Review Article

The Application and Integration of Evidence-Based Best Practice Standards to Healthcare Simulation Design: A Scoping Review

Melanie Barlow, RN, PhD, BN, MN(ICU) [a],*, Leeanne Heaton, RN, RM, PhD, MSc (Mid), BN, BClinPrac (Paramed) [b,c], Colleen Ryan, RN, PhD [c], Terri Downer, RN, RM, MAdP, MEd, PhD [d], Kerry Reid-Searl, RN, RM MClin Ed, BHlth Sc, PhD [e,c], Stephen Guinea, RN, PhD, BN [a], Robyn Dickie, RN, BN [f], Alexandra Wordsworth, RN, BN, MHsc [f], Philip Hawes, RN, MHRes [g], Aimee Lamb, RN, MN (Clin. Ed.) [b], Patrea Andersen, RN, PhD [h,d]

[a] Faculty of Health Sciences, Australian Catholic University, Brisbane, Queensland, Australia
[b] School of Nursing and Midwifery, Western Sydney University, Sydney, New South Wales, Australia
[c] School of Nursing, Midwifery and Social Sciences, Central Queensland University, Sunshine Coast, Queensland, Australia
[d] School of Health, University of the Sunshine Coast, Sippy Downs, Queensland, Australia
[e] College of Health and Medicine, University of Tasmania, Hobart, Tasmania, Australia
[f] School of Nursing, Midwifery and Paramedicine, Australian Catholic University, Brisbane, Queensland, Australia
[g] Whitireia Community Polytechnic, Porirua, New Zealand
[h] Waiariki Institute of Technology (WINTEC), Tokoroa, New Zealand

Abstract Studies of simulation-based education report students are satisfied with simulated learning and that simulation effectively improves their psychomotor skills and knowledge. Yet, quality in the design, delivery, and execution of simulation learning is reported as inconsistent. Simulation learning activities need to be appropriately designed and delivered utilizing rigorous frameworks and best practice standards to assure learner preparedness. The Healthcare Simulation Standards of Best Practice were designed to address this issue and support multiple disciplines through 10 Standards of Best Practice, with criterion for each, and a Glossary of Terms. This review reports that very few articles clearly articulate how simulation activities tangibly align to the standards and criterion, making it difficult for simulation educators to design and deliver consistently high-quality simulation-based education, aligned to best practice standards.

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* Corresponding author: Mel.Barlow@acu.edu.au (M. Barlow).

Background

Simulation-based education (SBE) is an effective way to teach healthcare students clinical knowledge and skills. In nursing, SBE was favored during the recent pandemic to prepare nursing students for clinical placements (Wands, Geller, & Hallman, 2020) and in some American States simulation may replace up to 50% of required direct patient care contact hours (Curry-Lourenco et al., 2022). This was not the situation in Australia and New Zealand (NZ) nursing where accreditation bodies stipulated direct patient care hours were to remain in authentic settings (Australian Nursing & Midwifery Accreditation Council, 2021; Nursing Council of New Zealand, 2021). This position contrasts with studies that have demonstrated that SBE is equal to, or at times better than clinical placement in preparing undergraduate nurses for professional registration (Hayden, Keegan, Kardong-Edgren, & Smiley, 2014; Roberts, Kaak, & Rolley, 2019). In Australia, a recent review of nursing education recommended national bodies endorse research into how best to incorporate SBE into both on and off campus clinical placement experiences (Schwartz, 2019, p. 63).

To progress this discussion, researchers and academics have argued for increased consistency and rigor in the design, implementation and evaluation of scenarios as well the associated assessments, to ensure graduates emerge from SBE as safe, work ready practitioners, able to perform in rapidly changing clinical settings (Bogossian et al., 2019). This further emphasizes the need for simulation activities to be appropriately designed, delivered, and evaluated utilizing rigorous frameworks or standards to assure student preparedness and sufficiently support academics.

Standards and procedures are one way to ensure consistency and enhance rigor. The International Nursing Association for Clinical Simulation and Learning (INACSL) developed iterations of best practice simulation standards (Watts et al., 2021). Implementation strategies were introduced in the 2013, and 2015 saw the introduction of the overarching simulation design standard (Lioce et al., 2015; McDermott, Sarasnick, & Timcheck, 2017). The most recent version, rebranded the Healthcare Simulation Standards of Best Practice (HSSOBP), were designed to support disciplines beyond nursing and incorporate 11 Standards of Best Practice (including Glossary). Each standard has 4-11 criterion or action statements, to aid implementation (Watts et al., 2021). HSSOBP incorporate the Healthcare Simulationist Code of Ethics (Park & Murphy, 2018) thus establishing a set of values that support integrity, professionalism, quality, and ethical practice when designing, delivering, and evaluating simulated healthcare. INACSL aim to help the integration of standards into practice through forums such as the INACSL Learning Centre.

With the use of simulation learning becoming more favorable (Curry-Lourenco et al., 2022) there is a need to enhance the consistency and rigor of SBE within healthcare curricula. To do so, the HSSOBP must be more readily applied. Novice and expert educators/academics both need to be able to apply and integrate these standards into meaningful practice. Some studies have reported nurse educator experiences of applying the INACSL standards to practice (Nakajima, Teame, & Kostiuk, 2022; Rutherford-Hemming, Lioce, & Durham, 2015). Yet it is not known how many contemporary simulation studies are designed using INACSL standards and exactly how educators/academics work with the standards. This knowledge is especially important given the reported lack of consistency in Australian and NZ nursing curricula (Bogossian et al., 2019) that perhaps exists in global nurse education programs. The purpose of this scoping review was therefore to understand:

1. What is the evidence for translating/implementing/applying the INACSL HSSOBP to healthcare professionals' simulation learning?
2. What reported evidence is available to guide application and integration of HSSOBP in the Australian/New Zealand simulation context?

Key Points

- Articles describing the development, delivery and/or evaluation of simulation activities need to describe in more detail how their work aligned to the international simulation standards to help enhance application and integration of the standards into practice.
- More work needs to be done in the Australian and New Zealand context regarding alignment of simulation-based curriculum to international simulation standards.

Table 1 – Search Strategy

Population/Problem			Intervention/Exposure					
Health* OR "allied health" OR nurs* OR midwif* OR midwives OR medic* OR clinical	**AND**	Simulat*	**AND**	INACSL OR "international nursing association of clinical simulation and learning"	**AND**	standards OR quality OR framework OR accreditation	**AND**	Implement* OR applicat* OR translation* OR "curriculum integration" OR curricu* OR quality

Methods

A scoping review methodology designed to synthesis many sources of evidence on a particular issue or concept was chosen to guide this review. In the scoping review systematic approaches are followed to locate the best available evidence to describe key characteristics of the identified issue (Munn et al., 2022). This scoping review followed the JBI scoping review guidelines (Peters et al., 2017). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses for scoping reviews guided the reporting (PRISMA-ScR) (Tricco et al., 2018).

Search Strategy

The following data bases were searched for English language studies in January 2023: Medline, PsychInfo, Cumulative Index to Nursing and Allied Health Literature (CINAHL), SocIndex, Scopus, Web of Science, PubMed. For the search strategy, refer to Table 1.

Inclusion/Exclusion Criteria

Criteria were refined in an iterative process as questions arose (Munn et al., 2018). Following the search, all identified citations were collated and uploaded into Covidence (Access date). Duplicates were removed prior to review. Two research team members (M.B., L.H.) reviewed title and abstracts and included full texts. Conflicts were collaboratively discussed to reach consensus. Consensus disputes were decided with a third reviewer (R.D.). Included articles needed to clearly explain how the simulation activities directly aligned to one or more HSSOBP, thereby helping apply and integrate the HSSOBP into tangible practice. Articles that simply cited HSSOBP without further explanation about how the standards were applied and/or integrated were excluded. The HSSOBP, formally known as the INACSL Standards of Best Practice came into existence in 2011 (Sittner et al., 2015), articles prior to this date were excluded. HSSOPB are designed to be relevant across all healthcare professions (Watts et al., 2021), therefore simulation activities from any health discipline and both higher education and healthcare organizations were included.

Data Extraction

A total of 14 unique articles were identified for data extraction. Two research team members (M.B., L.H.) completed the extraction using JBI methodology (Peters et al., 2017) via a data extraction tool within Covidence. Figure 1 PRISMA flowchart summary of study selection details reasons articles were excluded at full text.

Results

Fourteen articles were included that clearly described how their simulation activities aligned and met the requirements of the relevant HSSOPB. Eight of the 14 (57%, n = 8) studies originated from the United States, (Bajjani-Gebara, Owen, McLemore, & Landoll, 2022; Becker, Collazo, Garrison, & Sandahl, 2020; Gordon, 2017; Kilroy et al., 2021; McDermott et al., 2017; Rutherford-Hemming et al., 2015; Sarage, O'Neill, & Eaton, 2021; Schneidereith, Leighton, & Foisy-Doll, 2020) followed equally by Canada (n = 2) (Jones & Potter, 2017; Nakajima et al., 2022) and South America (n = 2) (Ilha Schuelter et al., 2021; Saito & Dal Sasso, 2022) and then Turkey (n = 1) (Uslu, Ünver, Kocatepe, & Karabacak, 2019) and Pakistan (n = 1) (Kurji, Aijaz, Aijaz, Jetha, & Cassum, 2021). There were no studies undertaken within the Australian or NZ context.

Ten articles reported studies set in higher education: undergraduate programs (n = 6), postgraduate programs (n = 2), across both undergraduate and postgraduate programs (n = 2). Four (n = 4) were across all domains: undergraduate and postgraduate higher education and involved qualified clinicians within the healthcare sector and one concerned only with qualified clinicians. All but three of the 14 studies were descriptive papers (Ilha Schuelter et al., 2021; Jones & Potter, 2017; Saito & Dal Sasso, 2022), that is, they retrospectively described a simulation-based activity that had been designed and/or implemented. All included manuscripts reported simulation
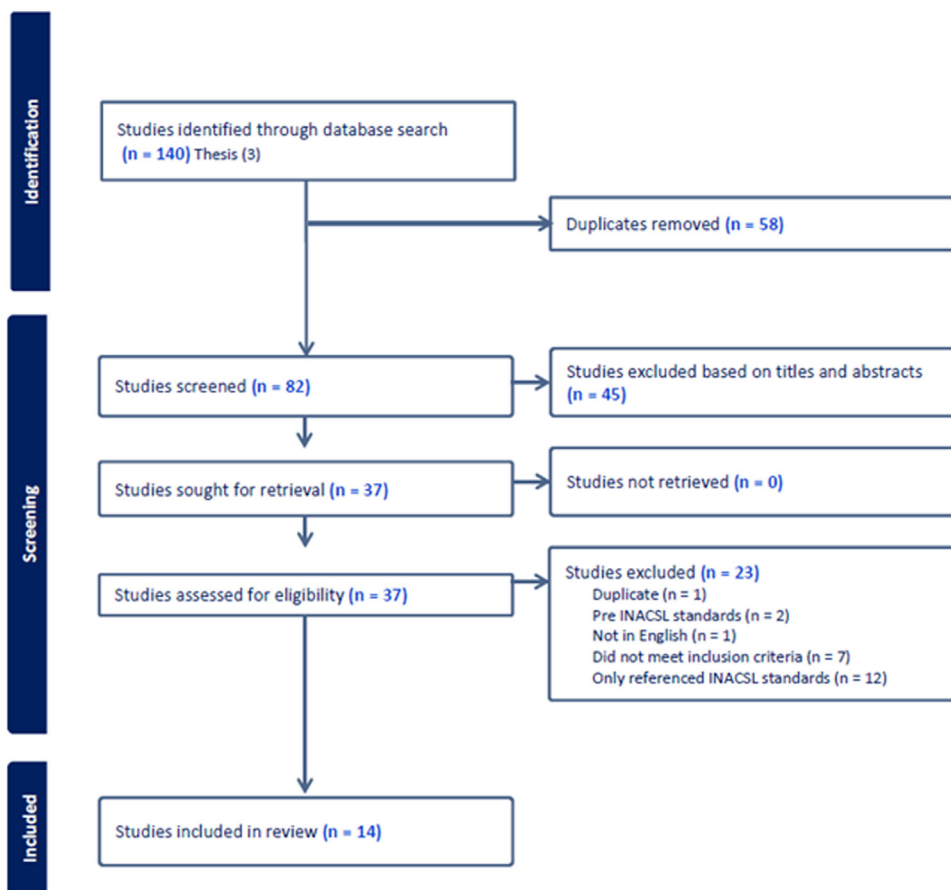
Figure 1   PRISMA flowchart summary of study selection.

activities involving nurses: students, professional nurses, nursing academics, nursing educators and nursing simulation educators. Many studies were interdisciplinary in nature.

Within the different versions of HSSOBP, the 2016 version was most common (n = 12), followed by 2021 (n = 1) and 2013 (Glossary, n = 1). No studies referred to the original 2011 version. The criteria within each standard were either not reported or reported inconsistently across the papers. Table 2 outlines each study's characteristics, country of origin, HSSOBP, standards and criterion translated, main study findings, and recommendations. Figure 2 showing a comparison between the frequency of reported standards, with Figure 3 demonstrating the type of simulation modalities described.

Discussion

The aim of this scoping review was to report the evidence for applying and integrating the INACSL HSSOBP into practice. We found that articles frequently cited the standards yet only 14 explained in detail how the simulation activities directly aligned. Reasons for this could include not being a focus of their paper or not having

considered this as a required element. A further reason could be that the providers of simulation struggle to apply and integrate the standards into tangible practice. Therefore, we were interested in articles that had explicitly explained how the simulation activities directly aligned to one or more HSSOBP so as to devise a way forward that could help meaningfully and tangibly apply and integrate the standards into practice. Having an approach where prescribed standards could be easily applied and shared with simulation providers would aid simulation educator professional development and enhance the consistency in the quality of nursing simulation-based delivery and learning.

The results from this scoping review indicate a dearth in this space, with varying levels of evidence within the included articles, for example, some activities aligned to standards only, others were inclusive of relevant criteria within the standards. Studies did report using web sites, checklists, and mentor programs to help translate, however few evaluations of these application strategies were reported. Three studies (Bajjani-Gebara et al., 2022; McDermott et al., 2017; Nakajima et al., 2022) devised, between them, an extensive list of methods strategizing the 11 Design standard criteria. Whilst this work is commendable many of the statements are general which may

not be explicitly helpful and could be potentially overwhelming for educators for example, "Construct a template for reviewing learning encounters for EDI content." This does suggest that those publishing their work within healthcare simulation, may at times make assumptions that there is a perceived maturity of simulation readers within

health who can make the connections between written standards and effective delivery. The missing element is the consideration of novice and casual and sessional academics who are involved in delivering simulation-based learning Becker et al. (2020) have commenced work targeting novice simulation educators, offering resources and

Table 2 – Studies Referring to Application and Integration of HSSOBP Into in Healthcare Simulation-Based Education			
Author/Year Country	Aim/Modality	HSSOBP standard (previously known as the INACSL Standards) application and integration plan	Main Findings/ Recommendations
Bajjani-Gebara et al., 2022 USA	To use the HSSOBP as a quality improvement strategy for a mental health interprofessional education (IPE) simulation using telehealth.	**Design Standard (2016):** 11/ 11 criterion described with some detail. <u>Needs assessment</u> Conducted to identify learner gaps <u>Measurable outcomes</u> Set learning goals <u>Structured Simulation format</u> Virtual simulation matched learner gaps Used a validated quality improvement process to implement the INACSL design standard. <u>Scenario Design</u> Revised an existing simulation scenario <u>Fidelity</u> Scenarios used different fidelities <u>Facilitation</u> Asynchronous and synchronous facilitation <u>Materials and Resources</u> Created standards of practice documents Research undertaken <u>Pilot testing</u> Undertaken <u>Prebriefing</u> Online. Outlined IPE facilitator responsibilities, resource materials, assessment requirements. <u>Debriefing</u> Online <u>Evaluation</u> Student and faculty feedback on scenarios and associated resources Planned future changes	The 11 criteria were helpful in refining the face-to-face scenario design to a virtual multi fidelity offering to assist the design standard implementation for administrators and curriculum designers.
Becker et al., 2020 USA	To develop a web-based resource guide to support the implementation of the HSSOBP.	**Professional integrity, Facilitation, Debriefing and Simulation Design Standards (2016)** criteria were described within the created website in detail. Standards and criteria not specified in paper. Team members reviewed the standards to identify ways novice educators could meet each standard. The website Finding Your Way Guide houses the resources. From website: https://sites.google.com/view/findingyourwayguide/home <u>Examples of resources</u> checklists examples to role model application/use of standards self-reflective learning videos links to useful websites literature were created and/or sourced.	The website requires more interactive resources to cater for expert simulation educators. Currently designed for administrators and expert simulation leaders to support novices. Ongoing funding requirements considered.

Table 2 (continued)

Author/Year Country	Aim/Modality	HSSOBP standard (previously known as the INACSL Standards) application and integration plan	Main Findings/ Recommendations
Gordon, 2017 USA	To describe how a web-based conferencing platform was used to conduct participant debriefing after immersion in an asynchronous virtual learning activity.	**Debriefing Standard (2016)** 1/5 criterion described with some detail. *General Description* Debriefers were coached by a trainer A debriefing guide with questions/prompts was created Debriefing facilitator roles were defined to describe the debriefers involvement and how to keep students safe and assist with knowledge transfer	Incorporate best practice debriefer training for simulation educators. Use validated debriefing assessment tools to develop debriefer practices e.g., Debriefing Assessment for Simulation in Healthcare Score Sheet© and the Debriefing Assessment for Simulation in Healthcare Instructor Version©
Jones & Potter, 2017 Canada	To evaluate how aligning a simulation program to the HSSOBP impacted manikin-based simulation training for intensive care nurses.	**Design Standard (2016)** 5/11 criterion described with some detail. Prebriefing Orientated to simulation environment using video and in person. Activity timing outlined. Facilitation Establish psychological safety Performance expectations reviewed Fidelity Real ward simulated environment. The manikin was voiced. Debriefing Used a validated debrief framework (Promoting Excellence and Reflective Learning in Simulation [PEARLS]) (Eppich & Cheng, 2015). Evaluation With ethics approval, a post-simulation evaluation tool was developed and completed by participants.	The evaluations showed that incorporating HSSOBP provided a safer learning environment. Highlighted Standards to wider hospital staff. Future collaborations between education providers, simulation specialists and hospital staff should be encouraged in HSSOBP application and integration.
Kilroy et al., 2021 USA	To describe the administrative process when implementing a simulation program at a multisite simulation facility using eight HSSOBP.	**Outcomes and objectives, Design, Facilitation Debriefing, Evaluation, Professional integrity Simulation-enhanced interprofessional education and Operations Standards (2016)** were mentioned but no criteria were described. *Overall General Description* Used one HSSOBP as an agenda item in all planning meetings. For example, when the group discussed budget, the meeting agenda item was "purchasing of new manikins — 2016 INACSL standard 8, Simulation Operations" (Kilroy et al., 2021 p.166).	Designating team members to align agenda items with an HSSOBP encouraged planning of evidence-based projects and incorporated simulation best practice into the program design.
Kurji et al., 2021 Pakistan	To outline how a tele-simulation learning experience using simulated patients was implemented using the HSSOBP.	**HSSOBP's (2016)** 9/11 criteria from the Design Standard described with some detail. (Stated followed the standards, however described the criteria specifically from the Design Standard) *Overall General Description* Facilitation and Structured Simulation Format omitted. Discussed standards in team meetings Prebriefing, simulation scenario, debriefing guidelines and learning resources were developed Created online quizzes for learning evaluations Simulated patients (SPs) were trained by a simulation champion SPs were provided feedback SPs provided question guides to respond to students	HSSOBP enhanced quality and boosted participants' confidence levels and made them feel safe. Discrepancy noted between 11 standards and Design Standard with 11 criteria.

Table 2 (continued)

Author/Year Country	Aim/Modality	HSSOBP standard (previously known as the INACSL Standards) application and integration plan	Main Findings/ Recommendations
McDermott et al., 2017 USA	To discuss the use of the HSSOBP design standard to create a manikin-based simulation experience.	**Design Standard (2016)** 11/11 criteria described with some detail. <u>Needs Assessment</u> Students learning level considered and pre-simulation activities tailored to the student learning level were designed and implemented <u>Measurable Outcomes, Structured Simulation Format and Design</u> Elsevier's Simulation Learning System used <u>Fidelity</u> High fidelity manikin <u>Facilitation</u> Trained facilitators used <u>Pilot Testing</u> Junior students pilot tested the scenarios <u>Prebriefing</u> Structured prebriefing was planned <u>Debriefing</u> Creighton Clinical Evaluation Instrument (C-CEI) for debriefing and feedback (Hayden et al., 2014). <u>Evaluation</u> Post Simulation Perspective Survey <u>Pilot Testing</u> Junior students pilot tested the scenarios	Using the Design Standard ensured best practice elements were included for learners to achieve the learning objectives. Students appreciated the simulation learning experience.
Nakajima et al., 2022 Canada	To describe processes that were undertaken to promote equity, diversity, and inclusion (EDI) into virtual patient scenarios in a national simulation-based program.	**Design Standard (2021)** 9/11 criteria described in significant detail. Tabulated many strategies/methods to apply the standards to equity diversion and inclusion simulation design (See Nakajima et al., 2022 for table). A snapshot is provided only (see Figure 2 for more detail) Criterion materials and resources and learning objectives not included. Added a criterion designed with content experts. <u>Briefing</u> land acknowledgment to recognize traditional territories of the indigenous people. Simulationists provide a disclosure and positionality statement recognizing and reflecting on their own bias and stereotypes. Simulation centers have diverse groups of simulation teams to facilitate representation <u>Fidelity</u> Use diverse models for still photos and video for virtual patient cases Engage simulated participants who are diverse and reflect the population Provide different ranges of normal <u>Facilitation</u> Creating a safe environment for EDI learners <u>Prebriefing</u> Selection of diverse material and background. Include supplementary material related to the EDI learning accommodate different learning preferences and abilities such as videos, audios, and written material.	The criteria allow an opportunity for meaningful inclusion and adding equity, diversity, and inclusion knowledge at each step of the simulation design.

Table 2 (continued)

Author/Year Country	Aim/Modality	HSSOBP standard (previously known as the INACSL Standards) application and integration plan	Main Findings/ Recommendations
Rutherford-Hemming et al., 2015 USA	Discusses challenges and shares approaches to enhance implementation of HSSOBP in relation to administrative support.	**Debriefing (1/4), Facilitation (1/5), Professional Integrity (1/5) Standards (2013)** were described with some detail. Assessment and Evaluation, Professional Development and Objectives Standards (2013) were mentioned but no criteria were described. *General Overview* Tabulated strategies/methods to implement the standards. Additional Glossary created. Professional Integrity Establish policy and procedures that address expectations, orientation requirements, ethical behaviors, and protection of simulation content Create a faculty forum Measurable outcomes Critique learning objectives with facilitation team Create exemplars to design learning objectives Create a Simulation Objection Map. Facilitation Formulate a performance measure checklist for each phase of simulation: before, during, and after. Facilitator Develop a formal hands-on facilitator training class Have expert facilitators mentor novice facilitators. Debriefing Develop a formal interactive debriefing workshop Use previously video-recorded debriefing sessions as training material. Provide co-debriefing experiences (expert debriefer and novice debriefer) Evaluation Demonstrate methods of giving learner-centered constructive feedback (coaching and cueing) in hands-on immersive training or video review	Administrative support was critical to a smooth implementation process. Facilitator training and simulation is critical.
Saito & Dal Sasso, 2022 South America	To outline the administrative support required to update a computerized instrument to guide teachers to create and conduct a clinical simulation for undergraduate nursing students in the disciplines of intensive care and emergency using the HSSOBP.	**Design, Debriefing, Facilitation, Evaluation, Professional Integrity, Operations, Objectives & Outcomes Standards (2016)** were mentioned but no criteria were described. (Note: unable to report referenced criterion without access to the electronic workflow. Appears extensive) The workflow guides users to implement standards (see Figure 2 for more detail) Simulation Design User enters information to plan and create the structure of a simulation activity Prebriefing Enter information that will be addressed Facilitation Provide a facilitator guide Debriefing Include information to assist the teacher in the debriefing session Evaluation Enter information about the evaluation method for learner assessment	Usability of the web-based workflow was high, rated as 'excellent'. Electronic workflows can be an effective, efficient, and satisfactory technology, contributing to promote the best simulation practices (and applying HSSOBP) in the learning process for professional training. Findings still recommend formal simulation methodology training.

Table 2 (continued)

Author/Year Country	Aim/Modality	HSSOBP standard (previously known as the INACSL Standards) application and integration plan	Main Findings/ Recommendations
Sarage et al., 2021 USA	To report on the strategies and resources used to create and implement an escape room simulation using a high-fidelity manikin.	**Design Standard (2016)** 1/11 criteria described in some detail. *Fidelity* Physical fidelity ensure the manikin was physically realistic and matched the patient profile described in the scenario in terms of sex, age and dress. Conceptual fidelity Use realistic vital signs Have the scenario critiqued and approved by content experts Psychological fidelity use a voice modulator as the voice of the manikin patient use realistic extra people in the scenario review the appropriateness of the medication orders Synergy of fidelity Enhance through patient experiencing confusion (for this scenario) Use the extra (family member) in the scenario	The standard and the criterion produced a safe environment. Enabled students to provide patient centred care, promoted a culture of safety, teamwork, and collaboration. Students were observed appropriately using healthcare informatics to ensure evidence-based practice.
Schneidereith et al., 2020 USA	To provide practical information to assist the administrative application of the HSSOBP Operations Standard.	**Operations Standard (2016)** 6/6 criteria described extensively. *General Overview* Develop and use questions for each criterion to prompt critical/forward thinking and to action strategies Developed a tool to assess organizational preparedness for cultural change. Authors developed Simulation Culture Organisational Readiness Survey (SCORS) https://sites.google.com/site/scorsfile/ simulation-culture-organizational-readiness-survey-scors Strategic Plan Assess desire for change Develop mission and vision statement Develop strategic plan with goals Include annual review Involve all key stakeholder groups including alumni and administration Conduct an organizational culture survey Detailed current and future budgets Plan for educator training Purchase of future technologies (may not yet be known) Include plans for program growth Provide experienced personnel to run the SBE Acknowledged expense and logistics of providing expertise Mentoring and attending professional development opportunities Financial Cost for human, capital, equipment, and operating expenses included Budget for hidden not yet known costs (planning/growth) Resource management Create and document inventory Develop training programs for all personnel Simulation safety management Policies and procedures Write job descriptions Create policies and procedures for orientation Create contingency/disaster plans Systems integration Ongoing feedback to stakeholders Use an advisory board Implement quality improvement processes Data metrics including course numbers, participants, hours of use, downtime hours, educator to learner ratios, numbers of expert and novice staff collected. Impact of the simulation learning on patient outcomes.	Organisational leaders must align simulation best practices to the curriculum. A changemaker mindset could assist with cultural change. Recommend use of SCORS (Foisy-Doll & Leighton, 2018).

Table 2 (continued)

Author/Year Country	Aim/Modality	HSSOBP standard (previously known as the INACSL Standards) application and integration plan	Main Findings/ Recommendations
Schuelter et al., 2021 South America	To observe, research and document best practice to facilitate the administration of simulation management.	**Design, Debriefing and Operations Standards (2016)** criteria described with some detail. *General Overview* Extensive list of strategies reported as study findings and findings collated with the literature review results. Design Group face-to-face training Individual meetings to plan and develop simulation Content development limited to academics Experts to address simulation methodologies/ modalities for facilitators and learners Use latest version of schedules for each simulation Provide study guides/references Prebriefing Use media facilities to explain the clinical case (presentation of imaging examinations, and others) Provide (prior to or during) data, guidance and/or case Facilitation Describe the case at the time of simulation Create educator training and orientation courses Describe the case at the time of simulation Use forms to follow script Use technology for document sharing and management direct simulation activity Evaluate the simulator Fidelity/ Operations Use High-tech, high-fidelity, hybrid simulators Use technology that allows interaction between simulation site and prebriefing site Debriefing Use technology that captures metrics of learners interacting with simulators	Staff training and technology identified as the most important factors for overcoming simulation challenges. The evaluation and dissemination of systems and processes that optimize simulation can enhance the method's action. Tools that clarify both the educational and managerial stages of the simulation process are essential to ensure the methodology's effectiveness and potential.
Uslu et al., 2019 Turkey	To share a simulation method and modality informed by HSSOBP.	**Design Standard (2016)** 11/11 criteria described in some detail. Needs Assessment Identified a need for the scenario (administering chemotherapeutic drugs) Measurable Objectives Define curriculum and scenario objectives Modality Specific equipment sourced matching to scenario aims Moulage matched to scenario requirements Extra documentation (i.e., laboratory results) available to match the scenario brief Structured Simulation Format Scenario aligned with the learning goals Fidelity Fidelity was confirmed during the pilot testing Appropriate moulage was applied to manikins aligned to enhance safety aspects (identification bracelet) Facilitation Several facilitators were involved with one taking a role in the simulation scenario	Design template generated may have minimised scenario problems. Planning for simulation scenarios should systematically address each component of the HSSOBP.

Table 2 (continued)

Author/Year Country	Aim/Modality	HSSOBP standard (previously known as the INACSL Standards) application and integration plan	Main Findings/ Recommendations
		<u>Materials and Resources</u> Reminded participants of simulation center rules, code of ethics Resources and information about the medication administration task was provided to students. Course content and learning objectives shared with students one week prior to the simulation. <u>Pilot Testing</u> Nursing students tested the scenario <u>Prebriefing</u> Simulator orientation provided. Scenario goals and expectations outlined. Obtaining video/photo permissions Privacy and a safe learning environment addressed. Physical safety considerations outlined. Participant roles described. Simulation timing given. Debriefing information provided. <u>Debriefing</u> Used validated framework (PEARLS) <u>Evaluation</u> Purposively designed 26 item observational checklist matching the knowledge and skills objectives of the scenario enabled student performance ratings (range from sufficient – insufficient)	

Note: INACSL Healthcare Simulation Standards of Best Practice (HSSOBP) are 10 standards and a Glossary of terms. The standards each have three or more criterion explaining how the standards can be met see https://www.inacsl.org/healthcare-simulation-standards-ql). For example the Design standard (2016 version) has 11 criterion (the most of any) guiding implementation:
1. Needs assessment 2. Learning objectives 3. Structured simulation format 4. Scenario design 5.Fidelity 6. Facilitation 7. Materials and resources 8. Pilot testing 9. Prebriefing 10. Debriefing 11. Evaluation
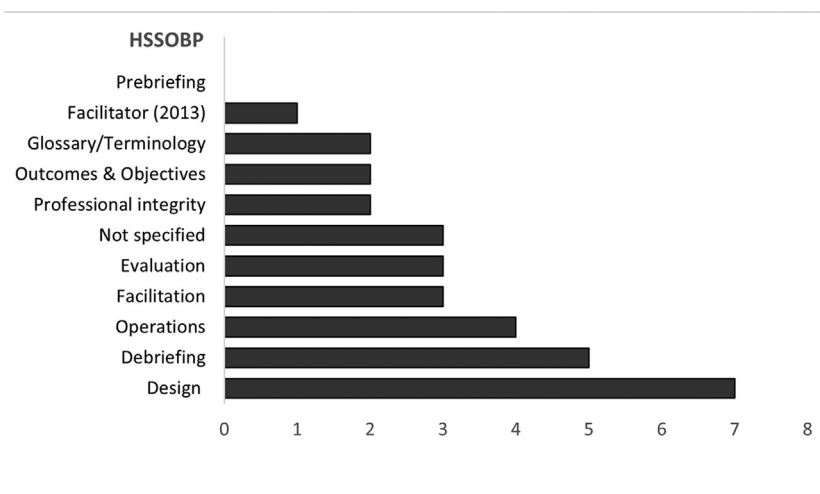

Figure 2   Frequency in applying and integrating HSSOBP to practice.

learning activities to learn and implement the HSSOBP via a website, however not all standards were included. Hence this review has revealed an area where further work needs to be done.

There is certainly an international awareness of HSOBPP, evidenced in this review through included and excluded articles (n=140). However, the standards are predominately written from the North American perspective, potentially limiting transfer of simulation terminology and best practices within other cultural, socioeconomic, and geographical contexts. Having work that translates the standards and terminologies into more localized contexts is
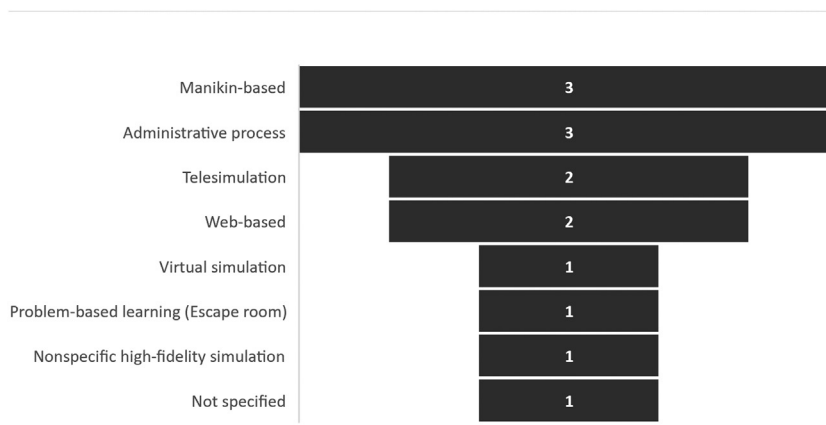
Manikin-based — 3
Administrative process — 3
Telesimulation — 2
Web-based — 2
Virtual simulation — 1
Problem-based learning (Escape room) — 1
Nonspecific high-fidelity simulation — 1
Not specified — 1

Figure 3   Modes of simulation described and aligned to HSSOBP.

important. Of note, no included studies originated from Australia and NZ, two countries advocating for inclusion of simulation-based learning in national nursing curriculums.

Within nursing and midwifery, the Australian Nursing Midwifery Accreditation Council (ANMAC) and the New Zealand Nursing Council (NZNC) currently supports simulation to enable students to develop clinical skills and professional capabilities prior to entering real life clinical contexts. Additionally, these accrediting bodies need to increasingly look towards simulation to help meet the competitive demand for clinical placements and meeting ongoing course accreditation requirements. Unlike some American states (Curry-Lourenco et al., 2022), to date ANMAC and NZNC have not recognized simulation as a replacement of, or adjunct to clinical placement hours (Australian Nursing & Midwifery Accreditation Council, 2021; Nursing Council of New Zealand, 2021). Potentially this is because there is a current lack of Australian/New Zealand centric research in this area and the absence of framework assessing the quality of SBE across nursing and midwifery curricula. Although highlighting the importance of experiential learning, there is currently no move to incorporate simulated clinical placement within curricula. Other health disciplines such as occupational therapy, have already been using simulation to replace a percentage of clinical hours (Chu, Sheppard, Guinea, & Imms, 2019).

Most studies in this scoping review focused on only one of the 11 standards - Design. We support this approach as the number and depth of criterion within and across all the standards is extensive. We believe that focusing on the Design standard would help more novice simulation providers design and deliver evidence-based, culturally appropriate simulation activities, irrespective of mode, methodology or clinical discipline. What we believe is a current gap is clear articulation of how to translate the HSSOBP Design Standard into practice, which considers and encompasses elements from all of the Standards. This paired with explicit cultural considerations is required globally, however is essential and lacking in the Australian and New Zealand context.

Recommendations

What is required, particularly in the Australian and New Zealand context, is a tool or framework based on the recognized and evidenced-based HSSOBP, to support simulation providers of all levels to develop consistently high-quality simulation. This framework could provide robust evidence of the quality of simulation-based curriculum for program accreditation processes. This would then enable not just nursing and midwifery regulatory bodies to have confidence in the use of simulation to meet education and clinical experience requirements and consider simulation as an appropriate means to support or replace placement hours. This work is in progress.

A further recommendation is for the more experienced simulation providers to consider the way in which simulation research and activities are described and aligned to the standards. Authors should consider the diversity of maturity in the audience whom their work is being delivered. The use of simple language and clarity in the design, implementation and evaluation, and the linkage to standards should be considered.

Strengths and Limitations

The authors acknowledge that the key words employed may have influenced search. The terms translation, application or integration can have multiple meanings. The review specifically was looking for articles applying and integrating the HSSOBP into tangible practice and acknowledge that other standards exist, such as the Society for Simulation in Healthcare accreditation standards. Only articles that were written in English were included.

Conclusion

As evidence supporting the use of the INACSL HSSOBP continues to evolve with ongoing research and advancements in simulation-based learning, and standardization of simulation programs using the standards will ensure a consistent and high-quality learning experience for healthcare professionals. Of the 14 studies that were included in this scoping review, all clearly described how their simulation activities aligned and met the requirements of the relevant HSSOBP. Both novice and expert simulation providers may find it difficult to translate the standards into practice when developing scenarios, because no clear guidelines articulating the application and integration of the standards exist. Future studies should therefore incorporate and more thoroughly report the development of simulation curricula using the HSSOBP.

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Disclosure

The authors report there are no competing interests to declare.

Data availability

Data can be provided upon reasonable request.

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