

Standardising Care in the ICU: A Protocol for a Scoping Review of Tools used to Improve Care Delivery

laura Allum (✉ laura.allum@kcl.ac.uk)

Guy's and Saint Thomas' NHS Foundation Trust <https://orcid.org/0000-0002-8083-419X>

Chloe Apps

Guy's and Saint Thomas' NHS Foundation Trust

Nicholas Hart

Guy's and Saint Thomas' NHS Foundation Trust

Natalie Pattison

University of Hertfordshire

Bronwen Connolly

Queen's University Belfast Faculty of Medicine Health and Life Sciences

Louise Rose

King's College London

Protocol

Keywords: Critical care, Patient care planning, Checklist, Delivery of Healthcare, Prolonged critical illness

Posted Date: December 4th, 2019

DOI: <https://doi.org/10.21203/rs.2.18217/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Version of Record: A version of this preprint was published on July 19th, 2020. See the published version at <https://doi.org/10.1186/s13643-020-01414-6>.

Abstract

Background: Increasing numbers of critically ill patients experience a prolonged intensive care unit stay contributing to greater physical and psychological morbidity, strain on families, and cost to health systems. Healthcare providers report dissatisfaction with provision of care for these longer stay patients due to competing demands from higher acuity patients. Quality improvement tools such as checklists concisely articulate best practices with the aim of improving quality and safety. However, these tools have not been designed for the specific needs of patients with prolonged ICU stay. The objective of this review is to generate data to inform development and implementation of quality improvement tools for patients with prolonged ICU stay, namely: the content, design and effect of multicomponent tools designed to standardise or improve ICU care. Secondary objectives are to understand how these tools were developed and implemented in clinical practice.

Methods: We will search the Cochrane Library, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, MEDLINE, PsycINFO, Web of Science, OpenGrey, NHS evidence and Trial Registries from 1999 to August 2019. We will include primary research studies recruiting more than 10 adult participants admitted to ICUs, high dependency units and weaning centres regardless of length of stay, describing quality improvement measures such as structured care plans or checklists designed to standardize more than one aspect of care delivery. Two authors will independently screen citations for eligible studies and perform data extraction. We will use a narrative synthesis to describe review findings.

Discussion: The findings will be used to guide development of tools for use with prolonged ICU stay. Our group will use experience-based co-design methods to identify the most important actionable processes of care to include in quality improvement tools for patients with prolonged ICU stay. Such tools are needed to standardise practice and thereby improve quality of care for patients with prolonged ICU stay and their families. Illustrating the development and implementation methods used for such tools will help to guide translation for similar tools in ICU and future research.

Systematic Review Registration: This protocol is registered on the Open Science Framework, <https://osf.io/> , DOI 10.17605/OSF.IO/Z8MRE

Background

Increasing numbers of patients remain in intensive care units (ICUs) for longer than a week due to increased survival rates, as well as more comorbidity and increasing age in the general population resulting in lower resilience to acute illness and longer recovery (1–4). Various terminology is used to describe these patients including ‘persistent critical illness’ and ‘chronic critical illness’ (CCI). Persistent critical illness is used to describe the point at which a patient’s presenting condition no longer predicts their risk of mortality (1) but patients continue to experience an ongoing illness-related complications and organ failure (5). This differentiates these patients from those experiencing prolonged respiratory weaning or conditions with an inherently long recovery time such as Guillain-Barré syndrome. Chronic

critical illness is also used to describe patients with a prolonged length of stay (LOS) (2), and refers to a medically complex group of patients with multiple co-morbidities, often of older age, and this frailty can result in less physical resilience to withstand the insult of critical illness (6). For clarity, the term 'prolonged ICU stay' which encompasses both persistent and chronic critical illness, will therefore be used in this paper to describe any patient with a stay of over 7 days; this timepoint being the lower threshold defined by Iwashyna et al (7), who suggest that the transition to persistent critical illness occurs within a range of 7–22 days. These patients experience a range of complications, including muscle wasting (3) and long-term physical functional deficits (8, 9), psychological distress (10), and cognitive deficits, leading to longer stays in hospital after ICU discharge (3), and prolonged recovery. They are more likely to die (11), and survivors are less likely to return home, often requiring ongoing nursing or residential care (12, 13). Family members of patients with CCI experience significant levels of psychological distress (14, 15), which may require involvement of social workers or psychologists.

The transition from acute illness to prolonged ICU stay involves a shift in the goals of care and frequently involves professions and specialities not involved in the acute phase of care, such as allied health professionals, social workers and palliative care. The needs of this patient group are distinct, and include rehabilitation and ensuring family members are regularly updated and involved (10). Clinicians report feeling dissatisfied with their management of these patients due to the need to prioritise care for more unstable patients (12), and a dislike of caring for lower acuity patients and a lack of training (16).

Intensive care units are complex environments, involving the coordination of multiple healthcare professions, specialties, and numerous tasks for patients with life-threatening conditions (17). Communication errors are common (18, 19) and contribute to patient harm and frustrations for clinicians (18, 20, 21). In response to these errors, quality improvement tools including checklists, tools to structure ward rounds, bundles and protocols have been developed for the purposes of standardising care. These tools have the potential to improve safety (22, 23), patient, family and staff satisfaction (24), and understanding of goals of treatment (25–28), and can decrease ICU length of stay (17, 28). However, these tools most commonly focus on medically-orientated priorities of care delivery during the acute period of a patients' stay (29–31). Such tools may be less relevant to more stable patients requiring aspects of care delivery such as mobilisation, communication aids and patient-led goal setting (12, 32). Additionally, many of these tools are designed for delivery of a single element of care, such as the prevention of infection associated with central line insertion, rather than the coordination of a range of tasks by the interprofessional team.

The ability of such tools to impact care is dependent on a wide range of factors (33), including successful implementation addressing local barriers to adoption, widespread 'buy-in' from clinicians and ongoing implementation strategies to sustain use (33). A 2013 systematic review of the impact of knowledge translation studies in ICU concluded that there was insufficient evidence to identify the most effective knowledge translation strategies for improving practice in the ICU, particularly for quality improvement measures which cannot be protocolised—however it did not include qualitative literature. (34).

Why is it important to do this review?

Given the demonstrable benefits of ICU quality improvement tools for patients in the acute phase of ICU admission, knowledge of the elements and factors that facilitate successful implementation could inform design of similar tools to address the distinct care needs of patients experiencing a prolonged ICU stay (32). This is particularly important given the rising prevalence of these patients and their cost to the healthcare system.

Our primary objective is to determine the characteristics (such as the format, content and effects) of multicomponent tools designed to standardise and/or improve care delivery in the post-acute phase of ICU, including what outcomes are reported and how they are measured. Our secondary objectives are to describe (1) the type of patients studied; (3) how tools were developed including patients and/or family member involvement; and (4) how these tools are implemented in practice.

We have chosen a scoping review approach as described by Tricco et al. (35) and adapted from Arksey and O'Malley (36) as the most appropriate methodology to achieve these objectives. We also anticipate a range of different methodologies and study designs, for which scoping reviews are the advised methodology. (36)

Methods

This protocol is written in accordance with the PRISMA extension for scoping reviews (PRISMA-scr) checklist (35) (Additional file 1). The protocol has been registered with the Open Science Framework <https://osf.io/>, with registration DOI [10.17605/OSF.IO/Z8MRE](https://doi.org/10.17605/OSF.IO/Z8MRE)

Search strategy

A search strategy (Additional file 2) was created using a combination of MeSH terms and keyword combinations. We will adapt the search strategy for each database. We will search the Cochrane Library, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, MEDLINE, PsycINFO and Web of Science from 1999 to December 2019, to reflect current ICU care. We will search for ongoing or completed trials using the World Health Organisation International Clinical Trials Registry Platform (<http://apps.who.int/trialsearch/>). We will search for grey literature using Opengrey (<http://www.opengrey.eu/>), NHS evidence (<https://www.evidence.nhs.uk/>), the Joanna Briggs Institute and Prospero. We will scan reference lists of included studies for other studies of relevance. We will exclude editorials, commentaries and animal studies.

Inclusion/exclusion criteria

Population

We will include studies recruiting adult patients aged 18 years and older admitted to an intensive or critical care unit, high dependency or a weaning centre, respiratory care unit, or long-term acute care hospital (LTACH), regardless of length of stay. We will also include studies that include family members/caregivers and the healthcare practitioners responsible for the care of these patients as participants.

Intervention

We will include studies that report on quality improvement interventions such as structured care plans, goal sheets, or checklists designed to standardize or remind clinicians about more than one aspect of care delivery. We will exclude checklists for procedures such as central line insertion, or tools such as care bundles with single objectives of care e.g. to prevent ventilator-associated pneumonia. Protocols, including those for delirium prevention, sedation management, weaning, and mobilisation will also be excluded as we do not seek to produce a decision algorithm and therefore this format is outside the scope of this review.

Comparators

We will include studies with an active comparator (i.e. another quality improvement tool), a passive comparator (i.e. usual care), and no comparator.

Outcomes

We will not make decisions related to inclusion of studies based on outcomes reported.

Study Design

We will include all qualitative and quantitative study designs except case series, as this design is not appropriate for the evaluation of a Quality Improvement (QI) tool. For pragmatic reasons we will only include studies published in English.

Study selection—screening

Two authors (LA and CA) will independently review titles and abstracts obtained through our search using Endnote X8. The full text of citations selected by either reviewer for potential inclusion will be retrieved and assessed independently for eligibility, with a third reviewer (LR) available for arbitration if needed. All decisions will be recorded in an Excel file.

Data extraction

Two authors (LA and CA) will independently extract data using a specifically designed form. The form will capture the type, design and content of the QI tool described, as well as study and participant

characteristics (country, setting (e.g. ICU or weaning unit), admission type and diagnoses). The effect of the interventions will be extracted, including outcome measures used. We will extract data on how the tool was developed, including patient and family involvement and feasibility testing, and implementation using the Theoretical Domains Framework (37) to describe barriers and facilitators to adoption.

Differences in extraction data between the two reviewers will be resolved by discussion, and a third reviewer (LR) consulted if an agreement cannot be reached. LA will contact corresponding authors for missing information as needed (e.g. tool development or implementation strategies).

Evidence synthesis, analysis and interpretation

We will complete a PRISMA study flow diagram (38) to describe our search results. We will provide a narrative synthesis to describe our findings as recommended by Levac et al. (39).

We will summarise characteristics of included studies, including the setting (type of unit and country) and type of tool used using descriptive statistics. We will present tables grouped according to tool type (e.g. checklist, care plan, goal sheet) describing the purpose, content and design of each tool as well as data on tool development; including source of content (e.g. published evidence, expert opinion) and whether patients and family members were involved in its development. Data on methods of tool implementation will be summarised with reported barriers and facilitators analysed using the Theoretical Domains Framework.

We will report the effects of the intervention for outcome measures selected for each study including any healthcare provider-reported outcomes (e.g. ratings of interprofessional communication or satisfaction with care), and patient/family reported outcomes (e.g. satisfaction with care, satisfaction with information provision, understanding of direction of care). We will report length of stay, duration of ventilation, changes in physical functioning, and mortality rates when reported.

Discussion

International work (32) to identify and prioritise the processes of care that most improve the experience of patients with prolonged ICU stay and their families is ongoing, using principles of experience-based co-design. This growing population experience high levels of ongoing disability at large cost to individuals and the health system and the findings of this review will inform the design and implementation of quality improvement tools using these identified processes of care, to ensure effective knowledge translation in clinical practice.

Although a previous systematic review (34) described the quantitative literature of knowledge translation in intensive care, to our knowledge none have captured the qualitative literature, and the addition of this in our review will add a vital context to the findings. An improved comprehension of how such tools are developed and implemented will help to guide translation for similar tools in ICU.

This review will also provide a summary for clinicians seeking to better understand and utilise the range of quality improvement tools used to improve more than one aspect of care in the ICU.

Abbreviations

ICU = Intensive care unit

CCI = chronic critical illness

LOS = length of stay

PRISMA-scr = Preferred Reporting Items for Systematic Reviews and Meta-Analyses, Scoping Review

MeSH = Medical Subject Headings

LTACH = long-term acute care hospital

QI = quality improvement

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

Not applicable

Competing interests

The authors declare that they have no competing interests

Funding

Laura Allum is funded by a National Institute for Health Research (NIHR) Clinical Doctoral Fellowship for this research project.

Authors' contributions

LA and LR conceived of this review. LA drafted the protocol under the supervision of LR. All authors read and approved the final manuscript.

No funding body, sponsor nor institution had any involvement in the development of this protocol. This paper presents independent research funded by the National Institute for Health Research (NIHR). The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care.

Acknowledgements

Not applicable

Additional files

Additional file 1: PRISMA extension for scoping reviews checklist (PRISMA-scr)

Additional file 2: MEDLINE search strategy.

References

1. Iwashyna TJ, Hodgson CL, Pilcher D, Orford N, Santamaria JD, Bailey M, et al. Towards defining persistent critical illness and other varieties of chronic critical illness. *Critical care and resuscitation: journal of the Australasian Academy of Critical Care Medicine*. 2015;17(3):215–8.
2. Kahn JM, Le T, Angus DC, Cox CE, Hough CL, White DB, et al. The epidemiology of chronic critical illness in the United States. *Critical Care Medicine*. 2015;43(2):282–7.
3. Nelson JE, Cox CE, Hope AA, Carson SS. Chronic critical illness. *American Journal of Respiratory and Critical Care Medicine*. 2010;182(4):446–54.
4. Sjoding MW, Cooke CR. Chronic critical illness: a growing legacy of successful advances in critical care. *Critical Care Medicine*. 2015;43(2):476–7.
5. Viglianti EM, Kramer R, Admon AJ, Sjoding MW, Hodgson CL, Bellomo R, et al. Late organ failures in patients with prolonged intensive care unit stays. *Journal of Critical Care*. 2018;46:55–7.
6. Pugh R, Ellison A, Pye K, Subbe C, Thorpe C, Lone N, et al. Feasibility and reliability of frailty assessment in the critically ill: a systematic review. *Critical Care*. 2018.
7. Iwashyna T, Hodgson C, Pilcher D, Bailey M, Lint A, Chavan S. Timing of onset and burden of persistent critical illness in Australia and New Zealand: a retrospective, population-based, observational study.

Lancet Respiratory Medicine. 2016;4.

8.Chelluri L, Im KA, Belle SH, Schulz R, Rotondi AJ, Donahoe MP, et al. Long-term mortality and quality of life after prolonged mechanical ventilation. *Critical care medicine*. 2004;32(1):61–9.

9.Combes A, Costa M-A, Trouillet J-L, Baudot J, Mokhtari M, Gibert C, et al. Morbidity, mortality, and quality-of-life outcomes of patients requiring ≥ 14 days of mechanical ventilation. *Critical care medicine*. 2003;31(5):1373–81.

10.Rose L, Nonoyama M, Rezaie S, Fraser I. Psychological wellbeing, health related quality of life and memories of intensive care and a specialised weaning centre reported by survivors of prolonged mechanical ventilation. *Intensive & critical care nursing*. 2014;30(3):145–51.

11.Leroy G, Devos P, Lambiotte F, Thevenin D, Leroy O. One-year mortality in patients requiring prolonged mechanical ventilation: multicenter evaluation of the ProVent score. *Critical Care*. 2014;18(4):R155.

12.Iwashyna TJ, Hodgson CL, Pilcher D, Bailey M, Bellomo R. Persistent critical illness characterised by Australian and New Zealand ICU clinicians. *Critical care and resuscitation: journal of the Australasian Academy of Critical Care Medicine*. 2015;17(3):153–8.

13.Douglas SL, Daly BJ, Gordon N, Brennan PF. Survival and quality of life: short-term versus long-term ventilator patients. *Critical care medicine*. 2002;30(12):2655–62.

14.Wintermann GB, Weidner K, Strauss B, Rosendahl J, Petrowski K. Predictors of posttraumatic stress and quality of life in family members of chronically critically ill patients after intensive care. *Annals of Intensive Care*. 2016;6(1):69.

15.Hickman RL, Jr., Douglas SL. Impact of chronic critical illness on the psychological outcomes of family members. *AACN advanced critical care*. 2010;21(1):80–91.

16.Roulin M-J, Boul'ch M-F, Merlani P. Staff satisfaction between 2 models of care for the chronically critically ill. *Journal of Critical Care*. 2012;27(4):426.e1-.e8.

17.Pronovost P, Berenholtz S, Dorman T, Lipsett PA, Simmonds T, Haraden C. Improving communication in the ICU using daily goals. *Journal of Critical Care*. 2003;18(2):71–5.

18.Reader TW, Flin R, Cuthbertson BH. Communication skills and error in the intensive care unit. *Current opinion in critical care*. 2007;13(6):732–6.

19.Alvarez G, Coiera E. Interruptive communication patterns in the intensive care unit ward round. *International journal of medical informatics*. 2005;74(10):791–6.

20.Thomas A, MacDonald J. A review of patient safety incidents reported as 'severe' or 'death' from critical care units in England and Wales between 2004 and 2014. *Anaesthesia*. 2016;71(9):1013–23.

21. Pronovost PJ, Berenholtz SM, Goeschel C, Thom I, Watson SR, Holzmueller CG, et al. Improving patient safety in intensive care units in Michigan. *Journal of Critical Care*. 2008;23(2):207–21.
22. Rosen MA, Pronovost PJ. Advancing the use of checklists for evaluating performance in health care. *Academic medicine: journal of the Association of American Medical Colleges*. 2014;89(7):963–5.
23. Sagana R, Hyzy RC. Achieving Zero Central Line-associated Bloodstream Infection Rates in Your Intensive Care Unit. *Critical Care Clinics*. 2013;29(1):1–9.
24. Jacobowski NL, Girard TD, Mulder JA, Ely EW. Communication in critical care: family rounds in the intensive care unit. *American journal of critical care: an official publication, American Association of Critical-Care Nurses*. 2010;19(5):421–30.
25. Gonzalo JD, Kuperman E, Lehman E, Haidet P. Bedside interprofessional rounds: perceptions of benefits and barriers by internal medicine nursing staff, attending physicians, and housestaff physicians. *Journal of hospital medicine*. 2014;9(10):646–51.
26. Agarwal S, Frankel L, Tourner S, McMillan A, Sharek PJ. Improving communication in a pediatric intensive care unit using daily patient goal sheets. *Journal of Critical Care*. 2008;23(2):227–35.
27. Phipps LM, Thomas NJ. The use of a daily goals sheet to improve communication in the paediatric intensive care unit. *Intensive & critical care nursing*. 2007;23(5):264–71.
28. Narasimhan M, Eisen LA, Mahoney CD, Acerra FL, Rosen MJ. Improving nurse-physician communication and satisfaction in the intensive care unit with a daily goals worksheet. *American journal of critical care*. 2006;15(2):217–22.
29. Newkirk M, Pamplin JC, Kuwamoto R, Allen DA, Chung KK. Checklists change communication about key elements of patient care. *The journal of trauma and acute care surgery*. 2012;73(2 Suppl 1):S75–82.
30. Siegele P. Enhancing outcomes in a surgical intensive care unit by implementing daily goals tools. *Critical care nurse*. 2009;29(6):58–69.
31. Weiss CH, Moazed F, McEvoy CA, Singer BD, Szleifer I, Amaral LA, et al. Prompting physicians to address a daily checklist and process of care and clinical outcomes: a single-site study. *American Journal of Respiratory and Critical Care Medicine*. 2011;184(6):680–6.
32. Rose L, Istanboulian L, Allum L, Burry L, Dale C, Hart N, et al. Patient and Family Centered Actionable Processes of Care and Performance Measures for Persistent and Chronic Critical Illness: A Systematic Review. *Critical Care Explorations*. 2019;1(4):e0005.
33. Bosk CL, Dixon-Woods M, Goeschel CA, Pronovost PJ. Reality check for checklists. *The Lancet*. 2009;374(9688):444–5.

34. Sinuff T, Muscedere J, Adhikari NK, Stelfox HT, Dodek P, Heyland DK, et al. Knowledge translation interventions for critically ill patients: a systematic review. *Critical Care Medicine*. 2013;41(11):2627–40.
35. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation The PRISMA-ScR Statement. *Annals of internal medicine*. 2018;169(7):467–73.
36. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *International journal of social research methodology*. 2005;8(1):19–32.
37. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation Science*. 2012;7(1):37.
38. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *British Medical Journal*. 2009;339:b2535.
39. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implementation Science*. 2010;5(1):69.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [LAllumSearchstrategy26.11.19.docx](#)
- [PRISMA ScR Fillable Checklist.docx](#)