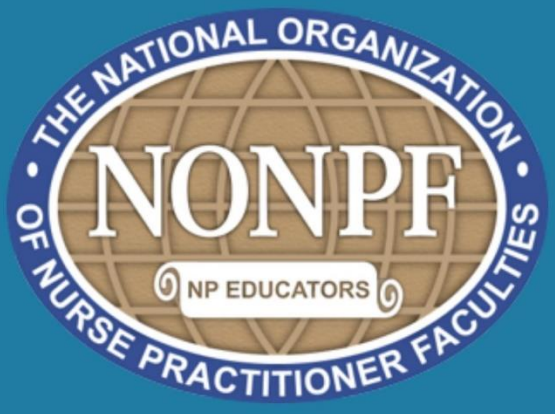


SIMULATION GUIDELINES & BEST PRACTICES FOR NURSE PRACTITIONER PROGRAMS

NATIONAL ORGANIZATION OF NURSE PRACTITIONER FACULTIES

OCTOBER 2020

Acknowledgements:

Thank you to the NONPF Simulation Committee 2019-2020.

Jill M. Slattery RN, MSN, Johns Hopkins University School of Nursing for her much appreciate editorial contributions.

Disclaimer: Statement: This living document reflects the current simulation education landscape and will evolve with advances in evidenced based practice.

Version 1.0, October 2020

Published by The National Organization of Nurse Practitioner Faculties May 2020. Comments relating to the material contained in this document may be submitted to the NONPF email NONPF@NONPF.ORG with the subject line Simulation Guidelines and Best Practice Document.

Suggested citation:

Lioce, L., Conelius, J., Brown, K., Schneidereith, T., Nye, C., Weston, C & Bigley, M. (2020). Simulation Guidelines and Best Practices for Nurse Practitioner Programs. National Organization of Nurse Practitioner Faculties. Washington: D.C.

TABLE OF CONTENTS

ABOUT THIS DOCUMENT

The National Organizations of Nurse Practitioner Faculties (NONPF) recognizes the need for clear nurse practitioner (NP) program simulation guidelines. In June 2019, the NONPF Board of Directors appointed a 17-member simulation committee, which recommended creating guidelines and resources for NP faculty education to support and guide simulation education. This document is a culmination of the committee's work and experience to date. This living document will change with the expansion of evidence-based practice.

PURPOSE AND SCOPE

The purpose of this document is to provide essential guidance for NP faculty seeking to create excellence in delivering simulation-based learning experiences. In addition, the document can assist NP programs faculty by standardizing and sustaining NP education to advance the science of simulation.

This document provides NP educators with a structured approach to the major aspects of simulation. Each section explores the elements and guidelines for best practice and offers direction for NP educators delivering high-level evidence-based simulation. These simulation guidelines, which are a collection of best practices, provide vital resources to aid in NP educators' implementation of simulation activities.

BACKGROUND

As demographics and healthcare delivery for the American population change (Institute of Medicine, 2010), society members live with more complex healthcare needs (National Center for Health Statistics, 2016). Nurse practitioner (NP) educators are at the forefront of preparing a qualified and competent NP workforce to meet these changes. However, the increased demands on NP education programs are continuing to tax the current system, challenging traditional didactic models as well as education in clinical settings (American Association of Colleges of Nursing, 2015). Growing enrollment, clinical site restrictions, and limited numbers of quality clinical preceptors require re-envisioning NP clinical education (Anderson, Campbell, Nye, Diaz, & Boyd, 2019; Aronowitz, Aronowitz, Mardin-Small, & Kim, 2017; Giddens et al., 2014; LeFlore & Thomas, 2016).

Only a paucity of research studies in NP education demonstrates the effectiveness of structured simulation on learning and the measurement of competencies. However, there is substantial evidence for the use of simulation in healthcare education, particularly as an augmentation to undergraduate nursing education (Alexander et al., 2015; Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014).

In a 2013 survey of NONPF members, 54% reported the use of high-fidelity simulation and 69% reported its use to augment NP clinical experiences (Nye et al., 2019; NONPF, 2013). Barriers to implementing simulation in NP education include inconsistent definitions of simulation modalities, limited research evaluating clinical competence and few outcomes-based studies (Rutherford-Hemming, Nye, & Coram, 2016; Wyatt & Krauskopf, 2014). This document provides a foundational guidance for NP education with the hope of clarifying application and adding to the science and future use of simulation in NP programs.

NP education has implemented simulation using standards and guidelines based on information predominately evaluated in undergraduate nursing programs. Stakeholders continue to debate on what counts toward direct patient care hours; however, evidence for replacement of these clinical hours is still lacking (Nye, Campbell, Hebert, Short, & Thomas, 2019). Currently, simulation may be used as long as the National Task Force on Quality Nurse Practitioner Education (NTF) minimum standard of direct patient care hours is met by the end of the program (National Task Force on Quality Nurse Practitioner Education, 2016). Well-designed, structured simulation can offer consistent, measurable educational opportunities and clinical experiences for learners to function in the role of NPs that may not be achievable in clinical settings (Coppa, Schneidereith, & Farina, 2019; Gore & Thomson, 2016; Guido-Sanz, Díaz, Anderson, Gonzalez, & Houston, 2019; Kelly, Blunt, & Nestor, 2019; LaManna et al., 2019; Parsons, Kuszajewski, Merritt, & Muckler, 2019; Schneidereith & Daniels, 2019).

INTRODUCTION

A recent survey of NP programs in North America found that 98% of all respondents used an educational modality that is defined as simulation by the International Nursing Association for Clinical Simulation and Learning (INACSL) (Nye, Campbell, Hebert, Short, Thomas, 2019). While simulation is being used in NP education, the guidelines for its use are based on undergraduate nursing education (Beroz, 2017; Cantrell, Franklin, Leighton, & Carlson; 2017). Many of the modalities and operational definitions of simulation are similar in undergraduate

and graduate nursing; however, there are variations and nuances in graduate education that are not fully captured in the undergraduate literature. Recent calls for action have suggested that creating simulation guidelines to specifically address its use in graduate education are needed to standardize the teaching and evaluation of graduate learners. (Anderson, Campbell, Nye, Diaz, Boyd, 2019; Jeffries et al., 2019).

Although many programs have implemented simulation, educators' preference for traditional methods of didactic instruction over active learning strategies has remained the same. Expansion of teaching and learning practices should include integrating social, learning, and behavioral theories to ground simulation experiences. The complex nature of developing a holistic NP program should include critical thinking – how to reason, communicate, practice and navigate complex healthcare systems. This need for critical thinking includes a focus on patient-centered behavior development, which may change the current curricular integration of knowledge, skills, attitudes, and behaviors. This shift in focus should ensure NP programs provide clinical experiences that allow the learner to experience, do, belong, and ultimately transform to become advanced practice providers (Lave, 1991).

SIMULATION AS A TOOL

What is simulation? There are several definitions in the literature which explain different aspects of simulation. Each of these definitions speaks to differing applications or experiences that reflect real-life situations and can be used to describe simulation.

- "A technique that creates a situation or environment to allow persons to experience a representation of a real event for the purpose of practice, learning, evaluation, testing, or to gain an understanding of systems or human actions" (Lioce et al., 2020, p.44).
- "An educational technique that replaces or amplifies real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner" (Gaba, 2004).
- "A pedagogy using one or more typologies to promote, improve, or validate a participant's progression from novice to expert" (INACSL, 2013).
- "An educational technique that allows interactive and at times immersive activity by recreating all or part of a clinical experience without exposing patients to the associated risks" (Maran & Glavin, 2003).

CORE COMPETENCIES IN NP EDUCATION

Since 1990, the National Organization of Nurse Practitioner Faculties (NONPF) has identified core competencies for all nurse practitioners (NPs). Core competencies are behaviors that include communication, psychomotor skills, and cognitive decision making. To determine if a learner is competent, the educator must assess for demonstration of that competency. All NPs need to show simulation competency demonstrations after graduating from an NP educational program. The 2017 updated competencies document also includes curriculum content" (NONPF, 2017). Simulation is a technique that allows for learning and assessment of core NP focused competencies.

IMPLEMENTING BEST PRACTICES

Identifying and adhering to best practices can be a daunting task. The past decade of simulation research, which supports its integration and operation, has created new certifications. For example, the Society of Simulation in Healthcare™ (SSH) awards the credential of Certified Healthcare Simulation Educator® (CHSE), as well as CHSE-A® and CHSOS®. In addition, the SSH sets accreditation standards and offers faculty development recommendations and program guidelines – all of which serve as a foundation for advancing the science of healthcare simulation.

A comprehensive list of NP simulation resources appears on the NONPF Simulation portal. The portal provides fundamental education resources and tools that include NP-specific simulation documents, International Nursing Association for Clinical Simulation and Learning's (INACSL) Standards of Best Practices℠, and simulation-specific educational learning theories from the simulation community.

A team of NPs certified to provide NP-specific recommendations and best practices reviewed the literature and studied best practices to select the essential elements featured in this document. A focused overview of each recommended element, along with resource links and program considerations, reflects a shared perspective.

This document identifies elements considered to be fundamental building blocks for clinicians with basic simulation orientation. Dynamically structuring these elements establishes a competency framework. Each element gives an overview of an important aspect of simulation education, provides operational implementation guidelines specific to NP education.

To streamline implementation, experienced simulationists have contributed additional information and operational considerations. Some guidelines include facilitators and barriers to implementation, advice about applying specific NP guidance to practice, exemplars and/or recommended application scenarios where appropriate.

These guidelines are not prescriptive; however, they can help NP education programs establish sound simulation practices, avoid known pitfalls, and build more robust simulation programs for competency-based education and assessment.

Whether NP educators are new to or experienced in simulation education, this document can be used to support incorporating simulation into curricula.

ELEMENTS & GUIDELINES

ELEMENT 1: SIMULATION THEORIES, FRAMEWORKS & STRATEGIES

Learning theories are essential to the educational process of designing, implementing teaching and assessing learning. These theories also offer a foundation for developing, integrating, and evaluating NPs' simulation-related competencies as they move through a curriculum. Employing a shared model using learning theories may improve knowledge acquisition and ultimately change behavior (Braungart, Braungart, & Gramet, 2019). This document offers nurse educators a framework for presenting simulation content across a curriculum.

GUIDELINE: LEARNING THEORIES

Multiple theories may be needed to support the objectives and goals of individual simulation experiences. Intentionally integrate theories during program simulation development and implementation to correlate with educational needs and priorities. The presented learning theories in this document are applicable to simulation, having been used in educational delivery and simulation research.

Bandura's Social Learning Theory

Overview: The premise of this theory, which is based on observational learning, is that we learn from one another. Learning through observation involves a four-step cognitive process: (1) attention [to role model]; (2) retention [processing or reflection of memory of observation]; (3) reproduction [using memory to guide learner behaviors]; and (4) motivation [based on feedback received from the performance of behaviors]. When used in simulation, Bandura's theory can link knowledge and skill through role modeling and observation of performance. According to this theory, NPs cultivate self-efficacy, or the belief in one's ability to perform the task, through role-modeling and observing the performance (Bandura, 1986).

- Application to NP Education: Learners observing faculty demonstrate cardiac assessment techniques in a health assessment lab [attention], discuss the technique in class [retention], provide a return demonstration in lab or in a formative simulation [reproduction], and feel a sense of self-efficacy in performing skills in practicum [motivation].

- Schön "The Reflective Practitioner"

Overview: This theory supports learning through guided self-reflection. Learners are asked to "reflection-in-action" and "reflection-on-action." Reflection-in-action refers to reflecting on behavior as it happens, and reflection-on-action refers to post-event activity that includes reviewing, analyzing and evaluating the recently completed event (Schon, 1987).

- Application to NP Education: Simulation debriefing is an educational strategy that incorporates reflection-in-action and reflection-on-action. In a formative simulation scenario, learners conduct a comprehensive patient history. During debriefing, they will recall what they were thinking while making decisions throughout the scenario [reflection-in-action]. They will summarize their overall learning and lessons learned from completing the simulation [reflection-on-action].

- Adult Learning Theory

  Overview: Knowles' theory is based on andragogy-- the art and science of teaching adults.

  - Adults enter into a simulation experience to change skills, behavior, and knowledge level. These self-directed learners need educators to facilitate their learning. They leverage their life experience as they learn. These concepts should be incorporated into simulation experiences to maximize learning (Knowles, 1984).
  - Adult learners have unique barriers to their learning that need to be taken into consideration. These barriers include but are not limited to a lack of time, low confidence level, and insufficient information regarding the learning experience and its benefits.

  - Application to NP Education: This theory can be applied to many types of simulation from using task trainers to learning a skill to a formative simulation using a standard patient (SP). As adults, NP learners have the desire to learn and need to see the benefit of the learning experience. Debriefing incorporates self-directed learning through reflection.

- Situated Cognition Theory

  Overview: The premise of this theory is that individuals acquire skills in the social situation in which the learning (naturally or authentically) occurs. As such, social constructs offer a context for learning. According to this theory, learning occurs as a continuum, and is not a linear evert with a specific beginning and end. This theory also emphasizes how the right kind of social engagement and community build interest and shared experiences (Lave and Wenger, 1991).

  - Application to NP Education: This theory can be applied to the role-playing that occurs in real-life clinical settings and/or an in-situ simulation in the hospital setting. Often, interprofessional simulations utilize the in-situ format when training for medical emergencies such as a mock code (Lave & Wenger, 1991).

- Experiential & Reflective Practice

  Overview: This theory is focused on intentionally creating learning experiences that allow learners to build upon their current knowledge and experience. It is also known as the least two other names: the cycle of reflective practice, and experiential learning theory (Kolb, 1983)

  - Reflective practice includes four stages: (1) concrete experience; (2) reflective observation or review; (3) abstract conceptualization; and (4) active experimentation. In the concrete experience and reflective observation stages, learners acquire new knowledge. Abstract conceptualization and active experimentations occur when learners transform or incorporate their new knowledge into their behaviors (Kolb, 1983).

  - Application to NP Education: NP learners participating in a simulation scenario are required to identify stroke symptoms [concrete experience]. During the debriefing, they reflect on the scenario and their thought processes, decisions, and actions [reflective observation or review]. The learner then completes a mental rehearsal of what they will

do when seeing a patient with these symptoms in the future [abstract conceptualization], and subsequently uses this new knowledge and awareness of their own experience in another simulated or real clinical experience [active experimentation].

- Deliberate Practice Theory

  Overview: Deliberate practice theory involves learners' repeated performance of defined skills. After each demonstration, the learner receives specific assessment and feedback, to improve skill performance. Learners must be motivated to attend to the assigned task and exert effort to improve their performance. The design of the task should incorporate the learner's pre-existing knowledge to assure an understanding after a brief instruction. The learner should repeatedly perform the same or similar tasks to improve performance (Ericsson, 2008).

  - Application to NP Education: NP learners use task trainers to learn how to conduct a pelvic or prostate exam. They receive feedback on their performance each time they perform the exam. Feedback can be provided by faculty or a peer using a checklist. The goal is to improve performance with each repetition until the learner can perform the skill competently.

GUIDELINE: FRAMEWORKS & STRATEGIES

A competency framework describes performance and excellence within a simulation program. Frameworks should provide both a mental model of competence and vocabulary that describes successful performance. These shared elements allow the NP educator and the learner to have a greater understanding of expected outcomes. An education program may use more than one framework to structure its simulation program.

- Miller's Pyramid of Professional Competence (1990)

  Overview: This pyramid-based framework can be used to scaffold the types of assessments that determine clinical competency. In this framework, achieving behavior competency requires successful cognition competency.

  - The lower levels of the pyramid assess cognition (Miller,1990):
    - Knows: Test factual recognition (example: written examination).
    - Knows How: Assess application of knowledge (example: case-based questions).
  - The upper levels of the pyramid assess behavior (Miller, 1990):
    - Shows How: Assess demonstrated clinical skills in a controlled situation (example: Objective Structured Clinical Examination, lab practice).
    - Does: Assess clinical skill competency in a work environment or direct observation in a clinical environment. This assessment focuses on overall performance; not component skills (example: 360degree assessment, videotaping with follow-up review).

  - Application to NP Education: NP learners learn about acute abdomens in class and take a test [knows]. They then complete a case study in class on differential diagnoses for abdominal pain [knows how]. Next, they complete an appendicitis simulation [shows how] and, finally, they care for a patient with an acute abdomen in a clinical setting [does]. Once these levels are achieved, simulation can be performed in multiple forms such as lab practice, an Objective Structured Clinical Examination, and videotaped demonstration.

- Reporter, Interpreter, Manager, Educator (RIME) (Pangaro, 1999; Pangaro, 2000)

  Overview: The RIME framework, which is utilized in medicine, assess competency while increasing learner competency in the clinical setting. This approach uses a universal evaluation vocabulary during clinical experiences and allows for mapping learners' progress across the curriculum. Using this framework allows for consistent language across the curriculum, permitting the NP educator and the learner to better understand expected outcomes (Pangaro, 1999; Pangaro, 2013). This framework can be incorporated throughout an NP program helping to distinguish basic skills from advanced performance.

  - Application to NP Education: RIME may be used to conduct a series of simulations throughout the NP program. For example, first semester: expect demonstration of competency in history and physical skills [reporter]; second semester: expect demonstration of competency in identifying differential diagnoses and ordering labs [interpreter]: third semester: expect demonstration of competency in managing changes in chronic conditions [manager]: fourth semester; expect demonstration of competency in leadership and detailed patient education [educator].

- Kirkpatrick (1996)

  Overview: Kirkpatrick's framework organizes simulation-based learning into four distinct levels. In Level One (Reaction), the learner's sense of confidence and competence is measured after participating in the simulation. In Level Two (Learning), the learner's knowledge is benchmarked before and after the simulation to track the gain. In Level Three (Behavior), changes in learner behavior, as shown in practice simulations, are evaluated post simulation. In Level Four (Results/Outcomes), the educator evaluates the learner's overall outcome in search of an improved patient outcome (Kirkpatrick, 1998).

  - Application to NP Education: Kirkpatrick's framework can be used to evaluate the effectiveness of simulation incorporated into an overall NP curriculum. Level One learning can be evaluated through confidence surveys. Level Two learning can be evaluated through tests or quizzes. Level Three learning can be evaluated through simulation checklists. Level Four learning is the most difficult to evaluate, due to the number of variables that can affect obtaining the data.

- Bloom's Revised Taxonomy (Krathwohl, 2002)

  Overview: Using Bloom's Revised taxonomy as a framework classifies educational learning objectives and describes the desired end behavior. This framework includes levels that increase in difficulty: knowledge, comprehension, application, analysis, synthesis, and evaluation. These levels use complexity to divide what is being measured in each simulation. NP educators employing Bloom's taxonomy intentionally match the objectives

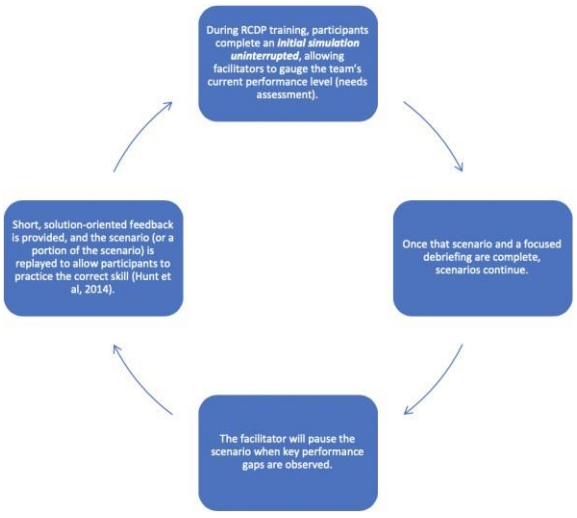
and outcomes to the level to the learner to measure competency (INACSL Standards Committee, 2016).

- Application to NP Education: Objectives should be scaffolded to expected outcomes. Learners early in a program may be applying knowledge to conduct a health assessment. Learners further along in a program may be synthesizing evidence to develop a management plan for a multi-faceted patient.

NP education requires advanced cognitive and psychomotor skill acquisition. Objectives may aid in determining a simulation-based approach to skill acquisition. Skills may be broken down into segments and offered to learners when they are ready. Simulations focused on skills support, advancing learners from simple tasks to mastering more complex tasks along a path of procedural skill acquisition. Verification of expanding skill-sets occurs throughout the process, which also incorporates and evaluates additional Knowledge, Skills, and Experience (KSAs) such as communication and safety. Consider applying one of the following training methodologies:

- Rapid Cycle Deliberate Practice (RCDP) Simulation Training (Teaching)
  - Overview: Involves repetitive practice over a short time to encourage rapid acquisition of a skill (Ericsson 2008; Hunt et al 2014; Brown et al, 2018; Perretta et al, 2020). RCDP, which is based on the deliberate practice work of Ericsson (2008), also includes elements of mastery learning as described by McGaghie (2009) (Eppich et al, 2015).
    - Repetitive, deliberate performance of defined skills with specific assessment and feedback, with a goal of improved performance.
    - A key objective of mastery learning involves facilitators assuring learners achieve certain skills before advancing to the next skill level (Brown et al, 2018; Eppich et al, 2015; Hardie & Lioce, 2020).
    - Allows for direct feedback.

FIGURE 1: RCDP [CYCLE] STEPS (Brown, et.al., 2018, Perretta et.al. 2020)

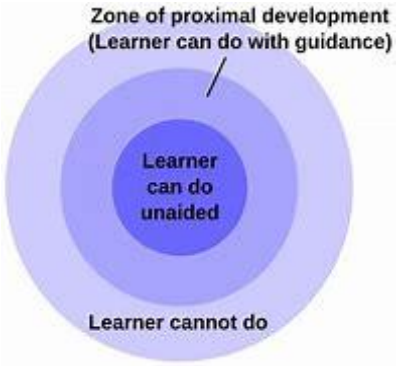


- Offers opportunities to re-try the scenario, increasing the likelihood of improved performance with repetition and allowing for progressively more challenging simulation rounds interspersed with brief, direct feedback (Hunt et al, 2014; Eppich et al, 2015; Doughty et al, 2015).
- Uses well-defined, time-sensitive objectives to maximize the time the learner is in "deliberate practice" (Hunt et al, 2014).

– Application to NP Education: Educators can use RCDP teaching methodology for simulation elements in which "time-to-task" is critical, such as CPR training and any guideline-directed checklist training.

- Zones of Proximal Development (Vygotsky, 1978)

Overview: The Zone of Proximal Development (ZPD) describes the developmental progress of a learner towards the ultimate goal of functioning independently. The premise of this theory is that the educator provides scaffold-to-support zones of development to move learners moving from "cannot do" (the outermost zone), to "can do with help," to what the learner "can do without help (the innermost zone) (Vygotsky, 1978; Wells, 1999)". Using the ZPD approach is said to provide a more natural environment in which to learn.



(Vygotsky, 1978)

– Application to NP Education: Every learner will need support to move from "cannot do" to "can do without help." This learning progression can be viewed as three levels on a continuum from novice to competent. Learners struggling in early simulations [cannot do] will need more detailed feedback and support during debriefing. Learners mid-way through the program will require additional feedback during simulation [can do with help]. Learners later in the program will confidently demonstrate competence in simulations [can do without help].

- Contextual Learning (Kneebone, 2005):

  Overview: Kneebone describes simulation learning in four stages of capacity development from assisted performance to unassisted performance to full internalization and, finally, to de-automization. Because this type of learning is multi-faceted and complex, simulation sessions should allow for deliberate practice with assistance from experts. The simulated experiences, which should closely resemble real-life experiences, should be learner-centered and supportive.

  - Application to NP Education: Simulating a primary care clinic for formative assessment requires a group of standardized patients in a similar care setting. . Furthermore, learners acquire skills that cross the continuum of care to "engage patients through simulation…rebalancing the dynamics of providing care" (Kneebone 2005).

ELEMENT 2: CURRICULAR INTEGRATION OF SIMULATION

Allowing registered nurses to take on the advanced care levels offered by NPs requires curricular integration of new knowledge skills, attitudes, and behaviors.

Simulation can evaluate cognitive proficiency and clinical proficiency in a realistic setting. The goal of simulation integration is to provide learners with a curriculum that intentionally scaffolds learning and expectation to support the attainment of NP competencies (National Task Force on Quality Nurse Practitioner Education, 2016).

Combining clinical simulation *with a quality debriefing* after direct patient care provides structured experiential learning opportunities that can lead to changes in behavior. These changes support increased competence and higher levels of critical thinking.

GUIDELINE: INTEGRATION PROCESS

Curricular integration requires a comprehensive needs assessment specific to the NP program. This integration should include identifying the NP competencies driving global programmatic objectives.

- Overview -Needs Assessment:
  - Before the simulation curriculum can be designed, a comprehensive, programmatic needs assessment needs to take place. End-of-program evaluation, certification data, course exam scores, preceptor feedback, simulation faculty feedback, and course faculty feedback should all be incorporated into the needs assessment.
  - The assessment should also include identified organizational and systems-based barriers to simulation training, such as financial support, faculty time and effort, and stakeholder buy-in.
  - Analysis of the needs assessment will help identify performance gap data.
- Alignment with the NP Curriculum:
  - Alignment of the simulation experiences with the curriculum should support the advanced practice competencies defined by the AACN and NONPF to reflect integration between the curriculum and clinical/simulated experiences. Program outcomes should support course objectives and subsequent learning outcomes.

  - Utilization of a curricular map as a blueprint for specific courses assures alignment of the curriculum with clinical and simulated experiences.

- Course Mapping:
  - Serves as architectural blueprint for the course.
  - Aligns course objectives to learning outcomes (Biggs, 1999; Biggs, 2003, INACSL, 2016;).
  - Uses a Simulation Objective Map (SOM) to incorporate course objectives with simulation objectives, providing an overview of simulation activities within a total program.

GUIDELINE: COMPETENCY

Curriculum integration of simulation should be based on the ultimate goal of preparing the learner at the highest level and meeting the competency standards set forth by AACN and NONPF. There has been a shift from "content-focused" to "competency-based" curriculum in healthcare (Schumacher & Risco, 2017). NONPF was an early champion of the concept of a competency-based curriculum for NPs.

As stated in AACN's *Common Advanced Practice Registered Nurse Doctoral-Level Competencies* (2017) regarding competency:

> "In response to the recommendations of the AACN APRN Clinical Training Task Force, AACN convened the APRN Competency-Based Education for Doctoral-Prepared APRNs Work Group in 2016. The work of this group began by examining, and ultimately adopting, common definitions of the terms competence, competency, and competency framework. Following a review of relevant *literature regarding competency-based education in the health professions, the group agreed to* adopt the following definition of competency identified by Frank, Snell, and colleagues (2010): An observable ability of a health professional, integrating multiple components such as knowledge, skills, and attitudes. Since competencies are observable, they can be measured and assessed to ensure their acquisition. The group also adopted the following definition of competence identified by Frank, Snell, and colleagues (2010): The array of abilities (knowledge, skills, and attitudes) across multiple domains or aspects of performance in a certain context. Competence is multi-dimensional and dynamic. It changes with time, experience, and settings."

ELEMENT 3: ESSENTIALS OF SIMULATION

GUIDELINE: PRE-BRIEFING

Pre-briefings are an essential step that should precede every simulation. In the session-specific briefing, facilitators provide learners with clarity to the objectives and goals of the specific simulation, instructions for the simulation, background information on the patient, and data about the setting required to complete the simulation (Hardie & Lioce, 2020; Lioce, et al. 2020). These explanations of expectations, patient data, and environment allow learners to focus on the critical thinking required by the simulation.

- Pre-briefing:
  - Provides orientation information prior to the start of the simulation (Lioce et al., 2020).
  - Sets the stage for learning objectives.
  - Offers preparatory information regarding the patient scenario.
  - Orients participants to the environment and equipment.
  - Sets psychological safety.
    - Establishes an environment that is safe for the learner.
    - Allows learners to engage in an environment that safely acknowledges errors, supports curiosity, and establishes respect.

Pre-briefings before the simulation experience begins should include six key components (Rutherford-Hemming, Lioce, Breymier, 2019). While the six components do not have to be completed in a specific order, each should be covered. If a variety of simulation experiences are taking place consecutively, repetitive information may be shortened.

1. Setting the scene (initial): Include information on psychological safety, the fictional contract, confidentiality, communication, and logistics.
2. Expectations (initial, consecutive, if altered): Discuss expectations of facilitator and learner.
3. Debriefing (initial and consecutive, if altered): Explain the purpose of debriefing, type format being used, and logistics of debriefing.
4. Simulation scenario (initial and consecutive): Provide backstory of the scenario, roles of the participants, objectives of the simulation, and methods of evaluation.
5. Simulation room orientation (initial and consecutive if altered): Include the modality of simulation (task trainer, mannequin, SP, confederates) and equipment availability.
6. Preparation time (initial and consecutive): At the end of pre-briefing, allow participants time to review case-specific information. Time allowance should reflect common timing experienced in a clinical environment, accommodating the learner's skill level.

GUIDELINE: DEBRIEFING

Debriefing is defined as "a formal, collaborative, reflective process within the simulation learning activity… An activity that follows a simulation experience and led by a facilitator" (Lioce et. al, 2020).

When considering debriefing options in NP education, the faculty should align the theoretical framework and the debriefing with the learning objectives (INACSL, 2016). Programs may incorporate faculty training about blended debriefing methodology or allow faculty choice of a method based on individual course needs. It is vital that the faculty has formal and continuing development in debriefing. Non-threatening debriefing should be organized, completed in a supportive learning environment, and focus on promoting a safe learning environment. There are multiple methods for debriefing learners. Different learning objectives and simulation specifics may favor one style of debriefing over another (Cheng et al., 2016; Dreifuerst, 2015; Gardner,

2013; Sawyer et.al, 2016)). Facilitators must be trained and evaluated on their use of the chosen debriefing method (Hardie & Lioce, 2020; INACSL Standards Committee, 2016). While there are variations among debriefing methods, commonalities between methods include:

- Address the Reaction: Learners' emotional responses to the simulation are addressed. Clearing of emotions early in the process enables the learner to focus on rigorous reflection rather than their response to the simulation.
- Describe the Facts: Learners verbalize the events that occurred in the simulation. This step creates a shared mental model of what occurred where discrepancies can be clarified.
- Reflection-Based Analysis: Facilitators lead learners through a process to support reflection, discovery, connections, and understanding of each learner's thoughts and actions throughout the simulation (Hardie & Lioce, 2020).
- Summary: Learners verbalize the key knowledge, skill, or attitudinal gain they will apply to future patients or simulation experiences.

There are various examples of methods of debriefing (Sawyer et.al, 2016):

- Plus-Delta (Dismukes & Smith, 2000)
- Debriefing for Meaningful Learning (Dreifuerst, 2015)
- Debriefing with Good Judgement (Rudolph et al, 2006)
- Advocacy-Inquiry Method (Rudolph et al, 2006)
- Gather, Analyze, Synthesize Model (Sawyer et.al., 2016)
- Promoting Excellence and Reflective Learning in Simulation (Eppich & Cheng, 2015b)
- Direct Feedback (Cheng, 2015; INACSL Standards Committee, 2016)

Prebriefings and debriefings may be done in person or virtually. Important aspects of prebriefing include the facilitator setting expectations, addressing learner questions, building trust, and lowering anxiety. Critical aspects of debriefing include the facilitator's curiosity about the learner's frames and experiences, probing the WHY behind decisions in immersive simulation, correcting and confirming clinical decision-making, and discussing knowledge gaps in real-time to bring the whole experience together. Individual, small group, and even large group debriefings have produced promising results (Rutherford-Hemming, Lioce & Breymier, 2019).

GUIDELINE: LEARNING OBJECTIVES

All simulation experiences are based on expected learner outcomes and objectives. For NP learners, outcomes and objectives should align with program outcomes, be guided by the discipline-specific certifying bodies, and incorporate the Nurse Practitioner Competencies as stated in *National Task Force on Quality Nurse Practitioner Education Criteria for Evaluation of Nurse Practitioner Programs:*

Create objectives using Bloom's taxonomy (based on the level of the learner and expected outcomes (see "Theories").

1. Write objectives using the SMART format: Specific, Measurable, Achievable, Realistic, and Time-phased (INACSL Standards Committee, 2016).

- Specific: Includes a specific description of the desired behavior. This statement includes the who or the what (i.e., develop three realistic, differential diagnoses).
- Measurable: Explain how outcome achievement will be measured (i.e., three differential diagnoses).
- Achievable: Allow enough time to meet the objectives. If time does not allow achievement, the objective should not be part of this simulation.
- Realistic: Consider the level of learner, timeframe, and resources. If working with beginning NP learners "appropriately running a Code Blue simulation" would not be a realistic objective, while "completing a thorough history" would be realistic.
- Time-phased: Identify the amount of time needed to accomplish the objective (i.e., During this simulation, the learner will develop three realistic differential diagnoses for a patient with respiratory distress).

2. Develop broad and specific objectives that will meet the outcomes.
   - Broad objectives include the simulation's overarching goal(s) as related to the program and or certification outcomes.
   - Specific objectives should relate to expected learner behaviors.
   - The specific objectives should be few enough to be achievable within the simulation timeframe (i.e., three to five minutes).
3. Provide learners with broad objectives prior to the simulation experience during the pre-briefing. However, do not offer information that would unduly influence learner performance.

GUIDELINE: MODALITIES FOR NP SIMULATION

Primarily, learning objectives and resources drive the choice of simulation modality. However, there are multiple factors to consider when choosing a simulation modality.

- Fidelity is "the degree to which the simulation replicates the real event and/or workplace; this includes physical, psychological, and environmental elements (Lioce et al, 2020)." (see "Types of Simulation Delivery" for specific examples)
  - High-Fidelity: "Refers to simulation experiences that are extremely realistic and provide a high level of interactivity and realism for the learner" (International Nursing Association for Clinical Simulation and Learning, 2013; Lioce et al, 2020).
  - Low Fidelity: Equipment "not needing to be controlled or programmed externally for the learner to participate" (Lioce et. al, 2020; Palaganas, Maxworthy, Epps, & Mancini, 2015).
  - Hybrid Simulation: "The union of two or more modalities of simulation with the aim of providing a more realistic experience" (Lioce et. al, 2020).

GUIDELINE: TYPES OF SIMULATION DELIVERY

- **Human Patient Simulators/Manikins**
  - Allows focus on incorporating multiple skills, behaviors, and critical thinking.
  - Allows learners to practice multi-modal simulated patient care, with realistic, interactive programmable simulator/manikin.
  - Enables instructors to assess the demonstration of multiple learner skills and behaviors simultaneously.
  - Choose a simulator based on learning objectives and available resources.
    - Example: *High-fidelity* with features that include chest movement, palpable pulses, heart tones, and breath sounds.
    - Application in NP education: NP learners use a *high-fidelity* simulator in a code scenario simulation. This simulation allows for an assessment of psychomotor skills of ventilation, intubation, chest compressions; teamwork and communication skills; critical thinking skills of medication management, time-to-task, decisions made in relation to a patient's response to treatment, and communication skills when updating the patient's family.
    - Common Facilitators: Immersive learning, interprofessional learning, advanced skill, and knowledge acquisition with repetitive practice and consistency in experiences among learners.
    - Common Barriers: Cost (Fletcher & Wind., 2013), set-up (moulage), facilitator training time (Hardie & Lioce, 2020), simulation, and storage space. Lack of realistic verbal and non-verbal cues.

- **Task Trainer/Partial Trainer**
  - Focus is on the psychomotor skill in isolation.
  - Allows learners to repetitively practice one specific task, which develops muscle memory.
  - Offers faculty a way to provide immediate directive feedback and to verify skill competency prior to performing on a real person.
    - Example: ABG wrist/arm, intubation head.
    - Application in NP education: NP learners practice intubation using an intubation head repetitively until they can complete the skill and meet minimal acceptable standards.
    - Common Facilitators: Focused, repetitive skills practice, consistency in experiences among learners.
    - Common Barriers: Facilitator training time, cost, space for implementing, and storage of equipment.

- **Standardized Patient (SP)**
  - The focus is on providing a *high-fidelity* scenario with a simulated patient, allowing for realistic verbal and non-verbal communication from the patient. A standardized patient (SP) is defined as "an individual who is trained to portray a real patient in order to simulate a set of symptoms or problems used for healthcare education, evaluation, and research" (Lioce et al, 2020). SP's can be trained to provide directive feedback or a full debriefing to the learners on their performance.
    - Examples: Physical Exam Training Assistants (PETA), Gynecological Teaching Assistant (GTA), and Virtual Standardized Patients (VSP). There can also be a hybrid simulation where an SP is used with a fake arm for a blood draw.
    - Application in NP education: Objective Structured Clinical Exam (OSCE) is an example of high-fidelity immersive simulation (Ling et.al. 2018); scenarios may include communication as a primary learning objective; hybrid simulations may include an SP and task trainer (use of 2 or more simulation methods).
    - Common Facilitators: Communication tool, high-fidelity, assessment tool.
    - Common Barriers: Cost, implementation training, case training, potential for variability of experience between learners.
  - The use of standardized patients is common and valued in NP education. In order to achieve the best results, it is crucial to incorporate the Association of Standardized Patient Educators' ASPE Standard of Best Practice (2017) into any standardized patient program.
    - Quality SP Programs include but are not limited to:
      - Script development with simulation, content, and SP experts.
      - SP training on the script.
      - SP training on the type and manner of feedback, if any.
      - Pilot testing simulation.
      - Post simulation feedback to SP.

- **Role Play**
  - Considered *lower fidelity*, role play focuses on developing communication skills.
  - Allows learners to portray a patient, family member, or another healthcare team member to facilitate a simulation objective. With minimal guidance, learners can play themselves or assume a specific role, enabling a partnered learner to develop competency and communication skills.
  - Allows faculty to observe and provide feedback in a large-group setting.
    - Examples: learner self-evaluation, formative applications, eliciting a history and physical

- Application in NP education: NP learner role play completing a history on a peer learner in a health assessment class.
- Common Facilitators: Cost-effective (Boss et.al., 2015), minimal preparation
- Common Barriers: Lack of fidelity, additional research needed on long term retention

- **Unfolding Case Study**
  - This form of case-based learning uses a story format to shows how a case evolves and requires the learner to apply clinical decision-making that may impact the progression of the case (NLN, 2020; Lioce et al, 2020). *Fidelity* may vary dependent on which modalities and briefing methods are incorporated.
  - Allows learners to work individually or collaboratively to critically think through the care management in a patient-based scenario.
  - Allows faculty to assess the critical thinking and decision-making skills of individual learners and groups of learners in the context of a patient case.
    - Example: NLN's Advancing Care Excellence for Seniors (ACE.S) Unfolding Cases (n.d). The case can increase in complexity over weeks, over the semester, or even throughout the curriculum.
    - Application in NP education: NP learners complete a semester-long unfolding case study that begins with a first patient encounter for a wellness visit, followed by a diagnosis of type 2 diabetes, followed by the impact of an acute illness, and ending with the need to change the medication regime based on patient data.
    - Common Facilitators: Cost-effective, scenario is provided within a patient context, allows for managing patients over time.
    - Common Barriers: May be time-consuming to develop and must evolve with unpredictability to develop clinical decision-making competency.

- **Distance & Online (Telepresence)**
  - As NP education evolves, being able to deliver content via an online platform has become necessary. To facilitate simulation experiences for learners, telepresence experience may be used to facilitate simulation for remotely located learners. Delivering this content online allows the learner to control and interact with the on-site simulation (Mudd, McIltrot & Brown, 2019). *Fidelity* may vary dependent on which modalities and briefing methods are incorporated.
    - Example: Simulation experience with the learner off-site
    - Application in NP Education: OSCEs, acute care high-fidelity, manikin simulations, SP simulations
    - Common Facilitators:

- A user-operated device allows learners to control what they see and how they interact in the classroom setting or simulated experiences. Facilitates active learning from remotely located participants, dissolves geographic boundaries.
- Time zone-independent scheduling.
- Browser-based (no apps needed). The learner can control the device using a personal computer, phone, or tablet via the internet.
- Allows the educator to implement both formative and summative evaluations.

o Common Barriers:

- Cost, storage of the device, Staff and IT support, maintenance of the devices, internet instability, limited physical exam.

- **Virtual Reality Simulation**

– Definitions (McGrath, Taekman, Dev, Danforth, Mohan, Kman, Crichlow, Bond, 2017).

Virtual Simulation (VS): Screen-based simulation where the visuals and sounds emphasize the 3D nature of the environment. The re-creation of reality on a computer (Lioce et al, 2020). Three types of VS are available today:

o Virtual Reality (VR)- Use of a fully immersive environment, which includes physical interfaces such as a headgear-based visual adaptation, sound, and haptic devices. Virtual reality simulations, which provide reflections of real-world scenarios or environments on a computer screen, are defined as a "broad concept that encompasses three categories of simulators – screen-based VR simulators, virtual worlds, and immersive VR environments" (Bracq, Michinov & Jannin, 2019).

o Augmented Reality (AR): "Stimuli are superimposed on real-world objects (overlays digital computer-generated information on objects or places in the real world)" for enhancing the user experience. "A technology that overlays digital computer-generated information on objects or places in the real world for the purpose of enhancing the user experience" (Lioce et al., 2020, p. 9)

o Virtual Standardized Patient (VSP): Avatar-based representations of human standardized patients that can converse with learners using natural language.

ELEMENT 4: SIMULATION DESIGN

Simulation design best practices offer factors to be taken into consideration before selecting a type of simulation (INACSL, 2016). Simulation design describes the process which yields quality simulations. Following a consistent process allows NP educators to use best practice pedagogical behaviors, which can lead to high quality simulations.

The production of a consistent method of documenting the multiple characteristics and components of a specific simulation is part of simulation design. Adapting a simulation template

enables faculty and simulation staff to ensure that they have the information needed to provide consistent and replicable simulations before they build a simulation experience. This template should include goals, objectives, pre-briefing case information, scripts, and debriefing points. Case information should specify the equipment needed, ideal room set-up, staffing support, and standardized patient information. While there are variations of components included in design templates, consistency is key to operationalizing and assessing quality simulation within and across NP programs. (see simulation design information and best practices resources located in The NONPF Simulation Portal.)

ELEMENT 5: EVALUATION

GUIDELINE: BEST PRACTICE FOR THE NP

Evaluation methods should align with stated learning objectives and should address competency metrics. Choosing an appropriate form of evaluation involves an understanding the goals of the simulation experience.

GUIDELINE: TOOLS FOR NP ASSESSMENT

Evaluation tools should be selected based on precise measurement of learning objectives' attainment. The selected tool should provide an unbiased roadmap for the evaluator. Facilitator training should always be conducted prior to the implementation of a tool for evaluation (Hardie & Lioce, 2020).

- Checklists: Can be expert guided or based on clinical guidelines (i.e., CPR checklist).
- Rubrics: Based on learning objectives and include levels of expected behaviors.

GUIDELINE: LEVELS OF EVALUATION

Standardized methods to measure outcomes and verify a variety of competencies fall into three categories:

- **Formative Simulations** support personal development and learners' learning acquisition of skill-based components of the NP role.
  - Allows learners to practice components of the NP role in a safe and developmental learning environment.
  - Aids the learner in self-evaluations.
  - Allows faculty to determine learner level and areas for improvement.
  - Formative simulations should align with the simulation's objectives and outcomes, occur at any time in the program, and include facilitated debriefing with directed feedback or full debriefing to enhance learning, critical thinking, and decision making.
    - Application in NP education: NP learners complete two formative simulations with SPs in the semester preceding their clinical experience to improve exam organization, communication, and patient presentation skills.

- **Summative Simulations** measure achievement of outcomes and objectives at a particular time within the program of study, often at the end.
  - Allows learners to demonstrate competency in identified skills related to the NP role.
  - Allows faculty to observe and assess learners using a consistent measuring technique.
  - Summative simulations should use valid and reliable instruments for scoring and provide rater training to establish interrater reliability prior to evaluation with learners. In addition, summative simulations provide learners directive feedback on outcome achievement, include elements of formative design (clear learning objectives, alignment with learner learning outcomes, and quality simulation design), and contribute to a grade that is the portion of a course grade or as pass/fail.

Consider post-simulation assignments that contribute to the summative grade and can be used in formative simulations (i.e., Reflective assignments (Schneidereith & Daniels, 2019) and SOAP notes (Podder, Lew & Ghassemzadeh, 2020).

ELEMENT 6: FACULTY/FACILITATOR DEVELOPMENT

Simulation is a pedagogy that requires a robust faculty development program for effective operation and utility. For optimal success, faculty require structured learning guided by simulation experts and mentors to ensure consistency and use of best practices for simulation in NP education (Hardie & Lioce, 2020). Best practices in faculty development require faculty exposure to these components prior to participation in simulation-based education. The National Organization of Nurse Practitioner Faculties (NONPF) Simulation Portal features Faculty Training Resources for Simulation; however, individual NP programs can certainly develop individualized faculty development.

GUIDELINE: FACULTY SIMULATION DEVELOPMENT

Faculty development for simulation must include:

- Development and maintenance in simulation-based curricular integration
- Simulation design (cases)
- Debriefing techniques (one type or blended methods)

Faculty development can be completed through continuing education, workshops, seminars, lunch and learn sessions, webinars, or self-paced study. Faculty should have an individualized development plan for simulation skills and proficiency, followed by an annual validation of competence. A recent article, "A Scoping Review and Analysis of Simulation Facilitator Essential Elements" (Hardie & Lioce, 2020) provides a comprehensive facilitator development plan. The National Council of State Boards of Nursing (NCSBN) Checklist for preparing simulation faculty includes:

- NP simulation faculty must receive education in the pedagogy of simulation.
- Faculty should have mentorship through initial simulation experiences until a simulation expert/mentor verifies competence and familiarity. Benner's framework of novice-to-expert can be applied to simulation faculty as competency in simulation pedagogy is

obtained (Benner, 1984; Waxman & Telles, 2009).

- A novice simulation faculty might receive basic knowledge in standards of best practices and basic technical skills.
- An advanced beginner might receive training in simulation design and curricular integration.
- A competent simulation faculty might explore certification as a Certified Healthcare Simulation Educator and expand skill sets to include full simulation execution.
- A proficient simulation faculty would begin mentorship of novice simulation faculty and consider advanced certification while an expert would explore leadership of simulation programs and research to improve and enhance the pedagogy of simulation.
- All faculty simulation team members should complete faculty development and begin the continuum of proficiency prior to engaging in simulation education.

Simulation faculty competency requires annual validation and can be accomplished in a variety of methods, including:

- An annual faculty self-evaluation will inform self-identified strengths and areas for growth to guide a self-directed development plan.
- The evidence-based tool, Debriefing Assessment for Simulation in Healthcare© (DASH) (Simon, Raemer, & Rudolph, 2010), can be utilized to validate faculty competency in debriefing techniques. DASH provides a 360 evaluation from the rater, learner, and instructor.
- Faculty competency in evaluating learner simulation performance can occur through establishing interrater reliability on simulation performance evaluation tools. Individual videos of learner simulation performance at high, moderate, and low effectiveness can be graded across faculty to establish consistency in rating and performance evaluation.
- Peer-to-Peer mentorship provides excellent faculty development in matching an experienced simulation faculty with a novice. The peer mentor can provide support in simulation development and co-briefing during simulation to not only offer competency validation but also faculty development.

GUIDELINE: CERTIFICATION/VERIFICATION PROCESS

Certification in the field of simulation is offered by The Society in Healthcare Simulation (SSH). Certification offers many benefits to healthcare professionals, including recognized expertise, improved simulation education, and improved patient safety. Several types of certification are available from SSH:

- CHSE: Certified Healthcare Simulation Educator, exam-based
- CHSE-A®: Certified Healthcare Simulation Educator-Advanced, portfolio-based
- CHSOS®: Certified Healthcare Simulation Operation Specialist, exam-based
- CHSOS-A®: Certified Healthcare Simulation Operation Specialist, portfolio-based

NPs as well as simulation centers can apply for accreditation. To meet criteria for accreditation, a simulation center must meet seven core standards that focus on the center's operations, including mission and governance, resource management, program management, program improvement, human resources, integrity, and expanding the field.

ELEMENT 7: SIMULATION RESEARCH

Evidence-based research is essential to advancing the science of NP simulation. However, a current lack of research describing the outcomes of simulation usage in NP programs complicates that advancement. Supporting the use of simulation as a reliable and valid teaching method to expand clinical skills, improve quality of care, and affect patient outcomes requires the rigorous research frameworks fundamental to reporting results. The following frameworks, which are endorsed by multiple high-quality journals, are foundational educational constructs in graduate-level research in simulation.

GUIDELINE: DISSEMINATION

Quality research uses sound frameworks. Simulation research include extensions to reporting known as "*Reporting Guidelines for Health Care Simulation Research: Extensions to the CONSORT and STROBE Statements" (Moher et.al., 2010; Von Elm, et.al.2008).* Use of a systematic and thorough reporting method will advance evidence-based practice and inform future practice.

- The CONSORT (Consolidated Standards of Reporting Trials), which was first published in 1996 and updated in 2010, centers on improving the quality of reporting randomized clinical trials to reduce design flaws, inadequate reporting, and bias. It consists of a 25-item checklist and a flow diagram.
- The STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) provides guidelines for reporting observational research such as case control, cross-sectional reporting, and cohort studies. It consists of a 22-item checklist that provides guidelines on reporting. *Note: This checklist does not feature information about how to design or conduct a study.*

CALL TO ACTION FOR RESEARCH IN NURSE PRACTITIONER EDUCATION

The NONPF Simulation Committee 2019-2020 recommends exploration of simulation best practices as a first step toward filling the current void of research. The committee suggests that best practices research be focused on using simulation as an effective teaching method in NP education. Specific areas of valuable research include:

- Simulation as a mode of competency measurement.
- Procedural skill validation.
- Effectiveness of different types of debriefing.
- Direct observational studies for clinical competencies, developing diagnostic reasoning, treatment planning, and communication across the patient lifespan and in various healthcare settings.
- Translation of competency to clinical practice.
- Improvement of treatment outcomes and quality of care.
- Effectiveness of different simulation modalities.
- Effective interprofessional communication and management.

REFERENCES

Alexander, M., Durham, C. F., Hooper, J. I., Jeffries, P. R., Goldman, N., Kardong-Edgren, S., Tillman, C. (2015). NCSBN simulation guidelines for prelicensure nursing programs. *Journal of Nursing Regulation, 6*(3), 39-42. https://doi.org/10.1016/S2155-8256(15)30783-3

American Association of Colleges of Nursing. (2015). Re-envisioning the clinical education of advanced practice registered nurses [PDF]. Retrieved from http://www.aacnnursing.org/Portals/42/News/White-Papers/APRN-Clinical-Education.pdf

Anderson, M., Campbell, S. H., Nye, C., Diaz, D., & Boyd, T. (2019). Simulation in advanced practice education: Let's dialogue!! *Clinical Simulation in Nursing, 26*, 81 85.https://doi.org/10.1016/j.ecns.2018.10.011

Aronowitz, T., Aronowitz, S., Mardin-Small, J., & Kim, B. (2017). Using objective structured clinical examination (OSCE) as education in advanced practice registered nursing education. *Journal of Professional Nursing, 33*(2), 119-125. https://doi.org/10.1016/j.profnurs.2016.06.003

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Upper Saddle River, NJ: Prentice-Hall, Inc.

Benner, P. (1984). *From novice to expert: Excellence and power in clinical nursing practice.* Menlo Park, CA: Addison-Wesley Publishing Co.

Beroz, S. (2017). A statewide survey of simulation practices using NCSBN simulation guidelines. *Clinical Simulation in Nursing*, 13(6), 270-277.

Biggs, J. (1999). *Teaching for quality learning at university: What the learner does*. New York, NY: Open University Press.

Biggs, J. (2003). Aligning teaching and assessment to curriculum objectives. *Imaginative Curriculum Project, LTSN Generic Centre, 12.*

Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (Eds.). (1956). *Taxonomy of educational objectives: The classification of educational goals*. London, WI: Longmans, Green & Co. Ltd.

Boss, H. M., Nickel, M., Huwendiek, S., Schultz, J. H., & Nikendei, C. (2015). Cost-effectiveness of peer role play and standardized patients in undergraduate communication training. *BMC Medical Education*, 15, 183. https://doi.org/10.1186/s12909-015-0468-1

Bracq, M., Michinov, E., & Jannin, P. (2019). Virtual reality simulation in nontechnical skills training for healthcare professionals: A systematic review. *The Journal of the Society for Simulation in Health Care, 14*(3), 188-194. Doi: 10:1097//SIH.0000000000000411

Braungart, M. M., Braungart, R. G., & Gramet, P. R. (2019). Applying learning theories to healthcare practice. In S.B. Bastable (Ed.), *Nurse as educator: Principles of teaching and*

learning for nursing practice (5th ed.) (pp. 69-115). Burlington, MA: Jones & Bartlett Learning.

Brown, K. M., Mudd, S. S., Hunt, E. A., Perretta, J. S., Shilkofski, N. A., Diddle, J. W., . . .McMillan, K. N. (2018). A multi-institutional simulation boot camp for pediatric cardiac critical care nurse practitioners. *Pediatric Critical Care Medicine, 19*(6), 564-571. doi: 10.1097/PCC.0000000000001532

Butt, A. L., Kardong-Edgren, S., Ellertson, A. (2018). Using game-based virtual reality with haptics for skill acquisition. *Clinical Simulation in Nursing*, 16, 25-32. https://doi.org/10.1016/j.ecns.2017.09.010

Cantrell, M. A., Franklin, A., Leighton, K., & Carlson, A. (2017). The evidence of simulation-based learning experiences in nursing education and practice: An umbrella review. *Clinical Simulation in Nursing*, *13*, 634-667.

Cheng, A., Kessler, D., & Mackinnon, R. (2016). Reporting guidelines for health care simulation research: Extensions to the CONSORT and STROBE statements. BMJ Simulation and Technology Enhanced Learning 2, 51-60.

Cheng, A., Grant, V., Robinson, T., Catena, H., Lachapelle, K., … Eppich, W. (2016). The promoting excellence and reflective learning in simulation (PEARLS) approach to healthcare debriefing: A faculty development guide. *Clinical Simulation in Nursing, 12*, 419-428. https://doi.org/10.1016/j.ecns.2016.05.002

Common Advanced Practice Registered Nurse Doctoral-Level Competencies. (2017). Retrieved from https://cdn.ymaws.com/www.nonpf.org/resource/resmgr/competencies/common-aprn-doctoral-compete.pdf

Coppa, D., Schneidereith, T., & Farina, C. L. (2019). Simulated home-based health care scenarios for nurse practitioner learners. *Clinical Simulation in Nursing, 26*, 38-43. https://doi.org/10.1016/j.ecns.2018.10.002

Doughty, C., Welch-Horan, T., Hsu, D., Fielder, E., Pereira, F., Little-Wienert, K., . . . Lemke, D. (2015). Rapid cycle deliberate practice pediatric simulation scenarios. *MedEdPortal*,*11*. https://doi.org/10.15766/mep_2374-8265.10134

Dismukes, R.K. & Smith, G.M. (2000). The mediated debrief of problem flights. In: Dismukes RK, Smith GM, ed. Facilitation and Debriefing in Aviation Training and Operations. Burlington, VT. Routledge Publishing.

Dreifuerst, K. T. (2015). Getting started with debriefing for meaningful learning. *Clinical Simulation in Nursing, 11*(5), 268-275. https://doi.org/10.1016/j.ecns.2015.01.005

Eppich, W. J., Hunt, E. A., Duval-Arnould, J. M., Siddall, V. J., & Cheng, A. (2015). Structuring feedback and debriefing to achieve mastery learning goals. *Academic Medicine, 90*(11), 1501-1508. https://doi.org/10.1097/ACM.0000000000000934

Eppich, W., & Cheng, A. (2015b). Promoting excellence and reflective learning in simulation (PEARLS): Development and rationale for a blended approach to health care simulation debriefing. *Simulation in Healthcare, 10*(2), 106-115.

Ericsson, K. A. (2008). Deliberate practice and the acquisition of expert performance: A general overview. *Academic Emergency Medicine, 15*(11), 988–994. https://doi.org/10.1111/j.1553-2712.2008.00227.x

Fletcher, J. D. & Wind, A. P. (2013). Cost consideration in using simulations for medical training. *Military Medicine, 178*(10), 37-46. https://doi.org/10.7205/MILMED-D-13-00258

Gaba, D.M. (2004) The future vision of simulation in healthcare. Quality and Safety Health Care, 13 (Suppl 1):i2–10.

Gardner, R. (2013). Introduction to debriefing. *Seminars in Perinatology, 37*(3), 166-174. https://doi.org/10.1053/j.semperi.2013.02.008

Giddens, J. F., Lauzon-Clabo, L., Morton, P. G., Jeffries, P., McQuade-Jones, B., & Ryan, S. (2014). Re-envisioning clinical education for nurse practitioner programs: Themes from a national leaders' dialogue. *Journal of Professional Nursing, 30*(3), 273-278. https://doi.org/10.1016/j.profnurs.2014.03.002

Gore, T., & Thomson, W. (2016). Use of simulation in undergraduate and graduate education. *AACN Advanced Critical Care, 27*(1), 86-95. https://doi.org/10.4037/aacnacc2016329

Guido-Sanz, F., Díaz, D. A., Anderson, M., Gonzalez, L., & Houston, A. (2019). Role transition and communication in graduate education: The Process. *Clinical Simulation in Nursing, 26*, 11-17. https://doi.org/10.1016/j.ecns.2018.10.013

Hardie, L. & Lioce, L. (2020). A Scoping Review and Analysis of Simulation Facilitator Essential Elements. *Nursing Primary Care 4*(3): 1-13.

Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The NCSBN national simulation study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation, 5*(2), S2-S64. https://doi.org/10.1016/S2155-8256(15)30061-2 37

Hunt, E. A., Duval-Arnould, J. M., Nelson-McMillan, K. L., Bradshaw, J. H., Diener-West, M., Perretta, J. S., & Shilkofski, N. A. (2014). Pediatric resident resuscitation skills improve after "rapid cycle deliberate practice" training. *Resuscitation, 85*(7), 945-951. https://doi.org/10.1016/j.resuscitation.2014.02.025

INACSL Standards Committee. (2016). INACSL standards of best practice: Simulation^{SM} *Clinical Simulation in Nursing, 12*, 21-25. http://dx.doi.org/10.1016/j.ecns.2016.09.008.

Institute of Medicine. (2010). *The future of nursing: Leading change, advancing health*. Washington, DC: The National Academies Press.

Jeffries, P. Bigley, M.B., McNelis, A., Cartier, J., Pintz, C., Slaven-Lee, P. & Zychowicz, M. (2019). A call to action: Building evidence for use of simulation in nurse practitioner

education. *Journal of the American Association of Nurse Practitioners, 31*(11), 627-632. doi: 10.1097/JXX.0000000000000335

Kelly, M. M., Blunt, E., & Nestor, K. (2019). After-hours/on-call simulation in primary care nurse practitioner education. *Clinical Simulation in Nursing, 26*, 49-53. https://doi.org/10.1016/j.ecns.2018.05.002

Kirkpatrick, D. (1996). Revisiting Kirkpatrick's four-level-model. *Training & Development, 1*, 54-57.

Kirkpatrick, D. L. (1998). *Evaluating training programs. The four levels*. San Francisco, CA: Berrett-Koehler Publishers.

Kneebone, R. (2005). Evaluating clinical simulations for learning procedural skills: A theory-based approach. *Academic Medicine, 80*(6), 549-553. https://doi.org/10.1097/00001888-200506000-00006

Knowles, M. (1984). *Andragogy in action*. San Francisco, CA: Jossey-Bass.

Kolb, D. A. (1983). *Experiential learning: Experience as the source of learning and development* (Vol. 1). Englewood Cliffs, NJ: Prentice-Hall.

Krathwohl, D.R. (2002). A revision of Bloom's taxonomy: an overview. *Theory Pract. 41*(4):212–8.

LaManna, J. B., Guido-Sanz, F., Anderson, M., Chase, S. K., Weiss, J. A., & Blackwell, C. W. (2019). Teaching diagnostic reasoning to advanced practice nurses: Positives and negatives. *Clinical Simulation in Nursing, 26*, 24-31. https://doi.org/10.1016/j.ecns.2018.10.006

Lave J. (1991). Situating learning in communities of practice. In Resnick LB, Levine JM, Teasley SD. (Eds.). Perspectives on Socially Shared Cognition.Washington, D.C.: American Psychological Association; pp. 63-82.

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, UK: Cambridge University Press.

LeFlore, J. L., & Thomas, P. E. (2016). Educational changes to support advanced practice nursing education. *The Journal of Perinatal & Neonatal Nursing, 30*(3), 187-190. doi: 10.1097/JPN.0000000000000201

Ling, C., Fuller, A., Taylor, L., & Johnson, H. (2018). Triangulation of multifactorial assessment: Bringing objectivity to objective structured clinical examination evaluation. *Clinical Simulation in Nursing, 16*, 40-47.

Lioce, L. (2020). An introduction for the faculty/educator instructing the APRN student: The evolution of healthcare simulation in graduate nursing education. In C. M. Alfes & E. P. Zimmermann (Eds.), *Clinical simulations for the advanced practice nurse: A comprehensive guide for learners, faculty, and simulation staff* (pp. 27-34). New York, NY: Springer Publishing Company, LLC.

Lioce, L. (Ed.), Lopreiato, J. (Founding Ed.), Downing, D., Chang, T.P., Robertson, J.M., Anderson, M., Diaz, D.A., and Spain, A.E. (Assoc. Eds.) and the Terminology and Concepts Working Group (2020). Healthcare Simulation Dictionary –Second Edition. Rockville, MD: Agency for Healthcare Research and Quality; September. AHRQ Publication No. 20-0019. DOI: https://doi.org/10.23970/simulationv2.

Maran, N. J. & Glavin, R. J. (2003). Low-to high-fidelity simulation – A continuum of medical education? *Medical Education, 37*(s1), 22-28. https://doi.org/10.1046/j.1365-2923.37.s1.9.x

McGaghie, W.C. & Issenberg, S. B. (1999). Simulation in professional competence assessment: Basic considerations. In A. Tekian, C. H. McGuire & W. C. McGaghie (Eds.), *Innovative simulations for assessing professional competence* (pp. 7-22). Chicago, IL: University of Illinois College of Medicine, Department of Medical Education.

McGaghie, W. C., Issenberg, S. B., Petrusa, E. R., & Scalese, R. J. (2010). A critical review of simulation based medical education research: 2003-2009. *Medical Education, 44*(1), 50-63. https://doi.org/10.1111/j.1365-2923.2009.03547.x

McGaghie, W. C., Siddall, V. J., Mazmanian, P. E., & Myers, J. (2009). Lessons for continuing medical education from simulation research in undergraduate and graduate medical education: Effectiveness of continuing medical education: American college of chest physicians evidence-based educational guidelines. *Chest, 135*(3), 62-68. https://doi.org/10.1378/chest.08-2521

Miller, G.E. (1990). The assessment of clinical skills/competence/performance. *Academic Medicine 87*(7), 63-67.

Moher, D., Hopewell, S., Schulz, K., Montori, V., Gøtzsche, P., Devereaux, P., … Altman, D. (2010). CONSORT 2010 explanation and elaboration: Updated guidelines for reporting parallel group randomized trials. *Journal of Clinical Epidemiology*, *63*(8), 1-37. https://doi.org/10.1016/j.jclinepi.2010.03.004

Mudd, S. S., McIltrot, K. S. & Brown, K. M. (2020). Utilizing telepresence robots for multiple patient scenarios in an online nurse practitioner program. *Nursing Education Perspectives (41)4*, 260-262. doi: 10.1097/01.NEP.0000000000000590

National Center for Health Statistics. (2017). Health, United States, 2016: with chartbook on long-term trends in health. Hyattsville, MD.

National League for Nursing. (n.d.). Advancing Care Excellence for Seniors (ACE.S) Unfolding Cases. Retrieved from www.nln.org/professionaldevelopment-programs/teaching-resources/aging/ace-s/unfolding-cases

National Task Force on Quality Nurse Practitioner Education. (2016). Criteria for evaluation of nurse practitioner programs [PDF]. Retrieved from http://www.acenursing.net/resources/NTF_EvalCriteria2016Final.pdf

Nye, C., Campbell, S. H., Hebert, S. H., Short, C., & Thomas, M. (2019). Simulation in advanced practice nursing programs: A North-American survey. *Clinical Simulation in Nursing, 26,* 3-10. https://doi.org/10.1016/j.ecns.2018.09.005

Palaganas, J. C., Maworthy, J. C., Epps, C. A., & Mancini, M. E. (2015). *Defining excellence in simulation programs*. Philadelphia, PA: Lippincott, Williams & Wilkins.

Pangaro, L. (1999). A new vocabulary and other innovations for improving descriptive in-training evaluations. *Academic Medicine, 74*(11), 1203-1207. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/10587681

Pangaro, L. (2000). Investing in descriptive evaluation: a vision for the future of assessment. *Medical Teacher, 22*(5), 478-481. doi: 10.1080/01421590050110740

Pangaro, L. & Cate, O. T. (2013). Frameworks for learner assessment in medicine: AMEE guide no. 78, *Medical Teacher, 35*(6), 1197-1210. doi: 10.3109/0142159X.2013.788789

Parsons, S. M., Kuszajewski, M. L., Merritt, D. R., & Muckler, V. C. (2019). High-fidelity simulation training for nurse anesthetists managing malignant hyperthermia: A quality improvement project. *Clinical Simulation in Nursing, 26,* 72-80. https://doi.org/10.1016/j.ecns.2018.10.003

Perretta, J.S., Duval-Arnould, J., Poling, S., Sullivan, N., Jeffers, J.D., Farrow, L., Shilkofski, N.A., Brown, K.M., Hunt, E.A. (2020). Best Practices and Theoretical Foundations for Simulation Instruction using Rapid-Cycle Deliberate Practice. *Simulation in Healthcare 15*(5), 356-362. doi: 10.1097/SIH.0000000000000433

Podder, V., Lew, V., & Ghassemzadeh, S. (2020). SOAP notes. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK482263/

Reed, T., Pirotte, M., McHugh, M., Oh, L., Lovett, S., . . . McGaghie, W. (2016). Simulation-based mastery learning improves medical learner performance and retention of core clinical skills. *Simulation in Healthcare, 11*(3), 173-80. doi:10.1097/SIH.0000000000000154

Rudolph, J.W., Simon, R., Dufresne, R. L., & Raemer, D. B. (2006). There's no such thing as ''nonjudgmental'' debriefing: A theory and method for debriefing with good judgment. Simulation in Healthcare, 1(1), 49-55.

Rutherford-Hemming, T., Lioce, L., & Breymier, T. (2019). Guidelines and essential elements for prebriefing. *Simulation in Healthcare, 14*(6), 409-414. doi:10.1097/SIH.0000000000000403

Rutherford-Hemming, T., Nye, C., & Coram, C. (2016). Using simulation for clinical practice hours in nurse practitioner education in the United States: A systematic review. *Nurse Education Today, 37,* 128-135. https://doi.org/10.1016/j.nedt.2015.11.006

Sawyer, T., Eppich, W., Brett-Fleegler, M., Grant, V. & Cheng, A. (2016). More than one way to debrief: a critical review of healthcare simulation debriefing methods. Simulation in Healthcare 11(3), 209-217.

Schneidereith, T., & Daniels, A. (2019). Integration of simulation to prepare adult-gerontology acute care nurse practitioners. *Clinical Simulation in Nursing, 26,* 18-23. https://doi.org/10.1016/j.ecns.2018.10.009

Schön, D. (1987). *Educating the reflective practitioner*. San Francisco, CA: Jossey-Bass.

Schumacher, G. & Risco, K. (2017). Competency-based nurse practitioner education: An overview for the preceptor. *The Journal for Nurse Practitioners, 13*(9), 596-602. https://doi.org/10.1016/j.nurpra.2017.07.020

Simon, R., Raemer, D.B., Rudolph, J.W. (2010). Debriefing Assessment for Simulation in Healthcare (DASH)© Rater's Handbook. Center for Medical Simulation, Boston, Massachusetts. https://harvardmedsim.org/wp-content/uploads/2017/01/DASH.handbook.2010.Final.Rev.2.pdf.

U.S. Department of Health and Human Services. (2016). Health, United States [PDF]. Retrieved from https://www.cdc.gov/nchs/data/hus/hus16.pdf

Von Elm, E., Altman, D., Egger, M., Pocock, S., Gøtzsche, P., & Vandenbroucke, J. (2008). The strengthening the reporting of observational studies in epidemiology (STROBE) statement: Guidelines for reporting observational studies. *Journal of Clinical* 14 *Epidemiology*, *61*(4), 344-349. https://doi.org/10.1016/j.jclinepi.2007.11.008 15

Vygotsky, L. (1978). *Mind and society: the development of higher mental processes.* Cambridge, UK: Cambridge University Press.

Waxman, K. T. & Telles, C. L. (2009). The use of Benner's framework in high-fidelity simulation faculty development: The bay area simulation collaborative model. *Clinical Simulation in Nursing, 5*(6), 231-235. https://doi.org/10.1016/j.ecns.2009.06.001

Wells, G. (1999) *Dialogic inquiries in education: Building on the legacy of Vygotsky.* Cambridge, UK: Cambridge University Press.

ELECTRONIC RESOURCES

1. NONPF SIMULATION RESOURCE PORTAL	https://www.nonpf.org/general/custom.asp?page=SimPortal
2. SOCIETY FOR SIMULATION IN HEALTHCARE SIMULATION CODE OF ETHICS	https://www.ssih.org/SSH-Resources/Code-of-Et
3. **SIMULATION TRACKING FORMS** (National Task Force on Quality Nurse Practitioner Education)	https://cdn.ymaws.com/www.nonpf.org/resource/mgr/Docs/EvalCriteria2016Final.pdf page 41 Appendix H
4. SIMULATION DESIGN STANDARD (Lioce et.al, 2015)	https://www.nursingsimulation.org/article/S1876-1399(15)00025-0/fulltext
5. PRE-BRIEFING CHECKLIST	https://journals.lww.com/simulationinhealthcare/Abstract/2019/12000/Guidelines_and_Essential_Elements_for_Prebriefing.10.aspx
6. SIMULATED PATIENT NETWORK	https://www.simulatedpatientnetwork.org/

APRN SIMULATION TEMPLATE CONSIDERATIONS

Templates should include essential elements to reflect practice and improve measurement of outcomes.

- Case Overview (for staff, facilitator, learner, SP's)
  - Name
  - Brief overview of simulation
  - Level of learner
  - Time/length of simulation
  - Clinical time given
  - Evaluation mechanism of simulation: formative summative, high stakes
  - Program or Course Objectives cross-walked to simulation
  - Competency(ies) directly linked to the simulation
  - Simulation objectives - 2-4 objectives
  - References
- Set-up (operations-information for staff)
  - Location and Rooms required
  - Equipment required
  - Simulator or SP set up
  - Flow of simulation, learner movement throughout simulation,
- Information for facilitator
  - Briefing materials
  - Simulation Timeline or run guide
  - Any additional cues to prompt learner throughout simulation
  - Debriefing style (choose one ahead of time: DML, PEARL, GAS, Inquiry Advocacy, etc. (Sawyer et al, 2016)
  - Debriefing objectives or prompts
  - Facilitator evaluation of learner performance- critical elements tied to simulation objectives and/or competencies
  - Facilitator evaluation of simulation
  - Facilitator evaluation of Simulation Center
- Information for learners
  - Preparation materials or information
  - Prebriefing information (see checklist Rutherford-Hemming, Lioce & Breymier, 2019)
  - Chart materials (both pre and post simulation)
  - Learner evaluation of simulation
  - Learner evaluation of facilitator
- Information for standardized patients
  - Script including detailed physical and psychosocial patient information (coaching)
    - Presenting situation/diagnosis
    - General patient demographic information (age, race, gender, physical characteristics)
    - General patient behavioral characteristics (affect, body language, speech quality, physical activity, etc.)

    - Mental Status descriptors if needed
    - History of present illness including OLDCART details
    - Past medical and surgical history
    - Family medical history
    - Social history including hobbies, drug and alcohol use, home environment, social support, relationship status, safety in home
    - Allergies
    - Medications
    - Exercise and diet history
    - Health maintenance history
    - Review of System with pertinent positives and negatives
    - Physical Exam findings: pertinent positives and negatives and how this information will be provided to learner.
- Guidelines for communication with learners
    - Technology engagement tips and technical information
        - How to communicate during the simulation using various technologies
    - Level of responsiveness/expectations to questions
    - Prompts and special instructions on how to react to or how to provide key information
    - Guidelines for feedback to learners after simulation
        - Debriefing style (often inquiry advocacy)
        - Key topics to address