National Institute for Health and Care Excellence

Final

Self-harm: assessment, management and preventing recurrence

[N] Evidence reviews for supporting people to be safe after self-harm

NICE guideline number NG225

Evidence reviews underpinning recommendations 1.12.1 to 1.12.9 and 1.14.4. in the NICE guideline

September 2022

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National Institute for Health and Care Excellence

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Supporting people to be safe after self-harm

Review question

What are the most effective ways of supporting people to be safe after self-harm?

Introduction

The objective of this review was to explore the most effective ways of supporting people to be safe after self-harm and to identify elements of mental health service provision which could reduce the rates of repeat self-harm in this population. The committee therefore chose to focus this review on reviewing the evidence for the effectiveness of different staffing models and physical environment designs on the safety of people who have self-harmed.

Summary of the protocol

See Table 1 for a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	**Inclusion:** • All people who have self-harmed, including those with a mental health problem, neurodevelopmental disorder or a learning disability **Exclusion**: • People displaying repetitive stereotypical self-injurious behaviour, for example head-banging in people with a significant learning disability
Intervention	1. Staffing model (e.g., number, expertise, skills mix of staff on duty, observation schedules, location of staff) 2. Physical environment design (e.g., physically safe environment [e.g., ligature points])
Comparison	1. Different staffing models 2. Different designs
Outcome	Critical: • Self-harm repetition (for example, self-poisoning or self-cutting) • Suicide • Service user satisfaction Important: • Quality of life • Engagement with services • Number of people leaving without assessment being completed

For further details see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in appendix A and the methods document (supplementary document 1).

Declarations of interest were recorded according to NICE's conflicts of interest policy.

Effectiveness evidence

Included studies

Five comparative observational studies were included for this review. One of these was a retrospective cohort study (Ford 2020) and 4 were before-and-after studies (Bowers 2006, Kapur 2016, Noelck 2019 and Reen 2020). One of these studies was an ecological analysis of mental health service level changes (Kapur 2016).

The included studies are summarised in Table 2.

Three studies were conducted in the UK (Bowers 2006, Kapur 2016 and Reen 2020) and 2 in the US (Ford 2020 and Noelck 2019).

One study included children and adolescents admitted to an inpatient setting following a suicide attempt (Noleck 2019). The other studies did not specify previous self-harm attempts of the study participants: 2 of these studies included inpatients on psychiatric wards (Bowers 2006 and Reen 2020), 1 included incarcerated adult males diagnosed with a mental health condition (Ford 2020) and 1 included all individuals who died by suicide within 12 months of contact with a mental health service (Kapur 2016).

Four studies compared complex interventions to treatment as usual (Bowers 2006, Ford 2020, Noelck 2019 and Reen 2020). All of these studies included a staffing intervention component: 1 study appointed nurses with clinical expertise in acute inpatient care to change staffing attitudes and establish ward “rules and routine” (Bowers 2006); 1 study implemented regular twilight nursing shifts in addition to a structured programme of evening activities (Reen 2020); 1 study implemented a quality improvement intervention, including a regular staffing communication intervention in addition to a safety protocol and a full patient safety search (Noleck 2019); the retrospective cohort study conducted in prison settings evaluated specialised mental health units, involving multidisciplinary teams, staff training in communication and patient-centered care, in addition to daily activities (Ford 2020). One study compared several different safety interventions before and after implementation, including environmental changes (removal of ligature points) and staff training (Kapur 2016).

See the literature search strategy in appendix B and study selection flow chart in appendix C.

Excluded studies

Studies not included in this review are listed, and reasons for their exclusion are provided in appendix K.

Summary of included studies

Summaries of the studies that were included in this review are presented in Table 2.

Table 2: Summary of included studies

Study	Population	Intervention	Comparison	Outcomes
Bowers 2006 Before-and-after study UK	N= not reported Inpatients of two acute psychiatric wards during the study period. The ward managers applied to participate in the study. Patient characteristics not reported	'City Nurses' staffing intervention, designed to reduce conflict and containment, involving: • action-research (intervention co-designed with ward staff and periodic feedback on outcomes from the wards)	Treatment as usual provided (not otherwise specified; assume standard of care for acute psychiatric ward)	• Self-harm (over 12 months) • Suicide attempts (over 12 months)

Study	Population	Intervention	Comparison	Outcomes
		• a 'City Nurse' with clinical expertise in acute inpatient care appointed to each ward for 3 days a week • staffing attitude: "positive appreciation of patients by staff; the ability of the staff to regulate their own natural emotional reactions to patients; and the creation of an effective structure (rules and routine) for ward life" (p. 166)		
Ford 2020 Retrospective cohort study US	N= 602 Incarcerated male adults (aged ≥18 years), diagnosed with a serious mental illness and in the jail census for 14 days or more during the study period. **Intervention:** • n= 302 • Age median: 36 • Female/ male n: 0/ 302 • Ethnicity: Hispanic 82; non-Hispanic white 33; non-Hispanic Black 165; non-Hispanic Asian 11; other or missing 11 • Comorbidities: bipolar and related disorders 23; depression and depressive disorders 12; neurodevelopmental disorder 24; personality disorder 37; PTSD, trauma and stress related disorders 13; schizophrenia and psychotic disorders 244; substance abuse 202 • Duration/ history of self-harm: not reported • Previous self-harm: not reported • Mean number of suicide attempts (SD): not reported • Method: not reported	PACE (program for accelerating clinical effectiveness) units in prisons, involving: • physical components: large open spaces; natural light; confidential interview rooms; sufficient space for protected group activities • staffing: multidisciplinary mental health treatment teams (including a psychologist, psychiatric providers, nurses, counsellors, treatment aides, art therapists) • training: correctional officers received specialised mental health training; staff communication mechanisms established • activities: daily activities, including community meetings, creative arts therapy, discussion groups • patient-centered crisis-deesaclation; incentives program to emphasize positive reinforcement over punishment; • treatment: patient engagement in medication over coercion	Single cell housing (mental observation units), including: • physical components: little natural light, loud and crowded spaces • treatment: limited continuity of care	• Self-harm (at 30 and 60 days)

Study	Population	Intervention	Comparison	Outcomes
	• Current psychiatric treatment: Clozapine 24; Lithium 40; Antipsychotic injection 101; Quetiapine 32; Haloperidol 67; Risperidone 116; Olanzapine 78; Aripiprazole 54; Valproic acid 106 • Assessment setting: prisons; specialised treatment units **Control:** • n= 302 • Age median: 36 • Female/ male n: 0/ 302 • Ethnicity: Hispanic 76; non-Hispanic white 38; non-Hispanic Black 163; non-Hispanic Asian 15; other or missing 10 • Comorbidities: bipolar and related disorders 25; depression and depressive disorders 17; neurodevelopmental disorder 24; personality disorder 38; PTSD, trauma and stress related disorders 17; schizophrenia and psychotic disorders 238; substance abuse 202 • Duration/ history of self-harm: not reported • Previous self-harm: not reported • Mean number of suicide attempts (SD): not reported • Method: not reported • Current psychiatric treatment: Clozapine 3; Lithium 32; Antipsychotic injection 87; Quetiapine 26; Haloperidol 61; Risperidone 121; Olanzapine 84; Aripiprazole 51; Valproic acid 90 Setting: prisons; single-cell housing			
Kapur 2016	N= 19248	Ward-safety service changes:	Treatment as usual	• Suicide (at 12 months)

Study	Population	Intervention	Comparison	Outcomes
Before-and-after ecological study UK	Individuals aged ≥10 years in England who died during the study period because of suicide, defined as a death that received a suicide or open verdict at Coroner's inquest (ICD-10 Codes X60–X84; Y10–Y34, Y87.0, and Y87.2, excluding Y33.9), and had contact with mental health services within 12 months of death Patient characteristics not reported	• removal of non-collapsible curtain rails • removal of low lying ligature points Staff-training service changes: • Clinical staff receive training in the management of suicide risk	(dependent on mental health service provider).	
Noelck 2019 Before-and-after study US	N= 224 Children and adolescents admitted for medical stabilization after a suicide attempt in the Paediatric Intensive Care Unit (PICU) and the Paediatric Acute-Care Medical unit (PACM) units at a 150 bed tertiary-care paediatric academic medical centre **Pre-intervention:** • n= 53 • Age mean (SD): 15.1 (1.7) • Female/ male n: 43/ 10 • Ethnicity: Non-Hispanic white 33; Non-Hispanic African American 1; Hispanic 6; Other 13 • Comorbidities: not reported • Duration/ history of self-harm: not reported • Previous self-harm: suicide attempt (all participants) • Mean number of suicide attempts (SD): not reported • Method: not reported • Current psychiatric treatment: not reported • Assessment setting: pediatric intensive care unit and pediatric acute-care medical	Quality Improvement (QI) intervention, co-designed by multidisciplinary care team, including: • Paediatric Behavioural Health Safety Protocol as standard of care (consent process, document patients' characteristics, set expectations for patients' behaviour) • Full patient safety search (by two nurses within 2 hours of arrival; details recorded) • Shared mental model/ development of communication process (Safety Huddle between care team members, within 24 hours of patient admission and for patients with ongoing concerns)	Treatment as usual. No standardised approach to care, with the exception of: • full-time patient safety attendant (equivalent to a certified nursing assistant) placed within the patient's room	• Self-harm (over 8- 17 months)

Study	Population	Intervention	Comparison	Outcomes
	Post-intervention: • n= 171 • Age mean (SD): 15.0 (1.5) • Female/ male n: 131/ 40 • Ethnicity: Non-Hispanic white 120; Non-Hispanic African American 5; Hispanic 30; Other 16 • Comorbidities: not reported • Duration/ history of self-harm: not reported • Previous self-harm: suicide attempt (all participants) • Mean number of suicide attempts (SD): not reported • Method: not reported • Current psychiatric treatment: not reported • Assessment setting: paediatric intensive care unit and the paediatric acute-care medical			
Reen 2020 Before-and-after study UK	N=205 Adolescents inpatients of a child and adolescent psychiatry ward during the study period aged 12 to 18 years **Pre-intervention:** • n=124 • Age mean (SD): 15.81 (1.41) • Female/ male n: 107/ 17 • Ethnicity: not reported • Comorbidities: adjustment and dissociative disorder 6; anxiety 11; developmental disorder 5; eating disorder 46; mood disorder 19; obsessive compulsive disorder 1; other 9; personality disorder 8; phobias 1; schizophrenia and psychosis 9; stress-related 2; substance abuse 3; unknown 5	Co-designed with clinical ward staff and with input from patients and consisted of the first 3 control group interventions along with: • regular twilight nursing shifts (3pm- 11pm, Sunday -Thursday) to increase availability of regular nursing staff on the ward during a vulnerable time, rather than employing expensive temporary agency staff • structured programme of evening activities that the inpatients were encouraged to participant in and could suggest, e.g., games and drama workshop, visit from therapy dog, mindfulness podcast groups and coping skills workshop conducted by activity workers or occupational therapists on the ward	Treatment as usual: • Group therapy sessions (2-3pm, daily) • Individual treatment sessions (nurse-led, weekly) • Medication provided on clinical need • Occasional evening activities • Ad-hoc twilight shift (3-11pm), covered by temporary nursing staff	• Self-harm (over 18-24 months)

Study	Population	Intervention	Comparison	Outcomes
	• Duration/ history of self-harm: not reported • Previous self-harm: not reported • Mean number of suicide attempts (SD): not reported • Method: not reported • Current psychiatric treatment: not reported • Assessment setting: inpatient psychiatric ward **Post-intervention:** • n=80 • Age mean (SD): 15.35 (1.60) • Female/ male n: 62/ 8 • Ethnicity: not reported • Comorbidities: adjustment and dissociative disorder 2; anxiety 7; developmental disorder 2; eating disorder 35; mood disorder 9; obsessive compulsive disorder 1; other 5; personality disorder 4; phobias 0; schizophrenia and psychosis 2; stress-related 1; substance abuse 1; unknown 1 • Duration/ history of self-harm: • Previous self-harm: not reported • Mean number of suicide attempts (SD): not reported • Method: not reported • Current psychiatric treatment: not reported • Assessment setting: inpatient psychiatric ward			

See the full evidence tables in appendix D. No meta-analysis was conducted (and so there are no forest plots in appendix E).

Summary of the evidence

One study (Bowers 2006) compared a nursing staff intervention to treatment as usual on 2 psychiatric inpatient wards, in which nurses with clinical expertise in acute inpatient care were appointed to change staffing attitudes and establish ward “rules and routine”. The study

found a significant decrease in the mean number of self-harm events per shift and no difference in the mean number of suicide attempts per shift in the 12 month follow-up period compared to the 3 month pre-intervention period (low quality).

One study (Ford 2020) compared specialised mental health units for prisoners diagnosed with a serious mental health disorder to standard of care single cell housing. The study did not find a significant decrease in the rate of self-injury at 30 or 60 days measured over the 38-month intervention period (low quality). Self-injury was reported as number of events per 100 person days, as multiple attempts could have been made by the same participant.

One study (Kapur 2016) compared the implementation of national policies at the service level (removal of collapsible curtain rails, removal of low-lying ligature points, and staff training in management of suicide risk) to treatment as usual before implementation of the policy for people who died by suicide up to 12 months after contact with mental health services. The study found significant reductions in the suicide incidence rate ratio after implementation of each the 3 interventions (very low quality). The number of patients exposed to each intervention was not reported.

One study (Noelck 2019) compared a quality improvement intervention, including a regular staffing communication intervention in addition to a safety protocol and a full patient safety search to standard care for children and adolescents who were hospitalised after a suicide attempt. The study reported a lower mean number of self-harm events per 100 patient days post-intervention compared to pre-intervention over an 18 month follow-up period (very low quality). The standard deviations of the means were not reported and not enough other data were reported to allow their calculation. The significance of the difference in means could not be determined.

One study (Reen 2020) compared regular twilight nursing shifts and a structured programme of evening activities to standard care for adolescents on an inpatient psychiatric ward. The study reported self-harm (reported as mean proportion of patients self-harming per month and the rate of self-harm per 100 bed days per month) during evening and non-evening periods over an 18-month follow-up period. The study reported a significantly lower mean proportion of patients self-harming per month in the post-intervention period, during both evening and non-evening periods compared to the pre-intervention period (low quality). The rate of self-harm per 100 bed days per month was also significantly lower in the post-intervention period, during both evening and non-evening periods relative to the pre-intervention period (low quality).

The following outcomes were not reported by any of the studies: service user satisfaction, quality of life, engagement with services and number of people leaving without assessment being completed.

See appendix F for full GRADE tables.

Economic evidence

Included studies

A single economic search was undertaken for all topics included in the scope of this guideline but no economic studies were identified which were applicable to this review

question. See the literature search strategy in appendix B and economic study selection flow chart in appendix G.

Excluded studies

Economic studies not included in the guideline economic literature review are listed, and reasons for their exclusion are provided in appendix J.

Economic model

No economic modelling was undertaken for this review because the committee agreed that other topics were higher priorities for economic evaluation.

Evidence statements

Economic

No economic studies were identified which were applicable to this review question.

The committee's discussion and interpretation of the evidence

The outcomes that matter most

Self-harm repetition, suicide and service user satisfaction were prioritised as critical outcomes by the committee. Self-harm repetition and suicide were prioritised as critical outcomes because they are direct measures of any differential effectiveness associated with the method of initial contact and captures both fatal and non-fatal self-harm. Service user satisfaction was chosen as a critical outcome due to the importance of delivering services which are centred around the patients' experiences and because patient satisfaction is likely to influence whether the patient engages with the intervention.

The committee agreed that quality of life, engagement with services and number of people leaving without assessment being completed should be important outcomes. Engagement with after-care was chosen as an important outcome because the first contact after discharge may influence the likelihood of whether a person who has self-harmed will attend follow-up sessions, thereby influencing whether after-care will be effective. Quality of life was chosen as an important outcome as this is a global measure of well-being and may capture aspects of effectiveness of the interventions not captured by any of the other outcome measures. Engagement with services and number of people leaving without assessment being completed were included as they are important measures of adherence and acceptability of interventions.

The quality of the evidence

When assessed using GRADE methodology the evidence was found to range from low to very low quality. In all cases, the evidence was downgraded due to risk of bias as per ROBINS-I (due to unmeasured confounding variables and inability to ascertain intervention exposure and follow-up in the intervention group). In four studies, the evidence was downgraded due to indirectness because the proportion of the population that had previously self-harmed was unclear.

Imprecision and clinical importance of effects

When examining the evidence from each study the committee discussed the effect sizes and 95% confidence intervals for each outcome to determine whether the results were clinically meaningful. The committee noted that for the majority of comparisons, there was no important difference or no evidence of important difference in outcomes, as either effect

sizes were small and confidence intervals crossed the line of no effect or confidence intervals could not be calculated based on the available data. There was evidence of a benefit in terms of self-harm repetition for removal of low lying ligature points and removal of non-collapsible curtain rails versus no removal, and for clinical staff training in management of suicide risk versus standard training on self-harm. The committee noted that the 95% confidence intervals were small indicating that the moderate effect estimates were precise, however, they were not confident of the clinical importance of the effect estimates as the data were from an ecological level observational study with a very serious risk of bias due to unmeasured confounding and classification of intervention exposure. There was evidence of a benefit in terms of mean number of patients self-harming per month and rate of self-harm for a ward environment intervention which aimed to establish rules and routine versus standard care. The committee noted that the size of the effect estimates were moderate to large and were relatively precise based on the width of the confidence intervals, however, they were not confident in the clinical importance of the effects due to concerns of risk of bias from unmeasured confounding, missing data and deviations from the intended intervention.

Benefits and harms

The recommendations were drafted on the evidence where possible, but due to concerns over the quality and paucity of evidence, they are in some parts supplemented with the committee's own experience and expertise.

There was evidence on the benefits of a staffing intervention which established ward rules and routines in an inpatient psychiatric ward in terms of the mean number of self-harm events per shift. The committee agreed that due to the indirectness of the evidence, they could not make a strong recommendation about a specific staffing intervention, however, discussed the evidence within the wider context of continuity of care. The committee acknowledged the importance of minimising variations in care and ensuring that all staff are familiar with setting-specific layouts, policies and protocols and noted that this was particularly important in settings where consistency in staffing could not be ensured, for example where temporary bank staff were used.

The committee discussed the lack of evidence on the consistency and continuity of staffing personnel and based on their experience, they agreed that this was a fundamental aspect of supporting people to be safe after self-harm. While the committee acknowledged that continuity of care is important for all patients, they wanted to make a recommendation to highlight the benefits of minimising the number of staff that people who have self-harmed see, as this is particularly important for minimising distress in this population. Based on their experience, the committee noted that this might not be practical at all times or in all settings due to staffing constraints and staff shift patterns. The committee used the evidence presented in Evidence Report T to support these recommendations. The committee referred to guidance on ensuring continuity of care in the NICE guideline on patient experience in adult NHS services and the NICE guideline on babies, children and young people's experience of healthcare.

The committee discussed the limited evidence on observation for people who have self-harmed and noted that in their experience, better outcomes were expected when observation was a therapeutic interaction which engaged the patient and built rapport. The committee stressed the importance of ensuring that clinical observation is considered an element of care which has important benefits for the patient's recovery. For these reasons, the committee agreed it is important that all staff undertaking clinical observation of people who have self-harmed be trained in clinical observation, which includes engagement of the patient and rapport building. The committee agreed that observation of people who have self-harmed should not be carried out by untrained staff such as security guards based on the principle of the parity of esteem. The committee discussed experiences where observation by non-clinical staff was intimidating and caused distress for people who had self-harmed and agreed that there was an increased risk of harm if observation was carried out by

untrained staff. These discussions were also used to inform the recommendations on assessment and care in general hospital settings.

The committee discussed safety considerations for people who have self-harmed when transferring between settings. While there was no evidence identified, based on their experience and expertise, the committee agreed it was important that care plans of people who have self-harmed were accessible to staff working in both primary and secondary care settings. The committee agreed that this would help to promote continuity of care across settings and minimise distress for the patient from variations in practice.

The committee discussed the limited evidence on the benefits of ensuring staff presence during periods in inpatient settings considered high-risk for episodes of self-harm. Together with their experience, the committee agreed that staff remaining visible and accessible during handovers and busy periods would have important benefits on patient safety.

There was very low quality evidence that removing low-lying ligature points and collapsible curtain rails had the benefit of reducing suicide rates in people who had been in contact with a mental health service in the previous 12 months. the committee agreed it is important to ensure a safe physical environment for all mental health patients, but a particular focus on environmental safety for people who have self-harmed is important, so that ways of self-harming are not needlessly accessible. The committee agreed that there was a risk that stigma surrounding self-harm could result in overly restrictive measures when assessing the safety of the environment, and agreed that the least restrictive measures should always be used depending on the person's needs and vulnerabilities in order to preserve the person's autonomy and dignity, and improve their experience of services. The restrictions taken would also vary between and within trusts and should be considered at the ward level. The committee also agreed the removal of items that could be used to self-harm should be considered, again based on the individual's needs and vulnerabilities. They agreed that removing every potential item that could be used to self-harm would not be practical, and that some people would not need this precaution to be taken. As a result, in order to promote person-centred care, the committee agreed the person who has self-harmed should be involved in any decision-making regarding this.

The committee discussed the benefits of staff familiarising patients to the procedures and the physical environment when people who have self-harmed present to the emergency department or are admitted to inpatient wards. In their experience, ensuring the person is comfortable and knows how to access help reduces distress and repeat self-harm in what can be a highly distressing experience for the person. Despite the lack of evidence, the committee agreed that this is an important component of supporting people to be safe and should be carried out at the earliest opportunity.

While there was limited evidence, the committee highlighted the importance of all staff working in secondary care settings knowing what to do if they have immediate concerns about somebody's safety, for example if the person has self-harmed or the professional is worried they might be about to. The committee noted that often non-specialist or temporary staff were not clear on communication procedures or, due to the sensitivity of the situation, were uncomfortable in raising concerns. The committee agreed that communication channels should be made clear and maintained to ensure all staff are capable of promptly raising concerns to ensure patient safety in secondary care settings.

Cost effectiveness and resource use

The committee noted that no relevant published economic evaluations had been identified and no additional economic analysis had been undertaken in this area. They recommended specific strategies that aimed to reduce the likely variation across the NHS in the current practice for delivering care for people who have self-harmed and ensure that current standards of care are consistently met across settings. The committee agreed that there was

unlikely to be a significant resource impact from the recommendations made, as these are in line with the current practice in terms of continuity of care and staffing. Additionally, they highlighted that a substantial economic impact was unlikely as the recommendations made were marginally different from the previous NICE guidelines on self-harm.

Recommendations supported by this evidence review

This evidence review supports recommendations 1.12.1-1.12.9 and 1.14.4.

References – included studies

Effectiveness

Study
Bowers, L., Brennan, G., Flood, C. et al. (2006) Preliminary outcomes of a trial to reduce conflict and containment on acute psychiatric wards: City Nurses. Journal of Psychiatric and Mental Health Nursing 13: 165-172
Ford, E. B., Silverman, K. D., Solimo, A. et al. (2020) Clinical outcomes of specialized treatment units for patients with serious mental illness in the New York City jail system. Psychiatric Services 71: 547-554
Kapur, N., Ibrahim, S., While, D. et al. (2016) Mental health service changes, organisational factors, and patient suicide in England in 1997-2012: A before-and-after study. The Lancet Psychiatry 3: 526-534
Noelck, M.; Velazquez-Campbell, M.; Austin, J. P. (2019) A quality improvement initiative to reduce safety events among adolescents hospitalized after a suicide attempt. Hospital Pediatrics 9: 365-372
Reen, G. K., Bailey, J., McGuigan, L. et al. (2020) Environmental changes to reduce self-harm on an adolescent inpatient psychiatric ward: an interrupted time series analysis. European Child and Adolescent Psychiatry

Economic

No studies were identified that met the inclusion criteria.

Appendices

Appendix A Review protocols

Review protocol for review question: What are the most effective ways of supporting people to be safe after self-harm?

Table 3: Review protocol

Field	Content
PROSPERO registration number	CRD42021230657
Review title	Supporting people to be safe after self-harm
Review question	What are the most effective ways of supporting people to be safe after self-harm?
Objective	To identify the most effective ways of supporting people to be safe after self-harm.
Searches	The following databases will be searched: • Cochrane Central Register of Controlled Trials (CENTRAL) • Cochrane Database of Systematic Reviews (CDSR) • Database of Abstracts of Reviews of Effects (DARE) • Embase • Emcare • International Health Technology Assessment (IHTA) database • MEDLINE & MEDLINE In-Process • PsycINFO • Web of Science (WoS) Searches will be restricted by: • English language studies • Human studies

Field	Content
	• Date: 2000 onwards as the current service context is different from pre-2000 Other searches: • Inclusion lists of systematic reviews • Reference lists of included studies • Forward and backward citation searches of key studies The full search strategies will be published in the final review.
Condition or domain being studied	All people who have self-harmed, including those with a mental health problem, neurodevelopmental disorder or a learning disability. 'Self-harm' is defined as intentional self-poisoning or injury irrespective of the apparent purpose of the act. This does not include repetitive stereotypical self-injurious behaviour, for example head-banging in people with a significant learning disability.
Population	Inclusion: • All people who have self-harmed, including those with a mental health problem, neurodevelopmental disorder or a learning disability Exclusion: • People displaying repetitive stereotypical self-injurious behaviour, for example head-banging in people with a significant learning disability
Intervention	1. Staffing model (e.g., number, expertise, skills mix of staff on duty, observation schedules, location of staff) 2. Physical environment design (e.g., physically safe environment [e.g., ligature points])
Comparator/Reference standard/Confounding factors	1. Different staffing models 2. Different designs
Types of study to be included	• Systematic review of randomised controlled trials (RCTs) or non-randomised comparative prospective and retrospective cohort studies • RCTs

Field	Content
	• Non-randomised comparative prospective cohort studies with N≥100 per treatment arm • Non-randomised comparative retrospective cohort studies with N≥100 per treatment arm Conference abstracts will not be included. Non-randomised studies should adjust for the following covariates in their analysis when there are differences between groups at baseline: age, gender, previous self-harm, comorbidities (e.g. alcohol and drug misuse, psychiatric illness, physical illness), and current psychiatric treatment. Studies will be downgraded for risk of bias if important covariates are not adequately adjusted for, but will not be excluded for this reason.
Other exclusion criteria	Studies will not be included for the following reasons: Language: • Non-English Publication status: • Abstract only Studies published in languages other than English will not be considered due to time and resource constraints with translation.
Context	Settings: Inclusion: • Primary, secondary and tertiary healthcare settings (including pre-hospital care, accident and emergency departments, community pharmacies, inpatient care, and transitions between departments and services) • Home, residential and community settings, such as supported accommodation • Supported care settings • Education and childcare settings • Criminal justice system

Field	Content
	• Immigration removal centres.
Primary outcomes (critical outcomes)	Critical: • Self-harm repetition (for example, self-poisoning or self-cutting) • Suicide • Service user satisfaction
Secondary outcomes (important outcomes)	Important: • Quality of life • Engagement with services • Number of people leaving without assessment being completed
Data extraction (selection and coding)	All references identified by the searches and from other sources will be uploaded into EPPI and de-duplicated. Titles and abstracts of the retrieved citations will be screened to identify studies that potentially meet the inclusion criteria outlined in the review protocol. Dual sifting will be performed on 10% of records; 90% agreement is required. Disagreements will be resolved via discussion between the two reviewers, and consultation with senior staff if necessary. Full versions of the selected studies will be obtained for assessment. Studies that fail to meet the inclusion criteria once the full version has been checked will be excluded at this stage. Each study excluded after checking the full version will be listed, along with the reason for its exclusion. A standardised form will be used to extract data from studies. The following data will be extracted: study details (reference, country where study was carried out, type and dates), participant characteristics, inclusion and exclusion criteria, details of the interventions, setting and follow-up, relevant outcome data, risk of bias and source of funding. One reviewer will extract relevant data into a standardised form, and this will be quality assessed by a senior reviewer.

Field	Content
Risk of bias (quality) assessment	Quality assessment of individual studies will be performed using the following checklists: • ROBIS tool for systematic reviews • Cochrane RoB tool v.2 for RCTs and quasi-RCTs • Cochrane ROBINS-I tool for non-randomised (clinical) controlled trials and cohort studies • The quality assessment will be performed by one reviewer and this will be quality assessed by a senior reviewer.
Strategy for data synthesis	Quantitative findings will be formally summarised in the review. Where multiple studies report on the same outcome for the same comparison, meta-analyses will be conducted using Cochrane Review Manager software. A fixed effect meta-analysis will be conducted and data will be presented as risk ratios if possible or odds ratios when required (for example if only available in this form in included studies) for dichotomous outcomes, and mean differences or standardised mean differences for continuous outcomes. Heterogeneity in the effect estimates of the individual studies will be assessed using the I2 statistic. I2 values of greater than 50% and 80% will be considered as significant and very significant heterogeneity, respectively. Heterogeneity will be explored as appropriate using sensitivity analyses and subgroup analyses based on identified covariates if they have not been adjusted for. If heterogeneity cannot be explained through subgroup analysis then a random effects model will be used for meta-analysis, or the data will not be pooled if the random effects model does not adequately address heterogeneity. The confidence in the findings across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group: http://www.gradeworkinggroup.org/
Analysis of sub-groups	Evidence (if data allows) will be stratified by: • Age group: ≥65 years, 18-64 years, 16-17 years, <16 • Neurodevelopmental disorder or learning disability, no neurodevelopmental disorder or learning disability
Type and method of review	Intervention
Language	English

Field	Content
Country	England
Anticipated or actual start date	31/12/20
Anticipated completion date	26/01/2022
Stage of review at time of this submission	Review stage — Started — Completed Preliminary searches ☐ ☐ Piloting of the study selection process ☐ ☐ Formal screening of search results against eligibility criteria ☐ ☐ Data extraction ☐ ☐ Risk of bias (quality) assessment ☐ ☐ Data analysis ☐ ☐
Named contact	5a. Named contact: National Guideline Alliance 5b Named contact e-mail: selfharm@nice.org.uk 5c Organisational affiliation of the review: National Institute for Health and Care Excellence (NICE) and National Guideline Alliance
Review team members	National Guideline Alliance
Funding sources/sponsor	This systematic review is being completed by the National Guideline Alliance which receives funding from NICE.

Field	Content
Conflicts of interest	All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be published with the final guideline.
Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines: the manual. Members of the guideline committee are available on the NICE website: https://www.nice.org.uk/guidance/indevelopment/gid-ng10148.
Other registration details	None
URL for published protocol	https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=230657
Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include standard approaches such as: • notifying registered stakeholders of publication • publicising the guideline through NICE's newsletter and alerts • issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.
Keywords	Self-harm, assessment, management, , health care
Details of existing review of same topic by same authors	None
Current review status	Ongoing
Additional information	Not applicable

Field	Content
Details of final publication	www.nice.org.uk

CDSR: Cochrane Database of Systematic Reviews; CENTRAL: Cochrane Central Register of Controlled Trials; DARE: Database of Abstracts of Reviews of Effects; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HTA: Health Technology Assessment; MID: minimally important difference; NGA: National Guideline Alliance; NHS: National health service; NICE: National Institute for Health and Care Excellence; RCT: randomised controlled trial; RoB: risk of bias; SD: standard deviation

Appendix B Literature search strategies

Literature search strategies for review question: What are the most effective ways of supporting people to be safe after self-harm?

Clinical

Database(s): MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily – OVID interface
Date of last search: 22nd February 2021

#	Searches
1	self mutilation/ or self-injurious behavior/ or suicidal ideation/ or suicide, attempted/ or suicide, completed/ or suicide/
2	(self harm* or selfharm* or self injur* or selfinjur* or self mutilat* or selfmutilat* or suicid* or self destruct* or selfdestruct* or self poison* or selfpoison* or (self adj2 cut*) or self immolat* or self immolat* or selfinflict* or self inflict* or auto mutilat* or automutilat*).tw.
3	or/1-2
4	advanced practice nursing/ or nurse clinicians/ or observation/ or *patient safety/ or "personnel staffing and scheduling"/ or shift work schedule/ or work schedule tolerance/
5	(health manpower/ or exp health personnel/ or health workforce/ or nurse practitioners/ or nursing service, hospital/ or nursing staff, hospital/ or nursing staff/ or nursing team/ or exp patient care team/ or patient safety/ or exp personnel management/ or safety/ or exp safety management/ or work-life balance/ or workload/) and (og or sd).fs.
6	*health manpower/ or exp *health personnel/ or *health workforce/ or *nurse practitioners/ or *nursing service, hospital/ or *nursing staff, hospital/ or *nursing staff/ or *nursing team/ or exp *patient care team/ or exp *personnel management/ or *safety/ or exp *safety management/ or *work-life balance/ or *workload/
7	(or/5-6) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*).ti,ab,hw.
8	interdisciplinary communication/ or interprofessional relations/ or organizational culture/ or patient care team/og, ed or hospital rapid response team/og
9	((nurs* adj1 (clinician? or specialist? or expert?)) or (advance? practice adj1 nurs*) or ((nurse or nurses or nursing or staffing) adj1 (assistant? or assistive personnel)) or ((usual or conventional) adj4 nursing) or ((nurse or nursing) adj1 (consultant? or advisor?)) or ((community or health or home or nurs*) adj aide*) or (personal adj2 (assistant* or attendant*)) or plns).ti,ab.
10	((clinician* or doctor* or human resources or nurs* or personnel or registrar* or staff* or worker* or workforce or work force) adj2 (allocat* or availability or capacit* or decreas* or desired or fewer or fluctuation* or high* or increas* or irregular or level* or low* or maximum or minimum or number* or optimal or rate* or reduce* or roster* or rotat* or schedule* or shift*1 or shortag* or staffing or supply or ((staffing or nursing or personnel or workforce) adj2 (adequate or requirement)) or (work adj2 pattern*))).ti,ab.
11	(((gender adj2 (level* or ratio*)) or (male* adj2 female* adj2 (level* or ratio*))) adj5 (clinician* or doctor* or human resources or nurs* or personnel or registrar* or staff* or worker* or workforce or work force)).ti,ab.

#	Searches
12	(regular schedule* or (schedule* adj2 (roster* or shift* or station)) or shiftwork* or (shift adj2 work*) or ((decreas* or high* or increas* or level* or low* or maxim* or minim* or number* or proportion* or straight or sitter*) adj3 shift*)).ti,ab.
13	((observation or observations) adj3 (allocation* or chart* or checklist* or check list* or close or competenc* or contact* or continuous or decreas* or direct* or guideline* or increas* or inter* or interact* or intermittent or leaflet* or level* or minute* or multi* or number* or nurs* or patient* or period* or plan* or polic* or practice* or prescrib* or professional* or reduc* or roster* or safe* or schedule* or staff* or standard* or support*)).ti,ab.
14	(((doctor* or Nurs* or staff* or worker*) adj2 (based or led or managed)) or primary nursing).ti,ab.
15	((patient* adj2 (per or ratio*)) or (patient* adj (per or ratio* or to) adj doctor*) or (patient* adj (per or ratio* or to) adj nurse*)).ti,ab.
16	(grademix or (grade* adj2 mix) or ((human resources or nurs* or rn or personnel or staff*) adj10 (mix or ratio*)) or skillmix or skill mix or ((desired or grade* or qualified or optimal) adj2 mix) or ((human resources or nurs* or rn or personnel or staff*) adj2 (characteristic* or composition* or gender* or ratio*))).ti,ab.
17	((leader* adj2 style*) or ((team or unit) adj2 (culture or lead* or manager*)) or ((human resources or nurs* or rn or personnel or staff*) adj2 leader* adj2 manag*) or ((nursing or patient care) adj team?)).ti,ab.
18	(((nurs* or staff* or workforce or work force or worker*) adj2 (delivery or high intensity or model* or system*)) or (models adj3 integration) or ((nurs* or workforce or work force or worker*) adj2 staffing) or ((allocation or modular or team*) adj2 model*) or planning model*).ti,ab.
19	((therapeutic adj (alliance* or rapport or relation*)) or ((human resources or nurs* or rn or personnel or staff*) adj2 patient* adj2 (engag* or interact*))).ti,ab.
20	(burnout* or ((capacity or resources) adj2 service*) or ((job or work) adj2 (disatisf* or unsatis*)) or ((heavy or manageable or stress*) adj2 (workload* or workplace or work place)) or (poor adj2 wellbeing)).ti,ab.
21	((length adj2 service) or (length adj2 time adj2 (duty or duties or position* or post)) or ((amount* or level*) adj2 (education or experience)) or ((clinician* or doctor* or human resources or nurs* or personnel or registrar* or staff* or worker* or workforce or work force) adj2 (competenc* or qualified or qualification* or skill*))).ti,ab.
22	(((inter disciplin* or inter profession* or interdisciplin* or interprofession* or intra disciplin* or intra profession* or intradisciplin* or intraprofession* or joint disciplin* or joint profession* or jointdisciplin* or jointprofession* or multidisciplin* or multi disciplin* or multiprofession* or multi profession*) adj3 (collaborat* or communicat* or conversation* or educat* or learn* or taught or team* or teach* or train*)) or teamwork* or team work* or ((joint or inter or intra or multi*) adj3 (disciplin* or profession*) adj5 (collaborat* or communicat* or conversation* or educat* or learn* or taught or team* or teach* or train*)) or ((effectiv* or facilitat* or improv*) adj3 (communicat* or team*))).ti,ab.
23	(((well being or wellbeing or stress or burnout or caseload or workload or leadership or cultural unit* or (patient adj2 interact*) or staffing or ((competence* or nurs* or staff*) and model*)) and (nurs* or staff* or workforce* or personnel)) or ((care or observation* or observer or transition) adj2 model*) or (health adj2 (delivery or service* or system) adj2 model*)).ti.
24	or/4,7-23
25	exp Environment Design/ or exp "Facility Design and Construction"/ or exp Health Facility Environment/
26	((architectur* or (dimension* or intervention* or solution* or strateg*)) adj2 design*).ti,ab.

#	Searches
27	(((design* or environment or layout*) adj5 (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)) or ((a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*) adj2 structure)).ti,ab.
28	(environment* adj2 (build or design* or effect* or feature* or physical or planned or quality or restorative)).ti,ab.
29	((evidence based adj2 (healthcare or health care) adj2 design) or ((design adj2 (mental adj2 health)) or (psychiatric adj (care or service*)))).ti.
30	((a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*) adj2 privacy).ti,ab.
31	(activity room* or (ambulant adj2 light*) or artwork or art work or courtyard* or court yard* or decor or finishes or fittings or furnishing* or furniture or gardens or green space* or handles or hooks or ligature* or rails or resistant glass or (wall* adj2 material*) or water feature* or windows or ((colo?r or art or landscape or mirrors or nature or outdoor* or plants or window*) adj3 (sens* or stimulat* or view*)) or ((hospital or ward) adj hangings) or sound attenuation).ti,ab.
32	((enhance* adj2 visability) or (open adj2 layout*)).ti,ab.
33	((balance adj2 (privat* or privacy or visibility)) or sightline* or (sight adj2 line*) or (spac* adj2 (circulat* or delineat* or layout*)) or ((workstation* or work station*) adj2 (locat* or placement*))).ti,ab.
34	((room or space*) adj3 (call* or report*)).ti,ab.
35	(((safe adj (environent or room*)) or (room* adj2 (equip* or includ* or provid*))) adj3 (alarm* or external lock* or peep* or reinforced or telephone)).ti,ab.
36	(trauma room* adj4 famil*).ti,ab.
37	((column* or quiet* or safe* or wall*) adj2 (area* or admission* or admit* or checkin* or check in* or cubicle* or enclosure* or room* or (wait* adj2 register*))).ti,ab.
38	((a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*) adj2 privacy).ti,ab.
39	(((private consultation* or single) adj2 room*) or (seclude* adj2 (area* or room*)) or ((area or cubicle* or space* or room*) adj2 (speak* or talk*) adj2 confiden*) or ((minimi* or reduce*) adj2 scrutin*)).ti,ab.
40	((acoustic* adj2 (divider* or tile*)) or ((curtain* or floor to ceiling or solid) adj2 partition*) or (glass adj2 slid*) or (wood* adj2 door*)).ti,ab.
41	(tamper resistant or mechanical air pressure or weather cover).ti,ab.
42	(((audio* or cctv or security or video*) adj2 (discreet or monitor* or surveil*)) or secure entry or video security or (audio adj2 (capabilit* or monitor* or security)) or (security adj2 (office* or presen* or visible))).ti,ab.
43	(separate parking or signage* or wayfinding or way finding).ti,ab.
44	((abscond* or escape) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
45	((prevent* adj3 (inpatient* or patient*) adj3 harm*) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
46	(safety adj10 (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.

#	Searches
47	(((colocation or location) adj3 (clinician* or doctor* or human resources or nurs* or personnel or registrar* or service* or staff* or worker* or workforce or work force)) or (staff* adj2 station)).ti,ab.
48	(safe* adj3 transition*).ti,ab.
49	((safe* adj2 (clinical practice or plan* or legislation* or polic* or resources)) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
50	(safe* and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti.
51	(prevent* adj3 (harm* or selfharm* or suicid*) adj3 (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
52	or/25-51
53	or/24-52
54	3 and 53
55	limit 54 to yr="2000 -Current"
56	limit 55 to english language
57	letter/ or editorial/ or news/ or exp historical article/ or anecdotes as topic/ or comment/ or case report/ or (letter or comment*).ti. or (animals not humans).sh. or exp animals, laboratory/ or exp animal experimentation/ or exp models, animal/ or exp rodentia/ or (rat or rats or mouse or mice).ti.
58	56 not 57

Database(s): Embase and Emcare – OVID interface
Date of last search: 22nd February 2021

#	Searches
1	automutilation/ or exp suicidal behavior/
2	(self harm* or selfharm* or self injur* or selfinjur* or self mutilat* or selfmutilat* or suicid* or self destruct* or selfdestruct* or self poison* or selfpoison* or (self adj2 cut*) or self immolat* or self immolat* or selfinflict* or self inflict* or auto mutilat* or automutilat*).tw.
3	or/1-2
4	advanced practice nursing/ or clinical nurse specialist/ or observation/ or *patient safety/ or shift schedule/ or work schedule tolerance/ or ("organization and management"/ and personnel management/)
5	(health workforce/ or exp health care personnel/ or health workforce/ or nurse practitioner/ or nursing/ or nursing staff / or team nursing/ or *patient care / or patient safety/ or exp personnel management/ or safety/ or work-life balance/ or workload/) and ("organization and management"/ or personnel management/)
6	*health workforce/ or exp *health care personnel/ or *health workforce/ or *nurse practitioner/ or *nursing/ or *nursing staff / or *team nursing/ or *patient care / or *patient safety/ or exp *personnel management/ or *safety/ or *work-life balance/ or *workload/
7	(or/5-6) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*).ti,ab,hw.
8	interdisciplinary communication/ or public relations/ or organizational culture/ or (patient care/ and ("organization and management"/ or education.hw.)) or (rapid response team/ and "organization and management"/)

#	Searches
9	((nurs* adj1 (clinician? or specialist? or expert?)) or (advance? practice adj1 nurs*) or ((nurse or nurses or nursing or staffing) adj1 (assistant? or assistive personnel)) or ((usual or conventional) adj4 nursing) or ((nurse or nursing) adj1 (consultant? or advisor?)) or ((community or health or home or nurs*) adj aide*) or (personal adj2 (assistant* or attendant*)) or plns).ti,ab.
10	((clinician* or doctor* or human resources or nurs* or personnel or registrar* or staff* or worker* or workforce or work force) adj2 (allocat* or availability or capacit* or decreas* or desired or fewer or fluctuation* or high* or increas* or irregular or level* or low* or maximum or minimum or number* or optimal or rate* or reduce* or roster* or rotat* or schedule* or shift*1 or shortag* or staffing or supply or ((staffing or nursing or personnel or workforce) adj2 (adequate or requirement)) or (work adj2 pattern*))).ti,ab.
11	(((gender adj2 (level* or ratio*)) or (male* adj2 female* adj2 (level* or ratio*))) adj5 (clinician* or doctor* or human resources or nurs* or personnel or registrar* or staff* or worker* or workforce or work force)).ti,ab.
12	(regular schedule* or (schedule* adj2 (roster* or shift* or station)) or shiftwork* or (shift adj2 work*) or ((decreas* or high* or increas* or level* or low* or maxim* or minim* or number* or proportion* or straight or sitter*) adj3 shift*)).ti,ab.
13	((observation or observations) adj3 (allocation* or chart* or checklist* or check list* or close or competenc* or contact* or continuous or decreas* or direct* or guideline* or increas* or inter* or interact* or intermittent or leaflet* or level* or minute* or multi* or number* or nurs* or patient* or period* or plan* or polic* or practice* or prescrib* or professional* or reduc* or roster* or safe* or schedule* or staff* or standard* or support*)).ti,ab.
14	(((doctor* or Nurs* or staff* or worker*) adj2 (based or led or managed)) or primary nursing).ti,ab.
15	((patient* adj2 (per or ratio*)) or (patient* adj (per or ratio* or to) adj doctor*) or (patient* adj (per or ratio* or to) adj nurse*)).ti,ab.
16	(grademix or (grade* adj2 mix) or ((human resources or nurs* or rn or personnel or staff*) adj10 (mix or ratio*)) or skillmix or skill mix or ((desired or grade* or qualified or optimal) adj2 mix) or ((human resources or nurs* or rn or personnel or staff*) adj2 (characteristic* or composition* or gender* or ratio*))).ti,ab.
17	((leader* adj2 style*) or ((team or unit) adj2 (culture or lead* or manager*)) or ((human resources or nurs* or rn or personnel or staff*) adj2 leader* adj2 manag*) or ((nursing or patient care) adj team?)).ti,ab.
18	(((nurs* or staff* or workforce or work force or worker*) adj2 (delivery or high intensity or model* or system*)) or (models adj3 integration) or ((nurs* or workforce or work force or worker*) adj2 staffing) or ((allocation or modular or team*) adj2 model*) or planning model*).ti,ab.
19	((therapeutic adj (alliance* or rapport or relation*)) or ((human resources or nurs* or rn or personnel or staff*) adj2 patient* adj2 (engag* or interact*))).ti,ab.
20	(burnout* or ((capacity or resources) adj2 service*) or ((job or work) adj2 (disatisf* or unsatis*)) or ((heavy or manageable or stress*) adj2 (workload* or workplace or work place)) or (poor adj2 wellbeing)).ti,ab.
21	((length adj2 service) or (length adj2 time adj2 (duty or duties or position* or post)) or ((amount* or level*) adj2 (education or experience)) or ((clinician* or doctor* or human resources or nurs* or personnel or registrar* or staff* or worker* or workforce or work force) adj2 (competenc* or qualified or qualification* or skill*))).ti,ab.
22	(((inter disciplin* or inter profession* or interdisciplin* or interprofession* or intra disciplin* or intra profession* or intradisciplin* or intraprofession* or joint disciplin* or joint profession* or jointdisciplin* or jointprofession* or multidisciplin* or multi disciplin* or multiprofession* or multi profession*) adj3 (collaborat* or communicat* or conversation* or educat* or learn* or taught or team* or teach* or train*)) or

#	Searches
	teamwork* or team work* or ((joint or inter or intra or multi*) adj3 (disciplin* or profession*) adj5 (collaborat* or communicat* or conversation* or educat* or learn* or taught or team* or teach* or train*)) or ((effectiv* or facilitat* or improv*) adj3 (communicat* or team*))).ti,ab.
23	(((well being or wellbeing or stress or burnout or caseload or workload or leadership or cultural unit* or (patient adj2 interact*) or staffing or ((competence* or nurs* or staff*) and model*)) and (nurs* or staff* or workforce* or personnel)) or ((care or observation* or observer or transition) adj2 model*) or (health adj2 (delivery or service* or system) adj2 model*)).ti.
24	or/4,7-23
25	exp Environment planning/ or hospital design/ or (exp Health care facility/ and environment.hw.)
26	((architectur* or (dimension* or intervention* or solution* or strateg*)) adj2 design*).ti,ab.
27	(((design* or environment or layout*) adj5 (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)) or ((a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*) adj2 structure)).ti,ab.
28	(environment* adj2 (build or design* or effect* or feature* or physical or planned or quality or restorative)).ti,ab.
29	((evidence based adj2 (healthcare or health care) adj2 design) or ((design adj2 (mental adj2 health)) or (psychiatric adj (care or service*)))).ti.
30	((a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*) adj2 privacy).ti,ab.
31	(activity room* or (ambulant adj2 light*) or artwork or art work or courtyard* or court yard* or decor or finishes or fittings or furnishing* or furniture or gardens or green space* or handles or hooks or ligature* or rails or resistant glass or (wall* adj2 material*) or water feature* or windows or ((colo?r or art or landscape or mirrors or nature or outdoor* or plants or window*) adj3 (sens* or stimulat* or view*)) or ((hospital or ward) adj hangings) or sound attenuation).ti,ab.
32	((enhance* adj2 visability) or (open adj2 layout*)).ti,ab.
33	((balance adj2 (privat* or privacy or visibility)) or sightline* or (sight adj2 line*) or (spac* adj2 (circulat* or delineat* or layout*)) or ((workstation* or work station*) adj2 (locat* or placement*))).ti,ab.
34	((room or space*) adj3 (call* or report*)).ti,ab.
35	(((safe adj (environent or room*)) or (room* adj2 (equip* or includ* or provid*))) adj3 (alarm* or external lock* or peep* or reinforced or telephone)).ti,ab.
36	(trauma room* adj4 famil*).ti,ab.
37	((column* or quiet* or safe* or wall*) adj2 (area* or admission* or admit* or checkin* or check in* or cubicle* or enclosure* or room* or (wait* adj2 register*))).ti,ab.
38	((a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*) adj2 privacy).ti,ab.
39	(((private consultation* or single) adj2 room*) or (seclude* adj2 (area* or room*)) or ((area or cubicle* or space* or room*) adj2 (speak* or talk*) adj2 confiden*) or ((minimi* or reduce*) adj2 scrutin*)).ti,ab.
40	((acoustic* adj2 (divider* or tile*)) or ((curtain* or floor to ceiling or solid) adj2 partition*) or (glass adj2 slid*) or (wood* adj2 door*)).ti,ab.
41	(tamper resistant or mechanical air pressure or weather cover).ti,ab.

#	Searches
42	(((audio* or cctv or security or video*) adj2 (discreet or monitor* or surveil*)) or secure entry or video security or (audio adj2 (capabilit* or monitor* or security)) or (security adj2 (office* or presen* or visible))).ti,ab.
43	(separate parking or signage* or wayfinding or way finding).ti,ab.
44	((abscond* or escape) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
45	((prevent* adj3 (inpatient* or patient*) adj3 harm*) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
46	(safety adj10 (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
47	(((colocation or location) adj3 (clinician* or doctor* or human resources or nurs* or personnel or registrar* or service* or staff* or worker* or workforce or work force)) or (staff* adj2 station)).ti,ab.
48	(safe* adj3 transition*).ti,ab.
49	((safe* adj2 (clinical practice or plan* or legislation* or polic* or resources)) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
50	(safe* and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti.
51	(prevent* adj3 (harm* or selfharm* or suicid*) adj3 (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
52	or/25-51
53	or/24-52
54	3 and 53
55	limit 54 to yr="2000 -Current"
56	limit 55 to english language
57	(animal/ not human/) or exp Animal Experiment/ or animal model/ or exp Experimental Animal/ or nonhuman/ or exp Rodent/ or (rat or rats or mouse or mice).ti.
58	56 not 57

Database(s): PsycINFO – OVID interface
Date of last search: 22nd February 2021

#	Searches
1	self-injurious behavior/ or self-destructive behavior/ or self-inflicted wounds/ or self-mutilation/ or self-poisoning/ or exp suicide/ or suicidal ideation/
2	(self harm* or selfharm* or self injur* or selfinjur* or self mutilat* or selfmutilat* or suicid* or self destruct* or selfdestruct* or self poison* or selfpoison* or (self adj2 cut*) or self immolat* or self immolat* or selfinflict* or self inflict* or auto mutilat* or automutilat*).tw.
3	or/1-2
4	Exp observation methods/ or *patient safety/ or (medical personnel and human resource management) or exp working conditions/ or work scheduling/

#	Searches
5	exp *health personnel/ or *nurses/ or (*nursing/ and teams.hw.) or exp *human resource management/ or *safety/ or exp *occupational safety/ or *work-life balance/ or *work load/
6	Or/4-5
7	6 and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*).ti,ab,hw.
8	(interdisciplinary and communication).hw. or interprofessional relations/ or organizational climate/
9	((nurs* adj1 (clinician? or specialist? or expert?)) or (advance? practice adj1 nurs*) or ((nurse or nurses or nursing or staffing) adj1 (assistant? or assistive personnel)) or ((usual or conventional) adj4 nursing) or ((nurse or nursing) adj1 (consultant? or advisor?)) or ((community or health or home or nurs*) adj aide*) or (personal adj2 (assistant* or attendant*)) or plns).ti,ab.
10	((clinician* or doctor* or human resources or nurs* or personnel or registrar* or staff* or worker* or workforce or work force) adj2 (allocat* or availability or capacit* or decreas* or desired or fewer or fluctuation* or high* or increas* or irregular or level* or low* or maximum or minimum or number* or optimal or rate* or reduce* or roster* or rotat* or schedule* or shift*1 or shortag* or staffing or supply or ((staffing or nursing or personnel or workforce) adj2 (adequate or requirement)) or (work adj2 pattern*))).ti,ab.
11	(((gender adj2 (level* or ratio*)) or (male* adj2 female* adj2 (level* or ratio*))) adj5 (clinician* or doctor* or human resources or nurs* or personnel or registrar* or staff* or worker* or workforce or work force)).ti,ab.
12	(regular schedule* or (schedule* adj2 (roster* or shift* or station)) or shiftwork* or (shift adj2 work*) or ((decreas* or high* or increas* or level* or low* or maxim* or minim* or number* or proportion* or straight or sitter*) adj3 shift*)).ti,ab.
13	((observation or observations) adj3 (allocation* or chart* or checklist* or check list* or close or competenc* or contact* or continuous or decreas* or direct* or guideline* or increas* or inter* or interact* or intermittent or leaflet* or level* or minute* or multi* or number* or nurs* or patient* or period* or plan* or polic* or practice* or prescrib* or professional* or reduc* or roster* or safe* or schedule* or staff* or standard* or support*)).ti,ab.
14	(((doctor* or Nurs* or staff* or worker*) adj2 (based or led or managed)) or primary nursing).ti,ab.
15	((patient* adj2 (per or ratio*)) or (patient* adj (per or ratio* or to) adj doctor*) or (patient* adj (per or ratio* or to) adj nurse*)).ti,ab.
16	(grademix or (grade* adj2 mix) or ((human resources or nurs* or rn or personnel or staff*) adj10 (mix or ratio*)) or skillmix or skill mix or ((desired or grade* or qualified or optimal) adj2 mix) or ((human resources or nurs* or rn or personnel or staff*) adj2 (characteristic* or composition* or gender* or ratio*))).ti,ab.
17	((leader* adj2 style*) or ((team or unit) adj2 (culture or lead* or manager*)) or ((human resources or nurs* or rn or personnel or staff*) adj2 leader* adj2 manag*) or ((nursing or patient care) adj team?)).ti,ab.
18	(((nurs* or staff* or workforce or work force or worker*) adj2 (delivery or high intensity or model* or system*)) or (models adj3 integration) or ((nurs* or workforce or work force or worker*) adj2 staffing) or ((allocation or modular or team*) adj2 model*) or planning model*).ti,ab.
19	((therapeutic adj (alliance* or rapport or relation*)) or ((human resources or nurs* or rn or personnel or staff*) adj2 patient* adj2 (engag* or interact*))).ti,ab.
20	(burnout* or ((capacity or resources) adj2 service*) or ((job or work) adj2 (disatisf* or unsatis*)) or ((heavy or manageable or stress*) adj2 (workload* or workplace or work place)) or (poor adj2 wellbeing)).ti,ab.

#	Searches
21	((length adj2 service) or (length adj2 time adj2 (duty or duties or position* or post)) or ((amount* or level*) adj2 (education or experience)) or ((clinician* or doctor* or human resources or nurs* or personnel or registrar* or staff* or worker* or workforce or work force) adj2 (competenc* or qualified or qualification* or skill*))).ti,ab.
22	(((inter disciplin* or inter profession* or interdisciplin* or interprofession* or intra disciplin* or intra profession* or intradisciplin* or intraprofession* or joint disciplin* or joint profession* or jointdisciplin* or jointprofession* or multidisciplin* or multi disciplin* or multiprofession* or multi profession*) adj3 (collaborat* or communicat* or conversation* or educat* or learn* or taught or team* or teach* or train*)) or teamwork* or team work* or ((joint or inter or intra or multi*) adj3 (disciplin* or profession*) adj5 (collaborat* or communicat* or conversation* or educat* or learn* or taught or team* or teach* or train*)) or ((effectiv* or facilitat* or improv*) adj3 (communicat* or team*))).ti,ab.
23	(((well being or wellbeing or stress or burnout or caseload or workload or leadership or cultural unit* or (patient adj2 interact*) or staffing or ((competence* or nurs* or staff*) and model*)) and (nurs* or staff* or workforce* or personnel)) or ((care or observation* or observer or transition) adj2 model*) or (health adj2 (delivery or service* or system) adj2 model*)).ti.
24	or/7-23
25	Exp environmental planning/ or exp Facility Environment/
26	((architectur* or (dimension* or intervention* or solution* or strateg*)) adj2 design*).ti,ab.
27	(((design* or environment or layout*) adj5 (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)) or ((a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*) adj2 structure)).ti,ab.
28	(environment* adj2 (build or design* or effect* or feature* or physical or planned or quality or restorative)).ti,ab.
29	((evidence based adj2 (healthcare or health care) adj2 design) or ((design adj2 (mental adj2 health)) or (psychiatric adj (care or service*)))).ti.
30	((a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*) adj2 privacy).ti,ab.
31	(activity room* or (ambulant adj2 light*) or artwork or art work or courtyard* or court yard* or decor or finishes or fittings or furnishing* or furniture or gardens or green space* or handles or hooks or ligature* or rails or resistant glass or (wall* adj2 material*) or water feature* or windows or ((colo?r or art or landscape or mirrors or nature or outdoor* or plants or window*) adj3 (sens* or stimulat* or view*)) or ((hospital or ward) adj hangings) or sound attenuation).ti,ab.
32	((enhance* adj2 visability) or (open adj2 layout*)).ti,ab.
33	((balance adj2 (privat* or privacy or visibility)) or sightline* or (sight adj2 line*) or (spac* adj2 (circulat* or delineat* or layout*)) or ((workstation* or work station*) adj2 (locat* or placement*))).ti,ab.
34	((room or space*) adj3 (call* or report*)).ti,ab.
35	(((safe adj (environent or room*)) or (room* adj2 (equip* or includ* or provid*))) adj3 (alarm* or external lock* or peep* or reinforced or telephone)).ti,ab.
36	(trauma room* adj4 famil*).ti,ab.
37	((column* or quiet* or safe* or wall*) adj2 (area* or admission* or admit* or checkin* or check in* or cubicle* or enclosure* or room* or (wait* adj2 register*))).ti,ab.

#	Searches
38	((a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*) adj2 privacy).ti,ab.
39	(((private consultation* or single) adj2 room*) or (seclude* adj2 (area* or room*)) or ((area or cubicle* or space* or room*) adj2 (speak* or talk*) adj2 confiden*) or ((minimi* or reduce*) adj2 scrutin*)).ti,ab.
40	((acoustic* adj2 (divider* or tile*)) or ((curtain* or floor to ceiling or solid) adj2 partition*) or (glass adj2 slid*) or (wood* adj2 door*)).ti,ab.
41	(tamper resistant or mechanical air pressure or weather cover).ti,ab.
42	(((audio* or cctv or security or video*) adj2 (discreet or monitor* or surveil*)) or secure entry or video security or (audio adj2 (capabilit* or monitor* or security)) or (security adj2 (office* or presen* or visible))).ti,ab.
43	(separate parking or signage* or wayfinding or way finding).ti,ab.
44	((abscond* or escape) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
45	((prevent* adj3 (inpatient* or patient*) adj3 harm*) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
46	(safety adj10 (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
47	(((colocation or location) adj3 (clinician* or doctor* or human resources or nurs* or personnel or registrar* or service* or staff* or worker* or workforce or work force)) or (staff* adj2 station)).ti,ab.
48	(safe* adj3 transition*).ti,ab.
49	((safe* adj2 (clinical practice or plan* or legislation* or polic* or resources)) and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
50	(safe* and (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti.
51	(prevent* adj3 (harm* or selfharm* or suicid*) adj3 (a&e or emergency department* or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) adj (care or setting*)) or surgery or unit*1 or ward*)).ti,ab.
52	or/25-51
53	or/24-52
54	3 and 53
55	limit 54 to yr="2000 -Current"
56	limit 55 to english language

Database(s): Cochrane Library - Wiley interface
Cochrane Database of Systematic Reviews, Issue 2 of 12, February 2021; Cochrane Central Register of Controlled Trials, Issue 2 of 12, February 2021
Date of last search: 22nd February 2021

#	Searches
1	MeSH descriptor: [poisoning] this term only
2	MeSH descriptor: [self-injurious behavior] explode all trees
3	MeSH descriptor: [self mutilation] this term only
4	MeSH descriptor: [suicide] this term only

#	Searches
5	MeSH descriptor: [suicidal ideation] this term only
6	MeSH descriptor: [suicide, attempted] this term only
7	MeSH descriptor: [suicide, completed] this term only
8	(automutilat* or “auto mutilat*” or cutt* or (self near/2 cut*) or selfdestruct* or “self destruct*” or selfharm* or “self harm*” or selfimmolat* or “self immolat*” or selfinflict* or “self inflict*” or selfinjur* or “self injur*” or selfmutilat* or “self mutilat*” or selfpoison* or “self poison*” or selfwound* or “self wound*” or suicid*):ti,ab.
9	{or #1-#8}
10	MeSH descriptor: [advanced practice nursing] this term only
11	MeSH descriptor: [nurse clinicians] this term only
12	MeSH descriptor: [observation] this term only
13	MeSH descriptor: [patient safety] this term only
14	MeSH descriptor: [personnel staffing and scheduling] this term only
15	MeSH descriptor: [shift work schedule] this term only
16	MeSH descriptor: [work schedule tolerance] this term only
17	{OR #10-#16}
18	MeSH descriptor: [advanced practice nursing] this term only and with qualifier(s): [organization & administration - OG, standards - ST]
19	MeSH descriptor: [nurse clinicians] this term only and with qualifier(s): [organization & administration - OG, standards - ST]
20	MeSH descriptor: [observation] this term only and with qualifier(s): [organization & administration - OG, standards - ST]
21	MeSH descriptor: [patient safety] this term only and with qualifier(s): [organization & administration - OG, standards - ST]
22	MeSH descriptor: [personnel staffing and scheduling] this term only and with qualifier(s): [organization & administration - OG, standards - ST]
23	MeSH descriptor: [shift work schedule] this term only and with qualifier(s): [organization & administration - OG, standards - ST]
24	MeSH descriptor: [work schedule tolerance] this term only and with qualifier(s): [organization & administration - OG, standards - ST]
25	{OR #18-#24}
26	(a&e or “emergency department*” or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*):ti,ab,kw.
27	#25 and #26
28	MeSH descriptor: [interdisciplinary communication] this term only this term only
29	MeSH descriptor: [interprofessional relations] this term only
30	MeSH descriptor: [organizational culture] this term only
31	MeSH descriptor: [patient care team and with qualifier(s): [organization & administration - OG, education - ED]
32	MeSH descriptor: [hospital rapid response team and with qualifier(s): [organisation &nd administration- AD]
33	((nurs* near/1 (clinician? or specialist? or expert?)) or (advance? practice near/1 nurs*) or ((nurse or nurses or nursing or staffing) near/1 (assistant? or “assistive personnel”)) or ((usual or conventional) near/4 nursing) or ((nurse or nursing) near/1 (consultant? or advisor?)) or ((community or health or home or nurs*) next aide*) or (personal near/2 (assistant* or attendant*)) or plns):ti,ab.
34	((clinician* or doctor* or “human resources” or nurs* or personnel or registrar* or staff* or worker* or workforce or “work force”) near/2 (allocat* or availability or capacit* or decreas* or desired or fewer or fluctuation* or high* or increas* or irregular or level* or low* or maximum or minimum or number* or optimal or rate* or reduce* or roster* or rotat* or schedule* or shift* or shortag* or staffing or supply or

#	Searches
	((staffing or nursing or personnel or workforce) near/2 (adequate or requirement)) or (work near/2 pattern*))):ti,ab.
35	(((gender near/2 (level* or ratio*)) or (male* near/2 female* near/2 (level* or ratio*))) near/5 (clinician* or doctor* or "human resources" or nurs* or personnel or registrar* or staff* or worker* or workforce or "work force")):ti,ab.
36	("regular schedule*" or (schedule* near/2 (roster* or shift* or station)) or shiftwork* or (shift near/2 work*) or ((decreas* or high* or increas* or level* or low* or maxim* or minim* or number* or proportion* or straight or sitter*) near/3 shift*)):ti,ab.
37	((observation or observations) near/3 (allocation* or chart* or checklist* or "check list*" or close or competenc* or contact* or continuous or decreas* or direct* or guideline* or increas* or inter* or "interact*" or intermittent or leaflet* or level* or minute* or multi* or number* or nurs* or patient* or period* or plan* or polic* or practice* or prescrib* or professional* or reduc* or roster* or safe* or schedule* or staff* or standard* or support*)):ti,ab.
38	(((doctor* or nurs* or staff* or worker*) near/2 (based or led or managed)) or "primary nursing"):ti,ab.
39	((patient* near/2 (per or ratio*)) or (patient* next (per or ratio* or to) next doctor*) or (patient* next (per or ratio* or to) next nurse*)):ti,ab.
40	(grademix or (grade* near/2 mix) or (("human resources" or nurs* or rn or personnel or staff*) near/10 (mix or ratio*)) or skillmix or "skill mix" or ((desired or grade* or qualified or optimal) near/2 mix) or (("human resources" or nurs* or rn or personnel or staff*) near/2 (characteristic* or composition* or gender* or ratio*))):ti,ab.
41	((leader* near/2 style*) or ((team or unit) near/2 (culture or lead* or manager*)) or (("human resources" or nurs* or rn or personnel or staff*) near/2 leader* near/2 manag*) or ((nursing or patient care) next team?)):ti,ab.
42	(((nurs* or staff* or workforce or "work force" or worker*) near/2 (delivery or high intensity or model* or system*)) or (models near/3 integration) or ((nurs* or workforce or "work force" or worker*) near/2 staffing) or ((allocation or modular or team*) near/2 model*) or "planning model*"):ti,ab.
43	((therapeutic next (alliance* or rapport or relation*)) or (("human resources" or nurs* or rn or personnel or staff*) near/2 patient* near/2 (engag* or interact*))):ti,ab.
44	(burnout* or ((capacity or resources) near/2 service*) or ((job or work) near/2 (disatisf* or unsatis*)) or ((heavy or manageable or stress*) near/2 (workload* or workplace or "work place")) or (poor near/2 wellbeing)):ti,ab.
45	((length near/2 service) or (length near/2 time near/2 (duty or duties or position* or post)) or ((amount* or level*) near/2 (education or experience)) or ((clinician* or doctor* or "human resources" or nurs* or personnel or registrar* or staff* or worker* or workforce or "work force") near/2 (competenc* or qualified or qualification* or skill*))):ti,ab.
46	((("inter disciplin*" or "inter profession*" or interdisciplin* or interprofession* or "intra disciplin*" or "intra profession*" or intradisciplin* or intraprofession* or "joint disciplin*" or "joint profession*" or jointdisciplin* or jointprofession* or multidisciplin* or "multi disciplin*" or multiprofession* or "multi profession*") near/3 (collaborat* or communicat* or conversation* or educat* or learn* or taught or team* or teach* or train*)) or teamwork* or "team work*" or ((joint or inter or intra or multi*) near/3 (disciplin* or profession*) near/5 (collaborat* or communicat* or conversation* or educat* or learn* or taught or team* or teach* or train*)) or ((effectiv* or facilitat* or improv*) near/3 (communicat* or team*))):ti,ab.
47	((("well being" or wellbeing or stress or burnout or caseload or workload or leadership or "cultural unit*" or (patient near/2 interact*) or staffing or ((competence* or nurs* or staff*) and model*)) and (nurs* or staff* or workforce* or personnel)) or ((care or observation* or observer or transition) near/2 model*) or (health near/2 (delivery or service* or system) near/2 model*)):ti.

#	Searches
48	{OR #28-#47}
49	#17 or #27 or #48
50	MeSH descriptor: [Environment Design] explode all trees
51	MeSH descriptor: [Facility Design and Construction] explode all trees
52	MeSH descriptor: [Health Facility Environment] explode all trees
53	((architectur* or (dimension* or intervention* or solution* or strateg*)) near/2 design*):ti,ab.
54	(((design* or environment or layout*) near/5 (a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*)) or ((a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*) near/2 structure)):ti,ab.
55	(environment* near/2 (build or design* or effect* or feature* or physical or planned or quality or restorative)):ti,ab.
56	(("evidence based" near/2 (healthcare or "health care") near/2 design) or ((design near/2 (mental near/2 health)) or (psychiatric next (care or service*)))):ti.
57	((a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*) near/2 privacy):ti,ab.
58	("activity room*" or (ambulant near/2 light*) or artwork or "art work" or courtyard* or "court yard*" or decor or finishes or fittings or furnishing* or furniture or gardens or "green space*" or handles or hooks or ligature* or rails or "resistant glass" or (wall* near/2 material*) or "water feature*" or windows or ((colo?r or art or landscape or mirrors or nature or outdoor* or plants or window*) near/3 (sens* or stimulat* or view*)) or ((hospital or ward) next hangings) or "sound attenuation"):ti,ab.
59	((enhance* near/2 visability) or (open near/2 layout*)):ti,ab.
60	((balance near/2 (privat* or privacy or visibility)) or sightline* or (sight near/2 line*) or (spac* near/2 (circulat* or delineat* or layout*)) or ((workstation* or "work station*") near/2 (locat* or placement*))):ti,ab.
61	((room or space*) near/3 (call* or report*)):ti,ab.
62	(((safe next (environent or room*)) or (room* near/2 (equip* or includ* or provid*))) near/3 (alarm* or "external lock*" or peep* or reinforced or telephone)):ti,ab.
63	("trauma room*" near/4 famil*):ti,ab.
64	((column* or quiet* or safe* or wall*) near/2 (area* or admission* or admit* or checkin* or "check in*" or cubicle* or enclosure* or room* or (wait* near/2 register*))):ti,ab.
65	((a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*) near/2 privacy):ti,ab.
66	((("private consultation*" or single) near/2 room*) or (seclude* near/2 (area* or room*)) or ((area or cubicle* or space* or room*) near/2 (speak* or talk*) near/2 confiden*) or ((minimi* or reduce*) near/2 scrutin*)):ti,ab.
67	((acoustic* near/2 (divider* or tile*)) or ((curtain* or floor to ceiling or solid) near/2 partition*) or (glass near/2 slid*) or (wood* near/2 door*)):ti,ab.
68	("tamper resistant" or "mechanical air pressure" or "weather cover"):ti,ab.
69	(((audio* or cctv or security or video*) near/2 (discreet or monitor* or surveil*)) or "secure entry" or "video security" or (audio near/2 (capabilit* or monitor* or security)) or (security near/2 (office* or presen* or visible))):ti,ab.
70	("separate parking" or signage* or wayfinding or "way finding"):ti,ab.

#	Searches
71	((abscond* or escape) and (a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*)):ti,ab.
72	((prevent* near/3 (inpatient* or patient*) near/3 harm*) and (a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*)):ti,ab.
73	(safety near/10 (a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*)):ti,ab.
74	(((colocation or location) near/3 (clinician* or doctor* or "human resources" or nurs* or personnel or registrar* or service* or staff* or worker* or workforce or "work force")) or (staff* near/2 station)):ti,ab.
75	(safe* near/3 transition*):ti,ab.
76	((safe* near/2 ("clinical practice" or plan* or legislation* or polic* or resources)) and (a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*)):ti,ab.
77	(safe* and (a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*)):ti.
78	(prevent* near/3 (harm* or selfharm* or suicid*) near/3 (a&e or "emergency department*" or hospital* or inpatient* or ((acute or clinical or emergency or intensive or medical) next (care or setting*)) or surgery or unit* or ward*)):ti,ab.
79	{OR #50-#78}
80	#49 or #79
81	(#9 and #80) with Cochrane Library publication date Between Jan 2000 and Feb 2021

Database(s): CDSR and HTA – CRD interface
Date of last search: 22nd February 2021

#	Searches
1	MeSH descriptor: poisoning IN CDSR, HTA
2	MeSH descriptor: self-injurious behavior EXPLODE ALL TREES IN CDSR, HTA
3	MeSH descriptor: self mutilation IN CDSR, HTA
4	MeSH descriptor: suicide IN CDSR, HTA
5	MeSH descriptor: suicidal ideation IN CDSR, HTA
6	MeSH descriptor: suicide, attempted IN CDSR, HTA
7	MeSH descriptor: suicide, completed IN CDSR, HTA
8	(automutilat* or "auto mutilat*" or cutt* or (self near2 cut*) or selfdestruct* or "self destruct*" or selfharm* or "self harm*" or selfimmolat* or "self immolat*" or selfinflict* or "self inflict*" or selfinjur* or "self injur*" or selfmutilat* or "self mutilat*" or selfpoison* or "self poison*" or selfwound* or "self wound*" or suicid*) IN CDSR, HTA
9	(#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8) from 2000 to 2021

Economic

A global, population based search was undertaken to find for economic evidence covering all parts of the guideline.

Database(s): MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily – OVID interface
Date of last search: 12th August 2021

#	Searches
1	poisoning/ or exp self-injurious behavior/ or self mutilation/ or suicide/ or suicidal ideation/ or suicide, attempted/ or suicide, completed/
2	(automutilat* or auto mutilat* or cutt* or (self adj2 cut*) or selfdestruct* or self destruct* or selfharm* or self harm* or selfimmolat* or self immolat* or selfinflict* or self inflict* or selfinjur* or self injur* or selfmutilat* or self mutilat* or selfpoison* or self poison* or selfwound* or self wound* or suicid*).ti,ab.
3	or/1-2
4	Economics/
5	Value of life/
6	exp "Costs and Cost Analysis"/
7	exp Economics, Hospital/
8	exp Economics, Medical/
9	Economics, Nursing/
10	Economics, Pharmaceutical/
11	exp "Fees and Charges"/
12	exp Budgets/
13	budget*.ti,ab.
14	cost*.ti.
15	(economic* or pharmaco?economic*).ti.
16	(price* or pricing*).ti,ab.
17	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
18	(financ* or fee or fees).ti,ab.
19	(value adj2 (money or monetary)).ti,ab.
20	Quality-Adjusted Life Years/
21	Or/4-20
22	3 and 21
23	limit 22 to yr="2000 -current"

Database(s): Embase and Emcare – OVID interface
Date of last search: 12th August 2021

#	searches
1	automutilation/ or exp suicidal behavior/
2	(auto mutilat* or automutilat* or self cut* or selfcut* or self destruct* or selfdestruct* or self harm* or selfharm* or self immolat* or selfimmolat* or self inflict* or selfinflict* or self injur* or selfinjur* or self mutilat* or selfmutilat* or self poison* or selfpoison* or suicid*).ti,ab.
3	or/1-2
4	health economics/

#	searches
5	exp economic evaluation/
6	exp health care cost/
7	exp fee/
8	budget/
9	funding/
10	budget*.ti,ab.
11	cost*.ti.
12	(economic* or pharmaco?economic*).ti.
13	(price* or pricing*).ti,ab.
14	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
15	(financ* or fee or fees).ti,ab.
16	(value adj2 (money or monetary)).ti,ab.
17	Quality-Adjusted Life Year/
18	Or/4-17
19	3 and 18
20	limit 19 to yr="2000 -current"

Database(s): Cochrane Library - Wiley interface
Cochrane Central Register of Controlled Trials, Issue 8 of 12, August 2021
Date of last search: 12th August 2021

#	Searches
1	MeSH descriptor: [poisoning] this term only
2	MeSH descriptor: [self-injurious behavior] explode all trees
3	MeSH descriptor: [self mutilation] this term only
4	MeSH descriptor: [suicide] this term only
5	MeSH descriptor: [suicidal ideation] this term only
6	MeSH descriptor: [suicide, attempted] this term only
7	MeSH descriptor: [suicide, completed] this term only
8	(automutilat* or “auto mutilat*” or cutt* or (self near/2 cut*) or selfdestruct* or “self destruct*” or selfharm* or “self harm*” or selfimmolat* or “self immolat*” or selfinflict* or “self inflict*” or selfinjur* or “self injur*” or selfmutilat* or “self mutilat*” or selfpoison* or “self poison*” or selfwound* or “self wound*” or suicid*):ti,ab.
9	{or #1-#8}
10	MeSH descriptor: [Economics] this term only
11	MeSH descriptor: [Value of life] this term only

#	Searches
12	MeSH descriptor: [Costs and Cost Analysis] explode all trees
13	MeSH descriptor: [Economics, Hospital] explode all trees
14	MeSH descriptor: [Economics, Medical] explode all trees
15	MeSH descriptor: [Economics, Nursing] this term only
16	MeSH descriptor: [Economics, Pharmaceutical] this term only
17	MeSH descriptor: [Fees and Charges"]
18	MeSH descriptor: [Budgets] this term only
19	budget*:ti,ab.
20	cost*.ti.
21	(economic* or pharmaco?economic*):ti.
22	(price* or pricing*):ti,ab.
23	(cost* near/2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)):ab.
24	(financ* or fee or fees):ti,ab.
25	(value near/2 (money or monetary)):ti,ab.
26	MeSH descriptor: [Quality-Adjusted Life Years] this term only
27	{OR #10-#26}
28	(#9 and #27) with Cochrane Library publication date Between Jan 2000 and Aug 2021

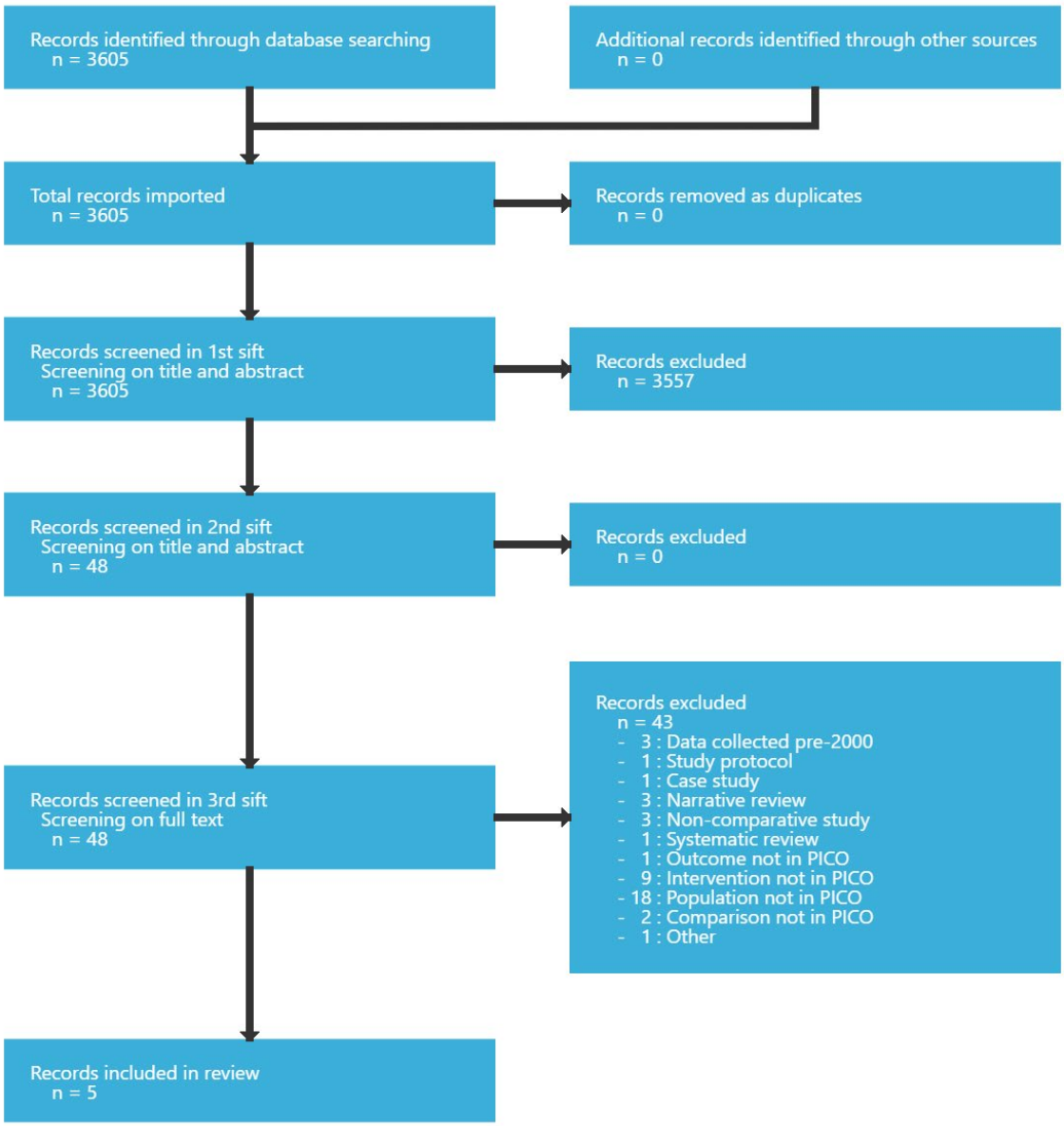
Database(s): NHS EED and HTA – CRD interface
Date of last search: 12th August 2021

#	Searches
1	MeSH descriptor: poisoning IN NHSEED, HTA
2	MeSH descriptor: self-injurious behavior EXPLODE ALL TREES IN NHSEED, HTA
3	MeSH descriptor: self mutilation IN NHSEED, HTA
4	MeSH descriptor: suicide IN NHSEED, HTA
5	MeSH descriptor: suicidal ideation IN NHSEED, HTA
6	MeSH descriptor: suicide, attempted IN NHSEED, HTA
7	MeSH descriptor: suicide, completed IN NHSEED, HTA
8	(automutilat* or “auto mutilat*” or cutt* or (self near2 cut*) or selfdestruct* or “self destruct*” or selfharm* or “self harm*” or selfimmolat* or “self immolat*” or selfinflict* or “self inflict*” or selfinjur* or “self injur*” or selfmutilat* or “self mutilat*” or selfpoison* or “self poison*” or selfwound* or “self wound*” or suicid*) IN NHSEED, HTA
9	(#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8) from 2000 to 2021

Appendix C Effectiveness evidence study selection

Study selection for: What are the most effective ways of supporting people to be safe after self-harm?

Figure 1: Study selection flow chart



Appendix D Evidence tables

Evidence tables for review question: What are the most effective ways of supporting people to be safe after self-harm?

Table 3: Evidence tables

Bowers, 2006	
Bibliographic Reference	Bowers, L.; Brennan, G.; Flood, C.; Lipang, M.; Oladapo, P.; Preliminary outcomes of a trial to reduce conflict and containment on acute psychiatric wards: City Nurses; Journal of Psychiatric and Mental Health Nursing; 2006; vol. 13; 165-172

Study details

Country/ies where study was carried out	UK
Study type	Before-and-after studies
Study dates	April 2003- September 2004
Inclusion criteria	Inpatients of two acute psychiatric wards during the study period. The ward managers applied to participate in the study.
Exclusion criteria	None stated
Patient characteristics	Not reported
Intervention(s)/control	**Pre-Intervention** No clear definition of pre-intervention care provided (assume standard of care for acute psychiatric ward) **Post-intervention** 'City Nurses' staffing intervention, designed to reduce conflict and containment, involving: action-research (intervention co-designed with ward staff and periodic feedback on outcomes from the wards) a 'City Nurse' with clinical expertise in acute inpatient care appointed to each ward for 3 days a week staffing components: "positive appreciation of patients by staff; the ability of the staff to regulate their own natural emotional reactions to patients; and the creation of an effective structure (rules and routine) for ward life" (p. 166)
Duration of follow-up	12 months

Sources of funding	Square Smile Appeal and Henry Smiths charity
Sample size	Not reported
Other information	Number of Patient-Staff Conflict Checklist reports (PCC-SRs) completed gives some indication of sample size. PCC-SRs are completed at the end of each shift. The authors report "During the baseline period, the wards completed 284 PCCSRs, and during the intervention 1315. Together this represents a response rate of 56% of all possible end of shift reports." Each of the two wards included in the study had 18 beds.
Results	**Mean number of self-harm events per shift** Pre-Intervention control group mean (SD): 0.035 (0.203) Post-intervention group mean (SD): 0.010 (0.099) P = 0.004 (one-tailed, Mann-Whitney U test) **Mean number of suicide attempts per shift** Pre-Intervention control group mean (SD): 0.004 (0.059) Post-intervention group mean (SD): 0.003 (0.055) P = 0.900 (one-tailed, Mann-Whitney U test)

Critical appraisal

Section	Question	Answer
1. Bias due to confounding	Risk of bias judgement for confounding	Serious *(Lack of measurement of patient characteristics and adjustment; shorter stays on the ward more likely from patients at a lower risk of self harm, so intervention discontinuations related to factors prognostic for the outcome)*
2. Bias in selection of participants into the study	Risk of bias judgement for selection of participants into the study	Low *(All participants on the two wards were included in the analysis and follow-up time coincided with start of intervention for each participant)*
3. Bias in classification of interventions	Risk of bias judgement for classification of interventions	Low *(Intervention status is well defined)*
4. Bias due to deviations from intended interventions	Risk of bias judgement for deviations from intended interventions	Moderate *(Deviations from the expected intervention difficult to ascertain due to 'action research' methods used, although not expected to introduce bias)*

Section	Question	Answer
5. Bias due to missing data	Risk of bias judgement for missing data	Low *(Likely that data were reasonably complete as all participants present on wards should have been included in analysis)*
6. Bias in measurement of outcomes	Risk of bias judgement for measurement of outcomes	Serious *(The methods of outcome assessment were not comparable across intervention groups (large difference in length of time of data collection). The outcome measure could have been influenced by knowledge of the intervention by the outcome assessors who co-designed and implemented the intervention)*
7. Bias in selection of the reported result	Risk of bias judgement for selection of the reported result	Moderate *(Moderate risk of bias as no clear a priori analysis plan. Outcome measurement of self-harm is clearly defined and consistent with other reported outcome measures. No indication of selection of result from multiple analyses or subgroups.)*
Overall bias	Risk of bias judgement	Serious *(Serious risk of bias introduced due to confounding and measurement of outcomes)*
	Risk of bias variation across outcomes	N/A
	Directness	Partially Applicable *(Number of patients who had previously self-harmed not defined)*

Ford, 2020

Bibliographic Reference	Ford, E. B.; Silverman, K. D.; Solimo, A.; Jude Leung, Y.; Smith, A. M.; Bell, C. J.; Katyal, M.; Clinical outcomes of specialized treatment units for patients with serious mental illness in the New York City jail system; Psychiatric Services; 2020; vol. 71; 547-554

Study details

Country/ies where study was carried out	US
Study type	Retrospective cohort study
Study dates	January 2016 to March 2018

Inclusion criteria	Incarcerated male adults (aged 18 years and older), diagnosed with a serious mental illness and in the jail census for 14 days or more during the study period, and: Intervention group: first admission to one of the four PACE units for 14 days or more during the study period Control group: not admitted to PACE units because of limited bed availability; selected based on propensity score matching (demographic, health, and incarceration level covariates)
Exclusion criteria	None stated
Patient characteristics	**Intervention** n= 302 Age median: 36 Female/ male n: 0/ 302 Ethnicity: Hispanic 82; non-Hispanic white 33; non-Hispanic Black 165; non-Hispanic Asian 11; other or missing 11 Comorbidities: bipolar and related disorders 23; depression and depressive disorders 12; neurodevelopmental disorder 24; personality disorder 37; PTSD, trauma and stress related disorders 13; schizophrenia and psychotic disorders 244; substance abuse 202 Duration/ history of self-harm: not reported Previous self-harm: not reported Mean number of suicide attempts (SD): not reported Method: not reported Current psychiatric treatment: Clozapine 24; Lithium 40; Antipsychotic injection 101; Quetiapine 32; Haloperidol 67; Risperidone 116; Olanzapine 78; Aripiprazole 54; Valproic acid 106 Assessment setting: prisons; specialised treatment units **Control** n= 302 Age median: 36 Female/ male n: 0/ 302 Ethnicity: Hispanic 76; non-Hispanic white 38; non-Hispanic Black 163; non-Hispanic Asian 15; other or missing 10 Comorbidities: bipolar and related disorders 25; depression and depressive disorders 17; neurodevelopmental disorder 24; personality disorder 38; PTSD, trauma and stress related disorders 17; schizophrenia and psychotic disorders 238; substance abuse 202

	Duration/ history of self-harm: not reported Previous self-harm: not reported Mean number of suicide attempts (SD): not reported Method: not reported Current psychiatric treatment: Clozapine 3; Lithium 32; Antipsychotic injection 87; Quetiapine 26; Haloperidol 61; Risperidone 121; Olanzapine 84; Aripiprazole 51; Valproic acid 90 Assessment setting: prisons; single-cell housing
Intervention(s)/control	**Intervention** PACE (program for accelerating clinical effectiveness) units in prisons, involving: physical components: large open spaces; natural light; confidential interview rooms; sufficient space for protected group activities staffing components: multidisciplinary mental health treatment teams (including a psychologist, psychiatric providers, nurses, counsellors, treatment aides, art therapists) training components: correctional officers received specialised mental health training; staff communication mechanisms established activity components: daily activities, including community meetings, creative arts therapy, discussion groups behavioral components: patient-centered crisis-deesaclation; incentives program to emphasize positive reinforcement over punishment; treatment components: patient engagement in medication over coercion **Control** Single cell housing (mental observation units), including: physical components: little natural light, loud and crowded spaces treatment components: limited continuity of care
Duration of follow-up	39 months
Sources of funding	None stated
Sample size	N= 604
Results	**Rate per 100 person-days of self-injury among PACE and control group patients (unclear whether event or person is the unit of analysis)** Rate of self-injury over 30 days

	Intervention group rate (N), person days: 0.08 (7), 8345 Control group rate (N), person days: 0.11 (10), 8746 Rate ratio (95% CI): 0.73 (0.28-1.92) Rate of self-injury over 60 days Intervention group rate (N), person days: 0.08 (11), 13819 Control group rate (N), person days: 0.13 (20), 15968 Rate ratio (95% CI): 0.64 (0.3-1.34)

Critical appraisal

Section	Question	Answer
1. Bias due to confounding	Risk of bias judgement for confounding	Moderate *(Propensity score matching used to reduce confounding bias, however, not all important confounders measured)*
2. Bias in selection of participants into the study	Risk of bias judgement for selection of participants into the study	Serious *(Selection into PACE units was related to intervention and outcome and this could not be adjusted for in analyses)*
3. Bias in classification of interventions	Risk of bias judgement for classification of interventions	Low *(Intervention definition is reasonably well defined and based only on information collected at the time of the study)*
4. Bias due to deviations from intended interventions	Risk of bias judgement for deviations from intended interventions	No information
5. Bias due to missing data	Risk of bias judgement for missing data	Serious *(The nature and extent of the missing data (25% of intervention arm participants) means that the risk of bias cannot be removed through appropriate analysis. Not clear that results were robust to the method used to address missing data.)*
6. Bias in measurement of outcomes	Risk of bias judgement for measurement of outcomes	Serious *(Difference in treatment settings and observation methods between groups likely to have introduced error in measuring self-harm incidents. The outcome was in part subjective (attempted self-injury) and therefore vulnerable to influence by knowledge of the intervention received.)*

Section	Question	Answer
7. Bias in selection of the reported result	Risk of bias judgement for selection of the reported result	Serious *(There is high risk of selective reporting from among multiple analyses)*
Overall bias	Risk of bias judgement	Serious *(Serious risk of bias introduced from participant selection, missing data, measurement of outcomes and selective reporting.)*
	Risk of bias variation across outcomes	N/A
	Directness	Partially Applicable *(Male only population in prison setting)*

Kapur, 2016

Bibliographic Reference	Kapur, N.; Ibrahim, S.; While, D.; Baird, A.; Rodway, C.; Hunt, I. M.; Windfuhr, K.; Moreton, A.; Shaw, J.; Appleby, L.; Mental health service changes, organisational factors, and patient suicide in England in 1997-2012: A before-and-after study; The Lancet Psychiatry; 2016; vol. 3; 526-534

Study details

Country/ies where study was carried out	UK
Study type	Before-and-after studies
Study dates	January 1997 - December 2012
Inclusion criteria	Individuals aged 10 years and older in England who died during the study period because of suicide, defined as a death that received a suicide or open verdict at Coroner's inquest (ICD-10 Codes X60–X84; Y10–Y34, Y87.0, and Y87.2, excluding Y33.9), and had contact with mental health services within 12 months of death
Exclusion criteria	None reported
Patient characteristics	None reported
Intervention(s)/control	**Intervention** Ward-safety service changes: removal of non-collapsible curtain rails removal of low lying ligature points

	Staff-training service changes: Clinical staff receive training in the management of suicide risk **Control** Standard of care (dependent on mental health service provider)
Duration of follow-up	Up to 12 months from contact with mental health services
Sources of funding	Healthcare Quality Improvement Partnership, part of the National Confidential Inquiry into Suicide and Homicide by People with Mental Illness (NCISH)
Sample size	N= 19,248
Other information	Data collected from annual reports of service providers, NHS staff and patient surveys, and national databases of hospital activity, including the Mental Health and Learning Disabilities Data Set (MHLDDS). National Health Service (NHS) mental health services in England were asked to complete a service provision survey in January, 2012 which had a yes or no binary response to whether specific mental health service changes had been implemented. However no data collected on what services individual patients received.
Results	**Suicide incidence rate (per 10000 contacts with mental health services)** Removal of non-collapsible curtain rails: Pre-intervention (95% CI): 12.10 (11.84-12.36) Post-intervention (95% CI): 9.45 (9.26-9.65) IRR (95% CI): 0.78 (0.76-0.81) P value <0.0001 Removal of low lying ligature points Pre-intervention (95% CI): 12.00 (11.75-12.25) Post-intervention (95% CI): 9.31 (9.11-9.51) IRR (95% CI): 0.78 (0.75-0.80) P value <0.0001 Clinical staff received training in the management of suicide risk Pre-intervention (95% CI): 11.82 (11.58-12.07) Post-intervention (95% CI): 9.28 (9.08-9.48) IRR (95% CI): 0.79 (0.76-0.81) P value <0.0001

	IRR (incidence rate ratio)

Critical appraisal

Section	Question	Answer
1. Bias due to confounding	Risk of bias judgement for confounding	Critical *(Confounding inherently not controllable. Authors were unable to identify the independent contribution of different service changes, neither did they have information on the timescales for implementation, or the extent and quality of the implementation or patient-level variables.)*
2. Bias in selection of participants into the study	Risk of bias judgement for selection of participants into the study	Moderate *(Some risk of bias introduced as initiation of follow up varied for each participant and did not coincide with the start of each intervention)*
3. Bias in classification of interventions	Risk of bias judgement for classification of interventions	Serious *(Serious risk of bias introduced due to retrospective definition of intervention status by service providers combined with grouping all service providers into pre- and post-intervention groups at national level based on median implementation date)*
4. Bias due to deviations from intended interventions	Risk of bias judgement for deviations from intended interventions	Serious *(Serious risk of bias introduced due to lack of information if interventions were implemented as expected and whether participants were exposed to the intervention. Likely that participants were included in analysis who were not exposed to the intervention.)*
5. Bias due to missing data	Risk of bias judgement for missing data	Moderate *(Some risk of bias as unclear how many participants were included in each analysis)*
6. Bias in measurement of outcomes	Risk of bias judgement for measurement of outcomes	Low *(Risk of bias from measuring suicide as an outcome is low)*
7. Bias in selection of the reported result	Risk of bias judgement for selection of the reported result	Low
Overall bias	Risk of bias judgement	Critical *(Critical risk of confounding due to unmeasured variables and insufficient data on the independent contribution of different service changes, the timescales for implementation, or the extent and*

Section	Question	Answer
		quality of the implementation. Not possible to ascertain which patients were exposed to which interventions.)
	Risk of bias variation across outcomes	N/A
	Directness	Directly applicable

Noelck, 2019

Bibliographic Reference	Noelck, M.; Velazquez-Campbell, M.; Austin, J. P.; A quality improvement initiative to reduce safety events among adolescents hospitalized after a suicide attempt; Hospital Pediatrics; 2019; vol. 9; 365-372

Study details

Country/ies where study was carried out	US
Study type	Before-and-after studies
Study dates	1st June 2016 to 30th June 2018 Pre-intervention (1st June 2016 to 26th January 2017) Post-intervention (27th January 2017- 30th June 2018)
Inclusion criteria	Children and adolescents admitted for medical stabilization after a suicide attempt in the Paediatric Intensive Care Unit (PICU) and the Paediatric Acute-Care Medical unit (PACM) units at a 150 bed tertiary-care paediatric academic medical centre
Exclusion criteria	Children and adolescents who had paediatric psychiatry team involvement for reasons other than suicide attempt or were admitted to the surgical care unit
Patient characteristics	**Pre-intervention** n= 53 Age mean (SD): 15.1 (1.7) Female/ male n: 43/ 10 Ethnicity: Non-Hispanic white 33; Non-Hispanic African American 1; Hispanic 6; Other 13 Comorbidities: not reported Duration/ history of self-harm: not reported

	Previous self-harm: suicide attempt (all participants) Mean number of suicide attempts (SD): not reported Method: not reported Current psychiatric treatment: not reported **Post-intervention** n= 171 Age mean (SD): 15.0 (1.5) Female/ male n: 131/ 40 Ethnicity: Non-Hispanic white 120; Non-Hispanic African American 5; Hispanic 30; Other 16 Comorbidities: not reported Duration/ history of self-harm: not reported Previous self-harm: suicide attempt (all participants) Mean number of suicide attempts (SD): not reported Method: not reported Current psychiatric treatment: not reported Assessment setting: paediatric intensive care unit and the paediatric acute-care medical
Intervention(s)/ control	**Intervention** Quality Improvement (QI) intervention, co-designed by multidisciplinary care team, including: Paediatric Behavioural Health Safety Protocol as standard of care (consent process, document patients' characteristics, set expectations for patients' behaviour) Full patient safety search (by two nurses within 2 hours of arrival; details recorded Shared mental model/ development of communication process (Safety Huddle between care team members, within 24 hours of patient admission and for patients with ongoing concerns) **Control** No standardised approach to care, with the exception of: full-time patient safety attendant (equivalent to a certified nursing assistant) placed within the patient's room
Duration of follow-up	17 months

Sources of funding	No external funding
Sample size	N= 224
Other information	None
Results	**Number of significant safety events (SSE) per 100 patient days** Pre-intervention mean: 2.27 Post-intervention mean: 0.17 SDs not reported and not enough other data reported to enable their calculation SSEs defined by authors as defined as elopement, harm to self, or harm to others

Critical appraisal

Section	Question	Answer
1. Bias due to confounding	Risk of bias judgement for confounding	Critical *(Relevant confounders not measured and no adjustment for patient characteristics which were measured and found to differ significantly between groups)*
2. Bias in selection of participants into the study	Risk of bias judgement for selection of participants into the study	Low *(All participants on ward included)*
3. Bias in classification of interventions	Risk of bias judgement for classification of interventions	Low *(Low risk of bias as intervention groups defined temporally)*
4. Bias due to deviations from intended interventions	Risk of bias judgement for deviations from intended interventions	Moderate *(Moderate risk of bias due to deviation from intended component of the intervention; authors report deviation from one component of the intervention due to time and resource constraints)*
5. Bias due to missing data	Risk of bias judgement for missing data	Low *(No evidence to suggest that data were not complete)*
6. Bias in measurement of outcomes	Risk of bias judgement for	Serious *(Serious risk of bias from to the combination of non-blinding of outcome assessors and their*

Section	Question	Answer
	measurement of outcomes	*involvement in the intervention design and the different methods of collecting outcome data between the pre-intervention and post-intervention groups)*
7. Bias in selection of the reported result	Risk of bias judgement for selection of the reported result	Low
Overall bias	Risk of bias judgement	Critical *(Critical risk of bias due to lack of measurement of and therefore adjustment for confounding factors and differences in outcome measurement between control and intervention groups)*
	Risk of bias variation across outcomes	N/A
	Directness	Directly applicable

Reen, 2020

Bibliographic Reference	Reen, G. K.; Bailey, J.; McGuigan, L.; Bloodworth, N.; Nawaz, R. F.; Vincent, C.; Environmental changes to reduce self-harm on an adolescent inpatient psychiatric ward: an interrupted time series analysis; European Child and Adolescent Psychiatry; 2020

Study details

Country/ies where study was carried out	UK
Study type	Before-and-after studies
Study dates	1st June 2016 to 31st November 2019 Pre-intervention (1st June 2016 to 31st May 2018) Post-intervention (1st June 2018- 31st November 2019)
Inclusion criteria	Adolescents aged between 12 and 18 years who were inpatients of a child and adolescent psychiatry ward from 1st June 2016 to 31st November 2019
Exclusion criteria	None stated
Patient characteristics	**Pre-intervention** n= 124 Age mean (SD): 15.81 (1.41)

	Female/ male n: 107/ 17 Ethnicity: not reported Comorbidities: adjustment and dissociative disorder 6; anxiety 11; developmental disorder 5; eating disorder 46; mood disorder 19; obsessive compulsive disorder 1; other 9; personality disorder 8; phobias 1; schizophrenia and psychosis 9; stress-related 2; substance abuse 3; unknown 5 Duration/ history of self-harm: not reported Previous self-harm: not reported Mean number of suicide attempts (SD): not reported Method: not reported Current psychiatric treatment: not reported Assessment setting: inpatient psychiatric ward **Post-intervention** n= 80 Age mean (SD): 15.35 (1.60) Female/ male n: 62/ 8 Ethnicity: not reported Comorbidities: adjustment and dissociative disorder 2; anxiety 7; developmental disorder 2; eating disorder 35; mood disorder 9; obsessive compulsive disorder 1; other 5; personality disorder 4; phobias 0; schizophrenia and psychosis 2; stress-related 1; substance abuse 1; unknown 1 Duration/ history of self-harm: not reported Previous self-harm: not reported Mean number of suicide attempts (SD): not reported Method: not reported Current psychiatric treatment: not reported Assessment setting: inpatient psychiatric ward
Intervention(s)/control	**Pre-intervention** Group therapy sessions (2-3pm, daily) Individual treatment sessions (nurse-led, weekly) Medication provided on clinical need Occasional evening activities Ad-hoc twilight shift (3-11pm), covered by temporary nursing staff

	Intervention The intervention was co-designed with clinical ward staff and with input from patients and consisted of the first 3 control group interventions along with: regular twilight nursing shifts (3pm- 11pm, Sunday -Thursday) to increase availability of regular nursing staff on the ward during a vulnerable time, rather than employing expensive temporary agency staff structured programme of evening activities that the inpatients were encouraged to participant in and could suggest, e.g., games and drama workshop, visit from therapy dog, mindfulness podcast groups and coping skills workshop conducted by activity workers or occupational therapists on the ward
Duration of follow-up	18 months
Sources of funding	None stated
Sample size	N=205
Other information	None
Results	Mean proportion of patients self-harming per month Pre-intervention mean (SD): 33.09 (13.94) Evening mean (SD): 26.50 (11.46) Non-evening mean (SD): 17.81 (11.59) Post-intervention mean (SD): 20.35 (20.35) Evening mean (SD): 17.19 (10.11) Non-evening mean (SD): 8.69 (6.27) Rate of self-harm per 100 bed days per month Pre-intervention mean (SD): 5.49 (3.47) Evening mean (SD): 3.58 (2.36) Non-evening mean (SD): 1.91 (1.34) Post-intervention mean (SD): 3.23 (2.27) Evening mean (SD): 2.21 (1.81) Non-evening mean (SD): 1.02 (0.93)

Critical appraisal

Section	Question	Answer
1. Bias due to confounding	Risk of bias judgement for confounding	Serious *(No adjustment for confounders)*
2. Bias in selection of participants into the study	Risk of bias judgement for selection of participants into the study	Low *(Authors reported that all patients on the ward during the study period were included in the study)*
3. Bias in classification of interventions	Risk of bias judgement for classification of interventions	Low *(Intervention definition is based on timing/ initiation of intervention)*
4. Bias due to deviations from intended interventions	Risk of bias judgement for deviations from intended interventions	Moderate *(Insufficient data presented to ascertain whether the intervention was delivered as intended and if patients adhered to the intervention; however, this is not likely to have introduced bias due to deviation from the intervention beyond what would be expected)*
5. Bias due to missing data	Risk of bias judgement for missing data	Moderate *(Risk of bias cannot be removed as no participant flow information/ diagram available, therefore the total number of patients included in self-harm outcomes is not clear)*
6. Bias in measurement of outcomes	Risk of bias judgement for measurement of outcomes	Moderate *(Some risk of bias as clinical ward staff who recorded the outcome were aware of the intervention and were involved in designing it)*
7. Bias in selection of the reported result	Risk of bias judgement for selection of the reported result	Low *(Low risk of bias for selection of the reported result)*
Overall bias	Risk of bias judgement	Serious *(Serious risk of confounding from unmeasured patient variables and other service or ward-level changes over the study period. Moderate risk of bias due to insufficient information on the successful implementation of the intervention and missing data and in the measurement of outcomes.)*
	Risk of bias variation across outcomes	N/A
	Directness	Directly applicable

Appendix E Forest plots

Forest plots for review question: What are the most effective ways of supporting people to be safe after self-harm?

No meta-analysis was conducted for this review question and so there are no forest plots.

Appendix F Modified GRADE tables

Modified GRADE tables for review question: What are the most effective ways of supporting people to be safe after self-harm?

Table 5: Evidence profile for comparison between nursing staff intervention and treatment as usual

Quality assessment						No of shifts[1]		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	Nursing staff intervention	Treatment as usual	Mean (SD)	Absolute		
Mean number of self-harm events per shift (over 12 months) (Better indicated by lower values)											
1 (Bowers 2006)	observational studies	serious[2]	no serious inconsistency	serious[3]	none	1315	284	pre-intervention: 0.035 (0.203) post-intervention: 0.010 (0.099)	not estimable[4]	LOW	CRITICAL
Mean number of suicide attempts per shift (over 12 months) (Better indicated by lower values)											
1 (Bowers 2006)	observational studies	serious[2]	no serious inconsistency	serious[3]	none	1315	284	pre-intervention: 0.004 (0.059) post-intervention: 0.003 (0.055)	not estimable[5]	LOW	CRITICAL

SD: standard deviation
1 Sample size is the number of completed shift reports
2 Serious risk of bias in the evidence contributing to the outcomes
3 Population is indirect due to previous self-harm unknown and not measured in study participants
4 Not possible to calculate absolute effect as study did not report number of patients in each group. A Mann-Whitney U test conducted by the authors showed that the estimates differed statistically significantly (P= 0.004)
5 Not possible to calculate absolute effect as study did not report number of patients in each group. A Mann-Whitney U test conducted by the authors showed that the estimates did not differ statistically significantly (P= 0.90)

Table 4: Evidence profile for comparison between PACE units and single cell housing in prison settings

Quality assessment						Number of person days[1]		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	PACE Units	Single cell housing	Relative (95% CI)	Absolute	Quality	Importance
Rate of self-injury at 30 days (Better indicated by lower values)											
1 (Ford 2020)	observational studies	serious[2]	no serious inconsistency	serious[3]	none	7/8345 (0.08%)	10/8746 (0.11%)	rate ratio 0.73 (0.28 to 1.92)	0 fewer per 1000 (from 1 fewer to 1 more)	LOW	CRITICAL
Rate of self-injury at 60 days (Better indicated by lower values)											
1 (Ford 2020)	observational studies	serious[2]	no serious inconsistency	serious[3]	none	11/13819 (0.08%)	20/15968 (0.13%)	rate ratio 0.64 (0.3 to 1.34)	0 fewer per 1000 (from 1 fewer to 0 more)	LOW	CRITICAL

CI: confidence interval
1 Number of person days as reported in study used as the unit of analysis. Number patients in intervention (N= 302) and control group (N= 302) reported by study authors, but not known how long each patient was exposed
2 Serious risk of bias in the evidence contributing to the outcomes
3 Population is indirect due to previous self-harm unknown and not measured in study participants

Table 5: Evidence profile for comparison between removal of non-collapsible curtain rails and no removal

Quality assessment						No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	Removal of non-collapsible curtain rails	No removal	Relative (95% CI)[1]	Absolute	Quality	Importance
Suicide incidence rate per 10000 contacts with mental health services (over 12 months) (Better indicated by lower values)											

Quality assessment						No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	Removal of non-collapsible curtain rails	No removal	Relative (95% CI)[1]	Absolute	Quality	Importance
1 (Kapur 2016)	observational studies	very serious[2]	no serious inconsistency	serious[3]	none	NR	NR	pre-intervention: rate 12.10 (11.84 to 12.36) post-intervention: rate 9.45 (9.26 to 9.65) IRR: 0.78 (0.76 to 0.81)	not estimable	VERY LOW	CRITICAL

CI: confidence interval; IRR: Incidence rate ratio; NR: Not reported
1 Suicide incidence rate per 10000 contacts with mental health services (95% CI) as reported in study. IRR (95% CI) as reported in study. Not possible to calculate absolute event rates as number of patients in pre- and post-intervention arms not reported
2 Very serious risk of bias in the evidence contributing to the outcomes
3 Population is indirect due to previous self-harm unknown and not measured in study participants

Table 6: Evidence profile for comparison between removal of low lying ligature points and no removal

Quality assessment						No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	Removal of low lying ligature points	No removal	Relative (95% CI)1	Absolute	Quality	Importance
Suicide incidence rate per 10000 contacts with mental health services (over 12 months) (Better indicated by lower values)											

Quality assessment						No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	Removal of low lying ligature points	No removal	Relative (95% CI)1	Absolute	Quality	Importance
1 (Kapur 2016)	observational studies	very serious2	no serious inconsistency	serious[3]	none	NR	NR	pre-intervention: rate 12.00 (11.75 to 12.25) post-intervention: rate 9.31 (9.11 to 9.51) IRR: 0.78 (0.75 to 0.80)	not estimable	VERY LOW	CRITICAL

CI: confidence interval; IRR: Incidence rate ratio; NR: Not reported
1 Suicide incidence rate per 10000 contacts with mental health services (95% CI) as reported in study. IRR (95% CI) as reported in study. Not possible to calculate absolute event rates as number of patients in pre- and post-intervention arms not reported
2 Very serious risk of bias in the evidence contributing to the outcomes
3 Population is indirect due to previous self-harm unknown and not measured in study participants

Table 7: Evidence profile for comparison between clinical staff training in management of suicide risk and standard training/ no training

Quality assessment						No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	Clinical staff training in management of suicide risk	Standard training/ no training	Relative (95% CI)[1]	Absolute	Quality	Importance
Suicide incidence rate per 10000 contacts with mental health services (over 12 months) (Better indicated by lower values)											

Quality assessment						No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	Clinical staff training in management of suicide risk	Standard training/ no training	Relative (95% CI)[1]	Absolute	Quality	Importance
1 (Kapur 2016)	observational studies	very serious[2]	no serious inconsistency	serious[3]	none	NR	NR	pre-intervention: rate 11.82 (11.58 to 12.07) post-intervention: rate 9.28 (9.08 to 9.48) IRR: 0.79 (0.76 to 0.81)	not estimable	VERY LOW	CRITICAL

CI: confidence interval; IRR: Incidence rate ratio; NR: Not reported
1 Suicide incidence rate per 10000 contacts with mental health services (95% CI) as reported in study. IRR (95% CI) as reported in study. Not possible to calculate absolute event rates as number of patients in pre- and post-intervention arms not reported
2 Very serious risk of bias in the evidence contributing to the outcomes
3 Population is indirect due to previous self-harm unknown and not measured in study participants

Table 8: Evidence profile for comparison between a quality improvement intervention and treatment as usual

Quality assessment						No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	Quality improvement intervention	Treatment as usual	Mean[1]	Absolute	Quality	Importance
Number of self-harm events per 100 patient days (over 8-17 months[2]) (Better indicated by lower values)											
1 (Noelck 2019)	observational studies	very serious[3]	no serious inconsistency	serious[4]	none	53	171	pre-intervention: 2.27 post-intervention: 0.17	not estimable	VERY LOW	CRITICAL

1 SDs not reported and not enough other data reported to enable their calculation. Authors did not present any inferential statistics
2 Duration of follow-up was not the same for each group: Quality improvement intervention, 17 months; Treatment as usual, 8 months
3 Very serious risk of bias in the evidence contributing to the outcomes
4 Outcome is indirect due to combined measure of significant safety events (including elopement, harm to self, or harm to others)

Table 9: Evidence profile for comparison between ward environment intervention and treatment as usual

Quality assessment						No of patients		Effect[1]			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Other considerations	Ward environment intervention	Treatment as usual	Mean Difference (95% CI)	Absolute	Quality	Importance
Mean number of patients self-harming per month (overall) (over 18-24 months[2]) (Better indicated by lower values)											
1 (Reen 2020)	observational studies	serious[3]	no serious inconsistency	serious[2]	none	71	124	-12.74 (-18.07 to -7.41)	not estimable	LOW	CRITICAL
Mean number of patients self-harming per month (evening) (over 18-24 months[2]) (Better indicated by lower values)											
1 (Reen 2020)	observational studies	serious[3]	no serious inconsistency	serious[4]	none	71	124	-9.31 (-12.41 to -6.21)	not estimable	LOW	CRITICAL
Mean number of patients self-harming per month (non-evening) (over 18-24 months[2]) (Better indicated by lower values)											
1 (Reen 2020)	observational studies	serious[3]	no serious inconsistency	serious[4]	none	71	124	-9.12 (-11.63 to -6.61)	not estimable	LOW	CRITICAL
Rate of self-harm per 100 bed days per month (overall) (over 18-24 months[2]) (Better indicated by lower values)											
1 (Reen 2020)	observational studies	serious[3]	no serious inconsistency	serious[4]	none	71	124	-2.26 (-3.07 to -1.45)	not estimable	LOW	CRITICAL
Rate of self-harm per 100 bed days per month (evening) (over 18-24 months[2]) (Better indicated by lower values)											
1 (Reen 2020)	observational studies	serious[3]	no serious inconsistency	serious[4]	none	71	124	-1.37 (-1.96 to -0.78)	not estimable	LOW	CRITICAL
Rate of self-harm per 100 bed days per month (non-evening) (over 18-24 months[2])(Better indicated by lower values)											
1 (Reen 2020)	observational studies	serious[3]	no serious inconsistency	serious[4]	none	71	124	-0.89 (-1.21 to -0.57)	not estimable	LOW	CRITICAL

CI: confidence interval
1.Mean difference calculated using author reported mean and standard deviation of proportion of patients self-harming per month. Absolute number of patients self-harming per month not reported and not possible to calculate as unclear how long each patient was present on the ward
2 Duration of follow-up was not the same for each group: Ward environment intervention, 18 months; Treatment as usual, 24 months
3 Serious risk of bias in the evidence contributing to the outcomes

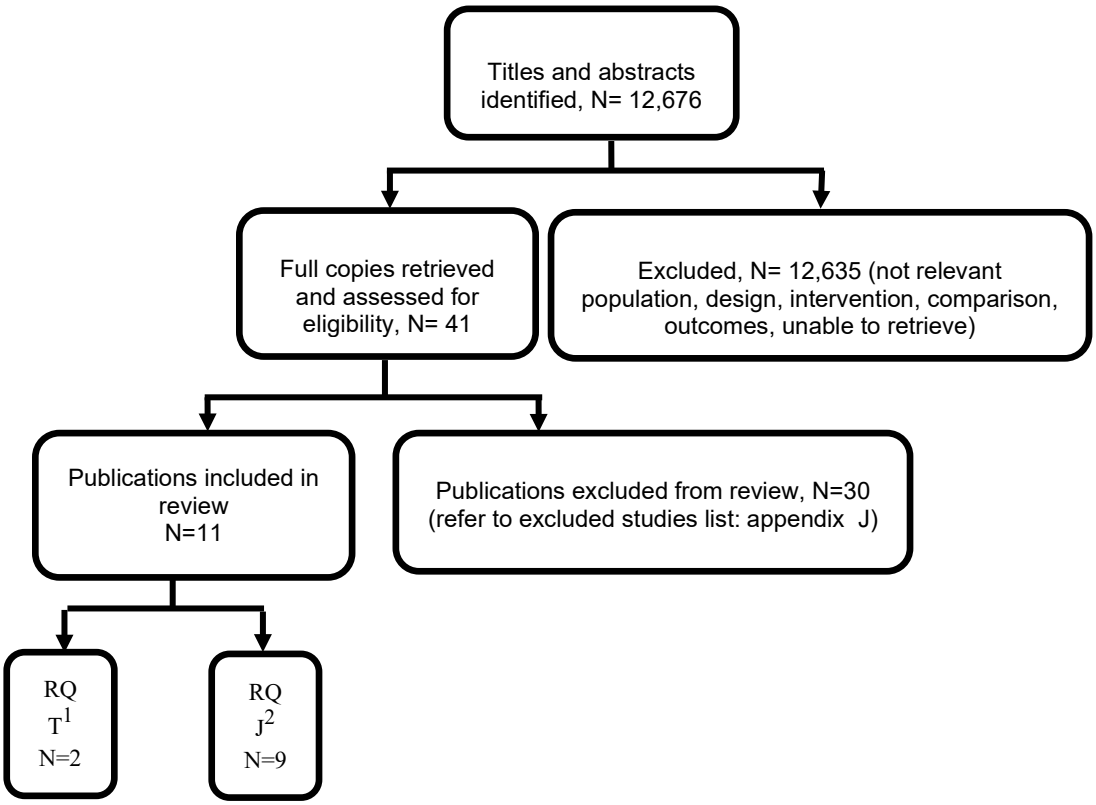
4 Population is indirect due to previous self-harm unknown and not measured in study participants

Appendix G Economic evidence study selection

Study selection for: What are the most effective ways of supporting people to be safe after self-harm?

A global health economics search was undertaken for all areas covered in the guideline. Figure 2 shows the flow diagram of the selection process for economic evaluations of interventions and strategies associated with the care of people who have self-harmed.

Figure 2 Flow diagram of economic article selection for global health economic search



Abbreviations: RQ: Research question:
1 What are the most effective models of care for people who have self-harmed?
2 What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

Appendix H Economic evidence tables

Economic evidence tables for review question: What are the most effective ways of supporting people to be safe after self-harm?

No evidence was identified which was applicable to this review question.

Appendix I Economic model

Economic model for review question: What are the most effective ways of supporting people to be safe after self-harm?

No economic analysis was conducted for this review question.

Appendix J Excluded studies

Excluded studies for review question: What are the most effective ways of supporting people to be safe after self-harm?

Excluded effectiveness studies

Table 12: Excluded studies and reasons for their exclusion

Atkinson, J. A., Page, A., Heffernan, M. et al. (2019) The impact of strengthening mental health services to prevent suicidal behaviour. Australian and New Zealand Journal of Psychiatry 53: 642-650	- Comparison not in PICO Study examines through modelling analyses the effect of different mental health or hospital service level variables on forecast incidence of suicidal behaviour. Actual data input into the model also unclear
Atkinson, J. A., Page, A., Skinner, A. et al. (2019) The impact of reducing psychiatric beds on suicide rates. Frontiers in Psychiatry 10: 448	- Comparison not in PICO Study examines through modelling analyses the effect of different mental health or hospital service level variables on forecast incidence of suicidal behaviour. Actual data input into the model also unclear
Bowers, L., Allan, T., Simpson, A. et al. (2007) Adverse incidents, patient flow and nursing workforce variables on acute psychiatric wards: The Tompkins acute ward study. International Journal of Social Psychiatry 53: 75-84	- Population not in PICO Mixed psychiatric population- unclear how many of the population had previously self-harmed
Bowers, L. and Crowder, M. (2012) Nursing staff numbers and their relationship to conflict and containment rates on psychiatric wards-A cross sectional time series Poisson regression study. International Journal of Nursing Studies 49: 15-20	- Population not in PICO Mixed psychiatric population- not clear how many participants had self-harmed
Bowers, L., Whittington, R., Nolan, P. et al. (2008) Relationship between service ecology, special observation and self-harm during acute in-patient care: City-128 study. British Journal of Psychiatry 193: 395-401	- Population not in PICO Mixed psychiatric population- unclear how many of the population had previously self-harmed
Bryan, C. J., Mintz, J., Clemans, T. A. et al. (2017) Effect of crisis response planning vs. contracts for safety on suicide risk in U.S. Army Soldiers: A randomized clinical trial. Journal of Affective Disorders 212: 64-72	- Intervention not in PICO Crisis response plan vs enhanced crisis response plan vs treatment as usual (in people with suicidal ideation and/ or lifetime history of suicide attempt)
Cailhol, L., Allen, M., Moncany, A. H. et al. (2007) Violent behavior of patients admitted in emergency following drug suicidal attempt: a specific staff educational crisis intervention. General Hospital Psychiatry 29: 42-44	- Outcome not in PICO Aggregated outcome of violent behaviour (suicidal ideation, self-harming behaviors, refusing psychiatric care or violence towards people or furniture)
Cardell, R.; Bratcher, K. S.; Quinnett, P. (2009) Revisiting "suicide proofing" an inpatient unit through environmental safeguards: A review. Perspectives in Psychiatric Care 45: 36-44	- Narrative review
Catalan, J.; Keating, D.; Williams, E. R. L. (2003) Clinical audit of suicides in a general psychiatric service. Archives of Suicide Research 7: 183-188	- Data collected pre-2000 Data collected between 1995 and 1997
Changchien, T. C., Yen, Y. C., Wang, Y. J. et al. (2019) Establishment of a comprehensive	- Population not in PICO

inpatient suicide prevention network by using health care failure mode and effect analysis. Psychiatric Services 70: 518-521	Mixed population (hospital-wide initiative)- not clear how many participants had self-harmed
Clarke, T., Baker, P., Watts, C. J. et al. (2002) Self-harm in adults: A randomised controlled trial of nurse-led case management versus routine care only. Journal of Mental Health 11: 167-176	- Intervention not in PICO Case management
Corser, R. and Ebanks, L. (2004) Introducing a nurse-led clinic for patients who self-harm. Journal of wound care 13: 167-170	- Case study n=1
Donovan, A. L., Aaronson, E. L., Black, L. et al. (2021) Keeping Patients at Risk for Self-Harm Safe in the Emergency Department: A Protocolized Approach. Joint Commission Journal on Quality and Patient Safety 47: 23-30	- Population not in PICO ≤ 27% of the population had self-harmed
Doupnik, S. K., Rudd, B., Schmutte, T. et al. (2020) Association of Suicide Prevention Interventions with Subsequent Suicide Attempts, Linkage to Follow-up Care, and Depression Symptoms for Acute Care Settings: A Systematic Review and Meta-analysis. JAMA Psychiatry 77: 1021-1030	- Intervention not in PICO The study includes brief suicide prevention interventions (psychosocial assessments, brief contact interventions, safety planning and follow-up interventions)
Drew, B. L. (2001) Self-harm behavior and no-suicide contracting in psychiatric inpatient settings. Archives of psychiatric nursing 15: 99-106	- Data collected pre-2000 Study used patient medical records from January 1996 to mid-July 1997
Ferguson, M. S., Reis, J. A., Rabbetts, L. et al. (2018) The Effectiveness of Suicide Prevention Education Programs for Nurses. Crisis 39: 96-109	- Population not in PICO Study population is nurses
Fletcher, E. and Stevenson, C. (2001) Launching the Tidal Model in an adult mental health programme. Nursing standard (Royal College of Nursing (Great Britain) : 1987) 15: 33-36	- Population not in PICO Mixed patient population- not clear how many participants had self-harmed (also preliminary results, not fully reported)
Flynn, S., Nyathi, T., Tham, S. G. et al. (2017) Suicide by mental health in-patients under observation. Psychological medicine 47: 2238-2245	- Non-comparative study
Furuno, T., Nakagawa, M., Hino, K. et al. (2018) Effectiveness of assertive case management on repeat self-harm in patients admitted for suicide attempt: Findings from ACTION-J study. Journal of Affective Disorders 225: 460-465	- Intervention not in PICO Assertive case management
Ghahramanlou-Holloway, M., Brown, G. K., Currier, G. W. et al. (2014) Safety planning for military (SAFE MIL): Rationale, design, and safety considerations of a randomized controlled trial to reduce suicide risk among psychiatric inpatients. Contemporary Clinical Trials 39: 113-123	- Study protocol
Harrington, A., Darke, H., Ennis, G. et al. (2019) Evaluation of an alternative model for the management of clinical risk in an adult acute psychiatric inpatient unit. International journal of mental health nursing 28: 1099-1109	- Population not in PICO Mixed patient population- not clear how many participants had self-harmed
Hochstrasser, L., Frohlich, D., Schneeberger, A. R. et al. (2018) Long-term reduction of seclusion	- Population not in PICO

and forced medication on a hospital-wide level: Implementation of an open-door policy over 6 years. European Psychiatry 48: 51-57	Mixed psychiatric population- not clear how many participants had self-harmed
Huber, C. G., Schneeberger, A. R., Kowalinski, E. et al. (2016) Suicide risk and absconding in psychiatric hospitals with and without open door policies: a 15 year, observational study. The Lancet Psychiatry 3: 842-849	- Population not in PICO <10% participants had self-harmed
Katz, I. R., Kemp, J. E., Blow, F. C. et al. (2013) Changes in suicide rates and in mental health staffing in the veterans health administration, 2005-2009. Psychiatric Services 64: 620-625	- Population not in PICO Not clear how many participants had self-harmed
Kroll, D. S., Stanghellini, E., DesRoches, S. L. et al. (2020) Virtual monitoring of suicide risk in the general hospital and emergency department. General Hospital Psychiatry 63: 33-38	- Non-comparative study Single-arm intervention (virtual monitoring not compared to standard care)
Links, P. S. and Hoffman, B. (2005) Preventing suicidal behaviour in a general hospital psychiatric service: Priorities for programming. Canadian Journal of Psychiatry 50: 490-496	- Systematic review Included studies checked for relevance
Loveridge, S. M. (2013) Use of a safe kit to decrease self-injury among adolescent inpatients: a pilot study. Journal of psychosocial nursing and mental health services 51: 32-36	- Non-comparative study
Lynch, M. A., Howard, P. B., El-Mallakh, P. et al. (2008) Assessment and management of hospitalized suicidal patients. Journal of Psychosocial Nursing and Mental Health Services 46: 45-52	- Narrative review
McCue, R. E., Urcuyo, L., Lilu, Y. et al. (2004) Reducing Restraint Use in a Public Psychiatric Inpatient Service. Journal of Behavioral Health Services and Research 31: 217-224	- Population not in PICO Mixed psychiatric population- not clear how many participants had self-harmed
Miller, I. W., Camargo, C. A., Arias, S. A. et al. (2017) Suicide prevention in an emergency department population: The ED-safe study. JAMA Psychiatry 74: 563-570	- Intervention not in PICO Universal screening vs universal screening, secondary risk assessment and telephone-based follow-up for 52 weeks vs treatment as usual
Mohl, A., Stulz, N., Martin, A. et al. (2012) The "Suicide Guard Rail": a minimal structural intervention in hospitals reduces suicide jumps. BMC research notes 5: 408	- Population not in PICO Mixed population (hospital-wide initiative)- not clear how many participants had self-harmed
Riley, D., Meehan, C., Whittington, R. et al. (2006) Patient restraint positions in a psychiatric inpatient service. Nursing times 102: 42-45	- Population not in PICO Mixed psychiatric population- not clear how many participants had self-harmed
Robst, J. (2015) Suicide Attempts After Emergency Room Visits: The Effect of Patient Safety Goals. Psychiatric Quarterly 86: 497-504	- Intervention not in PICO Risk assessment
Rotheram-Borus, M. J., Piacentini, J., Cantwell, C. et al. (2000) The 18-month impact of an emergency room intervention for adolescent female suicide attempters. Journal of consulting and clinical psychology 68: 1081-93	- Data collected pre-2000 Data collected from suicidal youths admitted to an emergency department between March 1991 to February 1994
Russell, G. and Owens, D. (2010) Psychosocial assessment following self-harm: Repetition of nonfatal self-harm after assessment by	- Intervention not in PICO Psychosocial assessment

psychiatrists or mental health nurses. Crisis 31: 211-216	
Sarchiapone, M., Mandelli, L., Iosue, M. et al. (2011) Controlling access to suicide means. International Journal of Environmental Research and Public Health 8: 4550-4562	- Narrative review
Sivak, K. (2012) Implementation of comfort rooms to reduce seclusion, restraint use, and acting-out behaviors. Journal of Psychosocial Nursing and Mental Health Services 50: 24-34	- Population not in PICO Mixed psychiatric population- not clear how many participants had self-harmed
Smith, T., Clark, A., Dodd, E. et al. (2018) Feasibility study suggests no impact from protected engagement time on adverse events in mental health wards for older adults. International journal of mental health nursing 27: 756-764	- Population not in PICO Mixed psychiatric population- not clear how many participants had self-harmed
Stanley, B., Brown, G. K., Brenner, L. A. et al. (2018) Comparison of the safety planning intervention with follow-up vs usual care of suicidal patients treated in the emergency department. JAMA Psychiatry 75: 894-900	- Intervention not in PICO Follow-up intervention
Stewart, D.; Bowers, L.; Warburton, F. (2009) Constant special observation and self-harm on acute psychiatric wards: a longitudinal analysis. General Hospital Psychiatry 31: 523-530	- Population not in PICO Mixed psychiatric population- not clear how many participants had self-harmed
Sullivan, A. M., Barron, C. T., Bezmen, J. et al. (2005) The safe treatment of the suicidal patient in an adult inpatient setting: A proactive preventive approach. Psychiatric Quarterly 76: 67-83	- Population not in PICO Mixed psychiatric population- not clear how many participants had self-harmed
Tyler, N.; Wright, N.; Waring, J. (2019) Interventions to improve discharge from acute adult mental health inpatient care to the community: systematic review and narrative synthesis. BMC health services research 19: 883	- Intervention not in PICO Follow-up interventions
While, D., Bickley, H., Roscoe, A. et al. (2012) Implementation of mental health service recommendations in England and Wales and suicide rates, 1997-2006: A cross-sectional and before-and-after observational study. The Lancet 379: 1005-1012	- Other Earlier version of Kapur 2016 which is included

Excluded economic studies

Table 10: Excluded studies from the guideline economic review

Study	Reason for Exclusion
Adrian, M., Lyon, A. R., Nicodimos, S., Pullmann, M. D., McCauley, E., Enhanced "Train and Hope" for Scalable, Cost-Effective Professional Development in Youth Suicide Prevention, Crisis, 39, 235-246, 2018	Not relevant to any of the review questions in the guideline - this study examined the impact of an educational training ongoing intervention, and the effect of the post-training reminder system, on mental health practitioners' knowledge, attitudes, and behaviour surrounding suicide assessment and intervention. As well, this study was not a full health economic evaluation.
Borschmann R, Barrett B, Hellier JM, et al. Joint crisis plans for people with borderline personality	Not relevant to any of the review questions in the guideline - this study examined the feasibility

Study	Reason for Exclusion
disorder: feasibility and outcomes in a randomised controlled trial. Br J Psychiatry. 2013;202(5):357-364.	of recruiting and retaining adults with borderline personality disorder to a pilot randomised controlled trial investigating the potential efficacy and cost-effectiveness of using a joint crisis plan.
Bustamante Madsen, L., Eddleston, M., Schultz Hansen, K., Konradsen, F., Quality Assessment of Economic Evaluations of Suicide and Self-Harm Interventions, Crisis, 39, 82-95, 2018	Study design - this review of health economics studies has been excluded for this guideline, but its references have been hand-searched for any relevant health economic study.
Byford, S., Barrett, B., Aglan, A., Harrington, V., Burroughs, H., Kerfoot, M., Harrington, R. C., Lifetime and current costs of supporting young adults who deliberately poisoned themselves in childhood and adolescence, Journal of Mental Health, 18, 297-306, 2009	Study design – no comparative cost analysis.
Byford, S., Leese, M., Knapp, M., Seivewright, H., Cameron, S., Jones, V., Davidson, K., Tyrer, P., Comparison of alternative methods of collection of service use data for the economic evaluation health care interventions, Health Economics, 16, 531-536, 2007	Study design – no comparative cost analysis.
Byford, Sarah, Barber, Julie A., Harrington, Richard, Barber, Baruch Beautrais Blough Brent Brodie Byford Carlson Chernoff Collett Fergusson Garland Goldberg Harman Harrington Hawton Huber Kazdin Kazdin Kerfoot Kerfoot Kerfoot Knapp Lindsey McCullagh Miller Netten Reynolds Sadowski Shaffer Simms Wu, Factors that influence the cost of deliberate self-poisoning in children and adolescents, Journal of Mental Health Policy and Economics, 4, 113-121, 2001	Study design – no comparative cost analysis.
Denchev, P., Pearson, J. L., Allen, M. H., Claassen, C. A., Currier, G. W., Zatzick, D. F., Schoenbaum, M., Modeling the cost-effectiveness of interventions to reduce suicide risk among hospital emergency department patients, Psychiatric Services, 69, 23-31, 2018	Not relevant to any of the review questions in the guideline - this study estimated the cost-effectiveness of outpatient interventions (i.e. Postcards, Telephone outreach, Cognitive Behaviour Therapy) to reduce suicide risk among patients presenting to general hospital emergency departments.
Dunlap, L. J., Orme, S., Zarkin, G. A., Arias, S. A., Miller, I. W., Camargo, C. A., Sullivan, A. F., Allen, M. H., Goldstein, A. B., Manton, A. P., Clark, R., Boudreaux, E. D., Screening and Intervention for Suicide Prevention: A Cost-Effectiveness Analysis of the ED-SAFE Interventions, Psychiatric services (Washington, D.C.), appips201800445, 2019	Not relevant to any of the review questions in the guideline - this study estimated the cost-effectiveness of suicide screening followed by an intervention to identify suicidal individuals and prevent recurring self-harm.
Fernando, S. M., Reardon, P. M., Ball, I. M., van Katwyk, S., Thavorn, K., Tanuseputro, P., Rosenberg, E., Kyeremanteng, K., Outcomes and Costs of Patients Admitted to the Intensive Care Unit Due to Accidental or Intentional Poisoning, Journal of Intensive Care Medicine, 35, 386-393, 2020	Study design – no comparative cost analysis.
Flood, C., Bowers, L., Parkin, D., Estimating the costs of conflict and containment on adult acute	Study design – no comparative cost analysis.

Study	Reason for Exclusion
inpatient psychiatric wards, Nursing economic$, 26, 325-330, 324, 2008	
Fortune, Z., Barrett, B., Armstrong, D., Coid, J., Crawford, M., Mudd, D., Rose, D., Slade, M., Spence, R., Tyrer, P., Moran, P., Clinical and economic outcomes from the UK pilot psychiatric services for personality-disordered offenders, International Review of Psychiatry, 23, 61-9, 2011	Not relevant to any of the review questions in the guideline.
George, S., Javed, M., Hemington-Gorse, S., Wilson-Jones, N., Epidemiology and financial implications of self-inflicted burns, Burns, 42, 196-201, 2016	Study design – no comparative cost analysis.
Gunnell, D., Shepherd, M., Evans, M., Are recent increases in deliberate self-harm associated with changes in socio-economic conditions? An ecological analysis of patterns of deliberate self-harm in Bristol 1972-3 and 1995-6, Psychological medicine, 30, 1197-1203, 2000	Study design - cost-of-illness study.
Kapur, N., House, A., Dodgson, K., Chris, M., Marshall, S., Tomenson, B., Creed, F., Management and costs of deliberate self-poisoning in the general hospital: A multi-centre study, Journal of Mental Health, 11, 223-230, 2002	Study design – no comparative cost analysis.
Kapur, N., House, A., May, C., Creed, F., Service provision and outcome for deliberate self-poisoning in adults - Results from a six centre descriptive study, Social Psychiatry and Psychiatric Epidemiology, 38, 390-395, 2003	Study design – no comparative cost analysis.
Kinchin, I., Russell, A. M. T., Byrnes, J., McCalman, J., Doran, C. M., Hunter, E., The cost of hospitalisation for youth self-harm: differences across age groups, sex, Indigenous and non-Indigenous populations, Social Psychiatry and Psychiatric Epidemiology, 55, 425-434, 2020	Study design – no comparative cost analysis.
O'Leary, F. M., Lo, M. C. I., Schreuder, F. B., "Cuts are costly": A review of deliberate self-harm admissions to a district general hospital plastic surgery department over a 12-month period, Journal of Plastic, Reconstructive and Aesthetic Surgery, 67, e109-e110, 2014	Study design – no comparative cost analysis.
Olfson, M., Gameroff, M. J., Marcus, S. C., Greenberg, T., Shaffer, D., National trends in hospitalization of youth with intentional self-inflicted injuries, American Journal of Psychiatry, 162, 1328-1335, 2005	Study design – no comparative cost analysis.
Ostertag, L., Golay, P., Dorogi, Y., Brovelli, S., Cromec, I., Edan, A., Barbe, R., Saillant, S., Michaud, L., Self-harm in French-speaking Switzerland: A socio-economic analysis (7316), Swiss Archives of Neurology, Psychiatry and Psychotherapy, 70 (Supplement 8), 48S, 2019	Conference abstract.
Ougrin, D., Corrigall, R., Poole, J., Zundel, T., Sarhane, M., Slater, V., Stahl, D., Reavey, P., Byford, S., Heslin, M., Ivens, J., Crommelin, M.,	Not self-harm. In addition, the interventions evaluated in this economic analysis (i.e.: a supported discharge service provided by an

Study	Reason for Exclusion
Abdulla, Z., Hayes, D., Middleton, K., Nnadi, B., Taylor, E., Comparison of effectiveness and cost-effectiveness of an intensive community supported discharge service versus treatment as usual for adolescents with psychiatric emergencies: a randomised controlled trial, The Lancet Psychiatry, 5, 477-485, 2018	intensive community treatment team compared to usual care) were not relevant to any review questions.
Palmer, S., Davidson, K., Tyrer, P., Gumley, A., Tata, P., Norrie, J., Murray, H., Seivewright, H., The cost-effectiveness of cognitive behavior therapy for borderline personality disorder: results from the BOSCOT trial, Journal of Personality Disorders, 20, 466-481, 2006	Not self-harm.
Quinlivan L, Steeg S, Elvidge J, et al. Risk assessment scales to predict risk of hospital treated repeat self-harm: A cost-effectiveness modelling analysis. J Affect Disord. 2019;249:208-215.	Not relevant to any of the review questions in the guideline - this study estimated the cost-effectiveness of of risk assessment scales versus clinical assessment for adults attending an emergency department following self-harm.
Richardson JS, Mark TL, McKeon R. The return on investment of postdischarge follow-up calls for suicidal ideation or deliberate self-harm. Psychiatr Serv. 2014;65(8):1012-1019.	Not enough data reporting on cost-effectiveness findings.
Smits, M. L., Feenstra, D. J., Eeren, H. V., Bales, D. L., Laurenssen, E. M. P., Blankers, M., Soons, M. B. J., Dekker, J. J. M., Lucas, Z., Verheul, R., Luyten, P., Day hospital versus intensive out-patient mentalisation-based treatment for borderline personality disorder: Multicentre randomised clinical trial, British Journal of Psychiatry, 216, 79-84, 2020	Not self-harm.
Tsiachristas, A., Geulayov, G., Casey, D., Ness, J., Waters, K., Clements, C., Kapur, N., McDaid, D., Brand, F., Hawton, K., Incidence and general hospital costs of self-harm across England: estimates based on the multicentre study of self-harm, Epidemiology & Psychiatric Science, 29, e108, 2020	Study design – no comparative cost analysis.
Tsiachristas, A., McDaid, D., Casey, D., Brand, F., Leal, J., Park, A. L., Geulayov, G., Hawton, K., General hospital costs in England of medical and psychiatric care for patients who self-harm: a retrospective analysis, The Lancet Psychiatry, 4, 759-767, 2017	Study design – no comparative cost analysis.
Tubeuf, S., Saloniki, E. C., Cottrell, D., Parental Health Spillover in Cost-Effectiveness Analysis: Evidence from Self-Harming Adolescents in England, PharmacoEconomics, 37, 513-530, 2019	This study is not a separate study from one already included in the guideline for topic 5.2 (Cottrel 2018). This secondary analysis presents alternative parental health spillover quantification methods in the context of a randomised controlled trial comparing family therapy with treatment as usual as an intervention for self-harming adolescents of (Cottrel 2018), and discusses the practical limitations of those methods.
Tyrer, P., Thompson, S., Schmidt, U., Jones, V., Knapp, M., Davidson, K., Catalan, J., Airlie, J., Baxter, S., Byford, S., Byrne, G., Cameron, S., Caplan, R., Cooper, S., Ferguson, B., Freeman, C., Frost, S., Godley, J., Greenshields, J.,	Study design - no economic evaluation.

Study	Reason for Exclusion
Henderson, J., Holden, N., Keech, P., Kim, L., Logan, K., Manley, C., MacLeod, A., Murphy, R., Patience, L., Ramsay, L., De Munroz, S., Scott, J., Seivewright, H., Sivakumar, K., Tata, P., Thornton, S., Ukoumunne, O. C., Wessely, S., Randomized controlled trial of brief cognitive behaviour therapy versus treatment as usual in recurrent deliberate self-harm: The POPMACT study, Psychological medicine, 33, 969-976, 2003	
Van Roijen, L. H., Sinnaeve, R., Bouwmans, C., Van Den Bosch, L., Cost-effectiveness and Cost-utility of Shortterm Inpatient Dialectical Behavior Therapy for Chronically Parasuicidal BPD (Young) Adults, Journal of Mental Health Policy and Economics, 18, S19-S20, 2015	Conference abstract.
van Spijker, B. A., Majo, M. C., Smit, F., van Straten, A., Kerkhof, A. J., Reducing suicidal ideation: cost-effectiveness analysis of a randomized controlled trial of unguided web-based self-help, Journal of medical Internet research, 14, e141, 2012	Not self-harm.

Appendix K Research recommendations – full details

Research recommendations for review question: What are the most effective ways of supporting people to be safe after self-harm?

No research recommendations were made for this review question.