

Do seclusion reduction initiatives increase risk to staff safety?

An integrative review of evidence of
association and causality from 2004
to 2014, with recommendations for
practice



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Executive summary

Purpose

The publication in 2004 of the Six Core Strategies© (6CS) (Huckshorn, 2004) bolstered seclusion and restraint reduction initiatives in western nations. At about the same time, studies appeared suggesting that seclusion reduction initiatives could pose unique risks to the safety of staff. Although these studies have not been replicated, the perception of risk to personal safety associated with seclusion reduction initiatives remains a concern in mental health inpatient settings in New Zealand and elsewhere. The seclusion meme that has persisted throughout the last 20 years of the twentieth century and into the current period is described by Bigwood and Crowe (2008, p. 215) as the “part of the job [that] spoils the job” and by van der Merwe and colleagues (van der Merwe, Muir-Cochrane, Jones, Tziggili, & Bowers, 2013, p. 203) as “patients perceived seclusion negatively while staff perceived it to be therapeutic [or] vital for the running of inpatient units”. The success of seclusion reduction strategies will be limited or delayed as long as these initiatives are viewed as necessary for ward effectiveness and safety, and restrictions on its use are seen as unsafe. Balancing these two concerns places unique requirements on hospitals to ensure staff safety while honouring international conventions and New Zealand Ministry of Health policy to minimise coercion in mental health.

The purpose of this integrative review of intervention studies is to identify and synthesise the evidence related to seclusion reduction and safety. The research questions are:

- how does the literature describe the relationship between ward safety and seclusion reduction, in mental health and addiction inpatient units for adult or youth groups?
- what are the factors that contribute to the reduction of seclusion while maintaining or promoting safety?

The outcome variables, limited to civil adult or youth mental health and addiction units, are:

- conflict: patient-generated, other-directed verbal or physical aggression or violence
- seclusion and other containment: staff-generated activities to limit conflict, with a focus on seclusion, manual or chemical restraint. Special attention is given to seclusion reduction in this review, but the term containment is used, where necessary, to ensure consistency with the variety of initiatives described here
- safety: measured rates of assaults or injuries, regardless of reporting method.

Method

Literature searches were conducted with the assistance of an information specialist with a subject specialty in health sciences. The 137 records retrieved from Medline (Ovid-SP), PsycINFO (Ovid-SP) and CINAHL (Ebsco) for articles published between January 2004 and March 2014 (Table 1) were combined with 32 records from a manual search, to produce a total of 169 articles from journals, proceedings and student theses, using specified inclusion and exclusion criteria (Table 2). The 58 studies retained for inclusion in this review were classified and reduced by design and overall quality, then by relevance to the research questions (Table 3).

Findings

Literature reviews of containment and seclusion reduction initiatives published from 2005 to 2010 found that the research in this field was often poorly designed and did not allow for causal relationships to be established between interventions and rates of seclusion, or safety. Comparability between studies is further impeded by the variability in units of analysis (see Table 6). With regard to samples used in these early studies, all seem to have been selected on the basis of convenience, rather than on the basis of statistical calculations for power required for significance thus increasing the risk of bias.

Twenty-eight of the 58 articles retained for this review were studies of interventions; the remaining 30 were observational studies or literature reviews that provide context for this review. Of the 28 intervention studies, only 12 used control groups and seven of those used randomised or population designs (see Table 4). Of the 28 included studies, five examined changes in rates of all outcome variables simultaneously (conflict, safety and containment reduction). Three of these five studies tested discrete interventions, with mixed results: two used structured risk assessment and staff training in aggression management where containment decreased with no change to safety or conflict rates. Another deployed an experienced change agent (City Nurse); an intervention that on replication did not change rates of containment (seclusion), but was associated with a decrease in conflict and reported staff injury rates.

By contrast, the two studies (Putkonen et al., 2013; Smith, Ashbridge, Davis, & Steinmetz, in press) that adopted a comprehensive use of strategies identified in the 6CS framework, rather than discrete interventions, demonstrated statistically significant decreases in conflict and containment, and either a decrease or no change in staff assault. Interestingly, these latter two studies met the highest quality methodology, using either a randomised design among people assessed to be prone to violent actions, or a large population study.

Prior to 2011, research findings are inconsistent on whether or not seclusion reduction initiatives are linked to rates of conflict or staff injuries. From 2011, the external validity and reliability of research improved resulting in greater generalisability. Findings from the research since 2011 suggest the following conclusions.

- The highest quality, best designed recent studies identified through this review indicate that the 6CS, implemented comprehensively and with engaged leadership, reliably minimise seclusion without increasing risk to staff safety. In 2014, the results were published from two large-scale trials testing the effect of the 6CS for reducing seclusion, with one also accounting for staff injury rates. Despite the non-linearity of implementation (due to facility cultures and requirements, as well as variances in protocol fidelity), an average reduction in seclusion of 17 per cent was achieved. In the context of other controlled trial results, it appears that on average this level of reduction of seclusion can be achieved in civil inpatient units without additional risk to direct-care staff, or possibly with less risk.
- Standalone interventions to reduce conflict and seclusion, while posing no additional risk to staff safety, can be less reliably effective than a comprehensive, systemic transition from a culture of using seclusion. Examples where evidence is growing for specific interventions include: use of structured risk assessments as an aid to care planning; sensory-based environmental modifications and staff practices to facilitate optimal sensory input; collaborative planning with service users; and post-incident debriefing. Research on locking ward doors shows that it reduces one form of conflict – absconding – but is associated with increased risk of harm to self or others.

Background

Introduction

The involuntary detention of people in seclusion under the New Zealand Mental Health (Compulsory Assessment and Treatment) Act 1992, particularly when mental illness is linked with the criterion of dangerousness, is an act of discrimination against persons with disabilities (O'Brien & Thom, 2014). The convergence of elevated respect for ethics of care, international conventions, and occupational health and safety have promoted the diffusion of policy initiatives to reduce rates of seclusion in mental health units. This effort was bolstered by the publication in 2004 of the Six Core Strategies© (6CS) framework (Huckshorn, 2004).

Reduction in the use of seclusion as a specific form of containment began to be articulated as a policy objective in New Zealand that same year. Despite the initiatives and resulting successful implementations in the subsequent eight years (for which there is data) (NZ Ministry of Health, 2013), nurses in New Zealand, according to Bigwood and Crowe (2008), continue to reluctantly support the use of seclusion to promote unit and personal safety, and sometimes see it as a tool for behavioural control (Happell & Harrow, 2010).

The issue of behavioural control in conflict situations is the link between safety and a range of containment practices, including seclusion. The literature around seclusion has grown in tandem with studies of inpatient violence, and studies of aggression have grown at a similar rate to studies of staff accounts of workplace violence and injury (Johnson, 2010). McKenna and colleagues, in a national survey of new nurses in New Zealand (McKenna, Poole, Smith, Coverdale, & Gale, 2003), showed that nearly one-third of staff experienced verbal, sexual and physical intimidation, and physical injury, with the bulk of that endured by nurses working in mental health and addiction.

Research on inpatient violence has been confounded by lack of sufficient data to make cross-jurisdictional comparisons, and the variability of study designs of the effectiveness of the 6CS or discrete interventions has produced conflicting results of effectiveness and safety (Bowers et al., 2011). Despite these methodological difficulties, some early studies indicated that seclusion-reduction activities were associated with assaults on and reported injuries sustained by staff (Khadivi, Patel, Atkinson, & Levine, 2004; McCue, Urcuyo, Lili, Tobias, & Chambers, 2004; Moylan & Cullinan, 2011). These early studies that associated safety risks with seclusion reduction policies or interventions were not generalisable (by the authors' own claims), but continue to feed the concern that this review will address. One study in particular, by Moylan and Cullinan (2011), is frequently cited¹ for its "alarming" description of staff risk in a policy environment of reduced seclusion. Despite using non-equivalent comparison groups, and a warrant for the study that was no more than a widely repudiated opinion piece in a journal issue devoted to the topic, this study continues to be cited as grounds for ongoing concern for staff safety (Liberman, 2006). Despite the fact that these studies are not replicable, the perception of risk to personal safety, with or without seclusion reduction initiatives, continues as a concern in mental health inpatient settings in New Zealand and Australia (Baby, 2013; Van Der Merwe et al., 2013; Woolaardt & Webster,

¹ This study has been cited in English-language journal articles 10 times from 2012.

2014). The seclusion meme that has persisted throughout the last 20 years of the twentieth century and into the current period is formulated by van der Merwe et al. (2013) as “patients perceived seclusion negatively while staff perceived it to be therapeutic and vital for the running of inpatient units” (p. 203). The success of seclusion reduction strategies will be limited or delayed as long as these practices are viewed as necessary for unit safety.

Purpose and definitions

The purpose of this integrative review of intervention studies is to identify themes and trends in the chronology of evidence related to containment reduction and safety, and place that in the context of relevant non-intervention studies. The research questions are:

- how does the literature describe the relationship between unit safety and seclusion reduction?
- what are the factors that contribute to the reduction of seclusion while maintaining or promoting safety?

Definitions for terms used to describe outcome variables throughout this report, and which are critical elements of the research questions, are:

- seclusion and restraint: staff-generated activities to limit conflict, with a focus on seclusion, manual or chemical restraint. Special attention is given to seclusion reduction in this review, but the term containment is used, where necessary, to ensure consistency with the variety of initiatives described here
- conflict: verbal or physical aggression or violence that is other-directed (patient-to-patient or patient-to-staff)
- safety: measured assaults or injuries, regardless of reporting method; note that this does not refer to perceptions of safety but to incidents.

Method

This is an integrative review of primary studies of interventions, and findings from reviews of empirical studies, related to the reduction or prevention of conflict, service-user restraint or seclusion, and assault on or injury to direct-care staff in adult or young person inpatient psychiatric units.

An integrative review summarises the literature on a specific topic to support analysis and the construction of overall conclusions in an interpretive or evaluative framework accounting for study outcomes (Whittemore & Knafl, 2005). This approach shares features with narrative synthesis, in that both share a broad inclusion of research methodologies and theory, organised in an intuitive way, to enable overall conclusions about directionality, causality or weights of evidence for a given topic (Khangura, Konnyu, Cushman R, Grimshaw J, & Moher D, 2010). It is distinct from systematic reviews, which often include a meta-analysis, as this report does not undertake that level of quantitative synthesis.

Information retrieval and selection

Literature searches were conducted with the assistance of an information specialist with a subject specialty in health sciences. The data retrieval was conducted from Medline (Ovid-SP), PsycINFO (Ovid-SP) and CINAHL (Ebsco) for articles published between January 2004 and March 2014. Reference lists from selected articles were reviewed to identify useful studies not found in the searches. New information or clarification was obtained from personal communications with three study authors.

The 137 records retrieved from Medline (Ovid-SP), PsycINFO (Ovid-SP) and CINAHL (Ebsco) for articles published between January 2004 and March 2014 (Table 1), were combined with 32 records from a manual search, to produce a total of 169 articles from journals, proceedings and student theses, using specified inclusion and exclusion criteria (Table 2). The 58 studies retained for inclusion in this review were classified and reduced by relevance, design and overall quality (Tables 3 and 4).

Data analysis and synthesis

The analysis proceeded in the following phases: study extraction, categorisation by relevance, then reduction by design and overall quality (Whittemore & Knafl, 2005). Data relevant to the questions was identified and reduced to a matrix of core outcomes: conflict, containment and seclusion reduction, and safety.

The assessment of the overall quality of each study was based on common elements of quality criteria indicated in the following sources: Cochrane Musculoskeletal Group scoring for controlled trial reports (Maxwell et al., 2006); the Economic and Social Research Council of the University of Lancaster recommendations for quality evaluation of studies included in narrative syntheses (Popay et al., 2006), and Whittemore and Knafl (2005) for elements of integrative reviews of nursing research. This quality scoring system, adapted from these sources, will

allow “users to make a cursory determination as to whether a study has a higher or lower risk of bias” (Khangura, Konnyu, Cushman, Grimshaw, & Moher, 2010, p. 5).

One limit to interpreting the data for seclusion and staff injury from a patient assault is the variation in standardisation and how rates are reported. Within national boundaries containment and seclusion data has become standardised, but comparability internationally remains difficult (Abderhalden et al., 2007). A similar limit exists with regard to staff injury, as reporting mechanisms in the selected studies varied from self-report questionnaires, management reports and reviews of compensation claims. Also, injuries were not always attributed to a specific cause (accident or assault), criteria for what constitutes an injury or assault varies by study, and in some cases staff injuries, though unreported, were described as a rare event and would not have coloured the results (J. Borckardt, personal communication, March 29, 2014; D. A. Wieman, personal communication, May 7, 2014).

Results

Context

The purposes of the 30 studies, reports or reviews that provide historical context to the included intervention studies are outlined in Table 5. Five of these studies are literature or integrative reviews of intervention outcomes, of which three reviewed the relationship of containment reduction with staff safety. A finding, which is consistent across all of the reviews of containment and seclusion reduction initiatives published from 2005 to 2010, is that the research was often poorly designed and did not allow for causal relationships to be established between interventions and rates of seclusion or safety (Nelstrop, Chandler-Oatts, Bingley, Bleetman, & Corr, 2006; Stewart, Van der Merwe, Bowers, Simpson, & Jones, 2010). From 2011, studies began to be published with improved external validity and reliability, thus resulting in findings of greater generalisability.

Samples

Table 6 highlights the units of analysis and sample sizes of each of the intervention studies. The studies in which staff or patients were the unit of analysis had the largest sample sizes (median = 586), followed by studies that examined episodes of any of the key outcomes (median = 447). Where the unit of analysis was the unit or hospital, the median sample size was two. The population studies ranged from one United States state system to a region of England with 26 National Health Service trusts, all containing tens of thousands of observations. The variability of the samples is an impediment to comparability.

Determining the sample size for statistical power is an important consideration for intervention studies, regardless of randomisation. In the selected studies, the samples seemed to be ones of convenience, with no indication that size of numbers was determined prior to the commencement of the study. While the variability in the units of analysis limits comparability between studies, the selection of samples on the basis of availability increases the risk of bias. This shortcoming is reflected in the trend of the quality scores of the intervention studies from 2005 to 2014 (Figure 1 and Table 8).

Design strength

Of the 28 primary reports of interventions (Table 7), 16 used a simple pre- or post-design with no comparison group, while 12 studies used parallel comparison groups. Of those studies with comparison groups, five used non-randomised samples, while seven had randomised controls, or were large-scale population studies in defined geographical areas, thus ensuring higher external validity. The 28 intervention studies were classified by the strength of the research design using the following scale: 3= randomised design or population study; 2= non-randomised control group; 1= simple pre- or post-test.

Only four of these 28 intervention studies examined changes in rates of all three outcome variables, conflict and staff assault or injury, in the context of a containment reduction initiative. Two of these studies tested discrete interventions, and two tested the systematic implementation of the 6CS.

The studies of discrete interventions had mixed results. (Needham et al., 2004) used structured risk assessment and staff training in aggression management, which decreased containment with no measured change to staff injury or conflict rates. Bowers and colleagues, in two separate studies (Bowers, Brennan, Flood, Lipang, & Oladapo, 2006; Bowers, Flood, Brennan, & Allan, 2008) deployed an experienced change agent (City Nurse); an intervention that did not change rates of containment but was associated with a decrease in conflict and reported injury rates. The particular finding in the City Nurse study – that despite other gains there was no decrease in containment – “was both disappointing and curious, especially as reductions in conflict were achieved (Bowers et al., 2006, p. 171). Two explanations for this phenomenon are likely: staff use seclusion as a matter of local custom, rather than in response to actual conflict; or the threshold at which seclusion was initiated lowered, in line with reductions in conflict, and thus overall containment rates remained the same.

By contrast, the two studies that tested a comprehensive implementation of the 6CS demonstrated statistically significant decreases in conflict and containment, and either a decrease or no change in staff assault (Dean, Duke, George, & Scott, 2007; Putkonen et al., 2013). The study by Putkonen et al. (2013) was in a cluster-randomised setting of males exclusively with a diagnosis of schizophrenia or its subtypes, suggesting the feasibility of these successful outcomes in less extreme patient groups. The population study by Smith et al. (2014), from a sample of nearly 13,000 patient records, found that the 6CS effectively reduced containment and restraint without additional risk to staff safety.

A critique found in most of the review studies was that, in cases where multiple interventions are deployed, it is not possible in even well-designed trials to identify a causal direction as a result of any single intervention. There are exceptions to this critique, however, that point toward advances in research design. Needham et al.’s (2004) study relied on the sequencing of interventions, and Borckardt et al. (2011) deployed a multiple baseline design to identify the effect sizes of discrete interventions.

Quality scoring of studies

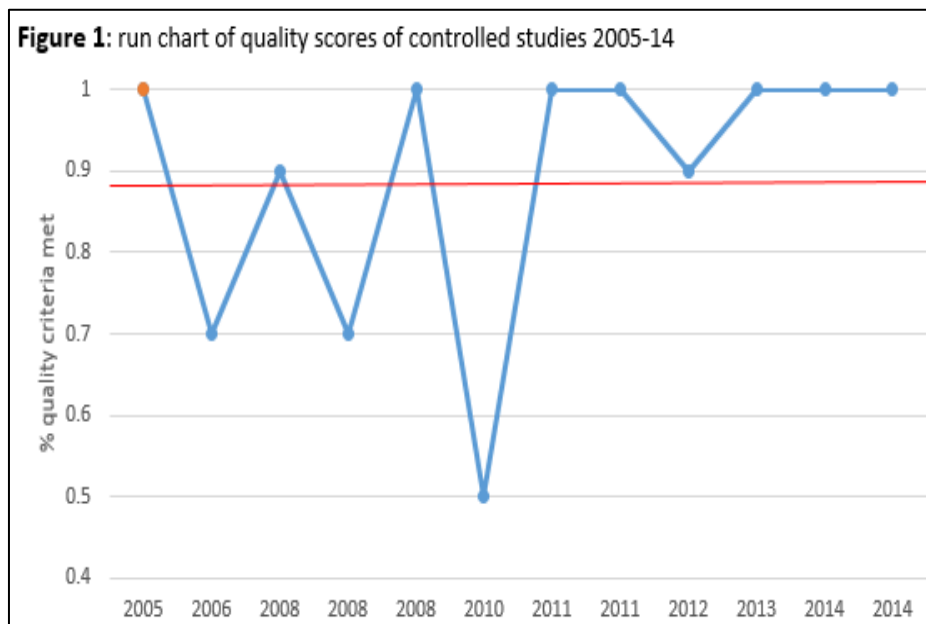
In this synthesis of intervention studies, a variety of study types and designs were included, as discussed above. The challenge with a heterogeneous collection of findings is to establish an overall ‘weight’ for each study. This is important to give the reader a guide to: the appropriateness of the design of the study’s questions, the generalisability of its findings, and the relative level of bias in the study. The guidance on the construction of narrative and integrative reviews (Popay et al., 2006) refers generally to scoring criteria found in Cochrane systematic reviews. While this review is not systematic, in that it does not include a meta-analysis of statistical data, it is possible to draw from the guidance the criteria for scoring that can organise these studies.

The criteria used in this review, which have been adapted from tools identified in the guidance, include: the clarity of the protocol and appropriateness of the design; the explanation of the reliability and validity of measures used; explanations of threats to validity; sample identification and statistical power explained; and statistical significance of findings (*p* value, confidence interval, etc.). Scoring was assigned as a percentage, reflecting the extent to which each of the criteria were present, on a scale of 0 (not present) to 1 (fully present), or n/a (in the case of some population studies). These individual scores were combined to comprise a full quality score for each of the intervention studies (Table 8), which were then arrayed chronologically in a run chart (Figure 1) to identify any quality trend.

Discussion

Systematic reviews of the literature of seclusion reduction, conflict and staff safety, dating from 2005 (Sailas & Wahlbeck, 2005), 2006 (Nelstrop et al., 2006), 2007 (Gaskin, Elsom, & Happell, 2007); (Borckardt et al., 2007), and 2010 (Johnson, 2010; Stewart et al., 2010), have described the difficulty in making sense of these variables, when studies are beset with small samples, lack of rigour in design or execution, non-generalisable findings and overall lack of replicability. In other words, as Sailas and Wahlbeck (2005) called for in their review, the field needs cluster-controlled trials to assess the effectiveness of discrete interventions. Against this call to push for 'gold standard' evidence, is the caution outlined by Gaskin et al. (2007) that the 'gold' might lie instead in the weight of the findings, in all their totality, rather than merely in the replicable isolation of a 'magic bullet' to make seclusion and other containment reduction strategies work safely.

This synthesis attempts to take both of those demands into account in the selection of the literature. In reviewing the timeline of the evolution of the evidence, the quality scores of the 12 controlled intervention studies (Table 8) were plotted by year on a run chart (Figure 1) to detect trends of generalisability. The mean quality score, on a scale of 0 to 1 for the 12 controlled intervention studies is 0.89. Using the mean quality score as the control line we can see in Figure 1 that the studies that appeared after 2011, representing fully half of the sample, consistently rose to a standard of higher reliability and external validity. This run chart describes the emergence of a clearer signal from a noisy background of varying study designs and quality.



Recommendations

The 6CS mark an important shift in mental health care from a situation where containment was the standalone intervention to reduce conflict. The 6CS are approaches designed to shift unit culture to one where containment is less necessary, because proactive nursing results in an atmosphere where aggressive behaviours are reduced. A decade of research on the 6CS does not indicate that there is a standalone intervention that reduces the use of seclusion or restraint. The best designed studies since 2011 consistently show that the 6CS can be effectively implemented, as a comprehensive framework, in a variety of mental health and addiction inpatient facilities, where there is consistent and visible leadership. Critically, for the questions at hand, the studies included here that measured staff assault or injury rates demonstrate that these strategies can be implemented with either no change or some improvement to staff safety.

In other words, while there is no ‘magic bullet’ to safely minimise conflict and seclusion, there is a set of choices.

A model to generate and implement choices that could work to reduce both conflict and seclusion and other containment practices, has been articulated in the Safewards model proposed by (Bowers et al., 2014). Because the domains of the model have at least some modest empirical validity, they provide a way to categorise the recommendations that have emerged in the literature relevant to the question of unit safety and seclusion reduction.

The following recommendations for practice derive from strategies for workforce development, the use of tools, and consumer involvement. These recommendations align with two of the six domains of the Safewards model for generating other innovative practices: structure and physical environment. The other domains of the model are supported by evidence, but are less relevant to this literature, and in some cases are not under local control of the mental health service (such as regulatory framework, out-of-hospital environments, patient characteristics, etc).

Recommendations in the domain of structure include:

- workforce development
- technical mastery in the use of tools to predict and prevent conflict
- consumer participation in event prevention and management.

1. Workforce development

Staff training is not the focus of this review, but it is at the frontline of efforts to reduce violence and aggression as causes for containment, and is frequently referred to, usually without specific explanation, in the description of interventions. However, as an intervention, training is difficult to link causally with identified outcomes, particularly in fluid and complex environments, such as inpatient psychiatry.

In her integrative review of the impact of training programmes on inpatient aggression and violence, Johnson (2010) notes that the complexity of study design needed in order to be able to measure impact on conflict or containment reduction “probably accounts for why researchers choose to study changes in attitudes or beliefs” (Johnson, 2010, p. 193). The following recommendations for training programmes to reduce inpatient conflict and containment (and resulting injuries) are drawn from Johnson’s review.

- **Recommendation 1a:** Training in containment techniques should be linked with principles of conflict management and seclusion reduction. As a primary prevention tool, training would include grounding in principles of trauma-informed care, recovery, promoting human rights, conflict resolution, post-incident support, and cultural support. Decoupling intervention training from these principles into standalone ‘content sets’ can be fruitless at best, and possibly dangerous. Examples drawn from the literature show that isolated training in principles of trauma-informed care and trauma-sensitive language did not make a difference to ward culture, by patient evaluations (Borckardt et al., 2011). Standalone training in physical techniques has been shown to instil an unwarranted confidence that has led to increased rates of containment (Bowers et al., 2006), and promotes a corruption of the unit culture (Stubbs et al., 2009). European Council Guidance, by way of example, requires all staff trained in physical interventions or containment techniques to have undertaken prior training in these grounding areas (Paterson & Duxbury, 2006).
- **Recommendation 1b:** Content and process focussed on reducing challenging behaviours should draw from evaluated training programmes conducted in groups and contexts not necessarily related to mental health or hospital-based care. Two features of behaviour change training (Johnson, 2010) that can be implemented are:
 - adoption of core principles that are then applied to specific situations that learners identify as most relevant to their practice. This avoids giving participants prescriptive strategies, but requires skilled facilitation to enable learners to apply principles creatively to clinical situations involving difficult behaviours
 - learning programmes should be determined in advance with content structured sequentially over time (from week to week). This approach enables evaluation and replication of successful elements, yet remains flexible to respond to learners’ changing needs. Sequencing also facilitates a shift in the focus from secondary or tertiary responses to conflict, towards one of primary prevention.

2. Use of tools to prevent conflict

The use of tools strategy is related to workforce development, in that these require technical mastery, but can be isolated as discrete interventions in an overall strategy. Bowers et al. (2014) identify technical mastery as a source of two contributors to unit safety: emotional regulation of staff members who are confident in skills and understand the limits of those skills, and patient confidence in staff who are able to model emotional regulation. The body of literature included in this review refers frequently to the skilled use of two tools that are consistent

with primary prevention: structured risk assessment as an aid to planning, and sensory tools to promote optimal internal states.

- **Recommendation 2a:** Use structured risk assessment. Early detection and prediction of behaviours that present as aggressive is a critical support for any intervention to reduce the need for coercive measures. Structured risk assessment, using an empirically-derived assessment tool, has demonstrated superior predictive validity to unaided clinical judgment. In the selected studies where risk assessment was an intervention, the use of structured risk assessment was associated with enhanced care planning, cross-shift communications, and reduced episodes of conflict and seclusion.

The Dynamic Appraisal of Situational Aggression version IV (DASA-IV) has emerged in Australia and New Zealand forensic settings as a useful structured risk assessment instrument (Barry-Walsh, Daffern, & Ogloff, 2009). In its first test of predictive validity in non-forensic inpatient units, the DASA-IV demonstrated moderate to high sensitivity for accurately predicting aggression over the next nursing shift and the next 24 hours (Griffith, Daffern, & Godber, 2013). Further, the DASA-IV has an advantage that enhances its utility over other validated predictive tools: it is brief and easy to score, being a seven-point scale with only three structured clinical judgment ratings (low, moderate and high risk).

- Consideration: the authors of the non-forensic study advocate that the initial use of benign interventions that calm or soothe aroused patients have a better chance of success when introduced early as a result of accurate prediction. Even with a strong sensitivity of 68 per cent in the non-forensic trial, the inference is that “approximately a third of all violent acts are committed by ‘low risk’ patients” (Taylor & Large, 2013, p. 579)(Taylor & Large, 2013, p579). This calculation points to what several observational and some controlled studies suggest: environmental modifications and programme activities that optimise arousal or reduce agitation, when available to the community of patients regardless of risk profile, produce a calmer, more predictable unit with reduced need for containment practices. However, routine structured risk assessment opens the opportunity to use benign interventions earlier in an escalation dynamic, and can prevent progression toward the use of restrictive measures.
- **Recommendation 2b:** Use of sensory tools. The most benign, least restrictive way to respond to early prediction of conflict is to moderate the mix of sensory inputs. The most recent long-term studies on the precipitants of inpatient conflict, cite sensory overload or sensory overstimulation as a major factor, along with substance use and trauma history, in aggressive and violent behaviour (Borckardt et al., 2011; Flannery, Staffieri, Hildum, & Walker, 2011; Flannery, 2005).

The use of an approach called sensory modulation, used to promote self-management through deliberate selection of desired sensory inputs, emerged in mental health and addiction inpatient settings the same year the 6CS were published, in 2004 (Champagne & Stromberg, 2004)2004). Sensory modulation, understood as a range of tools for optimising arousal to enhance performance, has applications both to individuals and to the environment. Thus this recommendation overlaps two domains: physical environment, as a primary

prevention tool where spaces are designated for sensory control (e.g. sensory rooms), and technical mastery in staff activity where staff guide patients in the use of sensory inputs to soothe, distract and entrain physiological responses (e.g. selection or use of sensory kits). Recent research in New Zealand demonstrates that the use of these tools promotes calmed, soothed feelings, a sense of self-mastery and the development of rapid rapport with staff who guide patients in its use (Sutton, Wilson, Van Kessel, & Vanderpyl, 2013).

Note: the evidence supporting the use of sensory tools for individuals as a seclusion reduction tool has not yet reached a standard of generalisability. The studies to date are either observational reports of quality improvement initiatives or use a qualitative method. On the other hand, sensory-based approaches to emotional regulation are congruent with both neurobiological and psychological models of safety, and thus have an intuitive consistency with recovery-focussed and trauma-informed care.

3. Consumer participation in service planning

The 6CS specify consumer roles in the inpatient setting as ones where consumers act in a staff role as peer specialists. While this is now a common feature of mental health services in New Zealand and Australia, there was no indication that this role had ever been tested as a strategy to reduce conflict or seclusion. The recommendation here has a focus on staff–patient collaboration in planning treatment and care, including risk assessment for violence and de-escalation preferences. In non-mental health service settings, research has demonstrated the processes and outcomes of consumer participation in service construction and delivery. The conclusion of Uzokurt’s (2010) integrative framework for customer participation points to the relationship between service satisfaction and the degree the customer participated in the construction or delivery of the service. In a therapeutic service setting, a similar effect is found, with consumers experiencing an increased sense of personal efficacy and responsibility for therapeutic outcomes when they participate in change during treatment (Kent & Read, 1998).

- **Recommendation 3a.** When it comes to assessing and planning for risk, ask the person who may know – the patient. In young persons’ inpatient settings, a manualised process rooted in cognitive-behavioural principles, called Collaborative Problem Solving, was shown over the medium to longer term to reduce episodes of aggression, containment and injuries to staff (Martin, Krieg, Esposito, Stubbe, & Cardona, 2008). For adult settings, descriptions of non-manualised patient collaboration planning activities included in this review have been shown to have a significant impact on reducing aggression and containment, with no change in risk to safety (Borckardt et al., 2011; Hamrin, Iennaco, & Olsen, 2009; Qurashi, Johnson, Shaw, & Johnson, 2010; Sullivan et al., 2005). A pilot study testing the predictive validity of self-reported risk of near-term violence against structured risk assessment tools found that the patients’ collaboration added significant utility to structured risk assessment instruments in predicting conflict (Skeem, Manchak, Lidz, & Mulvey, 2013).
- Note: findings from the pilot study in adults are consistent with predictions from consumer participation theories, but the study was tentative, with a small, proscribed sample that excluded

persons with schizophrenia. The study has not been replicated at the time of this report. At a minimum, the act of collaboration may be useful in providing guidance to staff or eliciting a level of rapport that could be useful as a de-escalation tool in the event of an episode.

4. The physical environment

In the “violence triad” of precipitants to assaults on staff, (Flannery et al., 2011) identify the denial of services as one of the most common single precipitants of conflict. For persons seeking safety from a threatening environment, or with out-of-hospital needs, the locked ward door is an icon for the denial of service and is known to be a precipitant for aggression to others, self-harm and medication refusal (Bowers et al., 2014). The impact on self-esteem, the sense of turning a therapeutic environment into imprisonment and the experience of social exclusion promote non-cooperation with the structure of the unit. Sometimes the decision to lock the doors is mandated by the regulatory environment or factors outside unit control, which place more importance on reduced absconding, but the literature consistently points at the importance of mitigating the impact of this ultimate denial of service. Importantly, a systematic review of 25 intervention studies found positive outcomes of reduced behavioural or aggressive incidents regardless of the specific environmental change, design or sensory intervention (Richter & Hoffman, 2014). One strategy to overcome a forbidding aspect of an environment is to heighten the attractive qualities of other aspects. The following recommendations have been shown to support that goal.

- **Recommendation 4a:** Replace the number of available seclusion rooms with de-escalation alternatives to reduce the episodes of seclusion. Transfers to intensive care sections of mental health units were associated with heightened containment, but may be necessary for the safety of others because no better alternatives exist (Bowers et al., 2012). The Safewards framework proposes that having available sensory rooms or quieter areas for de-escalation is likely to produce similar outcomes of safe conflict reduction, without containment. This proposal is supported by a controlled trial, which found that the simple conversion of spaces into more sensory appealing areas was uniquely and significantly associated with reduced containment episodes (Borckardt et al., 2011). There are many ways to implement this recommendation that promote consumer participation, as well as develop technical mastery among staff.
- **Recommendation 4b:** Smaller units promote better management of disturbed behaviour. The Royal College of Psychiatry (1998) recommends that units have no more than 15 beds and psychiatric intensive care units no more than 10 beds. An evaluation of an acute inpatient unit’s move from one 20-bed unit to two 10-bed units found a statistically significant association between the size reduction and reduced rates of seclusion (O’Malley, Frampton, Wijnveld, & Porter, 2007). This finding has been substantiated by the systematic review of physical environment features (Richter & Hoffman, 2014) that found increased numbers of patients promoted incidents resulting in seclusion.

- **Recommendation 4c:** Staff should engage with patients routinely and predictably in structured activities throughout the day. The lack of meaningful activity is a strong motivator for absconding, while the provision of a predictable routine of standardised therapeutic activities throughout the day is known to promote a calmer environment with reduced conflict (Bowers et al., 2014; van der Merwe et al., 2013). Developing these activities presents opportunities for both consumer participation in design or selection of activities.

Conclusion

Generalisable evidence has been emerging since 2011 that the 6CS for seclusion reduction are feasible and effective, across different facility types and service user groups. Randomised trials and large population studies of these strategies show that seclusion reduction can be implemented without additional risk to staff safety. Rates of seclusion and descriptors of conflict have achieved some degree of comparability across national jurisdictions, but information about staff injuries is not standardised nor collected in the same way. This variability in collecting or reporting staff injuries, particularly because this data may have financial repercussions, must be taken into consideration in the design and implementation of studies in this area. Discrete interventions to reduce seclusions, while maintaining safety, have not been shown to be as effective as leader-driven comprehensive implementation of the 6CS. However, specific examples or instances of the strategy identified as “using tools to reduce seclusion” have the most rapidly growing evidence-base. The specific tools that appear most frequently in these studies are structured risk assessment, where those assessments are communicated across shifts, and sensory-based practices by staff or environmental modifications to promote calmed states.

Table 1: Literature search strategies

Databases	Search strategy (and number unique records)
Medline	1 Patient Isolation/ (3117) 2 Psychiatric Nursing/ (15144) 3 Hospitals, Psychiatric/ma, og, st, td [Manpower, Organisation & Administration, Standards, Trends] (2949) 4 Mental Health Services/ma, og [Manpower, Organisation & Administration] (7492) 5 Attitude of Health Personnel"/ (89961) 6 Patient Isolation/ (3117) 7 Restraint, Physical/ (9944) 8 Violence/pc [Prevention & Control] (4756) 9 Safety Management/ (16242) 10 2 or 3 or 4 (24649) 11 6 or 7 or 8 or 9 (33121) 12 10 and 11 (626) 13 limit 12 to (English language and yr="2004 - 2014") (299) 14 5 and 13 (85)
PsycINFO	1 exp Patient Seclusion/ (371) 2 limit 1 to (English language and yr="2004 - 2014") (224) 3 exp Safety/ (14612) 4 exp Violence/ (55205) 5 3 or 4 (69149) 6 2 and 5 (40)
CINAHL	MW patient seclusion AND MJ (workplace violence or patient assault) NOT (aged or 65+ or forensic or dementia or intellectual disability) AND LA English Limiters – Published Date 20040101-20140101 12 records

Table 2: Inclusion and exclusion criteria

Inclusion criteria	Peer-reviewed research from 2004 to 2014 related to these three key outcomes in adult or youth inpatient psychiatric units: containment, conflict, safety from assault or injury.
Exclusion criteria	Studies of staff knowledge and attitudes toward any of the key outcomes. Non-New Zealand dissertations or theses; studies where students were subjects or participants; units of forensic or older person populations; and non-psychiatric facilities. Studies of mechanical restraint.

Table 3: Data reduction criteria

Criteria	Scoring (descending order of influence)
Relevance	<p>3=Study tests impact of containment reduction interventions on conflict or safety</p> <p>2= Study measures impact of interventions to reduce rates of containment or conflict or rates of injury or assault</p> <p>1= Study measures rates of, staff experience with, and predictors of aggression, assault, injury or containment</p>
Design strength	<p>3= population study or field experiment with randomly selected comparison group</p> <p>2= field experiment with non-randomised comparison group</p> <p>1= simple pre- or post-experiment</p> <p>0= literature, integrative or systematic review; qualitative, descriptive, or case studies</p>
Study quality	<p>Studies were scored by percentage of agreement with following quality criteria:</p> <ul style="list-style-type: none"> • design and protocol clearly presented • measures are identified and reliability and validity is referenced where appropriate • threats to validity of findings are accounted for • sample is identified clearly and power calculations provided • statistical significance is identified.

Table 4: Study selection and reduction schema

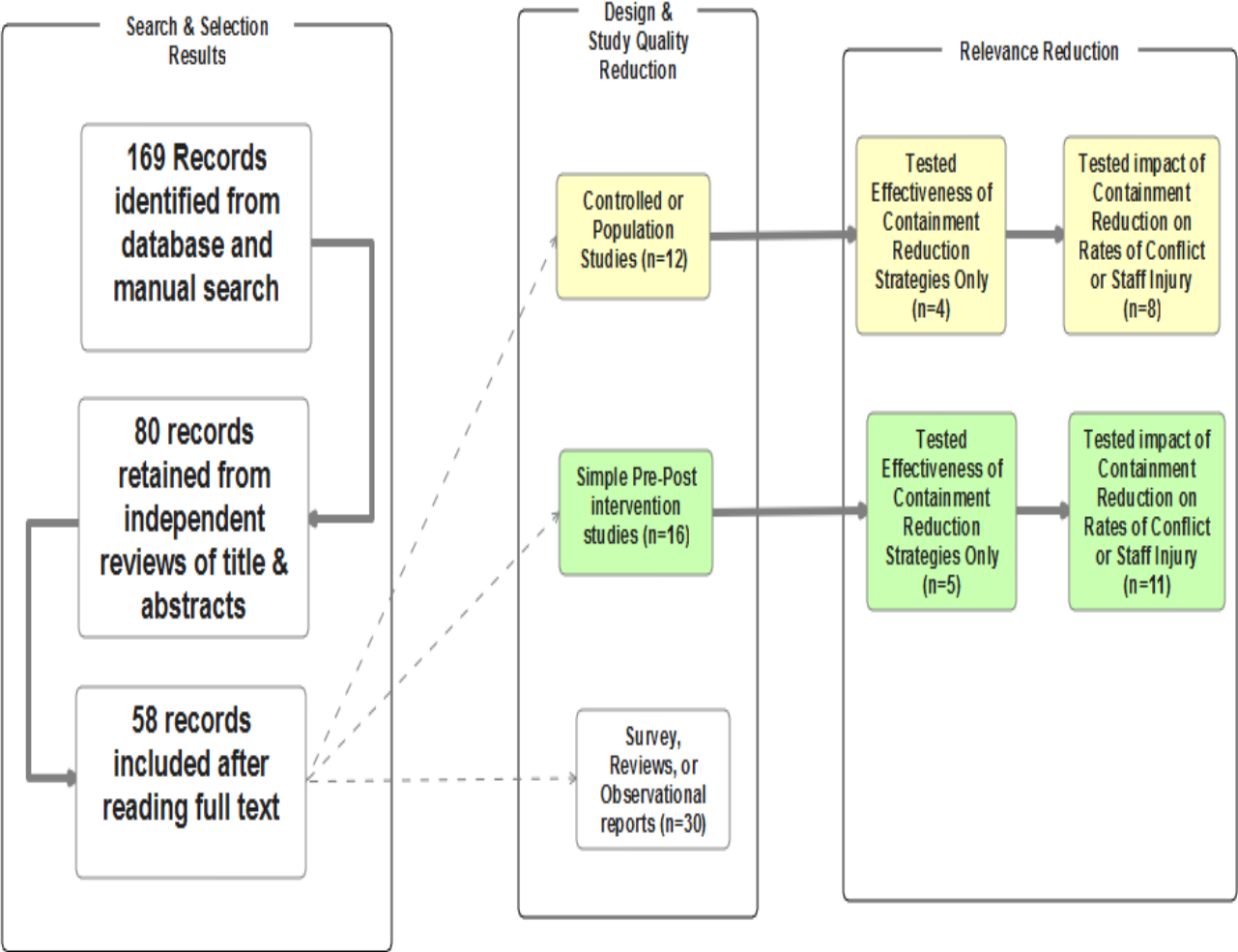


Table 5: Summary of purposes of non-intervention studies

First author	Year	Purpose	Design	Relevance in descending order
Khadivi	2004	Examine relationship of a seclusion reduction intervention on all aspects of patient violence	Retrospective review of 458 seclusion episodes to identify correlates with these episodes	3
LeBel	2005	Calculate cost of use of restraint in one adolescent unit, and the cost impacts of reducing restraint	Time-motion and cost analysis of over 4000 episodes	3
Nelstrop	2006	Assess effectiveness of seclusion reduction for safety	Systematic review of 36 eligible studies from 1985 to 2002	3
Johnson	2010	Effect of training programmes on seclusion reduction	Integrative review of 46 papers	3
Sailas	2005	Review of early stage interventions	Literature review	2
Abderhalden	2007	Measure rates of conflict	Literature review	2
Gaskin	2007	Review use of non-pharmacologically related seclusion reduction methods	Systematic review of 16 eligible papers	2
Hamrin	2009	Review factors associated with aggression using Public Health model	25-year review of evaluations of inpatient aggression	2

Table 5: Summary of purposes of non-intervention studies

First author	Year	Purpose	Design	Relevance in descending order
Bowers	2009	Review of factors associated with aggression	Prospective audit	2
Stewart	2010	Examine effectiveness of interventions to reduce seclusion and restraint	Literature review	2
Whittington	2012	Measure trends in use of physical interventions in relation to repeated episodes of aggression by particular patients	Five-year retrospective review	2
Sullivan	2005	Measure rates of seclusion and restraint and staff injury	Five-year retrospective study	1
Borckardt	2007	Review use of seclusion reduction methods	Literature review	1
Flannery	2007	15-year review of characteristics of assaulted staff	Retrospective review of Assaulted Staff Action Program records	1
Janssen	2007	Predictors of staff mix in seclusion use	Retrospective audit	1
Bigwood	2008	Nurse experience of restraint, using descriptive phenomenological method	Interview of seven registered nurses	1
El-Badri	2008	Identify patient and staff evaluations of seclusion	Survey	1

Table 5: Summary of purposes of non-intervention studies

First author	Year	Purpose	Design	Relevance in descending order
Bowers	2009	Assess relationship of patient aggression to other variables (containment methods, demographics, etc)	Cross-sectional study of 6-month time period	1
Lepping	2009	Evaluate perceptions of ward safety in Germany, Switzerland and UK	Survey of 144 ward managers	1
Stubbs	2009	Assess link between physical intervention training and aggression	Literature review	1
Happell	2010	Identify attitudes toward seclusion	Survey	1
Happell	2010	Compare demographics of secluded and non-secluded patients	Retrospective audit from Australian mental health facilities	1
De Benedictis	2011	Identify staff perceptions and organisational factors as predictors of containment	Interview of 309 direct care staff in Quebec	1
Mann-Poll	2011	Identify factors promoting seclusion decisions	Vignette analysis	1

Table 5: Summary of purposes of non-intervention studies

First Author	Year	Purpose	Design	Relevance in descending order
Tyrer	2012	Describe seclusion at Southland DHB (NZ)	Observational	1
Swadi	2012	Determine rate, process and indications for use of containment at an adolescent mental health unit (Christchurch)	Prospective	1
Baby	2013	Describe impact of violence on nurses	Qualitative	1
Knowles	2013	Invited commentary	n/a	1
Luckhoff	2013	Measure rates of assault and seclusion in South Africa	Retrospective audit	1
Janssen	2013	Examine impact of patient characteristics on seclusion	Retrospective audit	1

*Relevance score: 3=Study tests impact of containment reduction interventions on conflict or safety; 2= Study measures impact of interventions to reduce rates of containment or conflict or rates of staff injury and assault; 1=Study measures rates of, staff experience with, and predictors of aggression, assault, injury or containment.

Table 6: Unit of analysis and samples size for all intervention studies (n=28)

Geographical Region / Hospital System (n=3)	Hospital (n=2)	Ward or Unit (n=10) median=2	Individuals (staff/patient) (n=9) median = 586	Episode (n=4) mean=447
Bowers, 2009 (n= 26 NHS Trusts)	Smith , 2005 (n=9)	(Dean 2007) (n=1)	McCue, 2004 (n=10753)	Khadivi, 2004 (n=458)
Smith, 2014 (n=1 state system)	Qurashi, 2010 (n=1)	Bowers, 2006 (n=2)	Needham, 2004 (n=576)	Fralick, 2007 (n=16)
Wieman, 2014 (n=1 state system)		Lipscomb, 2006 (n=6) Bjorkdahl, 2007 (n=2) O'Malley, 2007 (n=1) Pollard, 2007 (n=1) Abderhalden, 2008 (n=14) Lewis, 2009 (n=5) Putkonen, 2013 (n=4) Woolaardt, 2014 (n=1)	Noorthoorn, 2008 (n=1470) Cummings, 2010 (n not given) Lee, 2010 (n=43) Borckardt, 2011 (n=786) Moylan, 2011 (n=125) van de Sande, 2011 (n=597) Sivak, 2012 (n=113)	Bowers, 2008 (n=5316) Papadopoulos, 2012 (n=436)

Table 7: Summary of intervention studies, by design and outcome

Design Strength = 3	First Author	Year	Intervention	Variables of Interest			Outcomes		
				Conflict	Containment	Safety	Conflict (violence, aggression)	Containment (seclusion, restraint)	Safety (assault, injury)
Population study or randomised control group (n=7)	Smith	2005	Leadership support, policy change, higher Staff:Pt ratio (smaller ward); PERT, 2nd gen antipsychotics	-	+	+	-	DECREASE episodes (p=.03); DECREASE duration (p<.01)	NO CHG
	Abderhalden	2008	Structured repeated risk assessments (SRA), instrument contained salient remedial measures related to increasing risk	+	+	-	DECREASE episodes 41% (severe)(CI .54-.82)	DECREASE episodes 27% (CI 1.35-1.75)	-
	Borkhardt	2011	Training: 2 TIC training programs (theory and language); Ward Practice: changes to phys environment, collaborative safety planning	-	+	-	-	DECREASE in rates of all containment (p=.008)	NO CHG*
	van de Sande	2011	daily use of BVC and weekly use of 4 other validated, complementary short term risk assessment tools to identify risk of escalation	+	+	-	DECREASE episodes 68% (p<.001)	NO CHG number episodes; DECREASE duration by 45% (p<.05)	-
	Putkonen	2013	6CS training with 6 month follow up supervision to develop and implement local practice	+	+	+	DECREASE episodes (p<.001)	DECREASE episodes (p<.001)	NO CHG
	Wieman	2014	6CS implementation	-	+	-	-	DECREASE episodes 17% (p=.002); DECREASE duration 19% (p=.001)	-
	Smith	2014	6CS; elimination of psychiatric PRN orders	-	+	+	-	DECREASE episodes 0.21 to 0.01 per 1000 days (p.003)	NO CHG
Design Strength = 2	First Author	Year	Intervention	Conflict	Containment	Safety	Conflict (violence, aggression)	Containment (seclusion, restraint)	Safety (assault, injury)
Non-Randomised control group (n=5)	Lipscomb	2006	training (non-specified risk assess, de-escalation, breakaway techniques), management commitment, staff participation, functional environment modification	-	-	+	-	-	NO CHG (p=.95; .p=.65 for mild/mod injury)
	Bowers	2008	Deploy part-time clinical expert on staff ("City Nurse"), to promote 'high therapy' nursing model	+	+	-	NO CHG	NO CHG	-
	Noorthoorn	2008	12 interventions related to ward culture, family and pt involve,ment, and clinical practice	-	+	-	-	DECREASE episodes (p<.000); DECREASE duration (p=.001)	-
	Cummings	2010	sensory room access with related sensory modulation activities	-	+	-	-	NO CHG	-
	Papadopoulos	2012	patient centered, staff centered, practice or ward centered interventions	+	+	-	DECREASE (p<.01)	DECREASE episodes (p<.01)	-

Table 7: Summary of intervention studies, by design and outcome

Design Strength = 1	First Author	Year	Intervention	Variables of Interest			Outcomes		
				Conflict	Containment	Safety	Conflict (violence, aggression)	Containment (seclusion, restraint)	Safety (assault, injury)
Simple Pre/Post (n=16)	Dean	2004	individualized patient management plans, early detection and prevention, staff training, reinforcement of appropriate behaviors, and intervention using the least restrictive option.	+	+	+	DECREASE episodes (p<.05)	DECREASE episodes (p<.05); DECREASE duration (p<.001)	DECREASE episodes (p<.05)
	McCue	2004	Daily pt/staff meetings, Daily review of incidents, pt education	+	+	.	DECREASE (p<0001)	INCREASE/NChg, initial incr; return to baseline @ 6mos	-
	Needham	2004	phase1 Risk Assessment; phase 2 Staff AM Training	+	+	+	NO CHG	DECREASE episodes (p=.0008)	NO CHG
	Bowers	2006	Implement clinical expert on staff ("City Nurse") to promote 'high therapy nursing model	+	+	+	DECREASE episodes (p<.001)	NO CHG	DECREASE episodes (p<.002)
	Bjorkdahl	2007	New Staff- expert clinical nurse, adoption of primary nursing model, Risk assess (BVC)	.	+	+	.	INCREASE episodes (p=.0001)	DECREASE (nonsign p=.11)
	O'Malley	2007	Move to a new unit sized to reduce seclusions	.	+	.	.	DECREASE episodes (p=.0001)	.
	Pollard	2007	Application of new regulatory standards to reduce containment	+	+	.	DECREASE (p=.004)	DECREASE duration (p<.001)	.
	Fralick	2007	QI Program of 3 years to reduce rates of restraint in youth	-	+	-	-	DECREASE episodes and duration: not specified	-
	Lewis	2009	Public Health Prevent Model: Prim (environment focus); Secondary (patient specific - Safety plan and sensory modulation; Tertiary (event analysis and debrief)	.	+	+	.	DECREASE 75% episodes (significance not given)	NO CHG
	Lee	2010	customised sm strategies	.	+	.	.	DECREASE episodes (significance not given)	.
	Qurashi	2010	Transparency of information; Collaborative care planning, audit/peer review, clin leadership; pt involvement	+	+	+	.	DECREASE 67%/5 yrs (significance not given)	DECREASE 63% (all types) (sign not given)
	Moylan	2011	policy change to least restrictive practice, not otherwise described	.	.	+	.	.	INCREASE (significance not given)
	Jayaram	2012	Pre-identified aggressors treatment documented on form designed to promote less restrictive care	+	+	.	DECREASE (significance not given)	DECREASE (significance not given)	.
	Sivak	2012	Pts assessed as requiring a calm space invited to use comfort room	.	+	.	.	DECREASE (significance not given)	.
	Mann-Poll	2013	Didactic and problem-solving training for attitude change	.	+	.	.	NO CHG	.
	Wolfhaardt T	2014	6CS Programme	.	+	.	.	DECREASE (significance not given)	.

* personal communication from author: assaults on staff not measured as they are rare occurrence and author doubts "whether any examination would be colored by a floor effect."

Table 8: Quality score of generalisable studies

First author	Year	Quality score*	QS1: design, protocol clear	QS2: R&V of measures used	QS3: threats to validity explained	QS4: sample identified and power calculations	QS5: significance explained (p value, confidence intervals, etc)	Design
Smith	2005	1	1	n/a	n/a	1	1	Population
Lipscomb	2006	0.7	1	0	1	0.5	1	Non-randomised
Bowers	2008	0.9	1	1	1	0.5	1	Non-randomised
Noorthoorn	2008	0.7	1	0	1	0.5	1	Non-randomised
Abderhalden	2008	1	1	1	1	1	1	Randomised
Cummings	2010	0.5	1	0	1	0.5	0	Non-randomised
Borckardt	2011	1	1	1	1	1	1	Randomised
van de Sande	2011	1	1	1	1	1	1	Randomised
Papadopoulos	2012	0.9	1	1	1	0.5	1	Non-randomised
Putkonen	2013	1	1	1	1	1	1	Randomised
Smith	In press	1	1	n/a	n/a	1	1	Population
Wieman	2014	1	1	1	n/a	1	1	Population

*Calculated as percentage of applicable criteria met (1=met; 0=unmet).

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