Appendix F. Summary of Findings for Pre-Post Studies, Not Rated for Risk of Bias

| **Intervention,**  **Citation,**  **Sample Size,**  **Length of Followup** | **Population:**  **Diagnosis Type,**  **Country, Setting** | **Intervention:**  **Components,**  **Duration,**  **Number of Patients** | **Comparator:**  **Duration,**  **Number of Patients** | **Outcomes:**  **Benefits,**  **Harms** | **Results** |
| --- | --- | --- | --- | --- | --- |
| **Staff Training**  Bowers et al., 20061  5,384a  31 months | Inpatients admitted to acute psychiatric units (one female-only, a second an assessment unit, and the remainder mixed-gender units serving specific localities)  U.K.  Acute admission psychiatric units (n=14) in 3 hospital sites (private or public status NR)b | PMVA training, 31 monthsc (n=NR)  Components:  PMVA training consisted of either five-day foundation course or one-day annual update course.  Five-day course components: prediction, anticipation, and prevention of violence; reporting requirements; role of personal, environmental, and organizational factors in violence reduction; responses to aggression (de-escalation, communication skills, problem solving, and negotiation); and principles and practice of breakaway and manual-restraint skills.  Update course components: Manual-restraint skills only | Usual care, 31 monthsc (n=NR) | Benefits:  Physical aggression;  Verbal aggression;  Property damage  Harms: NR | Statistically significant changes for five-day course in below outcomes (within week-specific timeframes):  Greater physical aggression associated with training attendance in the same week (IRR=1.5, p<0.001);  Greater verbal aggression associated with training attendance in the same week (IRR=1.34, p=0.042).  No results reported for the five-day course within 4-week month timeframes.  Statistically significant changes for update course in below outcomes (within 4-week month timeframes):  Greater physical aggression associated with training attendance of the update course one month prior to the incident (IRR=1.17, p<0.001);  *Less* verbal aggression one month prior to the incident (IRR=0.79, p=0.019), but greater verbal aggression associated with training attendance of the update course two months prior to the incident (IRR=1.13, p=0.026).  Statistically significant changes for update course in below outcomes (within week-specific timeframes):  Trend toward association of greater physical aggression with training attendance in the preceding week (p=NR). |
| Bowers et al., 20061  (continued) |  |  |  |  | Greater physical aggression associated with training attendance three weeks prior (IRR=1.17, p=0.04), and four weeks prior to the incident (IRR=1.2, p=0.019);  Greater verbal aggression associated with training attendance in the same week (IRR=1.21, p=0.038).  The following outcomes did not have statistically significant decreases:  No relationship between rates of property damage and previous five-day and update course attendance (p=NR). |
| **Staff training**  Chang et al., 20142  NR  8 months | Adult inpatients with a psychotic disorder  U.S.  Psychiatric hospital | Recovery-oriented cognitive therapy staff training program, 4 months (n=NR)  Components:  Staff participated in an 8 hour CT-R workshop organized into 2-hour weekly sessions over 4 weeks (8 hours total). Each weekly session repeated 5 times to ensure all trainees could attend. Psychiatrists and the senior psychologist received a condensed version (4 hours total);  Goals of program included:  Promoting staff empathy, warmth, and genuineness and an understanding of challenging behaviors; | Usual care, 4 months (n=NR) | Benefits:  Seclusion and restraint incidents  Harms: NR | Seclusion and restraint incidents declined from 19 in the 4 months prior to the intervention to 7 in the 4 months after, no statistical analyses due to limited number of cases |
| Chang et al., 20142  (continued) |  | Developing tools to allow staff to prevent patients’ maladaptive behavior from escalating to the point of physical or chemical intervention |  |  |  |
| **Staff training**  Laker et al., 20103  195d  12 months | Multiethnic inpatients admitted to a psychiatric ICU with schizophrenia-related, bipolar-related, or other conditions, many of whom also engaged in comorbid substance use  U.K.  Single psychiatric ICU | De-escalation and restraint training emphasizing prevention of aggressive incidents, 6 months (n=103e)  Components: NR | Usual care, 6 months (n=96e) | Benefits:  Overall rates of aggressive incidents;  Proportions of aggressive incidents (severe incidents, any requiring HO management, and any requiring use of RT);  Severity of aggressive incidents (defined dichotomously as “severe” or “not severe”)f  Harms: NR | Unadjusted outcomes not statistically significant, but all showed reductions post-intervention:  Overall rate of aggressive incidents (from 89 incidents [79%] to 91 incidents [66%], IRR [95% CI] = 0.986 [0.754 to 1.29], p=0.92)  Proportion of aggressive incidents classified as severe (from 89 incidents [79%] to 91 incidents [66%], OR [95% CI] = 0.577 [0.322 to 1.034], p=0.064)  Proportion of aggressive incidents requiring need for use of RT (from 89 incidents [79%] to 91 incidents [66%], OR [95% CI] = 0.876 [0.442 to 1.735], p=0.704)  Reduction in proportion of aggressive incidents requiring HO management by staff (from 89 incidents [79%] to 91 incidents [66%], OR [95% CI] = 0.517 [0.237 to 1.128], p=0.097)  Only one statistically significant adjustedg outcome:  Reduction in proportion of aggressive incidents requiring HO management by staff (from 89 incidents [79%] to 91 incidents [66%], OR [95% CI] = 0.398 [0.168 to 0.94], p=0.036) |
| Laker et al., 20103  (continued) |  |  |  | Benefits:  Cost of training  Harms: NR | Other adjustedg outcomes not statistically significant, but all showed reductions post-intervention:  Overall rate of aggressive incidents (1.7% lower post-training than pre-training, IRR [95% CI]=0.983 [0.74 to 1.3], p=0.905);  Proportion of aggressive incidents classified as severe (from 48 [55%] to 44 [42%], OR [95% CI]=0.59 [0.29 to 1.19], p=0.142);  Proportion of aggressive incidents requiring need for use of RT (from 45 [39%] to 51 [36%], OR [95% CI]=0.523 [0.226 to 1.209], p=0.129)  Overall staff cost for training to the psychiatric ICU: £69,285.25 (see below for component costs)  Cost of training all staff members: £12,555.00  Cost of trainers and facilities to provide training for psychiatric ICU, including extra 20% for costs of venue, overheads, trainer supervision, trainer appraisals, and initial training for trainers: £47,100.00h  Total costs of replacement psychiatric ICU staff while permanent staff were trained: £9,630.25 |
| **Multimodal**  Bowers et al., 20064  NR  15 months | NR  U.K.  two psychiatric wards in a hospital (private or public NR) | Nurse-led intervention, 12 months (n=NR)  Components:  Experienced psychiatric acute inpatient nurse delivered intervention; worked directly with unit staff 3 days per week to move toward low-conflict low-containment, high therapy nursing | Usual care, 3 months (n=NR) | Benefits:  Verbal aggression;  Physical aggression against self;  Physical aggression against others;  Seclusion rates;  Restraint rates;  Enforced i.m. medication use rates  Harms:  Suicide attempts | Statistically significant decreases in the below benefit outcomes:  Verbal aggression (from 0.64 to 0.36 mean incidents per shift, p<0.001);  physical aggression against self (0.03 to 0.01 mean incidents per shift, p=0.004);  physical aggression towards others (0.10 to 0.08 mean incidents per shift, p=0.002)  The following benefit and harm outcomes did not have statistically significant decreases:  Seclusion (from 0.011 to 0.007 mean incidents per shift, p=0.51)  restraint (from 0.039 to 0.032 mean incidents per shift, p=0.571)  enforced i.m. medication use (from 0.035 to 0.031 mean incidents per shift, p=0.626)  suicide attempt rates following implementation of the intervention (from 0.004 to 0.003 mean incidents per shift, p=0.9) |
| **Multimodal**  Bowers et al., 20085  NR  15 to 24 monthsi | NR  U.K.  Three acute admission psychiatric wards (private or public status NR)j | Nurse-led intervention, 3-12 months (n=NR)  Components:  Experienced psychiatric acute inpatient nurse delivered intervention; worked directly with unit staff 3 days per week to move toward low-conflict, low-containment, high therapy nursing | Usual care, 12 months (n=NR) | Benefits:  Verbal aggression;  Physical aggression against objects;  Physical aggression against others;  Physical aggression against self;  Seclusion rates;  Restraint rates;  Enforced i.m. medication use rates  Harms:  Suicide attempt rates | Statistically significant decreases in below outcomes:  Verbal aggression (from 0.56 to 0.44 mean incidents per shift, p=0.001);  physical aggression against objects (from 0.14 to 0.09 mean incidents per shift, p=0.002);  physical aggression against others (from 0.1 to 0.06 mean incidents per shift, p=0.001)  seclusion rates (from 0.02 to 0.01 mean incidents per shift, p=0.019)  restraint rates (from 0.06 to 0.03 mean incidents per shift, p=0.017)  enforced i.m. medication use (from 0.069 to 0.04 mean incidents per shift, p=0.003)  The following outcomes did not have statistically significant decreases:  physical aggression against self (from 0.075 to 0.084 mean incidents per shift, p=0.232)  suicide attempt rates (from 0.008 to 0.003 mean incidents per shift, p=0.098) |
| **Multimodal**  Currier et al., 20026  NR  6 months | Adult psychiatric inpatients  U.S.,  Three units (General Adult Unit, Chemical Abuse Unit, Neurogeriatric Unit) in an academic psychiatric hospital | HCFA One-hour rule, 3 months (n=NR)  Components:  Face-to-face assessment within one hour of initiation of S/R  Shortened interval between mandatory renewal orders  Required specific staff training  More stringent requirements for documentation | Usual care, 3 months prior to intervention (n=NR) | Benefits:  Restraint use (episodes, duration)  Harms:  Injury to staff;  Falls (on neurogeriatric unit) | General Adult Unit:  Episodes of restraint decreased 85.0%, from 20 to 3, and mean duration decreased 72.1%, from 8.6 to 2.4 hours (both p’s=NR)  Chemical Abuse Unit:  Episodes of restraint increased by 46.7%, from 15 to 22, while mean duration decreased 24.5%, from 11 to 8.3 hours (both p’s=NR)  Neurogeriatric Unit:  Episodes of restraint decreased by 81.1%, from 37 to 7, and mean duration decreased 23.4%, from 4.7 to 3.6 hours (both p’s=NR)  No increase in rate of injuries to staff by patients, but significant increase in number of patient falls without injury on neurogeriatric unit (both p’s=NR) |
| **Multimodal**  D’Orio et al., 20047  NR  18 months | Adult emergency service patients (35% substance use disorders, 25% psychotic disorders)  U.S.  Psychiatric emergency service | Comprehensive Plan, 9 months (n=NR)  Components:  Implementation of a response team for behavioral emergencies (code team)  Staff training in the preventive management of aggressive behavior with an emphasis on development of verbal de-escalation | Usual care, 9 months prior to intervention (n=NR) | Benefits:  Seclusion and restraint use (episodes)  Harms: NR | Mean episodes of seclusion and restraint per month decreased 41.5%, from 65 to 38 (p<0.001) |
| D’Orio et al., 20047  (continued) |  | Implementation of modified versions of the Overt Agitation Severity and the Overt Aggression Scales to assist in patient risk assessment. |  |  |  |
| **Multimodal**  Emmerson et al., 20078  NR  43 months | Adult psychiatric inpatients  Australia  Public mental health hospital | 4T Aggression Management Strategy, 24 months  (n=NR)  Components:  Team work: Human Error and Patient Safety Program (HEAPS) implemented; MD and unit manager identified patients at risk for aggression  Training: Full-time aggression management trainer appointed; One day aggression management training for staff (83% completion)  Treatment: New protocols instituted for PRN medication and “rapid tranquilization”  Tools: New risk screening tool employed; personal duress alarm system installed for staff; full-time occupational therapy assistant hired for each ward HEAPS | Usual care, 19 months prior to intervention (n=NR) | Benefits:  Aggressive behavior incidents  Harms:  Staff injuries;  Medication adverse effects | Total aggressive incidents decreased by 40% in first year of intervention (p=NR). Average aggressive incidents per month decreased 25.4%, from 17 to 13 (p<0.01);  Total number of staff injuries decreased by 56% in second year of intervention (p=NR). Average total number of monthly staff injuries decreased 41.8%, from 4 to 2.3, p<0.01);  No significant increase in sedation related adverse effects (p=NR) |
| **Multimodal**  Forster et al., 19999  5570k  24 months | Patient clinical characteristics NR, but all evaluated in the Psychiatric Emergency Service or admitted for inpatient treatment  U.S.  Urban acute care, inpatient psychiatric hospital (Psychiatric Emergency Service and four locked inpatient wards) | Hospital-wide quality improvement effort combining hospital S&R policy review, staff training (including staff experiencing restraint firsthand), regular discussion of S&R on units, and hospital-wide publicity of effort, 12 months (n=3,010l)  Components:  Creation of Management of Assaultive Behavior workgroup to evaluate hospital policies regarding S&R use and recommend changes, with full support by hospital administration;  Mandatory full-day “prevention of assaultive behavior” course for all staff members with any patient contact: key components noted include charismatic program leader; having each staff member experience 5-point restraints first-hand; training in hands-on self-defense and optimal “containment” techniques to minimize risk of injury; treatment teams training together; and hospital administrators’ active participation.  3) Weekly discussion items about S&R during local wards’ team meetings and hospital-wide publicity charting ongoing progress of effort | Usual care, 12 months prior to intervention (n=2,560m) | Benefits:  Restraint use (rate);  Seclusion or S&R (duration per episode)  Harms:  Staff injuries | All improvements (decreases) in outcomes:  Total annual rate of restraint decreased 13.9% overall, from 2,379 episodes per 2,560 admissions, to 2,380 episodes per 3,010 admissions  Average duration of seclusion or S&R per episode decreased 54.7%, from 13.9 hours/episode to 6.3 hours/episode  Staff injuries reduced 18.8%, from 48 to 39  Statistical significance of pre/post changes not evaluated |
| **Multimodal**  Hellerstein et al., 200710  NR  87 months | Adult psychiatric inpatients  U.S.  Single unit (Community Services clinical unit) in public psychiatric hospital | Three-component intervention, 67 months (n=NR)  Components:  Policy change to limit S/R to 2 hours before a new order required  Education of staff on identification of at risk patients and early intervention options  Use of Coping Agreement questionnaire to assess patient preference for dealing with agitation | Usual care, 20 months prior to intervention (n=NR) | Benefits:  Restraint use (number of patients, duration, duration rate);  Seclusion use (number of patients, duration, duration rate)  Harms: NR | Mean number of patients restrained per month decreased 47.4%, from 0.19 to 0.1 (p=NR)  Total hours of patients restrained/month decreased 70.3%, from 1.5 to 0.4 (p=NR)  Mean number of patients secluded per month decreased 75.5%, from 2.3 to 0.6 (p=NR)  Total hours patients secluded per month decreased 95.0%, from 28.9 to 1.5 (p=NR) |
| **Multimodal**  Jonikas et al., 200411  NR  30 months | Adult psychiatric inpatients; majority with mood or psychotic disorder  U.S.  Two units (General Psychiatry, Clinical Research) of a university hospital | Two-component intervention to reduce restraints, 15 months  (n=NR)  Components:  Advance crisis management training to teach patients how to determine personal triggers and staff to collaboratively create individualized crisis management plans  Nonviolent crisis intervention training (per Crisis Prevention Institute, Inc.) to teach staff to recognize factors precipitating crisis and management of aggressive behaviors | Usual care, 15 months prior to intervention (n=NR) | Benefits:  Restraint rate (patient hours per quarter)  Harms: NR | General Psychiatry Unit:  85% decrease in restraint rate one quarter after both trainings; 99% decrease two quarters after both trainings (both p’s=NR)  Clinical Research Unit:  51% decrease in restraint rate in first quarter after crisis management training; 49% decrease in restraint rate in second quarter after crisis intervention training (both p’s=NR) |
| **Multimodal**  Khadivi et al., 200412  NR  24 months | Adult psychiatric inpatients  U.S.  Large, inner city community hospital with academic affiliation | JCAHO standards, no date provided, 12 months (n=NR)  Components:  Staff education: focus on early recognition of agitation and early intervention  Addition of history of inpatient violence to admission forms  Continuous nursing monitoring to minimize duration of seclusion and restraint episodes  Post-episode debriefing of staff and patient, senior nurse and physician review of each episode | Usual care, 12 months prior to intervention (n=NR) | Benefits:  Seclusion and restraint (episodes);  Harms:  Assaults (on staff, patients);  Self-destructive behavior | Episodes of seclusion and restraint decreased from 310 to 148 (p<0.01)  Assaults on staff increased from 31 to 83 (p<0.01)  Assaults on patients increased from 67 to 85 (p<0.05)  Self-destructive behavior decreased from 27 to 24 (p=NS) |
| **Multimodal**  Melson et al., 201413  462  54 months | Adult inpatients (with and without DT)  U.S.  General medical hospital | Alcohol withdrawal care management guideline, 12 months (n=NR) – AUDIT-PC added to all nursing assessments to screen for alcohol withdrawal risk  Components:  If AUDIT-PC score 5 or higher, CIWA-Ar administered  If CIWA-Ar score 8 or below patient monitored for symptoms  If CIWA-Ar score 9 or greater treatment algorithm followed | Usual care, 9 months prior to intervention (n=NR) | Benefits:  Restraint use (in patients with DT)  Harms: NR | Restraint use decreased post-intervention after 15 months from 60.4% to 44.4% (p=NS) |
| **Multimodal**  Pollard et al., 200714  NR  46 months | Adult psychiatric inpatients  U.S.  Veteran’s Administration Hospital (public psychiatric hospital) | JCAHO 2000 standards, 18 months (n=NR)  Components:  Facility policies and procedures updates to reflect expanded leadership involvement in S/R usage (including review of all episodes of restraint)  Senior leadership commitment to a restraint free environment expressed through videotapes  Discussions between leadership and staff about alternatives to S/R, exploration of staff concerns  Positive feedback for use of alternative strategies  Committee to identify opportunities for improvement of care and patient safety  Review of performance data by clinical executive committee and leadership review of all episodes of behavioral restraints for appropriateness and documentation | Usual care, 28 months prior to intervention (n=NR) | Benefits:  Seclusion and restraint hours (both per patient and overall hours), risk adjusted by acuity;  Critical incidents in 24 hours  Harms: NR | Mean S/R hours decreased 69.2%, from 182 to 56 (p<0.001)  Hours in S/R per patient decreased 68.6%, from 8.6 to 2.7 (p<0.001)  Critical incidents in 24 hours decreased 36.4%, from a mean of 1.1 to 0.7 (p=0.004) |
| **Environmental or Group Psychotherapeutic**  Canatsey et al., 199715  1,031f  24 months | Veteran inpatients in a psychiatric ICU involuntarily after being assessed as dangerous to self or to others, or gravely disabled (unable to provide own food, clothing, or shelter)  U.S., psychiatric ICU in Veterans Affairs Medical Center hospital | Practice change initiative to prioritize removal from stimuli (RFS) before seclusion or S&R for verbally and physically threatening patients, 15 months (n=NR)  Components:  Applied to patients if they were cooperative and did not sustain their behaviors;  Patients placed in a bare seclusion room, but with an unlocked door (which would be locked during seclusion) to facilitate communication with staff;  Length of use varies widely, but averages several hours;  Door can be locked to seclude patient if unwilling to voluntarily remain in RFS, and both S&R can also be applied in a crisis | Usual care, 9 months (n=NR)  Components:  Consistently placing verbally threatening patients in seclusion and physically threatening and/or assaultive patients in four-point restraints and seclusion | Benefits:  Use of seclusion or S&R (incidents) | Overall, statistically significantly lower percentage of patients receiving seclusion and S&R in the post period (October 1993 through December 1994) than in the pre period (January through September 1993) (34% versus 54%, respectively, p<0.05).  Benchmark goal of ≥90% of RFS successfully de-escalating patients without subsequent need for seclusion or S&R uses achieved in 10 of 15 months after RFS initiative started. Complete effectiveness (100%) was achieved in three of 15 months. However, erratic decline in meeting this benchmark in last two months of post-period (November and December 1994) because seclusion or S&R was used more consistently as an intervention for aggressive behavior than RFS; see below:  June – December 1994  Monthly uses of restraint versus RFS, mean (SD) (range)  G1: 13.7 (4.7) (6 to 20) versus 11.3 (6.2) (7 to 25)  G2: NR  Within-group p (G1 only)=0.05 |
| **Environmental or Group Psychotherapeutic**  Vaaler et al., 200616,17  118  41 weeks (40 weeks 5 days, to be exact) | Adult psychiatric inpatients determined to be in need of psychiatric ICU stay by physician on duty  Norway, public psychiatric hospital | Segregation nursing in closed-door psychiatric ICU (at least 3 days), 3 years | Segregation nursing in open-door psychiatric ICU (at least 3 days), 1 year | Benefits:  Violent or threatening incidents (incidents, patients);  Change in aggression risk scores from baseline;  Mechanical restraint (incidents)  Harms:  Serious suicide attempts | Fewer patients with violent of threatening incidents in closed-door psychiatric ICU than in open-door psychiatric ICU (3 versus 10), but difference nonsignificant (unadjusted p=0.08)  Significantly fewer violent or threatening incidents in closed-door psychiatric ICU than in open-door psychiatric ICU (3 versus 19) (adjusted p<0.05)o  Change (reduction) in BVC aggression risk from baseline significantly greater in closed-door psychiatric ICU than in open-door psychiatric ICU (-0.61 versus -0.11) (adjusted p<0.05)  No difference in incidents of mechanical restraint (2 in closed-door and open-door psychiatric ICU)  Single serious suicide attempt after implementation of closed-door psychiatric ICU, but none in open-door psychiatric ICU |
| **Environmental or Group Psychotherapeutic Intervention**  Veltro et al., 200618,19  733  4 years | Adult psychiatric inpatients diagnosed with various mental illnesses, primarily schizophrenia and mood disorders  Italy  General hospital psychiatric inpatient unit | Cognitive-behavioral group therapy for inpatients (years 1-4) (n=583)  Components:  Manual-based inpatient therapy program designed to:  Teach patients to identify early warning signs of exacerbations and impending recurrences;  Emphasize the importance of optimal medication adherence;  Instruct patients in effective interpersonal communication and structured problem solving skills;  Help patients clarify personal goals and prepare for adjustments after leaving hospital, with homework assignments given to patients during sessions | Usual care (year 0) (n=150) | Benefits:  Frequency of aggressive and violent behaviors on unit (measured indirectly using NIMH ward atmosphere scalep);  Physical restraint (incidents)  Harms: NR | Ward atmosphere, mean (SD)  G1 (year 4): 1.3 (0.6)  G1 (year 3): 1.2 (0.5)  G1 (year 2): 1.3 (0.8)  G1 (year 1): 2.3 (1.1)  G2 (year 0): 2.8 (1.2)  Statistically significant improvement in ward atmosphere between the baseline period (year 0) and intervention period (years 1-4) (p<0.001).  Physical restraints used five times in year 0, and only once each year of the intervention period (years 1-4) (p=NR) |
| **Medication Protocol**  Thapa et al., 200320  437  6 months | Newly admitted adults to psychiatric units  U.S.  Public psychiatric hospital | Hospital-wide policy banning PRN orders for psychotropic medications, 3 months (n=219) | Usual care, 3 months (n=218) | Benefits:  Restraint (incidents);  Seclusion (incidents, duration)  Harms:  Employee injuries | Fewer incidents of seclusion (14.6% reduction, from 48 to 41) and restraint (50.0% reduction, from 8 to 4) after new policy, although the mean duration of seclusion was 46.6% higher (13.1 versus 19.2 hours). None of these observed differences were statistically significant (all p’s=NR).  Fewer employee injuries (14.3% reduction, from 14 to 12, p=NR). |

a Number of admissions analyzed in the sample, although unclear how many of these represent unique patients.1

b The study’s assessment unit closed in mid-2003, so its data only encompass about a year of the study period.1

c Entire study duration varied by individual units because of differing study periods across the three enrolled hospitals. The study period was 14 months for the five units in Refuge Hospital (began using the proprietary incident recording system mid-study) and about a year for the assessment unit (closed in mid-2003).1

d Reflects the N of unique patients admitted to the psychiatric ICU during the study period, in contrast with the sum of Ns reported in Table 1, which includes patients on the unit in both the pre- and post-intervention periods.3

e Ns during pre- and post-intervention periods include three patients who were present during both periods.3

f Aggressive incidents defined as “severe” when they involved the following outcomes: seclusion, high dependency area (extra care area), two-to-one nursing, one-to-one nursing, and rapid tranquilization (RT); need for use of RT; or need for hands-on (HO) management by staff. In contrast, “not severe” incidents involved the following outcomes: patient receiving time out, spoken to about their behavior, escorted to day area, or apologizing for behavior.3

g ORs adjusted for covariates expected to be associated with violent incidents: age, gender, ethnicity, diagnosis, and substance use.3

h Total cost of trainers and facilities was a conservative estimate and did not cover ongoing management costs.3

i Length of follow-up in the intervention group varied by specific unit, but control groups’ follow-up periods were presumably the entire length of the longest intervention period.5

j Two units (Wards 3 and 4) originally accepted into the project, but Ward 4 was removed from the project during the intervention period and replaced by a third unit, Ward 5.5

k Reflects total number of admissions during the course of the study, but unclear how many of these admissions were for patients being readmitted to the study hospital.9

l Reflects number of admissions during the *post*-intervention phase of the study, but unclear how many of these admissions were for patients being readmitted to the study hospital.9

m Reflects number of admissions during the *pre*-intervention phase of the study, but unclear how many of these admissions were for patients being readmitted to the study hospital.9

n Unclear how many unique, unduplicated patients admitted to the psychiatric ICU were included in the study sample.15

o P-value adjusted for BVC scores, physicians' prediction scores (0-4, with higher scores indicating increasing assumed probability of violent or threatening incidents), and diagnoses of schizophrenia or substance abuse disorder.16,17

p This study’s ward atmosphere scale is nurse-rated and assesses communication among patients and professionals, presence or absence of aggressive or violent behavior, and presence of bizarre behavior on a five-point scale. Scores include: 1 = white, if the atmosphere is excellent, 2 = green, if the atmosphere is acceptable, 3 = yellow, if there are one or more patients with disturbing behavior that is not alarming, 4 = orange, if there are one or more patients with disturbing behavior that requires immediate interventions but coercion is not necessary, and 5 = red, if there are one or more patients with disturbing behavior that requires interventions with coercion and physical restraint.18,19

AUDIT-PC = Alcohol Use Disorders Identification Test-Piccinelli Consumption; BVC = Broset Violence Checklist; CI = confidence interval; CIWA-Ar = Clinical Institute Withdrawal Assessment of Alcohol Scale; DT = delirium tremens; G = group; ICU = intensive care unit; i.m. = intramuscular; IRR = incident rate ratio; JCAHO = Joint Commission on Accreditation of Healthcare Organizations; MD = physician; n or N = number; NIMH = National Institutes of Mental Health; NR = not reported; OR = odds ratio; PMVA = Prevention and Management of Violence and Aggression; PRN = pro re nata (as-needed); S/R = seclusion or restraints; S&R = seclusion and restraints; SD = standard deviation; U.K. = United Kingdom; U.S. = United States

Appendix F References

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