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# BMJ Open

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# Mapping the use of Soft Systems Methodology for change management in healthcare: a scoping review protocol

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## ABSTRACT

### Introduction

It is notoriously challenging to implement evidence-based care and to update and improve healthcare practices. One reason for the difficulty is the complexity of healthcare and the powerful influence of context on implementation and improvement efforts. Thus, there is a need for multi-faceted, flexible change methods that takes these complexities into consideration. One approach that has the potential in this regard is Soft Systems Methodology (SSM). However, little is known about how SSM has been applied in healthcare settings, making it difficult to assess the usefulness of SSM for implementation science or improvement research. The aim of the proposed scoping review is to examine and map the use and outcomes of SSM in healthcare.

### Methods and analysis

The review will adopt the framework outlined by Arksey and O'Malley (2005). Citations will be uncovered through a comprehensive database search of the peer reviewed literature. Two reviewers will conduct a two-stage review and selection process where the titles/abstracts are examined followed by a screening of full texts of the selected citations. Reference lists of included citations will be snowballed to identify potential additional citations. Inclusion criteria are English language, peer-reviewed empirical papers focusing on the application of SSM in a healthcare setting. Both general information about the citations as well as information related to the objective of the review will be extracted from the included citations and entered into a data charting form. The extracted information will be reported in diagrams and tables and summarized to present a narrative account of the literature. The proposed review will provide information on the potential for using SSM to affect change in healthcare.

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### Key words

Soft Systems Methodology, healthcare, improvement, intervention, complex systems, change management

### Strengths and limitations of this study

- The review will be limited to the peer-reviewed and English-speaking literature.
- It will not provide a definitive account of the effectiveness of SSM.
- The scoping methodology will allow information from a broad range of studies, using different designs and methods, to be included and synthesized.
- The review will provide a comprehensive overview of the application of SSM in healthcare and synthesize information that can inform assessment of the feasibility and usefulness of SSM in healthcare.
- The findings may highlight future directions for research on SSM in healthcare.

### INTRODUCTION

Healthcare organisations are continuously required to implement new evidence and to improve their practices. However, improvement is exceedingly difficult. For instance, despite efforts to implement evidence-based care, only 55-60 percent of patients receive recommended care in Australia[1, 2] and the United States.[3] These difficulties are related at least in part to the complexity of healthcare and the pervasive influence that context has on implementation and improvement efforts. Context includes the attitudes, perceptions and actions of the individuals involved, their collective cultural attributes, and features of the inner and outer setting.[4-6]

Contextual factors manifest on multiple levels, are interwoven and interlinked, and interact in unpredictable ways in influencing implementation. This makes it difficult to plan, execute and then predict how an intervention will be adopted and taken-up in any specific setting.[7, 8] Indeed, interventions that have been shown to be effective in one setting can fail to produce results in another setting. For instance, a meta-analysis comparing the effectiveness of internationally adopted interventions, culturally adapted interventions and novel interventions showed that novel and adapted interventions were more effective than adopted interventions.[9] One explanation for this is that such interventions provide a better fit to the organisation's needs, culture, processes and structures and therefore are more likely to be embraced, implemented and sustained.[5, 10, 11]

An important aspect of intervention fit is related to the individuals and groups that are involved in, and affected by, the intervention. They can ultimately contribute to the intervention's success or failure.[4, 5, 12] For the intervention to succeed relevant individuals and stakeholder groups must recognize the problem and need for change,[13] agree on solutions, and put the intervention into practice.[5, 12] All-in-all, these issues underscore that improvement interventions cannot be separated from the context in which they are implemented.[4, 5, 14, 15]

### Rationale for the review

This suggests that there is a need for more flexible, multifaceted and participatory change approaches that takes complexity into consideration rather than trying to simplify problems, interventions and contexts.[6, 16-18] One approach that has been proposed to be useful in facilitating change in complex settings is Soft Systems Methodology (SSM).[19-21] SSM has several features that have been emphasized as important for responsive implementation and improvement interventions such as: involving stakeholders in the change process,[8, 17] factoring in the local context,[4, 5, 11] facilitating adaptation and ongoing learning,[4, 8, 10, 22] and taking a systems approach to change rather than trying to control all dependent variables or striving to affect change in one part of the system without recognizing the interconnections between other parts.[23, 24]

### Soft Systems Methodology in short

SSM builds on systems theory. It is a methodology designed for tackling real-world problems that may be hard to define and where people may have divergent views on the problem in focus, and the objective of change, or both. SSM is described as a learning process that engages relevant stakeholders in a process of inquiry into a problematic situation with the aim of developing a purposeful model of human activity that can be used for learning about the real world and facilitating improvement of the problem.[19-21] The learning cycle (Figure 1) involves four activities: 1. *Finding out about the problematic situation, including culturally and politically.* In this activity the context of the problem situation and the interlinks between different contextual factors are explored. A rich picture to illustrate this is developed. 2. *Formulating relevant purposeful activity models,* i.e. modelling how the activities in an improved situation could look. 3. *Debating the situation* using the models to find changes that are desirable as well as contextually and culturally feasible, and seeking agreement between disparate views, and 4. *Taking action to bring about improvement* by identifying opportunities for gain and progress based on the prior three activities, and testing changes as a basis for further learning.[19]

Insert Figure 1 here

### Soft Systems Methodology in healthcare

A review conducted in 2007 showed that SSM had been used in a variety of areas, including healthcare. However, the majority of studies on SSM had been conducted mostly in relation to development and implementation of information and communication technology and environmental and ecological problem situations.[25] A more recent review focused on the methodological aspects of the use of SSM in healthcare up to 2014.[26] This review showed that SSM had been applied in various ways, including being modified and used in combination with other methods. However, there is, to our best knowledge, no recent review mapping the use of SSM in healthcare, especially in identifying the type of problems to which SSM has been applied, or the types of interventions and outcomes have been reported following the use of SSM.

We propose a review to investigate these issues. Due to the likelihood of varying study designs and outcomes of studies describing the use of SSM, we consider a scoping review to be the optimal format. This will provide information about settings, the purpose of SSM use, and an overview of the types of interventions have been proposed and implemented as well as their reported outcomes. The findings will illustrate the extent to which SSM can be useful for the kinds of problematical situations healthcare is facing, and particularly it should unlock value in understanding contextually-adapted change and improvement strategies.

### METHODS AND ANALYSIS

We propose adapting for our purpose the framework of Arksey and O'Malley [27] for conducting scoping reviews. The framework includes five stages: 1. identifying the research question; 2. identifying relevant studies; 3. study selection; 4. charting the data; and 5. collating, summarizing and reporting the results. The study protocol is outlined according to these five stages.

## Stage 1. Identifying the research question

### Objectives

The objective of the proposed scoping review is to examine and map the use and outcomes of SSM in the context of healthcare. The review will be guided by the following secondary questions: 1. In which countries and healthcare settings has SSM been applied? 2. How has SSM been applied, e.g. for problem structuring, or for proposing or implementing interventions? 3. For what type of problems has SSM been used? 4. What kinds of interventions have been proposed or implemented using SSM? 5. What kind of outcomes have been reported following the use of SSM?

### Eligibility criteria

Citations will be assessed against the following inclusion criteria: English-language, peer-reviewed, empirical research articles published in scholarly journals where the full text is available. The content of the citations should be on the application of SSM in a healthcare setting, including primary care, mental health, hospital care, residential age care, rehabilitation and community health facilities. Citations focusing on the use of SSM in settings other than healthcare, e.g. educational settings (including healthcare education) will be excluded. No date limit will be applied.

## Stage 2. Identifying relevant studies

The review will focus on peer-reviewed literature. The main identification strategy will be to search the following electronic databases: Scopus, MEDLINE, Web of Science, CINAHL, EMBASE and PsycINFO. These databases were selected because they include a broad range of literature from different disciplines such as biomedicine, psychology, health services research, and nursing.

The search strategy (Table 1) will use the term "soft systems method\*" to identify citations referring to SSM. The search term health\* will be used to limit the search to the healthcare context. The wildcard character represents one or more other characters which allows variable endings of key words, e.g. healthcare. In addition to the database search the reference lists from the included citations will be snowball searched to identify additional citations. Because of the focus on a specific and named methodology the search strategy can be defined well in advance which will enable the identification of relevant citations and minimize citations not related to the scope of the review. The database searches will be made by one researcher (HA) and sample citations by another (KC) and include all citations published before August 2018.

Table 1. Search strategy

#1	"soft system* method*" (TITLE-ABS-KEY)
	AND
#2	health* (TITLE-ABS-KEY)
	AND
#3	LIMIT-TO (LANGUAGE, "English")

## Stage 3. Study selection

After duplicates have been removed in a structured process,[28] all references will be imported into Rayyan, a web and mobile app, that organises and facilitates the initial screening of titles and abstracts.[29] Two reviewers (HA, KC) will apply the inclusion and exclusion criteria to all the

citations, both in the title and abstract review and in the full text review. To test the inclusion and exclusion criteria and ensure consensus on included citations, titles and abstracts from ten percent of the identified references will be assessed by the two reviewers. Interrater agreement rates will be calculated using Cohen's kappa.[30] Any discrepancies between authors concerning the inclusion or exclusion of citations will be resolved through discussion and, if necessary, a third researcher (JB) will be consulted. After this initial test any adjustments or clarifications needed will be made to the inclusion and exclusion criteria. An agreement rate of 0.8 will be used as a target to ensure that the criteria are properly defined. The researchers will then review the remaining titles and abstracts. In the next step the reviewers will assess the full texts of the included citations for final inclusion.

#### Stage 4. Charting the data

An electronic data charting form will be developed to guide data charting from included citations. The form will contain information related to both general information about the citations such as publication year and authors as well as information related to the objective of the review (Table 2). Charting the results in a scoping review can often be an iterative process since the review method may reveal additional data that may be relevant to extract.[27, 31] The data charting form will be piloted by the two reviewers using a random selection of the citations and any changes needed will be made prior to data charting from the remaining citations. One of the reviewers (HA) will then independently chart the data from the remaining citations, with sample validation by KC and JB.

Table 2. Overview of data items for charting.

Information to be charted
a. Author(s)
b. Publication year
c. Title
d. Aim
e. Country of origin
f. Type of healthcare setting(s)
g. Methods (design, data collection, participants)
h. Way of using SSM (for problem structuring, for proposing/implementing interventions)
i. Type of problem that SSM has been applied to
j. Type of intervention (if applicable)
k. Type of outcomes reported (if applicable)

#### Stage 5. Collating, summarizing and reporting the results

A numerical overview of the extent, nature and distribution of the included studies will be summarized and reported in diagrams and tables to provide a synthesis of the literature on the use of SSM in healthcare. This may include which countries and healthcare settings that SSM has been used and in what way SSM has been used (e.g. as a problem structuring method, for proposing/implementing interventions etc). The extracted information will also be summarized to present a narrative account of the literature. Themes and categories will be both deductively developed, based on the research questions, and inductively developed, based on the empirical data and determined during the analytical process.[32] Examples include a narrative description of what type of problems that SSM has been used to address, of which interventions that have been proposed and/or implemented and of reported outcomes.



### **Patient and public involvement**

There was no patient or public involvement in the design of this scoping review protocol.

### **CONCLUSION**

The complexity of the healthcare system and the challenge of implementing new evidence and improving care practices calls for multifaceted, flexible approaches to facilitate change that take these complexities into consideration. SSM is an approach that has the potential to facilitate change in complex settings and situations. However, how SSM has been used in healthcare, including the type of changes for which it may be useful, and outcomes reported following application of SSM, is not clear. As such, the proposed review aims to map the use of SSM and to explore the potential for using SSM to affect health systems change.

### **Ethics and dissemination**

As no primary data will be collected, no ethical permission will be required. Dissemination of results include peer-reviewed publications and conference presentations.

### **Author contributions**

JB conceptualised the study and HA and JB developed the study design and methodology. HA drafted the initial manuscript, assisted by KC and JB. All authors had the opportunity to contribute to the final manuscript, edited it into its final form, and approved the final submission.

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### **Competing interests statement**

None declared

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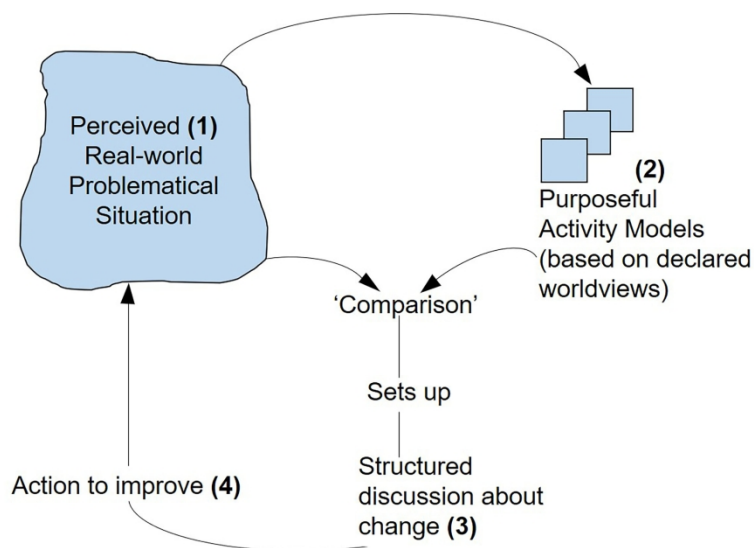


Figure 1. A generic SSM learning cycle. Source: Checkland and Poulter.[19] Permission granted by John Wiley and Sons for use of this image. Licence number: 4403900665359

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## Stage 1. Identifying the research question

### Objectives

The objective of the proposed scoping review is to examine and map the use and outcomes of SSM in the context of healthcare. The review will be guided by the following secondary questions: 1. In which countries and healthcare settings has SSM been applied? 2. How has SSM been applied, e.g. for problem structuring, or for proposing or implementing interventions? 3. For what type of problems has SSM been used? 4. To what degree have stakeholders been involved and consulted in the SSM process? 5. What kinds of interventions have been proposed or implemented using SSM? 6. What kind of outcomes have been reported following the use of SSM?

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Citations will be assessed against the following inclusion criteria: English-language, peer-reviewed, empirical research articles published in scholarly journals where the full text is available. The content of the citations should be on the application of SSM in a healthcare setting, including primary care, mental health, hospital care, residential age care, rehabilitation and community health facilities. Studies claiming to apply one or several elements from SSM will be included even if SSM has not been applied in its entirety. Studies using SSM, or parts of SSM, in combination with other methods will also be included. Citations focusing on the use of SSM in settings other than healthcare, e.g. educational settings (including healthcare education) will be excluded. No date limit will be applied.

## Stage 2. Identifying relevant studies

The review will focus on peer-reviewed literature. The main identification strategy will be to search the following electronic databases: Scopus, MEDLINE, Web of Science, CINAHL, EMBASE and PsycINFO. These databases were selected because they include a broad range of literature from different disciplines such as biomedicine, psychology, health services research, and nursing.

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Because of the focus on a specific and named methodology the search strategy can be defined well in advance which will enable the identification of relevant citations and minimize citations not related to the scope of the review. The database searches will be made by one researcher (HA) and sample citations by another (KC) and include all citations published before August 2018.

Table 1. Search strategy

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	AND
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1  
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3 AND  
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### 7 **Stage 3. Study selection**

9 After duplicates have been removed in a structured process,[28] all references will be imported into  
10 Rayyan, a web and mobile app, that organises and facilitates the initial screening of titles and  
11 abstracts.[29] Two reviewers (HA, KC) will apply the inclusion and exclusion criteria to all the  
12 citations, both in the title and abstract review and in the full text review. To test the inclusion and  
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### 23 **Stage 4. Charting the data**

24 An electronic data charting form will be developed to guide data charting from included citations.  
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27 Charting the results in a scoping review can often be an iterative process since the review method  
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30 be made prior to data charting from the remaining citations. One of the reviewers (HA) will then  
31 independently chart the data from the remaining citations, with sample validation by KC and JB.  
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40 Table 2. Overview of data items for charting.

41 <b>Information to be charted</b>
42 a. Author(s)
43 b. Publication year
44 c. Title
45 d. Aim
46 e. Country of origin
47 f. Type of healthcare setting(s)
48 g. Methods (design, data collection, participants)
49 h. Way of using SSM (for problem structuring, for proposing/implementing 50 interventions)
51 i. Type of problem that SSM has been applied to
52 j. Degree of stakeholder participation (e.g. number of stakeholder groups 53 that have been consulted in the different SSM activities)
54 k. Type of intervention (if applicable)
55 l. Type of outcomes reported (if applicable)

### 56 **Stage 5. Collating, summarizing and reporting the results**

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2  
3 A numerical overview of the extent, nature and distribution of the included studies will be  
4 summarized and reported in diagrams and tables to provide a synthesis of the literature on the use  
5 of SSM in healthcare. This may include which countries and healthcare settings that SSM has been  
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### 15 16 **Patient and public involvement**

17 There was no patient or public involvement in the design of this scoping review protocol.  
18  
19  
20

### 21 **CONCLUSION**

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23 The complexity of the healthcare system and the challenge of implementing new evidence and  
24 improving care practices calls for multifaceted, flexible approaches to facilitate change that take  
25 these complexities into consideration. SSM is an approach that has the potential to facilitate change  
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### 34 **Ethics and dissemination**

35  
36 As no primary data will be collected, no ethical permission will be required. Dissemination of results  
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### 41 **Author contributions**

42  
43 JB conceptualised the study and HA and JB developed the study design and methodology. HA drafted  
44 the initial manuscript, assisted by KC and JB. All authors had the opportunity to contribute to the  
45 final manuscript, edited it into its final form, and approved the final submission.  
46  
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### 49 **Funding statement**

50  
51 This work is supported by the National Health and Medical Research Council Partnership Centre  
52 grant in Health System Sustainability (ID:9100002).  
53  
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### 56 **Competing interests statement**

57 None declared  
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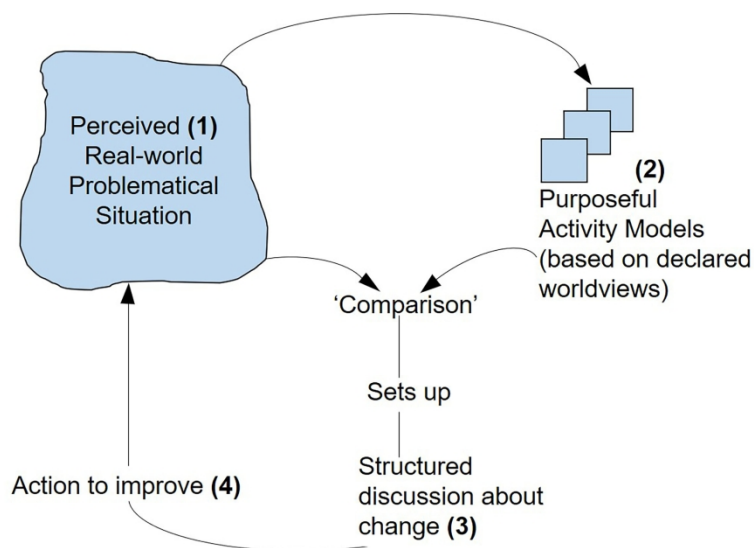


Figure 1. A generic SSM learning cycle. Source: Checkland and Poulter.[19] Permission granted by John Wiley and Sons for use of this image. Licence number: 4403900665359

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# Mapping the use of Soft Systems Methodology for change management in healthcare: a scoping review protocol

Hanna Augustsson<sup>\*1,2</sup>, Kate Churruca<sup>1</sup> and Jeffrey Braithwaite<sup>1</sup>

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## ABSTRACT

### Introduction

It is notoriously challenging to implement evidence-based care and to update and improve healthcare practices. One reason for the difficulty is the complexity of healthcare and the powerful influence of context on implementation and improvement efforts. Thus, there is a need for multi-faceted, flexible change methods that takes these complexities into consideration. One approach that has the potential in this regard is Soft Systems Methodology (SSM). However, little is known about how SSM has been applied in healthcare settings, making it difficult to assess the usefulness of SSM for implementation science or improvement research. The aim of the proposed scoping review is to examine and map the use and outcomes of SSM in healthcare.

### Methods and analysis

The review will adopt the framework outlined by Arksey and O'Malley (2005). Citations will be uncovered through a comprehensive database search of the peer reviewed literature. Two reviewers will conduct a two-stage review and selection process where the titles/abstracts are examined followed by a screening of full texts of the selected citations. Reference lists of included citations will be snowballed to identify potential additional citations. Inclusion criteria are English language, peer-reviewed empirical papers focusing on the application of SSM in a healthcare setting. Both general information about the citations as well as information related to the objective of the review will be extracted from the included citations and entered into a data charting form. The extracted information will be reported in diagrams and tables and summarized to present a narrative account of the literature. The proposed review will provide information on the potential for using SSM to affect change in healthcare.

### Ethics and dissemination

No primary data will be collected, and thus ethical permission is unnecessary. Dissemination of results include peer-reviewed publications and conference presentations.

### Key words

Soft Systems Methodology, healthcare, improvement, intervention, complex systems, change management

### Strengths and limitations of this study

- The review will be limited to the peer-reviewed and English-speaking literature.
- It will not provide a definitive account of the effectiveness of SSM.
- The scoping methodology will allow information from a broad range of studies, using different designs and methods, to be included and synthesized.
- The review will provide a comprehensive overview of the application of SSM in healthcare and synthesize information that can inform assessment of the feasibility and usefulness of SSM in healthcare.
- The findings may highlight future directions for research on SSM in healthcare.

### INTRODUCTION

Healthcare organisations are continuously required to implement new evidence and to improve their practices. However, improvement is exceedingly difficult. For instance, despite efforts to implement evidence-based care, only 55-60 percent of patients receive recommended care in Australia[1, 2] and the United States.[3] These difficulties are related at least in part to the complexity of healthcare and the pervasive influence that context has on implementation and improvement efforts. Context includes the attitudes, perceptions and actions of the individuals involved, their collective cultural attributes, and features of the inner and outer setting.[4-6]

Contextual factors manifest on multiple levels, are interwoven and interlinked, and interact in unpredictable ways in influencing implementation. This makes it difficult to plan, execute and then predict how an intervention will be adopted and taken-up in any specific setting.[7, 8] Indeed, interventions that have been shown to be effective in one setting can fail to produce results in another setting. For instance, a meta-analysis comparing the effectiveness of internationally adopted interventions, culturally adapted interventions and novel interventions showed that novel and adapted interventions were more effective than adopted interventions.[9] One explanation for this is that such interventions provide a better fit to the organisation's needs, culture, processes and structures and therefore are more likely to be embraced, implemented and sustained.[5, 10, 11]

An important aspect of intervention fit is related to the individuals and groups that are involved in, and affected by, the intervention. They can ultimately contribute to the intervention's success or failure.[4, 5, 12] For the intervention to succeed relevant individuals and stakeholder groups must recognize the problem and need for change,[13] agree on solutions, and put the intervention into practice.[5, 12] All-in-all, these issues underscore that improvement interventions cannot be separated from the context in which they are implemented.[4, 5, 14, 15]

This suggests that there is a need for more flexible, multifaceted and participatory change approaches that takes complexity into consideration rather than trying to simplify problems, interventions and contexts.[6, 16-18] One approach that has been proposed to be useful in facilitating change in complex settings is Soft Systems Methodology (SSM).[19-21] SSM has several features that have been emphasized as important for responsive implementation and improvement interventions such as: involving stakeholders in the change process,[8, 17] factoring in the local context,[4, 5, 11] facilitating adaptation and ongoing learning,[4, 8, 10, 22] and taking a systems approach to change rather than trying to control all dependent variables or striving to affect change in one part of the system without recognizing the interconnections between other parts.[23, 24]

### Soft Systems Methodology in short

SSM builds on systems theory. It is a methodology designed for tackling real-world problems that may be hard to define and where people may have divergent views on the problem in focus, and the objective of change, or both. SSM is described as a learning process that engages relevant stakeholders in a process of inquiry into a problematic situation with the aim of developing a purposeful model of human activity that can be used for learning about the real world and facilitating improvement of the problem.[19-21] The learning cycle (Figure 1) involves four activities: 1. *Finding out about the problematic situation, including culturally and politically.* In this activity the context of the problem situation and the interlinks between different contextual factors are explored. A rich picture to illustrate this is developed. 2. *Formulating relevant purposeful activity models,* i.e. modelling how the activities in an improved situation could look. 3. *Debating the situation* using the models to find changes that are desirable as well as contextually and culturally feasible, and seeking agreement between disparate views, and 4. *Taking action to bring about improvement* by identifying opportunities for gain and progress based on the prior three activities, and testing changes as a basis for further learning.[19]

Insert Figure 1 here

### Soft Systems Methodology in healthcare

A review conducted in 2007 showed that SSM had been used in a variety of areas, including healthcare. However, the majority of studies on SSM had been conducted mostly in relation to development and implementation of information and communication technology and environmental and ecological problem situations.[25] A more recent review focused on the methodological aspects of the use of SSM in healthcare up to 2014.[26] This review showed that SSM had been applied in various ways, including being modified and used in combination with other methods. However, there is, to our best knowledge, no recent review mapping the use of SSM in healthcare, especially in identifying the type of problems to which SSM has been applied, or the types of interventions and outcomes have been reported following the use of SSM.

We propose a review to investigate these issues. Due to the likelihood of varying study designs and outcomes of studies describing the use of SSM, we consider a scoping review to be the optimal format. This will provide information about settings, the purpose of SSM use, and an overview of the types of interventions have been proposed and implemented as well as their reported outcomes. The findings will illustrate the extent to which SSM can be useful for the kinds of problematical situations healthcare is facing, and particularly it should unlock value in understanding contextually-adapted change and improvement strategies.

### METHODS AND ANALYSIS

We propose adopting for our purpose the framework of Arksey and O'Malley [27] for conducting scoping reviews. The framework includes five stages: 1. identifying the research question; 2. identifying relevant studies; 3. study selection; 4. charting the data; and 5. collating, summarizing and reporting the results. The study protocol is outlined according to these five stages.

#### Stage 1. Identifying the research question

## Objectives

The objective of the proposed scoping review is to examine and map the use and outcomes of SSM in the context of healthcare. The review will be guided by the following secondary questions: 1. In which countries and healthcare settings has SSM been applied? 2. How has SSM been applied, e.g. for problem structuring, or for proposing or implementing interventions? 3. For what type of problems has SSM been used? 4. To what degree have stakeholders been involved and consulted in the SSM process? 5. What kinds of interventions have been proposed or implemented using SSM? 6. What kind of outcomes have been reported following the use of SSM?

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### 38 **Author contributions**

39  
40 JB conceptualised the study and HA and JB developed the study design and methodology. HA drafted  
41 the initial manuscript, assisted by KC and JB. All authors had the opportunity to contribute to the  
42 final manuscript, edited it into its final form, and approved the final submission.  
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47  
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### 52 **Competing interests statement**

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54 None declared  
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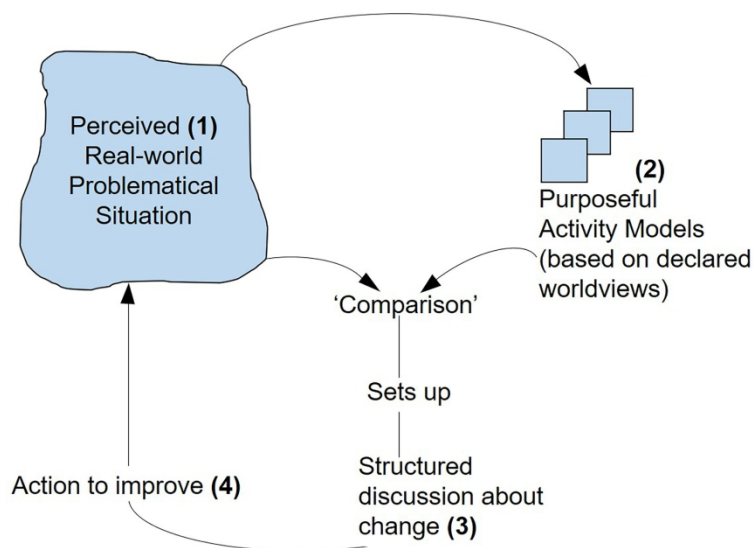


Figure 1. A generic SSM learning cycle. Source: Checkland and Poulter.[19] Permission granted by John Wiley and Sons for use of this image. Licence number: 4403900665359

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