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Hidden Dynamics in Healthcare Teams; Optimization of Expert Dyad Performance in Acute Care Settings: A Scoping Review Protocol

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Hidden Dynamics in Healthcare Teams; Optimization of Expert Dyad Performance in Acute Care Settings: A Scoping Review Protocol

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Abstract

Introduction: When clinician pairs in acute care settings are at loggerheads, patient care suffers. Miscommunication, both verbal and non-verbal, and poor coordination between clinician dyads can lead to error. The benefit of extensive learning practices, which lead to expert performance in procedural clinical skills, is well documented. Research on learning practices for the smallest team, and arguably the most important team, the healthcare dyad, is limited. The objective of this study is to map the extent and range of evidence available on learning practices which enhance expert dyad performance, and to identify the gaps in effective practice. This will guide future research, policy and practice.

Methods and Analysis: For this scoping review, we are using the JBI methodology for scoping reviews and the PRISMA ScR Extension Fillable Checklist. We will search for literature that meets the inclusion criteria. The authors are conducting searches using Maastricht University's Libsearch, which includes MEDLINE, ERIC, and PSYCH INFO, and a second search on Web of Science online databases. We will search grey literature and references of selected sources. Search limits include sources from 2016-2020, using English language only. A data extraction tool was developed and data will be charted and sorted using a thematic analysis approach.

Implications and Dissemination: This review will be the first to examine learning practices that lead to expert healthcare dyad performance in acute care settings. The findings will be used to develop learning best-practices in this context and will be shared with New York City municipal hospital system and the greater New York area. Dissemination will occur through peer-reviewed

1
2
3 publications, at healthcare safety and quality conferences, and at healthcare simulation
4
5
6 conferences.

7 8 9 Strengths and limitations of this study

- 11
12 ▪ This scoping review of learning practices that lead to healthcare dyad excellence is the
- 13 first to examine healthcare pairs and is unique.
- 14
15 ▪ This review is comprehensive, including all study designs and grey literature from the
- 16 past 5 years.
- 17
18 ▪ The use of a detailed data extraction form and a transparent, iterative team approach will
- 19 add rigor to the review.
- 20
21 ▪ The paucity and quality of literature addressing learning practices of healthcare teams
- 22 may limit findings, specifically factors associated with practices that lead to healthcare
- 23 dyad excellence.
- 24
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26

27 28 Introduction

29
30 Medical error in healthcare, particularly in the peri-operative environment, remains a major
31
32 cause of morbidity and mortality. The World Health Organization in 2019[1] reported that unsafe
33
34 surgical care procedures cause complications in up to 25% of patients, resulting in 1 million
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36 deaths during or immediately after surgery annually. Anecdotal evidence suggests that when
37
38 some healthcare teams are faced with difficult and complex situations, excellent performance is
39
40 difficult to achieve and can lead to less than optimal patient outcomes. Cooper, 2018,[2]
41
42 specifically suggests the collaboration between each surgeon–anaesthesiologist dyad in the
43
44 operating room, is perhaps the most critical element of overall operating room team
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46 performance. He says a well-functioning dyad is conducive to safe, effective care.
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3 communication and coordination rehearsals, that lead to expert dyad performance, in acute care
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5 settings. Learning practices can be defined as the transformative processes of taking in
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7 information, internalizing it, and combining it with previous experience. This changes what we
8
9 know and builds on what we do. It's based on input, process, and reflection. [3]
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13
14 Within the largest public hospital system within the United States, a quality assurance meeting
15
16 is held weekly where selected cases are reviewed. The cases include those where healthcare
17
18 teams performed as expert teams, and others where team improvement is needed. From the
19
20 cases discussed at these meetings, it is clear that when there is a breakdown in communication
21
22 and coordination in healthcare, the failure is usually between two specific members of the
23
24 healthcare team. It is often between the members of the dominant dyad in the team. There is
25
26 an urgency to understand more about how this breakdown in coordination and communication
27
28 can be prevented, as it often leads to sub-optimal patient outcomes and a fracturing in clinical
29
30 teams. There is significant research regarding whole team function, but a dearth of literature
31
32 investigating the learning practices that inform excellence in dyad function. A deeper
33
34 understanding of human cognitive architecture, [4] individually and shared [5] may give insight
35
36 to optimize dyad communication and coordination.
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44 A scoping review will be conducted, to systematically map current research on learning
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46 practices that promote excellence in dyad performance, in both peer reviewed journals and grey
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48 literature. The review will also identify any existing gaps in knowledge. [6] This scoping review
49
50 will target key concepts that underpin learning practices for peak performance in healthcare
51
52 dyads and clarify working definitions, and/or the conceptual boundaries of learning practices [7].
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56 In summary this scoping review aims to explore the breadth or extent of the literature,
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3 summarize the evidence, and inform future research [8], with the overarching objective of
4 providing a 'map' of the available evidence. The authors consider it important to provide this
5 evidence map as it will guide best practice in learning practices that lead to excellent dyad
6 performance. Finding the answer as to why there is not uniformity in exemplary performance
7 may assist in averting medical errors and assist expert teams to function more routinely, with
8 excellence. This will achieve the objective of the review and provide recommendations to
9 inform best practice in expert healthcare dyad learning practices.

10
11 Unlike a systematic review, scoping reviews do not tend to produce and report results that have
12 been synthesized from multiple evidence sources following a formal process of methodological
13 appraisal to determine the quality of the evidence. Rather, scoping reviews aim to provide an
14 overview or map of the evidence. As a result, an assessment of methodological limitations or
15 risk of bias of the evidence will not be performed. To put it simply, systematic reviews normally
16 inform the development of trustworthy clinical guidelines and recommendations. Scoping
17 reviews are not conducted for this reason but rather to provide an overview of the evidence or to
18 answer questions regarding the nature and diversity of the evidence/knowledge available.

19
20 In relation to this scoping review, to simplify the many complex communication and
21 coordination errors that plague healthcare teams in complex situations as a generic
22 communication or coordination error is an overt oversimplification of a complex system
23 phenomenon [9]. The relational coordination[10] and communication practices [11] that optimize
24 the performance of this small pivotal team may better guide the learning practices that lead to
25 expert practice.

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4 Three theoretical perspectives have been selected, that are relevant to this problem: cognitive
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6 workload theories, shared mental models or distributed cognition, and relational coordination
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8 theory.
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11 A deeper understanding of the three theories listed above, and how they interact and
12
13 complement each other, may assist us to solve the problem of poor performance more
14
15 effectively. This distinction will guide us to understand learning practices that accelerate expert
16
17 performance, specifically dyads in operating rooms. As this problem is specific to acute
18
19 healthcare settings, only expert, interprofessional, critical care teams will be examined. Student
20
21 training, single discipline training and ambulatory care teams will not be examined. There is
22
23 limited research on healthcare dyad learning practices and so the scoping review will extend to
24
25 teams rather than only the smallest team, the dyad.
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31 A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews and *JB/*
32
33 *Evidence Synthesis* was conducted and no current or underway systematic reviews or scoping
34
35 reviews on the topic were identified.
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38 39 Study Objectives

40
41 The overarching objective of this scoping review is to assess the extent of the literature with
42
43 respect to identifying and characterizing learning practices that lead to expert healthcare dyad
44
45 performance in acute care settings. The inclusion criteria are outlined using the PCC framework
46
47 and include the population of expert healthcare professional teams, the concept is the learning
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49 practices that drive expert performance of healthcare dyads with a focus on workload theories,
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51 shared mental models, communication and coordination practices and the context is acute care
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53 hospital settings.
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3 There are two questions this scoping review aims to answer. These include what are the
4
5 learning practices that optimize expert healthcare dyad performance in acute settings and
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7
8 secondly how do expert healthcare dyads develop specific future learning practices to optimize
9
10 performance?
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13 Methods & Analysis

14 Patient and Public Involvement

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16 Patients and the public were not involved in this study.
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19 Eligibility Criteria

20
21 Described below are the Population, Concept, Context and Study Designs eligibility criteria.
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23

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25 The participants are healthcare professionals who work in acute settings of any age or any sex.
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29 The group must be interprofessional including two or more disciplines. Characteristics of
30
31 participants who will be excluded are students, novices, healthcare professionals who work in
32
33 non-acute care settings and single profession studies. The concept is learning practices that
34
35 drive expert performance of healthcare dyads with a focus on workload theories, shared mental
36
37 models, communication and coordination practices. This also includes learning practices that
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39 promote and inform future expertise. The concept exclusion criteria are learning practices for
40
41 novices and students as well as individual psychomotor skill acquisition. The context includes all
42
43 acute care settings in hospitals including the operating room, emergency room and critical care
44
45 environments. Settings in all countries are included and there are no racial or gender-based
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47 exclusions. The exclusion criteria are all non-acute care settings including ambulatory care,
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49 behavioral health and home care.
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Study Designs

This scoping review will consider both experimental and quasi-experimental study designs including randomized controlled trials, non-randomized controlled trials, before and after studies and interrupted time-series studies. In addition, analytical observational studies including prospective and retrospective cohort studies, case-control studies and analytical cross-sectional studies will be considered for inclusion. This review will also consider descriptive observational study designs including case series, individual case reports and descriptive cross-sectional studies. Qualitative studies will be considered that focus on qualitative data including, but not limited to, designs such as phenomenology, grounded theory, ethnography, qualitative description, action research and feminist research. In addition, systematic reviews that meet the inclusion criteria will be considered, as well as text and opinion papers. The proposed scoping review will be conducted in accordance with the JBI methodology for scoping reviews [12].

Search strategy

The search strategy will aim to locate both published and unpublished studies. The databases to be searched include Maastricht University Libsearch including PsycINFO, MEDLINE, Education Resources Information Center (ERIC) and Web of Science (WoS). Sources of unpublished studies/ gray literature will be sourced using CADTH Grey Matters tool for health-related grey literature. [13]

The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles were used to develop a full search strategy for the Educational Resources Information Center, ERIC database (see table 1)

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2
3 The planned limits included years 2016-2020, world-wide libraries and full text publications. The
4 search strategy, including all identified keywords and index terms, will be adapted for each
5 included database and/or information source. The reference list of all included sources of
6 evidence will be screened for additional studies. Studies published in English will be included.
7
8 Studies published since 2016 will be included as the authors considered a five-year focus would
9 generate the current evidence on the topic. English language is a limitation as the primary
10 investigator is unilingual.
11
12

13 Source of Evidence selection

14 Following the search, all identified citations will be collated and uploaded into *EndNote X9/June*
15 *2019 (Clarivate Analytics, PA, USA)* and duplicates removed. The records will then be
16 uploaded to Covidence. Following a pilot test, titles and abstracts will then be screened by two
17 or more independent reviewers for assessment against the inclusion criteria for the review.
18
19 Relevant sources will be retrieved in full with their citation details. The full text of selected
20 citations will then be assessed in detail against the inclusion criteria by two or more independent
21 reviewers. Reasons for exclusion of sources of evidence at full text that do not meet the
22 inclusion criteria will be recorded and reported in the scoping review. Any disagreements that
23 arise between the reviewers at each stage of the selection process will be resolved through
24 discussion with an additional reviewer. The results of the search and the study inclusion process
25 will be reported in full in the final scoping review and presented in a Preferred Reporting Items
26 for Systematic Reviews and Meta-analyses extension for scoping review (PRISMA-ScR) flow
27 diagram [14].
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Data Extraction

Data will be extracted from papers included in the scoping review by two or more independent reviewers using a data extraction tool developed by the reviewers. The extraction instrument follows the JBI data extraction tool template with customization to answer the review objectives. The data extracted will include specific details about the participants, concept, context, study methods and key findings relevant to the review question/s. A draft extraction form is provided (see Figure 2). The draft data extraction tool will be modified and revised as necessary during the process of extracting data from each included evidence source. Modifications will be detailed in the scoping review. Any disagreements that arise between the reviewers will be resolved through discussion with an additional reviewer. If appropriate, authors of papers will be contacted to request missing or additional data, where required.

Data Analysis and Presentation

The evidence presented will directly respond to the review objective and questions. The data will be collected through the survey monkey platform and presented graphically, in diagrammatic form and/or a tabular form. The authors will determine how to best present the data or map and also provide a detailed description. A narrative summary will accompany the tabulated and/or charted results and will describe how the results relate to the reviews objective and questions.

Synthesis of Results

Quantitative (frequencies) and qualitative analyses (generation of descriptions) will be conducted. Thematic analysis will be used to evaluate and categorize study findings, that is, the

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3 types of learning practices that optimize expert dyad performance and tools used to measure
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5 excellence. Meta-analysis will not be performed. Data will be charted.
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8 9 Implications

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11 The results from this scoping review will grow understanding of the learning practices necessary
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13 for excellence in healthcare dyad performance. This in turn may lead to less errors in acute care
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15 settings and improved patient care. This project may offer a cost-effective opportunity to save
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17 time and resources by improving the performance of the dyad, therefore advancing the science
18
19 in this area. To the best of our knowledge, no previous empirical studies have taken this
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21 approach.
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26 27 Dissemination

28
29 This work was conceptualized from the NYC Health + Hospitals quality assurance and performance
30
31 improvement meeting (QAPI) which occurs every week. QAPI is comprised of system board members,
32
33 senior physicians, nurses and administrative leaders across the system to improve system-based
34
35 practice in New York City. The review findings will be shared with NYC Health + Hospitals municipal
36
37 hospital system and the greater New York area. Results, however, may be of interest to hospitals
38
39 globally who are seeking to improve healthcare errors in acute care settings. Dissemination will occur
40
41 through peer-reviewed publications and healthcare conferences.
42

43 44 Contributors

45
46 KW and MA conceptualized the research and drafted the protocol. JvM and JR helped to develop the
47
48 research idea, conceptualized the study, and edited the manuscript. MM, KC and TY gave initial ideas,
49
50 reviewed and edited the manuscript. All authors have made substantive intellectual contributions to the
51
52 development of this protocol. All have read and approved the manuscript.
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Competing interests

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Not commissioned; externally peer reviewed

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For peer review only

Table 1: Search strategy - Education Resources Information Center (ERIC)

#	SEARCHES	RESULTS
S1	("Operating room teams") AND ("performance")	0
S2	("Operating room teams") AND ("practice")	0
S3	("distributed cognition") AND ("team performance")	0
S4	("Operating room teams") AND ("learning")	0
S5	("Cognitive Load") AND ("dyad performance")	0
S6	"Health dyads" AND "Learning" or "Behavior"	0
S7	("dyad" OR "surg* dyads" OR "health dyads" OR "surgery") AND ("communicat*" OR "perform*" OR "coordinat*" OR "expect*" OR "practice*" OR "cognit*" OR "lead*")	109
S8	("surg* dyads") AND ("communicat*" OR "perform*" OR "coordinat*" OR "expect*" OR "practice*" OR "cognit*" OR "lead*")	4
S9	("surgeon dyads" OR "health dyads" OR "medical dyads") AND ("communicat*" OR "perform*" OR "coordinat*" OR "expect*" OR "practice*" OR "cognit*" OR "lead*")	6
S10	("expert healthcare dyad*" OR "expert healthcare team*" OR "expert medical team*" OR "expert operating room team*") AND (Learn* OR practic* OR educat* OR "deliberate practice" OR communic* OR coordinat*) AND (performance)	1
S11	("healthcare dyad*" OR "healthcare team*" OR "medical team*" OR "operating room team*") AND ("Learn*" OR "practic*" OR "educat*" OR "communic*" OR "coordinat*" OR "perform*")	11

Figure 1: Data Extraction Tool

Hidden Dynamics in Healthcare; The Learning Practices that Optimize Expert Dyad Performance in Acute Care Settings: A Scoping Review 2016-2020

Scoping Review Details

- Name of Reviewer
- Date of Review

EVIDENCE SOURCE DETAILS & CHARACTERISTICS

1. Citation details: author/s, title, journal, volume, issue, pages
2. Year of publication
3. Location. (please fill in by looking at affiliation of first author)
4. What was the setting of the study?
5. Number of participants enrolled in study
6. What was the profession of participants enrolled in the study? Select at least two.

DETAILS/RESULTS EXTRACTED FROM SOURCE OF EVIDENCE.

1. Which learning practices were identified?
2. How were learning practices conducted?
3. How was learning measured?
4. Was there a specific guide for future learning?
5. What was the research design?
6. Was there agreement or controversy from the authors about the efficacy of the learning practices?
7. Were specific learning practices suggested to optimize future learning?
8. Were there gaps identified to the uptake of effective learning practices?

BMJ Open

Hidden Dynamics in Healthcare Teams; Optimization of Expert Dyad Performance in Acute Care Settings: A Scoping Review Protocol

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-047260.R1
Article Type:	Protocol
Date Submitted by the Author:	14-Jun-2021
Complete List of Authors:	Walker, Katie; Maastricht University, Asoodar , Maryam ; Maastricht University Rudolph , Jenny ; Center for Medical Simulation Meguerdichian, Michael ; NYC Health + Hospitals , Simulation Center Yusaf, Tricia ; NYC Health + Hospitals , Simulation Center Campbell-Taylor , Kimberly ; NYC Health + Hospitals , Simulation Center van Merriënboer, Jeroen ; Maastricht University,
Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	Anaesthesia, Emergency medicine, Intensive care, Communication, Obstetrics and gynaecology
Keywords:	Adult intensive & critical care < ANAESTHETICS, Health & safety < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, MEDICAL EDUCATION & TRAINING, Adult surgery < SURGERY

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Hidden Dynamics in Healthcare Teams; Optimization of Expert Dyad Performance in Acute Care Settings: A Scoping Review Protocol

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D. Key Words: verbal communication, non-verbal communication, coordination, dyads, shared mental models.

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4 30 E. Word Count: 2610
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6 31 **Abstract**
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8 32 **Introduction:** When there is miscommunication and poor coordination between experienced
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12 33 clinician dyads, teamwork suffers. Research on expert learning practices for the smallest team,
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15 34 and arguably the most important team, the healthcare dyad, is limited. The objective of this
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18 35 study is to map the extent and range of evidence available on learning practices which
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21 36 experienced dyads use, to achieve excellent performance, and to identify the gaps in effective
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24 37 practice. This will guide future research, policy and practice.
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29 38 **Methods and Analysis:** We are using the JBI methodology for scoping reviews and the PRISMA
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32 39 ScR Extension Fillable Checklist, searching for literature that meets the inclusion criteria. The
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35 40 searches will be conducted using Maastricht University's Libsearch, which includes MEDLINE,
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38 41 ERIC, and PSYCH INFO, and a second search on Web of Science online databases. We will
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41 42 search grey literature and references of selected sources. Search limits include sources from
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43
44 43 2016-2021, using English language only. A data extraction tool was developed, and charting will
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48 44 use a thematic analysis approach.
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52 45 **Implications and Dissemination:** This review will be the first to examine the learning practices that
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55 46 experienced dyads use, which ensures excellent performance in acute care settings. The findings
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4 47 will be used to develop best-practices and shared with New York City hospital system.
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7 48 Dissemination will occur through peer-reviewed publications and at healthcare conferences.
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10 49 Strengths and limitations of this study

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12
13 50 ▪ This scoping review is the first to examine learning practices of expert healthcare dyads
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16 51 and is unique.

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19 52 ▪ This review is comprehensive, including all study designs and grey literature from the
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22 53 past 6 years.

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26 54 ▪ The use of a detailed data extraction form and a transparent, iterative team approach will
27
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29 55 add rigor to the review.

30
31
32 56 ▪ The paucity and quality of literature addressing the learning practices of expert
33
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35 57 healthcare dyads may limit findings.

36 37 38 58 Introduction

39
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41 59 Medical error in healthcare, particularly in the peri-operative environment, remains a major
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44 60 cause of morbidity and mortality. The World Health Organization in 2019[1] reported that unsafe
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47 61 surgical care procedures cause complications in up to 25% of patients, resulting in 1 million
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50 62 deaths during or immediately after surgery annually. Anecdotal evidence suggests that when
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53 63 some experienced healthcare dyads are faced with difficult and complex situations, excellent

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4 64 performance is difficult to achieve while other experienced dyads perform with excellence every
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7 65 time. Cooper, 2018,[2] specifically suggests the collaboration between each surgeon–
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10 66 anaesthesiologist dyad in the operating room, is perhaps the most critical element of overall
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13 67 operating room team performance. He says a well-functioning dyad is conducive to safe,
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16 68 effective care. Dysfunctional collaboration can promote unsafe conditions and contribute to an
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19 69 adverse outcome. This may also be true of dominant dyads in other acute care settings such as
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22 70 the emergency room, labor and delivery, critical care and pediatrics. The goal of this scoping
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25 71 review is to understand the learning practices, including communication and coordination
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28 72 rehearsals, that expert dyads use in acute care settings. Learning practices can be defined as
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31 73 the transformative processes of taking in information, internalizing it, and combining it with
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34 74 previous experience. This changes what we know and builds on what we do. It's based on input,
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37 75 process, and reflection. [3] Sebok-Seyer et al [4] in 2021 published a scoping review on the
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40 76 approaches for measuring 'interdependent' collaborative performances and found a strong level
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43 77 of interdependence between dyads of trainees and their supervisors. The learning practices of
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46 78 novices and experts and the interdependence between them is very different. [5] This review is
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49 79 limited to experienced healthcare professionals only.
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3 80 Within the largest public hospital system within the United States, a quality assurance meeting
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6 81 is held weekly where selected cases are reviewed. The cases include those where healthcare
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10 82 teams performed as expert teams, and others where team improvement is needed. From the
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13 83 cases discussed at these meetings, it is clear that when there is a breakdown in communication
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16 84 and coordination in healthcare, the failure is usually between two specific members of the
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19 85 healthcare team, the dominant dyad. There is an urgency to understand more about how this
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22 86 breakdown in coordination and communication can be prevented, as it often leads to a
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25 87 fracturing in clinical teams. There is significant research regarding whole team function, but a
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28 88 dearth of literature investigating the learning practices that inform excellence in dyad function. A
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31 89 deeper understanding of human cognitive architecture, [6] individually and shared [7] may give
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34 90 insight to optimize dyad communication and coordination.
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39 91 A scoping review will be conducted, to systematically map current research on learning
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42 92 practices that expert dyads use, in both peer reviewed journals and grey literature. The review
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45 93 will also identify any existing gaps in knowledge. [8] This scoping review will target key concepts
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48 94 that underpin learning practices for peak performance in healthcare dyads and clarify working
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51 95 definitions, and/or the conceptual boundaries of learning practices [9]. In summary this scoping
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54 96 review aims to explore the breadth or extent of the literature, summarize the evidence, and
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3 97 inform future research [10], with the overarching objective of providing a 'map' of the available
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6 98 evidence. The authors consider it important to provide this evidence map as it will guide best
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10 99 practice in learning practices that expert dyads use. Finding the answer as to why there is not
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13 100 uniformity in exemplary performance may assist in averting medical errors and assist expert
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16 101 dyadic teams to function more routinely, with excellence. This will achieve the objective of the
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19 102 review and provide recommendations to inform best practice in expert healthcare dyad learning
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22 103 practices.

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26 104 Unlike a systematic review, scoping reviews do not tend to produce and report results that have
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29 105 been synthesized from multiple evidence sources following a formal process of methodological
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32 106 appraisal to determine the quality of the evidence. Rather, scoping reviews aim to provide an
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35 107 overview or map of the evidence. As a result, an assessment of methodological limitations or
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39 108 risk of bias of the evidence will not be performed. To put it simply, systematic reviews normally
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42 109 inform the development of trustworthy clinical guidelines and recommendations. Scoping
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45 110 reviews are not conducted for this reason but rather to provide an overview of the evidence or to
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48 111 answer questions regarding the nature and diversity of the topic.

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52 112 In relation to this scoping review, to simplify the many complex communication and
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55 113 coordination errors that plague healthcare dyads in complex situations as a generic

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3 114 communication or coordination error is an overt oversimplification of a complex system
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6 115 phenomenon [11]. The relational coordination[12] and communication practices [13] that
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10 116 optimize the performance of this small pivotal team may better guide the learning practices that
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13 117 lead to expert practice.

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17 118 Three theoretical perspectives have been selected, that are relevant to this problem: cognitive
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20 119 workload theories, shared mental models or distributed cognition, and relational coordination
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23 120 theory.

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27 121 A deeper understanding of the three theories listed above, and how they interact and
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30 122 complement each other, may assist us to solve the problem of poor performance more
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33 123 effectively. This distinction will guide us to understand learning practices that accelerate expert
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36 124 performance, specifically dyads in acute care settings. As this problem is specific to acute
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40 125 healthcare settings, only expert, interprofessional, dyads will be examined. Student training,
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43 126 single discipline training and ambulatory care teams will not be examined. There is limited
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46 127 research on the learning practices of expert healthcare dyads and so the scoping review will
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49 128 extend to teams rather than only the smallest team, the dyad.
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3 129 A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews and *JB/*

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6 130 *Evidence Synthesis* was conducted and no current or underway systematic reviews or scoping

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10 131 reviews on the topic were identified.

11 12 13 132 Study Objectives

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16 133 The overarching objective of this scoping review is to assess the extent of the literature with

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19 134 respect to identifying and characterizing learning practices that expert healthcare dyads use in

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22 135 acute care settings. The inclusion criteria are outlined using the PCC framework and include the

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25 136 population of expert healthcare professional dyads/teams, the concept is the learning practices

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28 137 that drive expert performance of experienced healthcare dyads with a focus on workload

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31 138 theories, shared mental models, communication and coordination practices and the context is

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34 139 acute care hospital settings.

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37 140 There are two questions this scoping review aims to answer. These include what are the

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40 141 learning practices that expert healthcare dyads use to optimize performance in acute settings

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43 142 and secondly how do expert healthcare dyads develop specific future learning practices to

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46 143 retain optimum performance?

144 Methods & Analysis

145 Patient and Public Involvement

146 Patients and the public were not involved in this study.

147 Eligibility Criteria

148 Described below are the Population, Concept, Context and Study Designs eligibility criteria.

149 The participants are experienced healthcare professionals who work in acute settings of any
150 age or any sex. The group must be interprofessional including two or more disciplines.

151 Characteristics of participants who will be excluded are students, novices, healthcare
152 professionals who work in non-acute care settings and single profession studies. The concept is
153 learning practices that drive expert performance of experienced healthcare dyads with a focus
154 on workload theories, shared mental models, communication and coordination practices. This
155 also includes learning practices that promote and inform future expertise. The concept exclusion
156 criteria are learning practices for novices and students as well as individual psychomotor skill
157 acquisition. The context includes all acute care settings in hospitals including the operating
158 room, emergency room and critical care environments. Settings in all countries are included and
159 there are no racial or gender-based exclusions. The exclusion criteria are all non-acute care
160 settings including ambulatory care, behavioral health and home care.

161 Study Designs

162 This scoping review will consider both experimental and quasi-experimental study designs
163 including randomized controlled trials, non-randomized controlled trials, before and after studies
164 and interrupted time-series studies. In addition, analytical observational studies including
165 prospective and retrospective cohort studies, case-control studies and analytical cross-sectional
166 studies will be considered for inclusion. This review will also consider descriptive observational
167 study designs including case series, individual case reports and descriptive cross-sectional
168 studies. Qualitative studies will be considered that focus on qualitative data including, but not
169 limited to, designs such as phenomenology, grounded theory, ethnography, qualitative
170 description, action research and feminist research. In addition, systematic reviews that meet the
171 inclusion criteria will be considered, as well as text and opinion papers. The proposed scoping
172 review will be conducted in accordance with the JBI methodology for scoping reviews [14].

173 Search strategy

174 The search strategy will aim to locate both published and unpublished studies. The databases
175 to be searched include Maastricht University Libsearch including PsycINFO, MEDLINE,
176 Education Resources Information Center (ERIC) and Web of Science (WoS). Sources of

177 unpublished studies/ gray literature will be sourced using CADTH Grey Matters tool for health-
 178 related grey literature. [15]

179 The text words contained in the titles and abstracts of relevant articles, and the index terms
 180 used to describe the articles were used to develop a full search strategy for the Educational
 181 Resources Information Center, ERIC database (see table 1)

182 **Table 1 Search strategy - Education Resources Information Center (ERIC)**

#	SEARCHES	RESULTS
S1	("Operating room teams") AND ("performance")	0
S2	("Operating room teams") AND ("practice")	0
S3	("distributed cognition") AND ("team performance")	0
S4	("Operating room teams") AND ("learning")	0
S5	("Cognitive Load") AND ("dyad performance")	0
S6	"Health dyads" AND "Learning" or "Behavior"	0
S7	("dyad" OR "surg* dyads" OR "health dyads" OR "surgery") AND ("communicat*" OR "perform*" OR "coordinat*" OR "expect*" OR "practice*" OR "cognit*" OR "lead*")	109
S8	("surg* dyads") AND ("communicat*" OR "perform*" OR "coordinat*" OR "expect*" OR "practice*" OR "cognit*" OR "lead*")	4
S9	("surgeon dyads" OR "health dyads" OR "medical dyads") AND ("communicat*" OR "perform*" OR "coordinat*" OR "expect*" OR "practice*" OR "cognit*" OR "lead*")	6

S10	("expert healthcare dyad*" OR "expert healthcare team*" OR "expert medical team*" OR "expert operating room team*") AND (Learn* OR practic* OR educat* OR "deliberate practice" OR communic* OR coordinat*) AND (performance)	1
S11	("healthcare dyad*" OR "healthcare team*" OR "medical team*" OR "operating room team*") AND ("Learn*" OR "practic*" OR "educat*" OR "communic*" OR "coordinat*" OR "perform*")	11

183

184 The planned limits included years 2016-2021, world-wide libraries and full text publications. The
 185 search strategy, including all identified keywords and index terms, will be adapted for each
 186 included database and/or information source. The reference list of all included sources of
 187 evidence will be screened for additional studies. Studies published in English will be included.
 188 Studies published since 2016 will be included as the authors considered a six-year focus would
 189 generate the current evidence on the topic. English language is a limitation as the primary
 190 investigator is unilingual.

191 Source of Evidence selection

192 Following the search, all identified citations will be collated and uploaded into *EndNote X9/June*
 193 *2019 (Clarivate Analytics, PA, USA)* and duplicates removed. Following a pilot test, titles and
 194 abstracts will then be screened by two or more independent reviewers for assessment against
 195 the inclusion criteria for the review. Relevant sources will be retrieved in full with their citation

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3 196 details. The full text of selected citations will then be assessed in detail against the inclusion
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6 197 criteria by two or more independent reviewers. Reasons for exclusion of sources of evidence at
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10 198 full text that do not meet the inclusion criteria will be recorded and reported in the scoping
11
12
13 199 review. Any disagreements that arise between the reviewers at each stage of the selection
14
15
16 200 process will be resolved through discussion with an additional reviewer. The results of the
17
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19 201 search and the study inclusion process will be reported in full in the final scoping review and
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21
22 202 presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses extension
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25 203 for scoping review (PRISMA-ScR) flow diagram [16].
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30 204 Data Extraction

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33 205 Data will be extracted from papers included in the scoping review by two or more independent
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36 206 reviewers using a data extraction tool developed by the reviewers. The extraction instrument
37
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40 207 follows the JBI data extraction tool template with customization to answer the review objectives.
41
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43 208 The data extracted will include specific details about the participants, concept, context, study
44
45
46 209 methods and key findings relevant to the review question/s. A draft extraction form is provided
47
48
49 210 (see Figure 1). The draft data extraction tool will be modified and revised as necessary during
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53 211 the process of extracting data from each included evidence source. Modifications will be
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3 212 detailed in the scoping review. Any disagreements that arise between the reviewers will be
4
5
6 213 resolved through discussion with an additional reviewer. We will present the contentious manuscript
7
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9 214 to a third reviewer, and they will present their view on inclusion or exclusion. After thoughtful debate, and
10
11
12 215 a review of the inclusion/exclusion criteria, consensus will be attained. If appropriate, authors of papers
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15 216 will be contacted to request missing or additional data, where required.
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21 218 Data Analysis and Presentation

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25 219 The evidence presented will directly respond to the review objective and questions. The data
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27
28 220 will be collected through the survey monkey platform and presented graphically, in
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31 221 diagrammatic form and/or a tabular form. The authors will determine how to best present the
32
33
34 222 data or map and also provide a detailed description. A narrative summary will accompany the
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37 223 tabulated and/or charted results and will describe how the results relate to the reviews objective
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41 224 and questions.
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45 225 Synthesis of Results

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49 226 Quantitative (frequencies) and qualitative analyses (generation of descriptions) will be
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52 227 conducted. Thematic analysis will be used to evaluate and categorize study findings, that is, the
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55 228 types of learning practices that optimize expert dyad performance and tools used to measure
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3 229 excellence. We plan that the theoretical underpinnings of cognitive workload, shared mental
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6 230 models and relational coordination will be used as sensitizing frameworks and the data will be
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10 231 coded from the findings. Meta-analysis will not be performed. Data will be charted.
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13 14 232 Implications

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17 233 The results from this scoping review will grow understanding of the learning practices necessary
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20 234 for excellence in healthcare dyad performance. This in turn may lead to less errors in acute care
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23 235 settings and improved teamwork. This project may offer a cost-effective opportunity to save time
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27 236 and resources by improving the performance of the dyad, therefore advancing the science in
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30 237 this area. To the best of our knowledge, no previous empirical studies have taken this approach.
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33 34 238 Dissemination

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38 239 This work was conceptualized from the NYC Health + Hospitals quality assurance and performance
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40 240 improvement meeting (QAPI) which occurs every week. QAPI is comprised of system board members,
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42 241 senior physicians, nurses and administrative leaders across the system to improve system-based
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44 242 practice in New York City. The review findings will be shared with NYC Health + Hospitals municipal
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46 243 hospital system and the greater New York area. Results, however, may be of interest to hospitals
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48 244 globally who are seeking to improve healthcare errors in acute care settings. Dissemination will occur
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50 245 through peer-reviewed publications and healthcare conferences.
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53 54 55 246 Contributors

247 KW and MA conceptualized the research and drafted the protocol. JvM and JR helped to develop the
248 research idea, conceptualized the study, and edited the manuscript. MM, KC and TY gave initial ideas,
249 reviewed and edited the manuscript. All authors have made substantive intellectual contributions to the
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254 Competing interests

255 None declared.

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Figure 1: Data Extraction Tool

Hidden Dynamics in Healthcare; The Learning Practices that Optimize Expert Dyad Performance in Acute Care Settings: A Scoping Review 2016-2020

Scoping Review Details

- Name of Reviewer
- Date of Review

EVIDENCE SOURCE DETAILS & CHARACTERISTICS

1. Citation details: author/s, title, journal, volume, issue, pages
2. Year of publication
3. Location. (please fill in by looking at affiliation of first author)
4. What was the setting of the study?
5. Number of participants enrolled in study
6. What was the profession of participants enrolled in the study? Select at least two.

DETAILS/RESULTS EXTRACTED FROM SOURCE OF EVIDENCE.

1. Which learning practices were identified?
2. How were learning practices conducted?
3. How was learning measured?
4. Was there a specific guide for future learning?
5. What was the research design?
6. Was there agreement or controversy from the authors about the efficacy of the learning practices?
7. Were specific learning practices suggested to optimize future learning?
8. Were there gaps identified to the uptake of effective learning practices?