED and provide appropriate services to the public. This means short, succinct triage interviews that allow the PTNs to quickly observe the behaviours on the IPVST, but did not allow for a thorough history that would identify all potential risk factors present or related to previous violence and determine the causal mechanism of these factors.

Individual correlations between the items and the summary risk judgments, however, do provide some information around relevance. In this study, the risk factors of Confusion and Current Intoxication had the smallest correlations with the summary risk

ratings of the IPVST. This indicated that the presence of these risk factors was not as strongly related to the risk category assigned by the PTNs as the other IPVST risk factors. Confusion is a symptom that is common to many different psychiatric disorders and the path to aggression is not as clearly established when compared to other risk factors (e.g., Hostility). For Current Intoxication, information from the PTNs and notes in the patient charts indicated that, at times, an individual would be assessed for violence risk the following day once the intoxication had passed. The PTNs would likely be aware of this general pattern of intoxicated individuals behaving aggressively in the ED, sobering, and then not being aggressive or posing a further risk of aggression when sober. The small correlation for both of these items does not nullify their potential individual relevance; if these factors caused aggression in one person, they would be relevant. At the group level, however, it would seem they were less important in determining risk level.

The most strongly associated risk factors of the IPVST as indicated by the highest correlations with the summary risk rating were Physically Threatening, Unwillingness to Follow Directions, and Hostility. Physically threatening is certainly not surprising, as the literature has demonstrated that a history of previous violence is a strong risk factor for future aggression (e.g., Guy & Wilson, 2007). The importance of this risk factor is in formulating what an individual may do because he or she has shown the potential for aggression in the past. In the context of the ED and a quick snapshot of risk potential using the IPVST framework, it is very appropriate that this risk factor would be so strongly associated with the summary risk judgments. Hostility was a risk factor that was mentioned in previous research on violence (e.g., Flannery et al, 1998; Doyle & Dolan, 2006; McNiel & Binder, 1994), but was not included explicitly on any of the already established short-term risk assessments. Unwillingness to Follow Directions could lead to confrontation between the participants and the staff, leading to escalating negative emotions and aggression. Being unwilling to follow directions, especially on an inpatient unit that relies on rules and directions, places staff in the position of needing to enforce the rules, which also could create conflict between patients and staff. Overall, participants who were unwilling to follow directions could have been perceived as hostile to the PTN resulting in a higher risk categorization.

The second part of Hypothesis 2 was supported; just as the PTNs demonstrated knowledge of the SPJ decision-making approach via risk management, they also rated participants with higher average total scores on the IPVST as higher risk. The mean difference between the *Moderate* and *High Risk* categories was not significant. These results are consistent with previous research validating the SPJ model in other areas of violence risk assessment (e.g., Belfrage & Strand, 2008).

The third part of Hypothesis 2 was partially supported; only one of the principal components statistically significantly predicted aggression. To facilitate regression analyses the items on the IPVST were reduced to three principal components; Belligerent, Paranoid, and Confused. All three components were strong predictors of the summary risk judgments in conjunction with violence in the ED and previous violence. The odds of a participant being categorized as *Moderate/High Risk* on the IPVST was 13 times higher when the participant was violent in the ED. The confidence intervals around that odds ratio, however, were very large indicating measurement error and/or other errors of estimation. Previous Violence and Paranoid were also strong predictors of the *Moderate/High* categorization; The odds of being in the *Moderate/High Risk* group were 3.92 times higher if the participant had a previous violent incident (V-code on file) and 3.77 times higher for each additional risk factor present on the Paranoid principal component (Cohen, 1988). Thus, in practice, although aggressive behaviours appeared to be the most salient to the PTNs when determining risk level, other risk factors were also being considered. These considerations will be discussed in a later section regarding the feasibility of assessing risk in the ED.

9.2.3. Management Strategies and Summary Risk Judgments (Hypothesis 3)

Hypothesis 3: Those participants judged to be *Low Risk* will have the least number of suggested management strategies present, and those participants judged to be *High Risk* will have the most suggested management strategies present. The number of suggested management strategies will predict the summary risk judgments. The summary risk judgments and the implemented management strategies were completed at different points in the study by different nurses. There will be either no relationship or a small relationship between the summary risk ratings and the implemented

management strategies such that those participants judged to be *Low Risk* will have the least number of implemented strategies present, and those participants judged to be *High Risk* will have the most implemented strategies present.

The first part of Hypothesis 3 was supported. According to the SPJ decision-making model, to be successful at preventing aggression there should be a relationship between the intensity of risk management and the summary risk judgment (Kropp et al., 2005). In the current study, the more management strategies that were suggested by the PTNs, the higher the rated risk. Specifically, participants judged to be *Low Risk* had a significantly lower mean number of suggested management strategies than those rated as *Moderate* or *High Risk.* Participants judged to be *Moderate Risk* had a significantly lower mean number of suggested management strategies than those rated as *High Risk.*

The second part of Hypothesis 3 was partially supported. There was a small, statistically significant relationship between the transformed mean number of implemented management strategies and the summary risk judgement. Specifically, participants rated as *High Risk* had a significantly higher mean number of implemented management strategies than the *Low Risk* group. Similarly, participants rated as *Moderate Risk* had a significantly higher mean number of implemented management strategies than the *Low Risk* group. There was not a statistically significant relationship between the *Moderate* and *High Risk* groups.

PTN suggested management strategies also predicted membership in the summary risk judgment categories. The odds of being in the *Moderate/High Risk* group were 3.17 higher for each additional management strategy suggested by the PTNs. This result is consistent with the Need principle in the RNR model (Andrews et al., 1990) and with the violence prevention model (Douglas & Kropp, 2002) of the SPJ approach.

The odds ratio associated with the implemented strategies was smaller than for the suggested management strategies, which was expected since there was not a direct link in the study design between the implemented strategies and the summary risk ratings. This result, however, could reflect appropriate attempts at aggression prevention on the unit. First, there appeared to be consistency between the summary risk ratings of the PTNs in the ED and with implemented management on the units suggesting that the

nurses on the unit were generally accurate in assessing risk. Additionally, risk is dynamic and can be influenced by the setting (ED vs. unit), people (ED staff vs. primary unit nurse), and the other patients (exam room vs. waiting area vs. unit). Participants who were initially appearing as *High Risk* in the ED could be settled and appear as *Low Risk* on the unit or vice versa; this would decrease the relationship between the implemented strategies and previously identified risk level.

The clinical implication of this finding is that the initial presentation in the ED may fluctuate dramatically based on the risk factors present and any management implemented. It re-affirms that risk for inpatient aggression should be reviewed frequently.

9.2.4. Risk Factors, Risk Management, and Aggression (Hypothesis 5)

Hypothesis 4 will be discussed in the PTN Consistency section below.

Hypothesis 5: The total score of the IPVST, number of suggested management strategies, and the summary risk judgments will be predictive of violence on the inpatient ward. The SPJ judgment will add incremental validity to the total score of the IPVST. The relationship between the items and judgments with the outcome will be suppressed by interventions implemented on the inpatient ward.

Hypothesis 5 was partially supported because one of the three principal components predicted aggression, the summary risk judgments *in conjunction* with Paranoid predicted aggression, and the suggested management strategies did not predict aggression. This hypothesis will be broken down into three sections; the IPVST, the summary risk judgments and then risk management.

First the association between the individual items on the IPVST and aggression were investigated and then the relationship between the principal components and aggression. Verbally Threatening, Unwillingness to Follow Direction, Easily Angered When Requests are Denied, Negative Attitudes, and Hostility demonstrated statistically significant associations with aggression. Several of these risk factors were also

predictive of the summary risk ratings and management strategies. Only one of the principal components (Paranoid) had a significantly higher mean rank for aggressive individuals than non-aggressive individuals. Paranoid was a significant predictor of aggression, but once the summary risk ratings were added to the model, only previous violence was a significant predictor. The odds of being in the *Moderate/High Risk* group were 2.68 times higher if there was a history of violence. Similarly, there was a significant association between the summary risk judgments and aggression; there were more aggressive individuals in the *Moderate/High Risk* category than in the *Low Risk* category. The summary risk judgments alone did not add incremental validity; instead the combination of the total score and judgments were predictive of aggression.

Clinical implications of this result focus on nomothetic versus idiographic considerations. At the nomothetic level, the risk factors that comprise Paranoid were the only risk factors that significantly predicted inpatient aggression. The majority of the risk factors were from the DASA-IV; this study does support using the DASA-IV in practice. In the SPJ approach to violence risk decision-making, however, different individuals will have different relevant risk factors present and thus different formulations of risk. Although in this study, 5 of 15 risk factors significantly predicted aggression, this does not mean that the other risk factors are irrelevant or should be discarded. This result could be because of the low prevalence rates of the risk factors, the outcome being aggression instead of violence, or an artefact of particular characteristics of the 45 aggressive individuals in this study. The risk factors on the IPVST framework were chosen because over several studies the risk factors demonstrated statistically significant relationships with aggression and/or violence. This reasoning would also explain why only one of the principal components predicted aggression.

In addition, knowing which risk factors predicted aggression does not tell us how those risk factors were causally related (i.e., motivators, disinhibitors, destabilizers) to aggression for a particular individual. Those risk factors may not be present or not relevant for Patient A. This result underscores why actuarial risk assessment tools fall short in the prevention of aggression – the information is not necessarily useful for understanding risk or preventing aggression for the individual.

With regards to the second section (summary risk judgments) of Hypothesis 5, there were significantly more aggressive participants in the *Moderate/High Risk* category than in the *Low Risk* category. The summary risk judgments, however, did not add incremental validity to Paranoid when predicting aggression. Both Paranoid and the V-code or previous violence status of the participant were significant predictors of aggression. When the summary risk judgment was added to the model, only V-code was a significant predictor and the model was still significant. This does not mean that previous violence is the only information of import when assessing inpatient aggression; it is not a dynamic risk factor that can be changed, but it does tell the assessor what the individual is capable of doing. This result suggests that both the number of relevant risk factors present and the SPJ rating are important when assessing risk. The present and relevant risk factors are used to formulate an individual's risk of violence and the summary risk judgment is important for communicating the priority of an individual case and how much management will be needed to prevent the outcome. Future research should focus on the availability and content of specific information regarding past violence at the hospital. Then, it can be determined how this information may be useful in preventing inpatient aggression.

The third section of Hypothesis 5 (risk management) was not supported; the implemented management strategies or intervention on the unit did not predict aggression. Thus, intervention did not mediate the relationship between the IPVST and aggression or between the summary risk judgment and aggression. The BVC and DASA-IV were developed to predict inpatient aggression during the next shift or up to the next 24 hrs. In this study, the IPVST framework was completed in the ED and there was an average of seven days until the first documented aggressive incident. In the intervening seven days many different interventions could have been implemented that would impact aggression. It was thus hypothesized that the implemented management strategies would suppress the relationship between the IPVST and incidents of inpatient aggression. Unfortunately, seclusion/restraints and security were not significant predictors of aggression and thus there was no mediation. Seclusion/restraint and security are high intensity management strategies that would have been implemented in cases where individuals were unable to control their behaviours and/or emotions. For the mediation analysis, only those management strategies that were implemented before an

aggressive incident were included in the analysis. There were times, however, when the more intense strategies were used as precautions. For example, security was called to attend the unit to assist a nurse in administering medication or providing the food tray – there was not a specific trigger per se, but was rather to ensure staff safety. Seclusion could also be used as a precaution in escalating situations or for individuals who need less stimulation. Alternatively, the lack of relationship between the implemented strategies and aggression could indicate these strategies are being implemented in the absence of appropriate triggering behaviours. If these strategies were managing behaviours or emotions unrelated to aggression, then there would not be a relationship between the implemented management strategies and aggression. Lastly, it is possible that, especially in the PAU which is a high acuity unit, all patients coming from the ED are perceived as potentially aggressive and there was over management of patients.

9.3. PTN Consistency (Hypothesis 4)

Hypothesis 4: The PTNs will rate the risk of violence for similar patients (e.g., based on the presence of the same pattern of risk factors) consistently. In other words, all five PTNs will give the same or similar (e.g., *Low* or *Moderate*; *Moderate* or *High*) risk judgment to a group of patients with the same constellation of risk factors present on the IPVST.

Hypothesis 4 was partially supported as 4 of the 5 PTNs rated clusters of patients consistently. First, the results of IRR will be presented and then the details of the cluster analysis and consistency of the PTNs.

The IPVST is a framework for guiding decisions around risk for inpatient violence; it is not a test that needs to demonstrate reliability and validity with respect to a particular construct (e.g., the Beck Depression Inventory is a reliable and valid measure of the construct of depression). It does, however, need to be a reliable guide to the assessor to focus his or her clinical judgment on relevant risk factors and management strategies to prevent aggression. If the PTNs were inconsistent in their ratings of patients, the IPVST framework would be no better than chance and possibly worse than clinical judgment alone. In this study, traditional IRR was assessed with two PTNs in the

room during the triage interview and coding the IPVST form. Unfortunately, this happened infrequently due to time constraints and other work related difficulties. The IRR for the 22 cases was in the *moderate* to *almost perfect* range, which is consistent with the IRR of the BVC items and better than the BVC total score (Almvik et al., 2000). There were, however, 697 IPVSTs completed and 22 IRR cases was significantly below the target of 10% of cases. Instead, a cluster analysis provided five different subtypes of participants who presented to the ED based on the presence of combinations of the 15 items on the IPVST framework. The summary risk ratings assigned by each PTN to these five clusters was analyzed to determine consistency of the ratings.

9.3.1. Cluster Analysis and PTN Consistency

There was consistency of summary risk ratings between 4 of the 5 PTNs for the five clusters. There was one PTN who did not rate patients higher than *Moderate Risk* and often was summarizing the patients' risk as lower than the summary risk judgments of the other PTNs. This rater could have been eliminated from the analyses, but this would possibly decrease the ecological validity of the results. For all the published SPJ measures, IRR has been reported to be adequate to excellent (Douglas & Reeves, 2010; Kropp & Gibas, 2010; Hart & Boer, 2010). When particular groups of raters are compared, such as different types of professionals, or those with differing levels of training, then there are differences in summary risk judgments (Sutherland et al., 2012). This same phenomenon has been demonstrated with the PCL-R (Boccaccini, Murrie, Rufino, & Gardner, 2014; Murrie, Boccaccini, Turner, Meeks, Woods, & Tussey, 2009; Murrie, Boccaccini, Guarnera, & Rufino, in press; Rufino, Boccaccini, Hawes, & Murrie, 2012). In this case, the raters are all from the same profession, but their levels of expertise in mental health and level of training in both mental health and in risk assessment was diverse. Although the one PTN rated the participants as lower risk, it does not seem to be due to a lack of understanding of the SPJ model; more management strategies were suggested in cases that were rated as higher risk. In addition, when there were inconsistencies between the PTNs on the summary risk rating for a cluster, these inconsistencies were not between ratings of *Low* and *High*, but between *Low/Moderate* or *Moderate/High*. These discrepancies are not unusual in studies of the summary risk judgments for the HCR-20 (Douglas & Reeves, 2010).

The Hostile and Confrontational clusters had more individuals who were rated as *Moderate* to *High Risk* on the IPVST while the other three clusters had more participants rated as *Low Risk*. The Hostile participants were similar to the hypothesized and empirically derived Delta typology espoused by Skeem et al. (2004), characterized by recent aggression, paranoia, hostility, and cynicism. Confrontational participants were similar to the Beta typology characterized by interpersonal difficulties, aggression in response to perceived provocation, hostility, emotional volatility, impulsive, and antisocial lifestyle. Both groups were hypothesized by Skeem et al. (2004) to pose a moderate to high risk of inpatient violence. For the No Observations cluster, it is not surprising that the cluster was rated as *Low Risk* when there were no risk factors present. It does validate that the PTNs were using the IPVST as a guideline to assess risk for aggression and not ignoring the risk factors in favour of unstructured clinical judgment. The Intoxicated cluster included participants who were intoxicated at the time of the PTN interview; in most cases, once the individual was no longer intoxicated, the risk of aggression significantly decreased, hence the rating of *Low Risk*. For the Disoriented cluster, it may be that the risk factors contained in this cluster were more descriptive of mentally ill individuals generally and not specific to aggressive individuals resulting in a rating of *Low Risk.*

9.4. Predictive Ability of Risk Assessments (Hypothesis 6)

Hypothesis 6: The IPVST summary risk judgments will have the strongest predictive relationship followed by the IPVST total score and then the BVC, the DASA and the VSC and VSC-R. In addition, time will impact the relationship between the total score and summary risk judgments with violence. A longer inpatient stay will be associated with more treatment and a decline in total scores on SPJ risk assessments over time (e.g., Belfrage & Douglas, 2002). Therefore, the longer a patient is on the unit, the poorer the predictive ability of all of the measures due to intervening factors between the initial assessment and violence on the unit.

Hypothesis 6 was not supported because there were no statistically significant differences (after a Bonferronni correction) between the AUCs for the total scores of the measures or between the AUCs for the SPJ rating/categorical ratings. ROC Analyses

were conducted for each of the risk assessment instruments – the IPVST (i.e., the Paranoid principal component), BVC, VSC/VSC-R, DASA - and aggression. Across most of these instruments, the significant AUCs were in the near-moderate to moderate effect size range (.62-.65) and the differences between the AUCs were not statistically significant after the Bonferronni correction. Notably, the BVC was not predictive of aggression. This result was surprising because the BVC produced AUCs in the .75-.85 range in previous studies (e.g., Almvik et al., 2000; Chu et al., 2013; Ogloff & Daffern, 2006a). Even the DASA-IV which was predictive of aggression in this study had a smaller AUC than was previously reported in the literature (Chu et al., 2013; Ogloff & Daffern, 2006a). Generally, the risk assessment tools were not completed as intended in this study; the measures were completed once and the follow-up period was the entire inpatient admission. A shorter follow-up period (12 to 24 hrs) allows for a more definite link between the risk factors and aggression because of proximity. In the current study, it is unclear if the risk factors were present in close proximity to the aggression, if there were other triggers present, or if there was successful prevention of aggression. In addition, Physically Threatening, Verbally Threatening, and Attacking Objects occurred very infrequently and all three items are on the BVC which likely impacted the predictive ability of the measure.

Violating the assumption of independence of observations without accounting for "clustering" of the data (Obuchowski, 1997) can lead to spurious results. Instead, the correlation between the clusters should be taken into consideration when estimating the AUC or another analytic technique that accounts for repeated measurements over time should be conducted. Treating multiple ratings of a single participant as independent could account for the differences in AUC values between the current and previous studies of the same measures.

The VSC and VSC-R performed as well as the DASA-IV and the Paranoid component of the IPVST in predicting aggression. This result is in contrast to past studies that have compared the VSC to other risk assessment tools and it was not predictive of violence (Nicholls et al., 2004). In the current study, previous violence was a stronger predictor of aggression when controlling for the Paranoid principal component. The VSC and VSC-R also include an item about violence in the preceding two weeks before admission. It may not be the instrument as a whole, but that this one

specific item on the VSC and VSC-R accounts for all the variance in predicting aggression.

The summary risk judgment and categorical ratings for all of the measures, with the exception of the BVC, were predictive of aggression. The AUCs were very similar to the total scores (.61-.64) and in the near-moderate to moderate effect size range. The similarity between the AUCs for the categorical rating for the BVC, DASA-IV and VSC/VSC-R and the total scores of the measures is likely due to the actuarial nature of the ratings. The categorical ratings for the BVC, the DASA-IV, and the VSC/VSC-R were derived actuarially using the suggested cut-off scores. For the IPVST, the summary risk judgment was a true SPJ rating because it was not based on the actuarial total scores, but instead the PTNs used their clinical judgment after identifying the risk factors for each individual participant. The AUC is a global indicator of measurement accuracy along all possible cut-off scores. The categorical rating was just taking the total score and dividing it into three points on the curve instead of four, five, or seven depending on the measure. The IPVST SPJ rating, however, was separate and independent from the total score.

In the previous section, it was noted that the SPJ rating did not add incremental validity to predicting aggression, but both the total score and the SPJ rating were predictive on their own. This finding is inconsistent with the majority of previous studies of SPJ ratings. Half of 34 published studies that have investigated whether the summary risk judgments are predictive of violence focused specifically on whether the judgments added incrementally to the prediction of violence over and above another risk assessment or decision-making strategy (e.g., actuarial use of an SPJ measure; Douglas et al., 2014). Only two of the 17 studies did not find evidence of incremental validity. Generally, the results of the current study still support the SPJ rating as opposed to numeric cut-off scores for both predicting and preventing inpatient aggression.

The latter half of Hypothesis 6 was also not supported; even when controlling for the amount of time participants were at risk for aggression, Paranoid, the BVC (in the negative direction), the DASA-IV and the VSC-R were all still significant predictors of aggression. For the BVC and the DASA-IV it was the non-overlapping items of each measure that were significant predictors and not the two overlapping items suggesting

that each measure does add unique variance to the prediction of aggression. The surprising result, however, was that the BVC was inversely related to aggression meaning the odds of being in the aggressive group were multiplied by .60 for every step increase on the 4-item total score. This result could be because of the very low prevalence of Physically Threatening and Attacking Objects (less than 5%) and then Confused and Boisterous may have been present for many of the mentally ill individuals presenting to the ED, but not necessarily relevant to the participants' risk for aggression.

The clinical implications of these results relates to static and dynamic risk factors. Static risk factors as found on the VSC/VSC-R and the V-Code may be significant predictors of aggression with mostly moderate effect sizes, but their utility for preventing aggression is lacking. As described above, previous violence and other risk factors on the VSC/VSC-R indicate the potential of future inpatient aggression and what the individual may do on the unit, but it does not suggest what should be managed, how it should be managed, and the intensity of management. Without this management information, these risk factors only identified potentially at risk participants. This information is useful, but it is incomplete. Dynamic risk information is imperative to identify motivators, disinhibitors, and destabilizers that cause aggression and violence for a particular individual. That is the information that needs to be communicated to the units so staff can allocate resources, develop a comprehensive management plan, and address identified risk factors immediately. Storey, Watt, & Hart (2015) stated that the presence of risk factors, the functional relevance of the risk factors, the nature or level of risk, and the management plan were identified in the literature as the bare minimum information to communicate in a risk assessment. The authors highlight the best practice guidelines laid out in the Risk for Sexual Violence Protocol (RSVP; Hart et al., 2003), which includes the information above with the addition of scenarios of future violence. If only previous violence and risk factors on the VSC/VSC-R were considered when assessing risk for short-term inpatient violence, the best practice guidelines from the RSVP would not be followed.

9.5. How Good is Good?

Are these tools "good" at predicting inpatient aggression? Although prevention of aggression is the goal of identifying those individuals who are likely to be aggressive on the unit, it is important to establish if the risk assessment scheme can predict aggression. Instead of a stand alone statement about each instrument, perhaps the more appropriate question is: Are these tools "good" predictors as compared to what? (Monahan, 1992; McNiel & Binder, 1994). The comparison could be to the current risk assessment practice at the hospital. The process of assessing risk in the ED at the time of the study was the V-code, which indicated whether the person had previous hospital violence. That marker is placed on the chart for transparency and to enhance awareness of a possible future violence risk, but there is no link to management, no identified risk factors or summary risk rating, nor is a specific management plan suggested. Rather, it was left to the nurses to informally determine the level of risk a patient posed on the unit and how to manage that risk. In the current study, the AUC for the V-code was .64, an equivalent AUC to the risk assessment tools investigated in the ED. The IPVST, or the BVC, or the DASA-IV add identified risk factors that can be used to formulate the risk and develop a management plan.

Another comparison that is applicable here would be to unstructured clinical judgment (UCJ) because it is often employed in assessments of risk for violence (Ogloff & Daffern, 2006b). The accuracy of psychiatrist's UCJ in the ED to determine risk of violence was an AUC of .70, but untrained clinical residents were no better than chance (AUC=.52; Teo et al., 2012). The risk assessment tools in the current study had better predictive validity than the UCJ of residents (except the BVC), but had lower accuracy than trained psychiatrists. Teo et al. (2012) seems to be one of the exceptions because most studies of UCJ find actuarial or SPJ instruments to be superior when predicting violence (e.g., Ægisdóttir et al., 2006; Bonta, Law, & Hanson, 1998; Hanson & Morton-Bourgon, 2009; Grove et al., 2000). For example, Guy (2008) in a comprehensive meta-analysis of the ability of SPJ, actuarial, and unstructured clinical judgment to predict violence found that the SPJ ratings produced an average AUC of .68, actuarial measures produced an average AUC of .62, and unstructured clinical judgment

produced an average AUC of .59. It is not the psychiatrists, however, who are making the determination of risk for inpatient aggression; this role usually falls to the nurses.

Previous research indicates that the accuracy of nurses of correctly identifying moderate and high risk patients increases when nurses were provided a list of risk factors to consider (Ogloff & Daffern, 2006b). DASA-IV SPJ ratings as completed by nurses have demonstrated moderate predictive validity. The DASA-IV SPJ rating outperformed UCJ by 10% in one study when predicting aggression (Griffith et al., 2013). Similarly the AUC for UCJ was .52 and the AUC for the SPJ rating was .67 when predicting aggression. The DASA-IV SPJ rating was higher when predicting interpersonal violence (AUC=.75) and verbal threats (AUC=.75; Chu et al., 2013).

In summary, the IPVST total score and summary risk judgment performed better than chance, but not as well as psychiatrists in the Teo et al. (2012) study, and possibly not as well as the DASA-IV summary risk judgment depending on the outcome measure. Only the BVC, however, has demonstrated a reduction in aggression or violence on the inpatient unit following its implementation.

As discussed above, the AUC plots a measure's sensitivity against its specificity for the range of scores on the measure. Sensitivity and specificity can also be calculated for particular cut points for the measure. The sensitivity and specificity for *Low Risk* vs. *Moderate/High Risk* and *Low/Moderate Risk* vs. *High Risk* were calculated for all of the measures in this study. Generally, the sensitivity for *Low Risk* was low and the specificity was moderate and for *High Risk* the sensitivity was very low and the specificity was high. The 95% confidence intervals for all of the sensitivities included 50%. Again, it is questioned whether these are acceptable values for preventing aggression.

For each measure, acceptable accuracy will depend on the trade-off between sensitivity and specificity and the results in that particular setting. For this study, high sensitivity of a risk assessment in the ED would mean a person who was later aggressive on the inpatient unit would be assessed as high risk in the ED, and specificity would be a person who was not later aggressive on the inpatient unit would be assessed as low risk. When comparing the *Low Risk* category to the *Moderate/High Risk* category for the IPVST, in 65% of cases those participants rated as *Low Risk* would not be

aggressive, and in 58% of cases participants rated as *Moderate/High Risk* would be aggressive. For comparing the *Low/Moderate Risk* category to the *High Risk* category in 88% of cases participants rated as *Low Risk* would not be aggressive, and in 20% of cases participants rated as *High Risk* would be aggressive. The consequences of incorrectly classifying participants in this study were as follows (N=209): For the *Low Risk* vs. *Moderate/High Risk*, 19 participants rated as *Low Risk* in the ED were aggressive and potentially injured staff or co-patients when on the unit and 51 participants who were rated as *Moderate/High Risk* were not aggressive and were possibly given a chemical restraint, placed in seclusion/restraints, or had security attend the unit. For the *Low/Moderate* vs. *High* rating, 36 participants were aggressive and potentially injured staff and/or co-patients and 20 participants potentially erroneously received coercive management strategies. Of those 19 participants who were rated as *Low Risk* and were aggressive, 4 participants were physically violent. Of those 36 participants who were rated as *Low Risk* and were aggressive, 9 were physically violent. In comparison, in a previous study the sensitivity for the DASA-IV (score of 5) was .61 and the specificity was .76 for any aggression. For the BVC (score of 2) in the same study the sensitivity was .53 and the specificity was .91 (Chu et al., 2013). These indices are similar to the summary risk judgments of the IPVST in the current study.

There are several clinical implications of these results. Firstly, if the IPVST was to be used in clinical practice, anyone rated as *Moderate* or *High Risk* should have a management plan developed and implemented, because the *High Risk* category alone had low sensitivity and resulted in poor prediction of future aggression. It is unknown how the results would change if the nurses on the unit were aware of the results of the risk assessment and managed the individuals accordingly. Even if all *Moderate/High Risk* individuals were managed, at least four individuals would have been physically aggressive. This is an illustration of the difficulty of assessing a complex construct such as risk using information gathered from a 30 minute interview and possibly unreliable collateral information; the accuracy of the measure may be decreased. The reason the SPJ family of risk assessment tools work well to prevent aggression and violence is because it is an entire process that requires an in-depth investigation to identify present and relevant risk factors, to develop a formulation, scenarios, and a management plan.

Secondly, although a history of violence in the hospital was as strong or a stronger predictor than the Paranoid component and IPVST summary risk judgments, it should not be used as the only means to identify at risk individuals. It does not provide nursing staff with targets for prevention. Instead, a history of violence informs the assessor that the potential for aggression exists and what it might entail. Static risk factors, such as previous violence, should aid in informing the intensity of management strategies and right amount of monitoring, supervision, and treatment (Hart et al., 2001).

Instead of focusing on the predictive validity of these risk assessment tools, the more relevant and important question is how do these tools help mental health staff prevent aggression (Douglas & Kropp, 2002)? This study attempted to determine how the nurses are currently managing aggression on the unit, but it did not address whether the risk tools influenced management in an attempt to prevent aggression. The VSC/VSC-R, the BVC, and the DASA-IV focus on identifying individuals at risk and, in the case of the latter two, monitoring those individuals rather than attempting to explain why that individual may be at risk and how it can be prevented (Doyle & Logan, 2012).

9.6. Assessment of Risk in the Emergency Department

The IPVST framework did predict aggression on the inpatient unit, but not better than existing measures. The feedback on the tool was that it was quick to complete and user-friendly, however, the value of the tool was not immediately clear since it was predicting aggression for a different area of the hospital. This study only addressed whether aggressive individuals could be identified in the ED; the answer is some of them, but not in sufficient numbers to warrant implementation of any of these risk assessment measures immediately. The ED is a difficult place to gather sufficient, accurate information to understand an individual's risk for aggression and develop an individualized management plan. At best, these tools could be used as a triage mechanism to warn the inpatient unit about the potential for aggression and to highlight potentially relevant risk factors, but the formulation and development of the management plan should be left to the unit nurses who have more time and more information to make these decisions. This will result in over management of a subset of patients who are incorrectly classified, but if an appropriate management plan was developed on the unit,

there should be minimal impact to the incorrectly classified individuals. Frans Fluttert's Early Recognition Method (Fluttert et al., 2008) has potential for being a very valuable tool on inpatient units, not only as a means of preventing aggression, but also to change negative interpersonal interactions outside of the hospital. The ERM in conjunction with re-assessment of risk on a regular basis using the BVC or DASA-IV could greatly reduce inpatient aggression.

9.7. Limitations

There were, of course, limitations to this study. As described above, there were several risk factors that were observed infrequently. The presence rating on the IPVST framework in this study reflected only what the PTNs were able to directly observe and, thus, may not reflect the reality of the patient's entire time in the ED. The PTNs interviewed the patient for about 30 minutes, which is likely only a fraction of the time the patient was waiting in the ED for triage, a disposition, or admission. It is possible that these risk behaviours did occur, but not in sight of the PTNs. If this information was missed by the PTNs for various reasons, it would lower the potential predictive validity of the risk factor.

Risk factors on risk assessment measures such as the HCR-20, the START, or the VRAG have substantial manuals dedicated to outlining the need for the tool, the theoretical and empirical foundation of the tool, the guidelines for using the tool, and likely the largest section -- the description and definition of each of the risk factors. The level of detail in the risk factor descriptions and definitions allow for increased IRR of the items and aids in communication of risk because there is a common language. In the current study, the definitions of the items were succinct to increase its appeal to nursing staff and its practical utility. The definitions for the BVC and DASA-IV were the same ones used in previous studies. The definitions of the additional items were written to be similarly succinct and clear. There was still overlap between some of the item definitions (e.g., Suspiciousness and Sensitivity to Perceived Provocation), which can decrease the relevance of risk factors. Some of the risk factors were more general interpersonal styles as opposed to specific behaviours (Irritability vs. Easily Angered When Requests Are

Denied), thus different PTNs might have decided to rate Irritable present instead of Easily Angered or vice versa or code them together.

The base rate of aggression was lower than anticipated as compared to a previous study on the PAU (Watt et al., 2009). The base rate was sufficient for the ROC analyses and logistic regression models, but a higher base rate would have allowed for a more detailed analysis of the relationship between management and aggression. Also, due to a low base rate of aggression in this study, all incidents were described as aggression instead of being able to separately predict violence as defined in the HCR-20. This made it difficult to compare the current results to other studies utilizing the same risk assessment measures, but were able to use violence as a separate outcome from any aggression.

The PTNs were asked to suggest management strategies, but it was not possible to develop a truly individualized management plan that would be implemented on the unit. There was not sufficient time built into the PTN role, nor was enough information about risk collected for this to occur. Thus, the implemented management strategies were recorded as a proxy of the management plan for each participant. Unfortunately, the inpatient files were lacking in details regarding what management was implemented, when, and for what purpose. Only the more coercive strategies were recorded with regularity, but the reasoning was not always clear. Instead, specific terms such as “agitated” were used to indicate a management strategy linked to potential aggression. The outcome was the broad construct of aggression instead of violence because the base rate of violence was too low to run meaningful statistical analyses.

9.8. Future Directions

Some suggestions for future directions were included above, but will be briefly summarized here. The base rate of aggression in the current study did not allow for analyses of specific types of aggression or violence. All incidents were collapsed into one aggression variable. Future research should use the IPVST in the ED, but collect more follow-up data to increase the base rate of aggression. The predictive ability of the measures in this study was lower than reported in previous research on inpatient units.

This could be because measures perform best when predicting the outcome they were developed to assess. The findings of Singh et al. (2011), Fazel et al. (2012), and Guy (2008) reported that the HCR-20 summary risk judgments were better predictors of the outcomes when they focused on violence as opposed to nonviolent or general criminality. The same was true for all SPJ instruments; the predictive accuracy was increased when the instrument was predicting its intended outcome (Guy, 2008). Repeating the study with different outcomes could help answer whether these tools could or should be used in the ED.

Future research should focus more closely on the prevention of aggression. The call to shift the focus of research in forensic psychology to novel topics or novel methods has been made (e.g., Douglas & Kropp, 2002; Heilbrun, 2003; Skeem, 2014), but not necessarily followed through especially with regards to prevention of violence (Bjørkly, 2004; Doyle & Dolan, 2006). One reason why research on the management of violence has been slower to develop is barriers to conducting this research. For example, in the current study the information documented in the patient's file was insufficient to understand the process for management of aggression. In those studies that have reported on management of violence, there is cooperation with the agency that is assessing and managing the risk (Belfrage et al., 2012; Storey et al., 2014). Even when there is cooperation, the studies have only reported the suggested management strategies and were unable to analyze the impact of the implemented strategies (Belfrage et al., 2012; Belfrage & Strand, 2012). In addition to cooperation, there needs to be a belief in the study by the people who are completing the risk tools or managing the violence. It takes extra time for nurses to record aggressive incidents or detailed information regarding management. This will not be completed unless the nurses can see the benefit to them or believe in the need for the research generally. It will be important in future studies to tackle these important research questions despite needing to overcome barriers to the research.

In the current study, aggression was generally well documented, but the only management strategies recorded in the chart were the PRN medication and more coercive strategies (e.g., restraints). In order to study management, a more detailed record needs to be created, either in the chart or specifically for the study, that can track the escalation of behaviour and attempts to prevent further escalation. Training can be

provided to nursing staff regarding documenting management and details regarding aggressive or violence incidents. More detailed documentation will allow for more accurate analyses of the association between risk, management, and violence (Doyle & Logan, 2012).

The BVC and DASA-IV were developed for use on the inpatient unit and not for the ED. Although both measures are easy to rate, the nurse needs to observe the items to rate them. In the ED, a patient can be waiting a significant amount of time before being assessed, yet only be observed by the PTNs for 30 minutes. Several relevant risk factors could manifest in the ED, but not be observed by the rater of the risk assessment instruments. In addition, the BVC, and the DASA-IV do include dynamic risk factors, but the focus of these risk schemes is to identify those at risk and not to tell the assessor why or how (Doyle & Logan, 2012). Future research could encourage a more in-depth interview that would address either the risk factors on the BVC or DASA-IV, or even the HCR-20. It is possible to code the majority of HCR-20 items in the ED (Teo et al., 2012) and it is a very well researched risk assessment tool with established predictive validity in a variety of settings and is the most widely used risk assessment tool (Singh et al., 2014). Chu et al. (2013) did compare the C scale of the HCR-20 to the BVC and the DASA-IV, but this comparison has not been completed with the full HCR-20. If an already established risk assessment tool works as well or better than the IPVST, then it should be implemented instead of peppering the hospitals with a variety of different risk assessment tools.

Alternatively, the HCR-20 could be adapted to meet the unique needs of the ED including a lack of time and criminal history information. The process would be similar to how the B-SAFER was adapted from the SARA for police (Kropp et al., 2005, 2010). The SARA was reduced from 20 risk factors to 10 risk factors and then five victim vulnerability factors were added. The B-SAFER was created because of the limited amount of time police have to complete a risk assessment and to address items on mental illness that police were unable to rate due to lack of expertise in the area. There are similar difficulties in the ED. Future research could attempt to reduce the items on the HCR-20 and possibly adapt those items where the information needed to code the item would not be available in the ED.

Previous violence was a significant risk factor and does indicate an elevated risk (Douglas & Kropp, 2002), but as a static risk factor it has less utility than dynamic risk factors in preventing violence (e.g., Douglas et al., 2014; Douglas & Skeem, 2005; Heilbrun, 1997). As mentioned above, previous violence can inform the amount of management that is needed and inform what types of monitoring, supervision, treatment or victim safety planning may be needed in each individual case (Hart et al., 2001). Future research should determine what information is available to staff in the ED regarding the specifics about a previous violent incident and how it was managed. A review of previous violent incidents by a particular patient can provide valuable information that will inform not only the formulation of violence, but also aid in identifying which management strategies may be effective or ineffective. Death reviews or fatality reviews either in the case of children (Durfee, Durfee, & West, 2002) or for intimate partner violence (Campbell, Glass, Sharps, Laughon, & Bloom, 2007) have led to systemic changes in relevant agencies or even social policy changes. At an individual level therapeutic techniques have been used to determine antecedents to negative behaviours, identify patterns, and to determine when and what intervention could have been implemented to change the outcome (Lynch, Chapman, Rosenthal, Kuo & Linehan, 2006). Future research could include a file review of the most violent patients currently on the inpatient unit or in the recent past. The review would focus on risk factors present, the antecedents to the incidents, management strategies and violence outcome for each incident. The next step would be to encourage nursing staff to write an analysis after each aggressive or violence incident and include the trigger, risk factors present, management strategies, and outcome. Then for each subsequent admission, the current staff could quickly identify relevant risk factors, the most likely scenario, and management that worked previously or those strategies that were ineffective.

9.9. Conclusion

This study was the first to attempt to assess risk for aggression using a SPJ framework in the Emergency Department (ED) - the first point of hospital contact for mentally disordered individuals. The results of the study are promising regarding the ED as a place to identify individuals at risk for inpatient aggression; the items on the IPVST can be coded reliably and there is consistency between the PTNs regarding summary

risk judgments of different subtypes of patients based on the items on the IPVST. The SPJ rating did predict aggression, but did not add incremental validity to the Paranoid principal component. The SPJ rating should still be implemented because it flows from the presence and relevance of the risk factors and the intensity of the management needed to prevent aggression. The DASA-IV, the Paranoid principal component and the VSC/VSC-R were significant predictors of aggression, but the effect sizes were not as large as reported in previous studies using the same tools. This study is a first exploration of assessing risk in the ED; future studies should focus more specifically on the ability of the tools to prevent aggression. A decision regarding whether it is feasible to assess risk of aggression or violence on the inpatient unit in the ED is best made with prevention in mind.

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Appendix A.
Violence Perpetration Incident Form

ID#_____

Violence Perpetration Incident for the Index Hospitalization

□ NOT APPLICABLE

(Code for all Incidents)

Complete Narrative Form for each Incident

Type of Violence	
Incident #_____	
Date of incident (best estimate)	_____ □ DK
Time of incident (best estimate)	_____ □ DK
Verbal Aggression	☐ Shouts angrily, curses mildly, or makes personal insults. ☐ Curses viciously, is severely insulting, has temper outbursts.
Aggression Against Property (Nonverbal Aggression)	☐ slams door angrily, throws objects down, pushes furniture. ☐ Kicks furniture, throws objects, defaces property. ☐ Breaks objects, rips clothing, smashes windows, urinates/defecates on floor. ☐ Sets fires, ransacks room, uses weapons.
Violent Ideation	☐ Having thoughts or fantasies to harm others ☐ Making plans to harm others ☐ Intending to harm others
Violent Threats/Attempts	☐ Impulsively threatens violence toward others. ☐ Makes clear threats of violence toward others repeatedly or deliberately (e.g., to gain money or sex) ☐ Makes threatening gestures, swings at people, grabs at clothing, throws objects dangerously.
Physical Violence Against Others	☐ Strikes, pushes, scratches, pulls hair (without injury). ☐ Kicks, punches, bites. Actions result in mild-moderate physical injury (e.g., bruises, sprain, welts). ☐ Attacks others, uses weapons, resulting in severe physical injury (e.g., fracture, loss of teeth or consciousness, lacerations, internal injury).
Sexual Aggression	☐ Makes sexually inappropriate or suggestive invitations, gestures or statements. ☐ Makes sexually threatening statements, exposes genitals to others, masturbates in public or is voyeuristic. ☐ Sexually touches or fondles others nonconsensually. ☐ Commits coercive or violent sexual assaults (with/without penetration; oral, genital, or anal), uses weapons.
Where did incident occur	☐ PAU ☐ Other inpatient ward ☐ Other:_____
Provocation	☐ No understandable provocation ☐ Other patient(s) ☐ Patient being denied something ☐ Staff requiring patient to take medication ☐ Help with Activities of Daily Living ☐ Other:_____
Target	☐ Nothing/nobody ☐Object(s) ☐ Other patient ☐Patient self ☐Staff ☐ Other person
Means Used by the Patient	☐ Homicidal Ideation ☐ Verbal Aggression ☐ Knife ☐ Chair(s) ☐ Strangulation ☐ Glass(ware) ☐ Other weapon:_____ ☐ Other ordinary objects:_____ ☐ Hand (hitting, punching, etc.) ☐ Foot (kicking) ☐ Teeth (biting) ☐ Other body part:_____

ID#_____

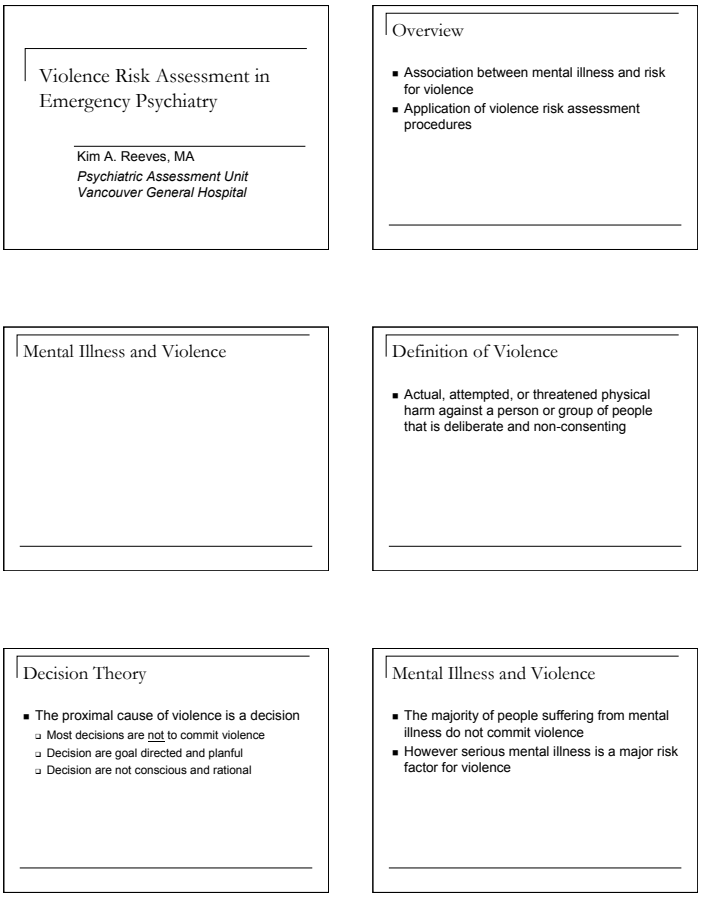
Consequence(s) for victim(s)	☐ None ☐ Object(s) damaged, no replaced ☐ Object(s) damaged, replaced ☐ Felt threatened ☐ Pain < 10 min ☐ Pain > 10 min ☐ Visible injury ☐ Need for treatment ☐ Need for treatment by a physician

If any of the above are Present, complete Narrative on each incident (e.g., who, what, when, where, why- triggers).

Appendix B.

Dissertation Training Slides

May 15



1

Prevalence of Violence

- North America
  - 17-50% of committed psychiatric inpatients have a history of violence
- British Columbia
  - 64% of psychiatric patients have a history of violence, 46% were violent while hospitalized, and 38% were violent within two years of release
- Psychiatric Assessment Unit
  - 42% of patients have a history of violence and 31% were violent during admission

Implications of Violence

- Harm to victim
  - Physical injuries & psychological trauma
- Harm to perpetrator
  - Increased stigma & limited services access
- Financial burden
  - Costs to criminal justice, social service & heath systems
- Workplace costs
  - Impact on productivity, absences & turnover

Professional Responsibility

- Required under statutory law, common law, and professional codes of ethics to screen for and respond to obvious signs of violence risk
- Failure to do so may result in legal liability if actions failed to meet professional standards and resulted in harm to others
- Assessment of risk for violence is critical to inform decisions related to civil commitment, duty to protect, and community discharge

Violence Risk Assessment Procedures

Standard Assessment Practices

- File review
  - Emergency services, hospital chart
- Collateral information
  - Family, friends, service providers
- Clinical Interview
  - Psychiatric, substance use, and social history
- Mental Status Exam
  - Attitudes, appearance, behaviour, affect, thoughts, hallucinations

Otherwise known as…

- Unstructured Professional Judgment
  - Information weighted and combined according to the evaluator's judgment
  - Imposes no structure on the evaluation or decision-making process

Two Approaches

- Actuarial Risk Assessment
  - Items weighed and combined according to specific rules
  - Intended to predict future violence
- Structured Professional Judgment
  - Items weighted and combined using both structure and judgment
  - Intended to prevent future violence

Broset Violence Checklist (Almvik, Woods, & Rasmussen, 2000)

- Confused
- Irritability
- Boisterousness
- Physically threatening
- Verbally threatening
- Attacking objects

DASA (Ogloff & Daffern, 2006)

- Irritability
- Impulsivity
- Unwillingness to follow directions
- Sensitivity to perceived provocation
- Easily angered when requests denied
- Negative attitudes
- Verbal threats

IPVST

- Combines Broset, DASA, plus 4 new items
- Structured Professional Judgement

Extra Items

- Hostility
- Current Intoxication
- Suspiciousness
- Agitation

Step 1: Gather Information

- Identify and gather information necessary for assessment
- Document information reviewed and important information missing

Step 2: Consider Risk Factors

- Consider standard and case specific risk factors
- Document presence and if critical
  - Critical = An item that, *on its own*, compels you to believe that the person is at high risk for violence
- "Other" risk factors

Step 2a: Additional Information

- Violent in Emerge
- Restraints

Step 4: Final Risk Judgments

- Timeframe
- Low, Moderate, and High
  - What level of effort or intervention will be needed to prevent the person from being violent?
  - To what extent is this opinion limited in light of information that is unclear, unavailable, or missing?

Step 5: Disposition

- Where are you going to refer this patient?
- Reasoning

Step 5: Management Strategies

- Specify management strategies
  - What would YOU recommend for this patient?
  - Check as many strategies as you feel are relevant

Implications and Recommendations

- The high prevalence and serious nature of violence among people with serious mental illness indicates the importance of assessing and managing for risk of violence
  - Application of risk assessment procedures
  - Documentation of management strategies

Appendix C. Violence Perpetration Form

ID#_____

Coder:_____
Date : ____ /____ /_____

Inpatient Violence Screening
Outcome Form

Admission Date Emerge (index): ____ / ____ / ____ **Release Date from last unit (index):** ____ / ____ / ____
Day Month Year Day Month Year

Inpatient Movement

Unit	Admission Date	Transfer Date

Information from the ER

Age (years): _____ **Gender:** Female Male Transgender

"V" status: ☐ Yes ☐ No

Marital status:
_____ 1. Never married
_____ 2. Never married or common law
_____ 3. Presently married
_____ 4. Presently common law
_____ 5. Divorced
_____ 6. Divorced and remarried
_____ 7. Widowed
_____ 8. Widowed and remarried
_____ 9. Separated
_____ 10. Widowed, remarried, and divorced
____11. Unknown

Education (# years): _____

Race:
____ 1. White
____ 2. Aboriginal
____ 3. Black
____4. East Indian
____ 5. Asian
____ 6. Part Native
7. Other _____
____ 8. Not documented

Language(s): _____

How did the individual get to the ER:

☐ Self
☐ EHS
☐ Car 87/88
☐ Family
☐ VPD
☐ Transfer

Discharge Details

Admitting Diagnosis	Discharge Diagnosis
1st Axis I	
2nd Axis I	
3rd Axis I	
4th Axis I	
5th Axis I	
1st Axis II	
2nd Axis II	
3rd Axis II	
4th Axis II	
5th Axis II	

ID#_____

Risk assessment

Was a risk screen completed (prior to discharge)? **Y / N / DK**

Where was it located in the file (Check all that apply):

☐ Emergency Nurse Assessment II ☐ Admitting Care Plan ☐ Violence and Aggression Tool/ALERT
☐ Other:_____

If a risk screen is present, please answer the following questions:

Were risk factors explicitly mentioned?	Y / N / DK
Were specific risk factors denoted as relevant or critical?	Y / N / DK
Were scenarios of future risk identified?	Y / N / DK
Was a risk judgment made?	Y / N / DK
Were recommendations for management mentioned?	Y / N / DK

Was a risk assessment completed (prior to discharge)? **Y / N / DK**

If yes:
Who completed the risk assessment?

☐ Psychologist ☐ Psychiatrist ☐ Nurse ☐ Other:_____ ☐ Don't Know

If a risk assessment is present, please answer the following questions:

Were risk factors explicitly mentioned?	Y / N / DK
Were specific risk factors denoted as relevant or critical?	Y / N / DK
Were scenarios of future risk identified?	Y / N / DK
Was a risk judgment made?	Y / N / DK
Were recommendations for management mentioned?	Y / N / DK

Current Admission Details

Admission Status

☐ Voluntary ☐ Change of status:_____(mm/dd/yy)
☐ Involuntary

If Involuntary, reason for admission (Check all that apply)

☐ "Protection of others" / Harm to others
☐ "Protection of self" / Harm to self
☐ Risk of psychiatric deterioration
☐ Other _____

Please describe reason for admission (Why did the person come to Emerge?):

_____
_____
_____
_____
_____
_____
_____
_____

ID#_____

Diagnostic History

Prior to Current Admission Diagnoses (most recent)
1st Axis I
2nd Axis I
3rd Axis I
4th Axis I
5th Axis I
1st Axis II
2nd Axis II
3rd Axis II
4th Axis II

McNiel & Binder Violence Screening Checklist – Based on Information Available in Emerge	
Physical attacks and/or fear inducing behavior within two weeks prior to admission	**NO 0** **YES 1**
Absence of suicidal behavior (attempts, threats, gestures, ideation) within two weeks prior to admission (p. 19)	**NO 0** **YES 1**
Diagnosis of schizophrenia or mania	**NO 0** **YES 1**
Male gender	**NO 0** **YES 1**
Currently married or living together	**NO 0** **YES 1**

Violence History (Check all that apply)

Type of Violence	**Present or Not (Ever)**	**Previous 6 months (before Emerge)**
Hx of Violent threats	Y / N / DK	Y / N / DK
Hx of Violent ideation	Y / N / DK	Y / N / DK
Hx of Community Violence	Y / N / DK	Y / N / DK
Hx of inpatient Violence (not VGH)	Y / N / DK	Y / N / DK
Hx of Inpatient Violence at VGH	Y / N / DK	Y / N / DK
Hx of Spousal Violence	Y / N / DK	Y / N / DK
Hx of Sexual Violence	Y / N / DK	Y / N / DK
Hx of Stalking (Criminal Harassment)	Y / N / DK	Y / N / DK

If any of the above are Present, complete Narrative on each incident (e.g., who, what, when, where, why- triggers). DOES NOT INCLUDE WHY PRESENTED TO EMERGE

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

ID#_____

Medications (Current Hospitalization)

Name	Type	Amount	Date Start	Date End
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	
	☐ Oral ☐ Intramuscular ☐ Intravenous ☐ Depo		☐ PRN	

ID#_____

PRN/Seclusion/Restraints/Security

Name of Medication (if unknown, write PRN) or Seclusion	Reason (e.g., to sleep, agitation, etc.)	Date

ID#_____

☐ Treatment (Psychosocial Rehab)

Treatment (Current Admission)	Quantity	Intensity	Reason (e.g., violence risk)
Medication	None/A little/Moderate/A lot	Mild/Moderate/Severe	
Individual Therapy	None/A little/Moderate/A lot	Mild/Moderate/Severe	
Group Therapy	None/A little/Moderate/A lot	Mild/Moderate/Severe	
Other _____	None/A little/Moderate/A lot	Mild/Moderate/Severe	

ID#_____

Violence Perpetration Incident for the Index Hospitalization

□ NOT APPLICABLE

(Code for all Incidents)

Complete Narrative Form for each Incident

Type of Violence	
Incident #_____	
Date of incident (best estimate)	_____ □ DK
Time of incident (best estimate)	_____ □ DK
Verbal Aggression	☐ Shouts angrily, curses mildly, or makes personal insults. ☐ Curses viciously, is severely insulting, has temper outbursts.
Aggression Against Property (Nonverbal Aggression)	☐ slams door angrily, throws objects down, pushes furniture. ☐ Kicks furniture, throws objects, defaces property. ☐ Breaks objects, rips clothing, smashes windows, urinates/defecates on floor. ☐ Sets fires, ransacks room, uses weapons.
Violent Ideation	☐ Having thoughts or fantasies to harm others ☐ Making plans to harm others ☐ Intending to harm others
Violent Threats/Attempts	☐ Impulsively threatens violence toward others. ☐ Makes clear threats of violence toward others repeatedly or deliberately (e.g., to gain money or sex) ☐ Makes threatening gestures, swings at people, grabs at clothing, throws objects dangerously.
Physical Violence Against Others	☐ Strikes, pushes, scratches, pulls hair (without injury). ☐ Kicks, punches, bites. Actions result in mild-moderate physical injury (e.g., bruises, sprain, welts). ☐ Attacks others, uses weapons, resulting in severe physical injury (e.g., fracture, loss of teeth or consciousness, lacerations, internal injury).
Sexual Aggression	☐ Makes sexually inappropriate or suggestive invitations, gestures or statements. ☐ Makes sexually threatening statements, exposes genitals to others, masturbates in public or is voyeuristic. ☐ Sexually touches or fondles others nonconsensually. ☐ Commits coercive or violent sexual assaults (with/without penetration; oral, genital, or anal), uses weapons.
Where did incident occur	☐ PAU ☐ Other inpatient ward ☐ Other:_____
Provocation	☐ No understandable provocation ☐ Other patient(s) ☐ Patient being denied something ☐ Staff requiring patient to take medication ☐ Help with Activities of Daily Living ☐ Other:_____
Target	☐ Nothing/nobody ☐Object(s) ☐ Other patient ☐Patient self ☐Staff ☐ Other person
Means Used by the Patient	☐ Homicidal Ideation ☐ Verbal Aggression ☐ Knife ☐ Chair(s) ☐ Strangulation ☐ Glass(ware) ☐ Other weapon:_____ ☐ Other ordinary objects:_____ ☐ Hand (hitting, punching, etc.) ☐ Foot (kicking) ☐ Teeth (biting) ☐ Other body part:_____

ID#_____

Consequence(s) for victim(s)	☐ None ☐ Object(s) damaged, no replaced ☐ Object(s) damaged, replaced ☐ Felt threatened ☐ Pain < 10 min ☐ Pain > 10 min ☐ Visible injury ☐ Need for treatment ☐ Need for treatment by a physician

If any of the above are Present, complete Narrative on each incident (e.g., who, what, when, where, why- triggers).

ID#_____

Triggers

Under influence of substances at time of incident Y / N / DK / RF	**If yes, specify type(s)** ☐ Alcohol ☐ Drugs (specify): _____ ☐ Alcohol and Drugs (specify): _____ ☐ DK ☐ NA
Substance use 24 hours prior to incident Y / N / DK / RF	**If yes, specify type(s)** ☐ Alcohol ☐ Drugs (specify): _____ ☐ Alcohol and Drugs (specify): _____ ☐ DK ☐ NA
Medication non-compliance 24 hrs of incident Y / N / DK / RF	**IF YES, specify type**: ☐ Discontinuation of medication ☐ Improper use of medication ☐ DK ☐ NA
Mental illness symptoms experienced 24 hrs of incident Y / N / DK / RF	**IF YES, specify type(s)**: ☐ Delusions ☐ TCO ☐ Hallucinations ☐ Other_____ ☐ DK ☐ NA
Related violent victimization incident Y / N / DK / RF	**IF YES, specify approximate timeframe** ☐ At the same time ☐ Within an hour before ☐ Within 24 hours before ☐ Within 2 weeks before ☐ DK ☐ NA
Related suicide/self-harm incident Y / N / DK / RF	**IF YES, specify approximate timeframe** ☐ At the same time ☐ Within an hour before ☐ Within 24 hours before ☐ Within 2 weeks before ☐ DK ☐ NA

Where was the violence documented ☐ Nursing notes ☐ Psychiatry Notes ☐ Psychology Notes
☐ Standard Form ☐ Other:_____

ID#_____

Risk Management

□ NOT APPLICABLE

Incident #_____

Were risk management strategies documented Y / N / DK

Where were risk management strategies documented? _____

Where were management strategies employed? ☐PAU ☐ Other inpatient unit ☐ Other:_____

What were the strategies:

Short Term Risk

☐ Talking	☐ Calmly brought away	☐ Held with force	☐Observation
☐ Object Removal	☐ PRN	☐ Restraints	☐ Seclusion
☐ Security	☐ Police	☐ Lockdown	☐ Transfer to another unit

Referral for: ☐ assessment ☐ inpatient treatment ☐ outpatient treatment

Long Term Risk

☐ Monitoring

Describe:_____

_____

_____

_____

☐ Treatment (Psychosocial Rehab)

Treatment (Current Admission)	Quantity	Intensity	Reason (e.g., violence risk)
Medication	None/A little/Moderate/A lot	Mild/Moderate/Severe	
Individual Therapy	None/A little/Moderate/A lot	Mild/Moderate/Severe	
Group Therapy	None/A little/Moderate/A lot	Mild/Moderate/Severe	
Other _____	None/A little/Moderate/A lot	Mild/Moderate/Severe	

☐ Supervision

Describe:_____

_____

_____

_____

☐ Safety Planning

Describe:_____

_____

_____

_____

ID#_____

Short Term Risk Factors
To be completed every 24 hours starting after the 1st 24 hour period on the inpatient unit.

Start Date (mm/dd/yy): _____/_____/_____ End Date (mm/dd/yy): _____/_____/_____

Start Time:_____ End Time:_____

Check if Present during the previous 24 hour period	
Confused Appears obviously confused and disorientated. May be unaware of time, place or person.	☐
Irritable Easily annoyed or angered. Unable to tolerate the presence of others.	☐
Boisterous Behaviour is overtly "loud" or noisy. For example slams doors, shouts out when talking etc.	☐
Physically threatening Where there is a definite intent to physically threaten another person. For example the taking of an aggressive stance; the grabbing of another person's clothing; the raising of an arm, leg, making of a fist or modeling of a head-butt directed at another.	☐
Verbally threatening A verbal outburst which is more than just a raised voice and where there is a definite intent to intimidate or threaten another person. For example verbal attacks, abuse, name-calling, verbally neutral comments uttered in a snarling aggressive manner.	☐
Attacking objects An attack directed at an object and not an individual. For example the indiscriminate throwing of an object; banging or smashing windows; kicking, banging or head-butting an object; or the smashing of furniture.	☐
Impulsivity The patient displays behavioural and affective instability (i.e., dramatic fluctuations in mood, or general demeanour; Inability to remain composed and directed).	☐
Unwillingness to Follow Directions The patient tends to become angry or aggressive when they are asked to adhere to treatment or to the ward's routine.	☐
Sensitivity to Perceived Provocation The patient tends to see other people's actions as deliberate and harmful; they may misinterpret other people's behaviour or respond with anger in a disproportionate manner to the extent of provocation.	☐
Easily Angered When Requests are Denied The patient tends to be intolerant, or is easily angered when they make a request that is denied or when they are asked to wait.	☐
Negative Attitudes The patient displays antisocial and negative attitudes and beliefs which may relate to violence and aggression.	☐
Hostility An attitude or mental state whereby a person is inclined to have an over generalized antagonistic appraisal of others and view others negatively. A tendency toward both preemptive or reactive aggression. Displays animosity, contempt, or belligerence to others.	☐
Current Intoxication Observable behaviours that lead the assessor to determine the individual is intoxicated including slurring of words, stumbling or staggering, smelling of alcohol, blood shot eyes, admission by patient, etc.	☐
Suspiciousness Openly distrustful of the motives of others; vigilant monitoring of the environment for potential harm; tendency to be resentful, to hold grudges, and to readily spot perceived inequalities in their treatment by others.	☐
Agitation High energy level evidenced in frequent movement and/or rapid speech - Frequently restless, fidgety, pacing, wagging one's foot etc. Observable physical and motor manifestations of tension and agitation.	☐