STANDARD OF BEST PRACTICE: SIMULATION DESIGN

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Standard Statement

Simulation-based experiences should be purposefully designed to meet identified objectives.

Rationale

Standardized simulation design provides a framework for developing effective simulation-based experiences (SBEs). In this article, "Design" includes the best evidence from fields such as adult learning, education, instructional design, clinical standards of care, evaluation, and simulation. Purposeful simulation design promotes essential structure, process, and outcomes that are consistent with programmatic goals and/or institutional mission.

Outcome(s)

Effective healthcare simulation design facilitates consistent outcomes and strengthens the overall value of the simulation-based experience (SBE) in all settings.

Criteria

The sequence for developing a SBE may vary according to the objectives or desired outcomes. To achieve optimal outcomes, simulation design should consider the following elements:

1. Needs assessment
2. Measurable objectives
3. Format of simulation
4. Clinical scenario or case
5. Fidelity
6. Facilitator/Facilitative approach
7. Briefing
8. Debriefing and/or feedback
9. Evaluation
10. Participant preparation

Criterion 1. Needs assessment

Guideline Statement: A needs assessment provides the foundational evidence of the need for a well-designed simulation. The results of the needs assessment guide the designer in developing an overarching goal or broad objective for the simulation, which in turn directs the designer in the development of simulation specific participant objectives. *For specific information see INACSL Standards of Best Practice (SOBP): Standard III: Participant Objectives (2013).*

Guideline 1: A needs assessment may include analysis of:

- Underlying causes of a concern (e.g. root-cause or gap analysis)
- Strengths, weaknesses, opportunities, and threats (SWOT)
- Surveys of stakeholders, participants, clinicians, and educators
- Outcome data (e.g. from pilot testing; previous SBE's; aggregate healthcare data)
- Standards (e.g. certifying bodies, rules and regulations, protocols)

Guideline 2: The needs assessment includes an examination of knowledge, skills, attitudes and/or behaviors of individuals; organizational initiatives; systems analysis, clinical practice guidelines, quality improvement programs, and/or patient safety goals. The results of the assessment may assist designers to create innovative and interactive experiences, which address the identified needs in order to:

- Enhance curriculum in the classroom and/or clinical areas
- Provide opportunities for standardized clinical experiences
- Address competencies
- Improve quality of care and patient safety
- Improve readiness for clinical practice

Criterion 2. Measurable Objectives

Guideline Statement: Objectives are designed to address identified needs from a broad to specific scope. Prior to the development of the clinical scenario or case, measurable objectives are determined from the needs assessment to drive the design. The facilitator assumes responsibility for guiding the achievement of the full set of objectives throughout the SBE. *For specific information see INACSL SOBP: Standard III: Participant Objectives (2013).*

Guideline 1: Broad objectives reflect the purpose of the SBE and are related to organizational goals. Specific objectives are related to participant performance measures. Together they provide a blueprint for the simulation.

Guideline 2: During the design phase, a determination is made regarding which objectives will or will not be available to the participant(s) prior to the experience.

- *Objectives* that provide general information and context for the learner should be disclosed (e.g. Deliver care for a patient with heart failure).
- Participant *performance measures* should not be disclosed (e.g. critical element checklist).

Criterion 3: Format of Simulation-Based Experience

Guideline Statement: Selecting the format of the SBE is based on the needs assessment, resources, and broad objectives, taking into account targeted participants as well as the purpose, theory, and modality. The format of an SBE provides the structure and process and allows the designer to identify expected outcomes of the experience.

Guideline 1: Purpose, Theory, and Modality:

- The purpose of the SBE is to provide a formative and/or summative encounter.
- A theoretical and/or conceptual framework is chosen based on the identified purpose and the targeted participants (e.g. adult learners, inter-professional teams, etc.).
- The modality is the platform for the experience. Modalities can include mannequin based simulation, computer-based simulation, virtual reality, procedural simulation, simulated clinical immersion with patient simulators (mannequins) and/or standardized patients, and/or hybrid simulation,

Guideline 2: Structure**:** All SBEs include a starting point, structured participant activities, and an endpoint. The starting point represents the initial circumstances of the the patient or situation when the participants start their engagement in the SBE. Structured participant activities are designed for

participant engagement. (e.g. a simulated case or an unfolding scenario, and/or psychomotor skill teaching/evaluation). The endpoint is the stage at which the SBE is expected to end, usually when expected learning outcomes have been demonstrated, time is exhausted, or the scenario can proceed no further.

Criterion 4. Clinical Scenario or Case

Guideline Statement: Development of the clinical scenario or case provides the context for the simulation experience. The designer should use a process that ensures quality and validity of the content, and maintains the reliability and standardization of objectives.

The clinical scenario or case story may include a situation and backstory, clinical progression and cues, time frames, script, and identification of critical actions:

Guideline 1: The *Situation and Backstory* provide a realistic starting point from which the structured participant(s') activity begins. The full picture of this context may be given verbally to the participants, found in the patient's file, or be revealed if requested through adequate inquiry on the part of participants.

Guideline 2: *Clinical Progression and Cues* provide a framework for the advancement of the clinical case or scenario in response to participant actions, including standardization of cues to guide the participant(s). These critical cues should be linked to performance measures and used to re-focus participants when they stray from the intended objectives. This can be done using cues provided to the participant(s) (e.g. verbal, visual, or other cues).

Guideline 3: *Time Frames* are established as part of the design to ensure there is reasonable time to achieve the objectives.

Guideline 4: *The script* of a scenario or case is developed for consistency and standardization to increase scenario repeatability/reliability. Unintentional variations from the planned dialogue may add distractions that could interfere with the learning objectives.

Guideline 5: *Identification of Critical Actions/Performance Measures* is required to evaluate achievement of scenario objectives. Each measure should be evidence-based. Use of subject matter experts will strengthen validity of the simulation scenario.

Criterion 5. Fidelity

Guideline Statement: Many types of fidelity should be considered to create the required perception of realism. This perception of reality allows participants to engage in a relevant manner. The design of the simulation is enhanced through attention to physical, conceptual, and psychological aspects of fidelity to contribute to the attainment of objectives.

Guideline 1: Physical fidelity relates to how realistically the physical context of the simulation-based activity replicates the actual environment in which the situation would occur in real life. Physical fidelity includes such factors as the patient(s), simulator, standardized patient, environment, equipment, embedded participants, and related props.

Guideline 2: Conceptual fidelity ensures that all elements of the scenario or case relate to each other in a realistic way so that the case makes sense as a whole to the learner(s) (e.g. vital signs are consistent with the diagnosis). To maximize conceptual fidelity, cases or scenarios should be reviewed by subject matter expert(s) and pilot-tested prior to use with learners.

Guideline 3: Psychological fidelity is maximized when the simulation environment mimics contextual elements found in clinical environments, e.g. an active voice for the patient(s) to allow realistic conversation, noise, distractions, family members, other health care team members, time pressure, and competing priorities. The higher the psychological fidelity the more realistically learners will engage in the experience and hence display their professional abilities and level of competence.

Criterion 6. Facilitator/Facilitative approach

Guideline Statement: In the design phase, the facilitative approach is determined. The specific facilitation method is participant-centered and driven by the objectives, participant's knowledge/level of experience, and the expected outcomes. *For the most effective outcomes, it is recommended for the facilitator to receive formal training in simulation-based pedagogy.* The level of facilitator involvement is inversely proportional to the participant's knowledge, experience, and personal perspective (frame). The facilitative approach should be consistent among facilitators for each scenario, case, or SBE. *For more specific information on facilitation or facilitator see INACSL Standards of Best Practice (INACSL SOBP): Standard IV: Facilitation and Standard V: Facilitator (2013).*

Criterion 7. Briefing

Guideline Statement: Briefing is an integral part of the SBE. Briefing sets the stage for the SBE by identifying participant's expectations and may differ depending on the level of expertise of the participant(s) and theoretical framework. Briefing is structured, planned for consistency, and completed immediately prior to the scenario/case.

Guideline 1: Briefing activities include the establishment of an environment of integrity, trust, and respect. Briefing includes identification of expectations for the participant(s) and the facilitator(s). This includes establishment of ground rules and a fiction contract.

Guideline 2: Briefing should include orientation of the participant(s) to the space, equipment, simulator, roles (participants/facilitator/standardized patient), time allotment, objectives (general information and context, see Criterion 2), patient situation and limitations.

Guideline 3: A written or recorded briefing plan standardizes the process and content for each scenario/case.

Criterion 8. Debriefing and/or Feedback

Guideline Statement: In the design phase of the SBE, a debriefing or feedback method is identified. Debriefing and feedback are different, but both are critical elements that should be structured using best practices. Effective debriefing is enhanced by adequate training and preparation of the facilitator. Using a planned debriefing or feedback session enhances learning and contributes to the consistency of the SBE for participants and facilitators. In the case of a skills-based or testing simulation activity, debriefing may be replaced by feedback so the participants are guided to further improve or confirm their practice. *For specific information see INACSL SOBP: Standard VI: The Debriefing Process (2013).*

Criterion 9. Evaluation

Guideline Statement: In the design phase, evaluation processes are determined to ensure quality and effectiveness. Adoption of an evaluation framework guides selection/development of a valid tool that is used to measure outcomes. Participant evaluation may be formative, summative, and/or high-stakes. Methods of evaluation should be clear to the participant(s) prior to or at the onset of the simulation. The evaluation process includes an evaluation of the participant(s), facilitator(s), the SBE, the facility, and support team. Evaluation includes input from participants, peers, and stakeholders. These data are used to assist in evaluating the simulation program for quality process improvement; hence any evaluation needs to be followed up by action based on the results. *For specific information see INACSL SOBP: Standard VII: Assessment and Evaluation (2013).*

Criterion 10. Participant preparation

Guideline Statement: In the design phase, inclusion of participant preparation should be determined once all the elements of the SBE have been identified. Preparation is designed to promote the best possible opportunity for participants to successfully address the simulation objectives. The designer and facilitator are responsible for ensuring that preparatory activities address the knowledge, skills, attitudes, and behaviors that will be expected of the participants during the SBE. Preparation activities should support the

participant(s) ability to achieve the objectives of the SBE and are completed in advance of the SBE briefing.

Guideline 1: Participants should be prepared with a basic understanding of the concepts related to the SBE. Preparation may include:

- Activities related to the content (e.g. reading assignments, coursework, didactic sessions, answering simulation specific questions, watching preparatory audiovisuals, completing a quiz, etc.)
- Information regarding codes of conduct, confidentiality, and expectations. *For more information see INACSL SOBP Standard II: Professional Integrity of Participant(s) (2013).*

Design Templates

A template may be selected to guide the evidence-based design and standardize the design process. A sample of templates is available at http://www.inacsl.org/i4a/pages/index.cfm?pageID=3407.

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Criterion 10. Participant preparation

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Criteria 11: Templates

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Terminology

Needs Assessment: A systematic process of identifying gaps in knowledge, skills, or attitudes of the learner. This leads to the purpose of the simulation-based experience. Simulation provides an educational method for the identified learning needs to be achieved. (Bastable, S. (2008). *Nurse as educator.* Boston: Jones and Bartlett Publishers, 96-97.)

Prebriefing (Briefing) An information or orientation session held prior to the start of a simulation-based experience in which instructions or preparatory information is given to the participants. The purpose of the prebriefing is to set the stage for a scenario and assist participants in achieving scenario objectives. Suggested activities in a prebriefing include an orientation to the equipment, environment, mannequin, roles, time allotment, objectives, and patient situation. *INACSL Standards of Best Practice (SOBP): Standard I: Terminology. (2013).*

Backstory: A narrative which provides a history and/or background, and is created for a fictional character(s) or about a situation for a SBE. (www.dictionary.com)

Briefing: Briefing is the sharing of information about objectives, time frame, expectations, scenario/case, roles, and type of evaluation with the participants prior to the start of the SBE. (Nehring, W. & Lashley, F. (2010). *High-fidelity patient simulation in nursing education.* Boston: Jones and Bartlett Publishers, 331. And Forrest, K., McKimm, J., & Edgar, S. (2013). *Essential simulation in clinical education.* Hoboken, NJ: Wiley-Blackwell, 221-222.

Fiction contract: a fiction contract is the implicit or explicit agreement among participants and facilitator(s) about how the participant is expected to interact with the simulated situation and how the facilitators will treat that interaction. (Dieckmann P, Gaba D, Rall M: Deepening the theoretical foundations of patient simulation as social practice. Simulation in Healthcare 2:183-193, 2007).

Frame(s): The perspectives through which individuals interpret new information and experiences for the purpose of decision making. Frames are formed through previous experiences and can be based on knowledge, attitudes, feelings, goals, rules, and/or perceptions; the internal participant or facilitator mindset; knowledge, thoughts, feelings, actions (speech/body language), attitudes (verbal/non-verbal), and perceptions. (adapted from Rudolph, J.W. *et al., Debriefing with good judgment: combining rigorous feedback with genuine inquiry. Anesthesiol Clin 25 (2), 361-376 (2007) and* Schon, D. A. (1983). The reflective practitioner: How professionals think in action (1st ed.) Basic Books, Inc.

Conceptual Fidelity: Ensures that all elements of the scenario or case relate to each other in a realistic way so that the case makes sense as a whole to the learner(s) (e.g. vital signs are consistent with the diagnosis). To maximize conceptual fidelity, cases or scenarios should be reviewed by subject matter expert(s) and pilot-tested prior to use with learners.

Modality: The way in which something is experienced. In a SBE, it refers to the type of simulation approach, which best meets the objectives. It is not about the tool used per se, but how it is used. www.vocabulary.com

Simulation modality: The means or mode in which a simulated experience is carried out.

Computer based simulation- a simulation-based learning activity designed to provide an experience through the use of a computer and screen. Learners can complete specific tasks in a variety of potential environments, use information to provide assessment and care, make clinical decisions and observe the results in action. Feedback can be provided during and after the interaction. (Fowler-Durham, C. & Alden, K. (2008). Chapter 51. Enhancing patient safety in nursing education through patient simulation. Agency for Healthcare Quality and Research. Retrieved from: http://www.ahrq.gov/professionals/clinicians-providers/resources/nursing/resources/nurseshdbk/durhamc_epsne.pdf)
Durham, C. and Alden, K. Enhancing Patient Safety in Nursing Education Through Patient Simulation, Chapter 51 in Patient Safety and Quality: An Evidence-Based Handbook for Nurses.

AHRQ Publication No. 08-0043, April 2008. Agency for Healthcare Research and Quality, Rockville, MD.http://www.ahrq.gov/qual/nurseshdbk/docs/DurhamC_ EPSNE.pdf

Virtual Reality- a computer generated reality, which allows a learner or group of leaners to experience various auditory and visual stimuli. This reality can be experienced through the use of specialized ear and eyewear. (Strategies for Nurse Managers.com. (2014). Simulation learning modalities. Going beyond the basics. Retrieved from: http://www.strategiesfornursemanagers.com/content.cfm?content_id=243687&oc_id=602)

Hybrid simulation - a blend of two or more different modes or forms of simulation.

Procedural simulation- the use of a simulation modality (e.g. task trainer, mannequin, computer) to assist in the process of learning to complete a technical skill(s) or a procedure, which is a series of steps taken to accomplish an end.

Simulated clinical immersion- a planned simulated experience in which participants have the experience of being engrossed in a task or setting as they would if it were the real world. The goal of clinical immersion is to evoke or replicate substantial aspects of the real world in a fully interactive fashion. (Stanford School of Medicine (2014). What is ISL? Retreived from: http://cisl.stanford.edu/resources/what_is/)

Standardized Patient (or Simulated Patient)- from current INACSL terminology

A person trained to consistently portray a patient or other individual in a scripted scenario for the purposes of instruction, practice, or evaluation (Robinson-Smith, Bradley, & Meakim, 2009).

Cues: add “aka prompts”