Healthcare Simulation Training Guidelines and Literature Reviews From the Third Society for Simulation in Healthcare Research Summit

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Abstract: The Society for Simulation in Healthcare held its third research summit in January 2023 with the aim of establishing evidence-based guidelines for healthcare simulation training. A panel of researchers, clinicians, and subject-matter experts conducted reviews of the literature addressing 12 key topics and followed a formal process to generate 16 guidelines for simulation-based training in healthcare. Eleven peer-reviewed literature reviews accompany these guidelines. Over the last 12 years, the Society for Simulation in Healthcare research summits have evolved with a consistent aim to advance simulation research, culminating in the formal set of guidelines published in this special issue.
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Key Words: Education, training, literature reviews, research.

BACKGROUND

The Society for Simulation in Healthcare (SSH) has held 3 research summits since its inception. The first of these was convened in 2011 and followed a consensus meeting format. The objectives for this meeting were to survey the current state of simulation research, provide guidance on a set of research topics, methods, and uses of simulation, and promote the importance of simulation-related research both within the society and internationally. The success of the inaugural research summit led the participants and leaders within SSH to conclude that a research summit should be held every 4 to 5 years.[1] Accordingly, the Second Research Summit was held in 2017.

This second summit had a different goal: to provide a forum in which researchers working within a variety of healthcare and nonhealthcare-related domains could share their work and facilitate the overall development of the field.[2] The discussion focused primarily on determining what investigations were needed to address the present concerns of healthcare instructors and providers and what potential synergies might exist between our field and other areas of technological development.

THE THIRD SSH RESEARCH SUMMIT

In January 2023, the SSH convened its third research summit. The objective of this meeting differed significantly from the previous 2 summits. Specifically, a panel of researchers, clinicians, and subject-matter experts were asked to conduct a retrospective review of the simulation-based training and methodology literature and propose a set of evidence-based guidelines for simulation training in healthcare based on the current state of the science. The panel was composed of teams who surveyed the literature on 12 key topics. Each team was required to:

1. Develop clear, comparative research questions
2. Conduct a systematic literature search on those questions following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method
3. Formally appraise, review, and synthesize the retrieved literature
4. Develop guidelines based on their review and evaluation of the literature

The teams were asked to use the GRADE (Grades of Recommendation, Assessment, Development, and Evaluation) process (when permitted by the literature) to generate the guidelines.[3] The GRADE method is a rigorous process for establishing evidence-based guidelines in healthcare. It is a well-recognized standard for evaluating the methodological quality of the most current research and generating recommendations based on the best available evidence.[4] Although the GRADE could not be used for some of the guidelines due to the lack of comparative literature in those domains, the primary article represents the first published use of GRADE as a guideline development process within healthcare simulation, a milestone for our field. These guidelines are primarily intended to help educators make decisions about the optimal training of healthcare providers. They can also be helpful to educate, inform policy and advocacy, and define future research needs.

The evidence-based guidelines are further supported by a set of 11 literature reviews that underwent peer review and are published in this special issue. These reviews were prepared by the teams that addressed research questions regarding debriefing, distance and in-person simulation, faculty development, in situ simulation, just-in-time training, physical realism and simulation fidelity, standardized patients, virtual reality, and extended reality. While not all teams were able to prepare a manuscript for this issue, the reviews included here provide a deep dive into the overall state of the literature and adduce further support for the respective guidelines.

SO, WHAT HAS CHANGED OVER THE PAST 12 YEARS?

It is illuminating to see how simulation, as a field of inquiry, has progressed in the 12 years since the first research summit.

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TABLE 1. Topics Addressed in the First and Third SSH Research Summits

The First SSH Research Summit	The Third SSH Research Summit
1) Simulation for learning and teaching procedural skills: the state of the science	1) Mastery learning/deliberate practice/technical skills
2) Simulation-based team training in healthcare	2) Feedback/debriefing
3) A path to better healthcare simulation systems: leveraging the integrated systems design approach	3) Spaced learning/booster training/warm up/just in time training
4) The study of factors affecting human and systems performance in healthcare using simulation	4) Self-guided learning/regulated learning/peer to peer learning
5) Literature review: instructional design and pedagogy science in healthcare simulation	5) Team training/nontechnical skills training
6) Evaluating the impact of simulation on translational patient outcomes	6) In situ training (for training vs process improvement)
7) Research regarding methods of assessing learning outcomes	7) Virtual reality/augmented reality/hybrid
8) Research regarding debriefing as part of the learning process	8) Remote simulation/tele-simulation (consider training and assessment)
9) Simulation-based assessment and the regulation of healthcare professionals	9) Standardized patients
10) Reporting inquiry in simulation	10) Simulation/simulator fidelity (task resemblance of reality)
	11) Faculty development
	12) Low/high stakes assessment/formative/summative

As noted previously, the goals from the initial research summit included the description of the then current state of simulation-related research, the provision of research-based guidance on the use of simulation, and the delineation of the topics and methods that needed further research. These objectives are consistent with those of the third research summit even though the organizing framework for the meetings and the outcomes differed.

Many of the researchers involved in the first simulation summit reviewed the literature on the state of the science surrounding simulation training in health care at that time. However, given the nascent stage of this evolving field, only 2 formal systematic literature reviews were conducted (described hereinafter). Other researchers were limited to performing more selective reviews describing and synthesizing trends found across the articles they chose for examination.

The topics selected for investigation in the first and third summits also differed significantly, although some overlap does exist. This can be seen in Table 1. In fact, there are only 2 topics that were addressed in both—team training and debriefing. In 2011, Eppich and colleagues[5] provided a selective review of the literature on simulation-based team training and offered 6 recommendations and key areas for future research. They noted the importance of context in teamwork training and that standardized training programs may not be beneficial to all stakeholders. They also recognized the importance of simulation-based team training in the relevant clinical settings and called for research on the "relative merits of interprofessional team training compared with discipline-specific team training."[3(pS17)] This issue was specifically addressed in the third summit and resulted in a guideline for training interdisciplinary teams.

The importance placed on team training over the years is further underscored by the increased scrutiny it received in the third summit. Team training was addressed directly in 3 research questions and indirectly in 3 others (eg, in situ training and simulation fidelity). Collectively, 5 guidelines are offered surrounding issues in team training, more than any other topic. Eppich and colleagues[3] also stressed the importance of debriefing in team training and the third summit offered a conditional recommendation for using one of several methods of debriefing.

Other topics show how our understanding has evolved and allowed for more focused, research questions to be posed. For example, Schaefer and colleagues[6] performed a literature review focusing on simulation as an educational intervention in health care and examined the validity and reliability of simulators, performance evaluation tools, study design, and translational impact. They concluded that most of the research appearing in the literature at that time did not address the validity and reliability of simulators or evaluation tools. Furthermore, they were unable to offer recommendations for best practices associated with pedagogical and design principles for simulation-based interventional research because of a lack of well-designed studies available at that time. Similarly, Nestel and colleagues[7] examined the literature on training of procedural skills in general, describing variables studied (eg, types of simulators used, instructional design, educational theory, context, etc) but offered only conditional statements on how simulation training benefits knowledge and skill acquisition and trainee satisfaction. By contrast, the research questions on procedural skills were more focused in the third summit addressing specific issues, such as mastery learning, deliberate practice, spacing of training, and just-in-time training, allowing the teams to offer four guidelines.

CONCLUSIONS

The importance of these research summits to SSH and the broader healthcare simulation community cannot be overstated. In the 12 years that have passed from the initial research summit, the research literature has expanded enough to permit systematic literature reviews of 12 different topics in simulation-based training. While the evidence base in many ways is still not a strong as we might like, the progression demonstrates a clear expansion and development of both our understanding and use of simulation. Accordingly, we offer this special supplemental issue of Simulation in Healthcare as an archival record of the endeavor. I am pleased to present the guidelines, recommendations, and supporting literature reviews from the Third SSH Research Summit.

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