Primer on Interprofessional Simulation for Clinical Laboratory Science Programs: A Practical Guide to Structure and Terminology

MICHELLE R. BROWN, PENNI WATTS

LEARNING OBJECTIVES

1. Differentiate types of simulation modalities.
2. Define fundamental terms associated with simulation.
3. Distinguish the three phases of simulation and determine the importance of each phase.

ABBREVIATIONS: INACSL - Nursing Association for Clinical Simulation and Learning, IP – Interprofessional

INDEX TERMS: Simulation, Interprofessional simulation, Debriefing, Interprofessional communication

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Michelle R. Brown, MS, MLS(ASCP)^{CM}SBB^{CM}, University of Alabama at Birmingham, School of Health Professions, Department of Clinical and Diagnostic Sciences, Birmingham, AL

Penni Watts, PhD, RN, CHSE-A, University of Alabama at Birmingham, School of Nursing, Birmingham, AL

Address for Correspondence: Michelle R. Brown, MS, MLS(ASCP)^{CM}SBB^{CM}, University of Alabama at Birmingham, Assistant Professor, School of Health Professions, Department of Clinical and Diagnostic Sciences, 1705 University Blvd, SHPB 474, Birmingham, AL 35294, 205-934-5987, michellebrown@uab.edu

Interprofessional (IP) simulation is an effective way to teach teamwork, communication, and utilization of resources.[1,2] While traditional classroom learning for health professionals rarely involves application of skills, simulation affords opportunities for practicing communication and collaboration. It allows students and/or practitioners to come together in a safe environment to learn clinical skills and practice communication strategies while serving as a means for clarifying roles on a healthcare team. Laboratory professionals are often described as being behind the scenes. Simulation allows laboratory practitioners to participate on the team and elucidate the importance of the lab during debriefing. In order for laboratory science students and practitioners to participate in medical simulation, there must first be a fundamental understanding of the organization and terminology.

Defining Simulation

Within healthcare education, experiential learning has become a central aspect of training our future healthcare providers. Simulation is defined as a technique providing experiences that represent or mimic a real life event or situation allowing learners to apply skills and knowledge to providing care during a simulated clinical event.[3] During a simulation, there are no real patients, thereby allowing learners to test and try their hand at synthesizing pieces of information into clinical situations without the potential for harm (Figure1). For example, a simulation may involve learners being placed in a simulated environment with a mannequin, or standardized patient that needs an intravenous line started and requiring a blood transfusion. The learners must interact together while obtaining blood and administer it to the patient.

Benefits of Simulation

Simulation is essential in educating future healthcare team members to function effectively as a team. Simulation allows for standardization of experiences for all learners which is often difficult to obtain in clinical practice. It is important to engage students in the use of scenarios and situations as in clinical practice. While single discipline simulations are beneficial, integrating the entire healthcare team is key to the team functioning effectively in the real

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world.[4] Most health professions are trained in silos and only learn to function as a team when in actual clinical practice. Creating simulated experiences that allow for learners to practice in their role and engage in situations with other professions encourage the acquisition of role understanding, and mutual respect, and practice in communicating with others.

Figure 1. A depiction of students in physical therapy, physician assistant studies, and nursing, interacting with each other and simulated patients and family members during an interprofessional simulation. The satellite lab is immediately across the hallway from these patient rooms.

Simulation Modalities

Simulation can encompass a spectrum of modalities from simple and inexpensive (i.e. IV arms) to complex and resource intensive (high fidelity mannequins). Analyzing specimens as students often do in the student laboratory is also a version of simulation. Students perform complete blood counts, cultures, and body fluid analysis on specimens for which faculty provide clinical history. They report results on paper or in a computer system. Another realm of the simulation spectrum involves task trainers used for such skills as teaching venipuncture or obtaining intravenous access to better understand blood draws from an existing IV or the process of transfusing blood components. Task trainers and individual lab specimens play a vital role in the education of our students, but it stops short of teaching them how to communicate beyond the walls of the laboratory. Interprofessional simulation engages learners in interaction with learners from other disciplines. High fidelity patient simulators such as a birthing simulator or adult mannequin are utilized in teaching teamwork and advanced decision making in high risk situations. These high fidelity simulators may be manipulated by the computer operator to respond to the actions of the learner. For example, if the learner administers a drug or the patient experiences a transfusion reaction, the patient's vital signs can change accordingly.

Simulation Objectives

Clear objectives drive the design, implementation, and debriefing of a simulation experience. It is essential to determine the expected outcomes of the simulation and to be able to assess if they have been achieved. The leaders from each of the professions should meet to discuss and agree upon objectives that are common to all of the participants from the various programs and professions.

The type of learner determines the complexity and level of the objective. For example, entry-level students in programs such as clinical laboratory science, nursing, and physician assistant studies, will often have lower level objectives than students nearing graduation. Likewise, current practitioners would have objectives that focus on more advanced skills and higher levels of communication. Often, two or three objectives are sufficient, keeping the simulation focused.

With IP simulation, there is commonly one objective that focuses on the learners working within a team and using effective communication, and one objective that focuses on a clinical skill. Improving how we work together as a healthcare team to care for the patient is one of the priorities for nearly all IP simulations. The preset objectives, in concert with the outcomes of the simulation, are used to guide the structured debriefing. The International Nursing Association for Clinical Simulation and Learning (INACSL) has developed Standards of Best Practice for Participant Objectives, which guides the development of objectives for the simulation experience (Table 1).[5]

Simulation Design

Developing a simulation experience requires an understanding of simulation methodology. The INACSL Standards of Best Practice for Simulation define the appropriate steps for simulation design (Table 2).[6] Educators must perform a needs

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assessment and determine scenarios that would best support the development of skills needed for the learners. Often scenarios are designed to focus on clinical skills, decision-making, team skills, or management of patient care. It is not strictly about knowledge, but about applying current knowledge and skills in a contextual and real life situation. For example, if a patient needs a transfusion and the crossmatch is not complete, the laboratory scientist in the blood bank needs to communicate why the blood is not ready, how much longer it will be before crossmatch compatible blood is available, and what the options are for transfusing the patient should an emergency transfusion be necessary. The ability to list the options on an exam assesses a fundamental level of knowledge; communicating this information to a fellow blood banker is a step higher, and having a conversation with a stressed provider on the other end of the phone telling you the patient needs blood now is an even higher stakes situation. Interprofessional simulation is a valuable educational tool for providing a safe environment in which laboratorians and students can practice both technical skills and communication (Figure 2).

Table 1. Criteria for Developing Objectives for Simulation from Standard III of Standards of Best Practice: Simulation[5]

Address the domains of learning
Correspond to the participant's knowledge level and experience
Remain congruent with overall program outcomes
Incorporate evidence-based practice
Include viewing the client holistically

Table 2. Steps for simulation design from the INACSL Standards of Best Practice for Simulation, Standard IX: Simulation Design[6]

Needs Assessment
Measurable objectives
Format of simulation
Clinical scenario or case
Fidelity
Facilitator/Facilitative approach
Briefing
Debriefing and /or feedback
Evaluation
Participant participation
Test of the design

Simulation Fundamentals and Terminology

While this is not a comprehensive lexicon of terms used in simulation, the following is a brief introduction to some of the phrases that are commonly used.

Figure 2. Nursing and physical therapy students interacting with clinical laboratory science students in the satellite lab during an interprofessional simulation.

The Basic Assumption

Each simulation experience is built upon the basic premise or assumption that all learners are capable and desire to learn how to provide excellent patient care.[7,8]

Fidelity

Simulations are designed to replicate a real event including environment, equipment, and emotions. While simulation experiences are created to be as real as possible, there is no way to achieve 100% realism.

Fiction Contract

Learners are asked to buy into the realism through a "fiction contract" and function as if they are in a real situation.[8] It must be clear to the learners that those who designed the simulation have done their best to create an environment, which accurately reflects true clinical situations.

Embedded Participants

In simulation, there are facilitators or embedded participants who are trained to play a scripted role to provide realism and at times, move a scenario forward. The embedded participants understand the objectives of the case, the level of the learner, available equipment, and may provide additional information to the learners.[9]

Safe Learning Environment

Each experience is created to promote a safe learning

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environment where participants can test their own learning without harm to patients and where mistakes are not punitive.[10]

Phases of Simulation

Generally, there are three major phases of the simulation experience: brief, simulation scenario, and debrief.

Brief

The brief is the time allotted prior to the simulation that is used to prepare the learners for the experience.[8] This often includes an orientation to the physical space, equipment, and roles of the facilitators in the simulation. It is important that the learners understand their own role and the role of the embedded participants prior to the beginning of the simulation. The following is an example:

> You will function as a current practitioner in your field of study (MLS, nurse, physician, etc.) there will be a nurse in the room; he is an embedded participant and can help you locate equipment and answer questions about the patient. Your patient is a high fidelity mannequin with pulse, breath sounds, and veins from which you can draw blood. There is a satellite lab located behind the nurse's station for specimen analysis and dispensing of blood products.

During the brief, facilitators reinforce that the scenario has been designed to be as realistic as possible, but that there are limitations. This is where the fiction contract and the basic assumption are discussed.

Case Scenario

In interprofessional simulation, students from multiple professions participate in the care of a patient and therefore learn about, from, and with each other. Cases need to be tailored to the level of the learners. The case scenario, guided by the script, is the phase of the simulation in which the participants or student learners act in their specified roles, most often as a current practitioner. If MLS students are in the beginning of their program, they are likely not ready to analyze specimens from multiple departments and communicate many critical results. However, if the students are nearing graduation, they should be able to balance multiple specimens, from multiple patients, and communicate information to multiple members of the healthcare team, both in person and over the telephone. An example case might include a simulated patient cared for by a nurse, a physician assistant, and scientists in the clinical laboratory. There is often a medical record with patient history, necessary equipment, and props. There are case scenarios published in various journals and for purchase through a variety of web-based platforms. It is often useful, yet time consuming, to draft original scenarios related specifically to the goals and objectives that have been established for the students in any given educational program.

A key aspect to effective cases is simplicity. Often, one of the goals in interprofessional simulation is centered around teamwork and communication. If the skills required to care for the patient are time consuming and complex, the learner's focus will often remain on completing the skill itself rather than working together as a team. For example, a crossmatch can be "added on" to a type and screen performed the previous day to facilitate procurement of blood products rather than performing an antibody identification on a patient who has three clinically significant antibodies. Likewise, the susceptibility testing may be completed and the student has to interpret the MicroScan® and communicate that there is a multidrug resistant organism, rather than performing the testing from an original specimen. Finally, if communicating that testing is not yet completed is within the objectives of the simulation, students may receive a specimen for a routine CBC and receive a phone call from the nurse inquiring about the turn-around time. Complex simulations involving multiple patients and professions are powerful events in supporting learners gaining skills in teamwork, role clarity, and resource utilization.[11]

Debrief

While scenarios must be designed to promote the use of techniques and teamwork, the majority of learning occurs after the simulation is over, during the debriefing phase of the experience. Debriefing is an opportunity for learners to reflect on their performance in a safe learner-centered environment. During the debriefing, participants are encouraged to

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discuss their reactions and thought processes, as well noting what they would want to change or improve. The debriefer guides the learners during the debriefing session and focuses on digging deeper to discern the learners' mental frames. By understanding the learners' decision making process and thought processes behind their actions, the debriefer may offer insight to the learner in order to close any performance gaps.

There are many debriefing strategies available and should be based on the knowledge and experience level of the learner and the type of simulation. For example, the "Plus-delta" method offers the learners opportunities to reflect on their experience and discuss what worked well and what would they want to change.[12] Additionally, the "Debriefing with Good Judgment" method is a three-phase method of debriefing: reactions, analysis, summary (Table 3). In this form of debriefing, advocacy inquiry statements are used and involves stating an observation of an action, the facilitator's judgment about the action, and then an inquiry statement into the learners' thoughts.[13]

Table 3. Debriefing with Good Judgment[13]

Reactions	Allow learners to verbalize reactions
Analysis	Encourage conversation with learners Learners reflect on situation Provide feedback and correct as needed
Summary	Elicit take home points from the learner

Debriefing also allows the different professions to discuss the interactions that occurred during the simulation and develop a better understanding of role clarity for each respective profession. Often, during the debriefing, it's the first time healthcare students actually discuss their roles on the healthcare team and engage in conversation leading to more positive relationships. Developing a mutual understanding of each profession will lead to better communication and improved patient care.

Outcomes and Assessment

Simulation experiences can be used for formative and/or summative assessment.[14,15] Educators must decide how the experience will be designed and in what manner it will be used with their learners. Often, a behavioral checklist will be used to assess the performance of a participant. If the focus is on skill acquisition and demonstration, a skills checklist may be used. If there is a combination of skills and communication to be assessed, an objective structured clinical examination may be used. Overall evaluations provide information on the experience, how the participants viewed the simulation, and their opinions on improvement of the event.

CONCLUSION

Interprofessional simulation is used by many healthcare programs to teach and promote the use of effective teamwork and communication. Simulation provides the opportunity for students to use the skills they have learned to care for patients in a safe environment. The fundamentals of simulation, the terminology, and the scenario design basics described in this manuscript provide a foundation on which CLS programs can build interprofessional simulations that suit their individual program needs.

REFERENCES

1. Liaw SY, Zhou WT, Lau TC, Siau C, Chan SW. An interprofessional communication training using simulation to enhance safe care for a deteriorating patient. Nurse Educ Today. 2014;34(2):259-64.
2. Tofil NM, Morris JL, Peterson DT, Watts P, Epps C, Harrington KF, et al. Interprofessional simulation training improves knowledge and teamwork in nursing and medical students during internal medicine clerkship. J Hosp Med. 2014;9(3):189-92.
3. Ulrich B, Mancini ME. Mastering Simulation, 2014 AJN Award Recipient: A Handbook for Success. Sigma Theta Tau; 2013 Sep 13.
4. Hood K, Cant R, Baulch J, Gilbee A, Leech M, Anderson A, et al. Prior experience of interprofessional learning enhances undergraduate nursing and healthcare students' professional identity and attitudes to teamwork. Nurse Educ Pract. 2014;14(2):117-22.
5. Lioce L, Reed CC, Lemon D, King MA, Martinez PA, Franklin AE, et al. Standards of best practice: Simulation standard III: Participant objectives. Clin Simul Nurs. 2013;9(6):S15-8.
6. Lioce L, Meakim CH, Fey MK, Chmil JV, Mariani B, Alinier G. Standards of best practice: Simulation standard IX: Simulation design. Clin Simul Nurs. 2015 Jun 30;11(6):309-15.
7. Ziv A, Ben-David S, Ziv M. Simulation based medical education: an opportunity to learn from errors. Med Teach. 2005;27(3):193-9.
8. Rudolph JW, Raemer DB, Simon R. Establishing a safe container for learning in simulation: the role of the presimulation briefing. Simulation in Healthcare. 2014 Dec 1;9(6):339-49.
9. Lopreiato, J.O.(Ed), Downing, D., Gammon, W., Lioce, L.,

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Sittner, B., Slots, V., et al. 2016. Healthcare Simulation Dictionary ™. Retrieved from http://www.ssih.org/dictionary.
10. Ganley BJ, Linnard-Palmer L. Academic safety during nursing simulation: Perceptions of nursing students and faculty. Clin Simul Nurs. 2012;8(2):e49-57.
11. Watts P, Langston SB, Brown M, Prince C, Belle A, Skipper MW, King JP, Moss J. Interprofessional Education: A Multi-patient, Team-Based Intensive Care Unit Simulation. Clin Simul Nurs 2014;10(10):521-8.
12. Eppich W, Cheng A. Promoting Excellence and Reflective Learning in Simulation (PEARLS): development and rationale for a blended approach to health care simulation debriefing. Simul Healthc. 2015;10(2):106-15.
13. Sawyer T, Eppich W, Brett-Fleegler M, Grant V, Cheng A. More Than One Way to Debrief: A Critical Review of Healthcare Simulation Debriefing Methods. Simul Healthc. 2016;11(3):209-17.
14. Rudolph JW, Simon R, Raemer DB, Eppich WJ. Debriefing as formative assessment: closing performance gaps in medical education. Acad Emerg Med. 2008;15(11):1010-6.
15. Boulet JR. Summative Assessment in Medicine: The Promise of Simulation for High-stakes Evaluation. Acad Emerg Med. 2008;15(11):1017-24.

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