

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Clinical teaching unit design: a systematic review protocol of evidence- based practices for clinical education and health service delivery
AUTHORS	Tang, Brandon; Sandarage, Ryan; Dutkiewicz, Katrina; Saad, Stephan; Chai, Jocelyn; Dawson, Kristin; Kitchin, Vanessa; McCormick, Iain; Kassen, Barry

VERSION 1 – REVIEW

REVIEWER	GLEN BANDIERA University of Toronto
REVIEW RETURNED	01-Nov-2019

GENERAL COMMENTS	<p>Page 5, Line 43: Why limit this study to post 1993 papers? Suspecting there may be limited eligible articles, might there be value in reviewing contributions before this date? The search methods later propose including dates as early as 1946, but again proposes limiting the eligibility to after 1992. Please provide justification for the comment, 'This date captures the vast majority of the literature.'</p> <p>Page 7, line 23, I am not sure that 'Star Model' needs to be restated in it's entirety again here.</p> <p>If the study aim is to determine which aspects of the CTU design are relevant in today's environment, how will a review of evidence from as long ago as 25 years help with this? The study seems to be designed to establish what empiric evidence base there may be for current and evolving designs, rather than as assessment of these aspects against current reality. Please describe how this stated goal of the paper will address this?</p> <p>Please clarify if the literature search has already been done; the methods suggest it is a future task, but the contributions section states that 'VK developed and executed the search strategy'</p>
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REVIEWER	Sarah Walpole Newcastle Hospitals, UK
REVIEW RETURNED	24-Nov-2019

GENERAL COMMENTS	<p>The systematic review is well justified.</p> <p>I feel that it would be very beneficial if this write up included clear statement of aims and objectives of the review - question and sub-questions. I see this question "what features of CTU still work today, and what needs to change?" stated, but in discussion and would be good to clarify if this is the key question for the review. I</p>
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	<p>think this would be easily addressed as the authors have considered this, just not articulated it as clearly as they could.</p> <p>The example search strategy is useful. (Does 8 and include 7 (although mp)? Not a problem if it does, but could make the strategy more succinct.)</p> <p>The abstract states there will be a two-stage process, by which i think you mean the abstract screening, then full text screening, but perhaps useful to refer to these as first and second stage in detailing the methods.</p> <p>What is the justification for excluding foreign language papers? I would suggest that foreign language papers should at least be searched for and included to the extent possible with local resources (departmental, online) https://www.sciencedirect.com/science/article/abs/pii/S0895435618309600?dgcid=author</p> <p>Given the wide inclusion criteria, it is likely that a large number of studies will be identified - good to see that key data will be extracted. How will qualitative data be handled?</p> <p>The inclusion of any data from a 'teaching unit' or centre/er again is broad and the locations searched can be expected to provide the limitation to health profession training. There is potential to include other common languages of publication, and the relevant terms in those languages could be included. Focusing on units described by a specific term (CTU) risks dividing studies according to terminology rather than function, therefore it makes sense to include other teaching units and centres as the authors have chosen to. The analysis will need to consider how these definitions are used, the differences and similarities between these types of learning setting and whether and how learning from other similar settings could be applied may be important to enhance medical education - so perhaps some preparation about how to organise / analyse papers according to the type of unit described may help.</p> <p>It would be good to see justification of choice of narrative synthesis over realist or another approach given the intention of this research to inform education practice.</p>
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REVIEWER	RA de Leeuw Amsterdam UMC, location VUMC
REVIEW RETURNED	10-Dec-2019

GENERAL COMMENTS	<p>This study is very relevant for those who aim to design or improve CTU's. Thank you for making the effort. I fully agree with your methodology and applaud your choice of databases.</p> <p>I do wonder about the data synthesis and analysis. Why do you choose for a narrative review, instead of for example an integrative review? Could you please formulate the rationale behind the chosen Star Model? A template analysis, for example, could be used as well. These are the most important aspects of your protocol, yet these choices are not justified enough in my opinion. Please elaborate on those choices in your protocol.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 1

Reviewer Name: GLEN BANDIERA

Institution and Country: University of Toronto

Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

Page 5, Line 43: Why limit this study to post 1993 papers? Suspecting there may be limited eligible articles, might there be value in reviewing contributions before this date? The search methods later propose including dates as early as 1946, but again proposes limiting the eligibility to after 1992.

Please provide justification for the comment, 'This date captures the vast majority of the literature.'

Thank you for your comment. Although the CTU model was first approved by the ACMC in 1962, we wanted to limit our review to more contemporary articles that would reflect which aspects of CTU design are most relevant in today's environment. In 1993, Maudsley published a significant opinion piece in CMAJ calling for reform in CTU design (<https://www.cmaj.ca/content/148/9/1564>). We therefore endeavoured to include articles published since 1993 that might have been spurred by Maudsley's paper and were more likely to reflect CTU in today's environment, as opposed to earlier decades. We have now included statements to reflect this thought process in the article:

"Our review was limited to include studies published in 1993 or later, which would be more likely to reflect aspects of CTU relevant to today's health care environment. This cut-off year was selected given the publication of a landmark opinion article in 1993 which called for reform and modernization of the CTU1."

Page 7, line 23, I am not sure that 'Star Model' needs to be restated in it's entirety again here.

If the study aim is to determine which aspects of the CTU design are relevant in today's environment, how will a review of evidence from as long ago as 25 years help with this? The study seems to be designed to establish what empiric evidence base there may be for current and evolving designs, rather than as assessment of these aspects against current reality. Please describe how this stated goal of the paper will address this?

Please clarify if the literature search has already been done; the methods suggest it is a future task, but the contributions section states that 'VK developed and executed the search strategy'

We have removed the restatement of aspects of the 'Star Model' from Page 7, Line 23.

Thank you for your comment regarding the goal of our paper. We have added a section to clarify:

"However, modern practices in CTU design are largely based on clinical intuition and experience, as opposed to empirical evidence. The proposed systematic review aims to identify principles of CTU design that contribute to improved outcomes in clinical education and health service delivery. We are hopeful that identifying evidence-based principles of CTU design will help inform redesign of the modern CTU, in accordance with the reality of health care in the 21st century."

We have also included a new section which clearly defines our primary and secondary research questions.

Reviewer: 2

Reviewer Name: Sarah Walpole

Institution and Country: Newcastle Hospitals, UK

Please state any competing interests or state 'None declared': None to declare

Please leave your comments for the authors below
The systematic review is well justified.

I feel that it would be very beneficial if this write up included clear statement of aims and objectives of the review - question and sub-questions. I see this question "what features of CTU still work today, and what needs to change?" stated, but in discussion and would be good to clarify if this is the key question for the review. I think this would be easily addressed as the authors have considered this, just not articulated it as clearly as they could.

Thank you for your comment. We have added a new section entitled "study objectives" which includes our research questions, detailed below:

- Primary question:
 - o Which principles of CTU design contribute to improved outcomes in clinical education and health service delivery?
- Secondary questions:
 - o In what contexts (country, clinical specialty, etc.) has the design of CTUs been examined?
 - o Which principles of CTU design have the highest quality supporting evidence?
 - o Which interventions in CTU design have the largest impact on clinical education and health service delivery?
 - o What gaps exist in the CTU design literature that suggest areas for future study?

The example search strategy is useful. (Does 8 and include 7 (although mp)? Not a problem if it does, but could make the strategy more succinct.)

Line 8 is a keyword search (Ovid command ".mp") which will account for any papers that have not yet been indexed with the teaching rounds/ subject heading (line 7; Ovid command "/"). We searched teaching rounds/ OR teaching round*.mp in order to cover any lag in indexing as well as account for the subjectivity of MeSH term application.

The abstract states there will be a two-stage process, by which i think you mean the abstract screening, then full text screening, but perhaps useful to refer to these as first and second stage in detailing the methods.

Thank you for your comment, we've included new language stating "in the first/second stage" to help clarify our methods section.

What is the justification for excluding foreign language papers? I would suggest that foreign language papers should at least be searched for and included to the extent possible with local resources (departmental, online)

<https://www.sciencedirect.com/science/article/abs/pii/S0895435618309600?dgcid=author>

Thank you for this comment and for sharing that citation. We appreciate the value of including studies in languages other than English (LOE). However, due to resource limitations and lack of language-expertise at our institution, we were concerned about our ability to appropriately search, screen, and analyze LOE articles. We have included a statement in our study to reflect this:

"We limited our study to English-language articles given the limited resources at our institution to appropriately search, screen, and analyze studies in languages other than English."

Given the wide inclusion criteria, it is likely that a large number of studies will be identified - good to see that key data will be extracted. How will qualitative data be handled?

After progressing through our literature search, we recognized the large number of qualitative studies identified. This is part of our rationale for shifting toward a "realist review" approach which specifically accounts for qualitative data. Statements reflecting how qualitative data will be handled have been added, including:

“Given that most retrieved studies involve qualitative approaches, the strength of recommendations that emerge from this review may be limited.”

“We intend to employ a realist approach to knowledge synthesis. Realist research utilizes mixed-methods (qualitative and quantitative) data to generate context-mechanism-outcome (CMO) hypotheses regarding the intervention of interest. In other words, it aims to understand “what works for whom, in what circumstances, in what respects, and how” for complex interventions such as CTU7.”

“Risk of bias assessment will be performed for all included studies using validated tools such as the Newcastle-Ottawa Scale for qualitative studies and GRADE system for quantitative studies.”

The inclusion of any data from a 'teaching unit' or centre/er again is broad and the locations searched can be expected to provide the limitation to health profession training. There is potential to include other common languages of publication, and the relevant terms in those languages could be included. Focusing on units described by a specific term (CTU) risks dividing studies according to terminology rather than function, therefore it makes sense to include other teaching units and centres as the authors have chosen to. The analysis will need to consider how these definitions are used, the differences and similarities between these types of learning setting and whether and how learning from other similar settings could be applied may be important to enhance medical education - so perhaps some preparation about how to organise / analyse papers according to the type of unit described may help.

Thank you for this insightful comment. We will continue to reflect on this, but this may be an interesting topic to discuss further in the discussion section of our final paper. Given that we have already executed our search strategy, we will not have the opportunity to include additional search terms, but we did include alternative terminology for “CTU” in the initial search.

It would be good to see justification of choice of narrative synthesis over realist or another approach given the intention of this research to inform education practice.

After our search retrieved a large number of qualitative studies, with wide variation in study context, we have decided to adopt a realist review approach. We have stated our rationale for this as follows: “Based on an analysis of knowledge synthesis strategies by Kastner et al. (2016)¹⁰, a realist review approach is appropriate for our study for multiple reasons:

- Purpose: Our study aims to generate theory regarding why and how certain principles of CTU design are effective, as well as identify gaps in the CTU design literature.
- Outputs: Given the wide range of contexts in which CTU occurs and has been studied, a realist approach is ideal given that it aims to generate highly contextualized context-mechanism-outcome statements. By considering what works in CTU design for whom, and in what circumstances, the results of our study will be highly relevant to our intended audience of clinician teachers, educators, and administrators.
- Applicability: Our study involves the evaluation and/or assessment of a complex program (CTU).”

Reviewer: 3

Reviewer Name: Robert A de Leeuw

Institution and Country: Amsterdam UMC, location VUMC

Please state any competing interests or state ‘None declared’: None declared

Please leave your comments for the authors below

This study is very relevant for those who aim to design or improve CTU's. Thank you for making the effort. I fully agree with your methodology and applaud your choice of databases.

I do wonder about the data synthesis and analysis. Why do you choose for a narrative review, instead of for example an integrative review? Could you please formulate the rationale behind the chosen Star Model? A template analysis, for example, could be used as well. These are the most important aspects of your protocol, yet these choices are not justified enough in my opinion. Please elaborate on those choices in your protocol.

(1) After our search retrieved a large number of qualitative studies, with wide variation in study context, we have decided to adopt a realist review approach. We have stated our rationale for this as follows:

“Based on an analysis of knowledge synthesis strategies by Kastner et al. (2016)¹⁰, a realist review approach is appropriate for our study for multiple reasons:

- Purpose: Our study aims to generate theory regarding why and how certain principles of CTU design are effective, as well as identify gaps in the CTU design literature.
- Outputs: Given the wide range of contexts in which CTU occurs and has been studied, a realist approach is ideal given that it aims to generate highly contextualized context-mechanism-outcome statements. By considering what works in CTU design for whom, and in what circumstances, the results of our study will be highly relevant to our intended audience of clinician teachers, educators, and administrators.
- Applicability: Our study involves the evaluation and/or assessment of a complex program (CTU).”

(2) The Star Model is a framework that emerged from the health administration literature, which is commonly used to guide health system design and redesign. We felt that using an established framework such as this would facilitate systems-thinking and process improvement in the CTU context. It would additionally serve to conceptually organize CTU in a way that both educators and administrators, key stakeholders in CTU redesign, can understand. We have added a new section to reflect our thought process:

“We will aim to categorize emergent principles of CTU design according to the Star Model, an evidence-based management tool used to guide health system design^{9,11}. This framework examines macro-systems (such as CTU) according to their interdependent subsystems (strategy, structure, etc.), and may help facilitate policy reform and communication by segmenting CTU into conceptual components meaningful to educators and administrators alike. Additionally, we believe that applying a framework intended for health system design may facilitate both systems-thinking and process improvement in the CTU context.”

VERSION 2 – REVIEW

REVIEWER	GLEN BANDIERA University of Toronto
REVIEW RETURNED	03-Feb-2020
GENERAL COMMENTS	The authors have addressed my questions for clarification to my satisfaction; I look forward to further evolution of this study.
REVIEWER	RA de Leeuw Amsterdam UMC
REVIEW RETURNED	29-Jan-2020
GENERAL COMMENTS	The paper has been approved a lot. I especially like the methodology section now. Well done.