Clinical Simulation Issue Brief  
AARC 2015 Sub Committee-Charge #2  
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Introduction
The use of simulation based instruction is playing a greater role in the training and evaluation of healthcare professionals. It provides a safe but realistic clinical environment that can be modified in complexity to facilitate critical thinking. The 2013-14 AARC 2015 Committee was charged with evaluation of clinical simulations for the preparation and continuing education of Respiratory Care practitioners.

CHARGE #2:
Explore models that validate the use of clinical simulations as a major tactic for increasing or upgrading the competency level of students and the current workforce for the purpose of 1) establishing the relevance of clinical simulation in the college/university setting as a substitute for actual clinical practice as requires by accreditation agencies 2) developing a "Standards of Quality Clinical Simulation" check list to guide hospital departments, educators and state affiliates in the development and effective use of clinical simulation projects.

The following Brief provides information related to the completion of this charge.

The Value of Simulation
The maintenance and development of clinical skills has become increasingly difficult to accomplish in the current hospital and educational arenas. The restructuring of our nation’s health care system has resulted in reduced reimbursement while healthcare costs continue to rise. As a result employee workloads are on the increase and new hires must be brought up to speed quickly. Medical education has also been impacted noting less opportunity for onsite student instruction. Conditions are ripe for new practitioners and employees to further contribute to the considerable errors in providing advanced medical care. ‘In a report by the Institute of Medicine entitled “To Err is human” (Corrigan, et al., 2000) it was reported that more Americans died because of medical errors than by automobile accidents or auto-immune deficiency syndrome’ (Murray, Grant, Howarth, and Leigh, 2007, pp. 6). Simulation training can play a vital role in obtaining and evaluating clinical skills when access to the clinical environment is limited. Medical simulation may not exactly replicate actual clinical practice, but its use in the training of health service personnel can mirror the experience in a non-threatening and safe environment’ (Murray, Grant, Howarth & Leigh, 2007, p. 6).

Validity of Simulation
There is a steady accumulation of studies and literature reviews, supporting the validity and utility of simulations for improving critical thinking skills in a variety of medical disciplines (Issenberg, 2006, Aucar, Groch, Troxel & Eubanks, 2005, Hall, Plant, Bands, Wall, Kang & Hall, 2005, Korndorffer, Dunne, Sierra, Stefanidis, Touchard & Scott, 2005, Stefanidis, Korndorffer, Markley, Sierra, Heniford & Scott, 2007, and Wayne, Didwania, Feinglass, Fudala, Farsuk & McGaghie, 2008, and Cant & Cooper, 2009). Although much research has been written on the topic, a review of the literature has not supported a meta-analysis of the subject matter due to variability in the type and quality of research study design. As a result conclusions regarding the effectiveness of clinical simulation remain unconfirmed beyond the specific results obtained through individual research (Laschinger et al. 2008).

Researchers Sweet and McDougall studied simulations used to train physicians in the technical skills needed for urologic operating room procedures (2008). Their findings determined that both the cognitive and psychomotor domains could be supported using a high-fidelity manikin since ‘it has been estimated that performing an operation properly is 75% decision-making and 25% dexterity’ (Spencer, 1978, pp. 9). An essential skill taught to trainees is how to recognize error, why it is an error, and what to do to avoid and recover from the error’ (Sweet & McDougall, 2008, pp.520). But clinical educators at the bedside cannot allow for misses and near misses in clinical skills acquisition. By using simulators, an instructor can allow for mistakes to play out followed by a debriefing session with an expert clinician to enhance the learning experience (DeMaria, Levine & Cohen, 2008). For these reasons high-fidelity simulation has become educational standard in many fields of practice. A survey of pre-licensure nursing programs identified that 87% of the participants use some form of simulation, and of that number 54% of the programs were using simulation in at least five clinical courses (Hayden, 2010, pp. 55).

The 2015 Sub-committee for Charge #2 contacted the Committee on Accreditation for Respiratory Care for a statement pertaining to the substitution of clinical simulation for real time clinical experience. Tom Smalling, COARC Executive Director in an email received Friday, Sep 20, 2013 at 8:45 AM commented as follows:

CoARC does not have any Standard or Accreditation Policy addressing specific time spent in a simulation lab vs. clinical time. Since we have an outcomes-based approach to accreditation, it is up to the program to determine their methods for instruction. The use of simulation technology should only be used to augment the clinical experiences (for example, augmenting a clinical involving airway management with some time in an a simulator lab). CoARC does not address the relationship of high-fidelity patient simulation to clinical patient hours or the ability to substitute the former for the latter. CoARC encourages the use of patient simulation as an adjunct to clinical training, but simulation cannot replace patient contact.

In light of this statement simulation as an instructional strategy for Respiratory Care will most likely increase in usage. Although it will not replace direct patient contact, it has value in the development of higher levels of learning mastery. This will be increasingly important in a healthcare environment where real time opportunities for such teaching and learning are becoming limited.
Outside of academic application clinical simulation can be used to maintain practice skills within medical institutions. Currently advanced clinical skills are obtained through continuing education sessions/lectures, conferences or by clinical educators employed by the vendors that sell new technology. However, these forms of pedagogy may no longer be sufficient to meet the educational needs of those who require training. Preferred learning styles are also changing. ‘Today’s generation of trainees being raised in a multimedia environment, prefer to learning by electronic methods (online, internet) instead of reading books’ (Sahu & Lata, 2010). Several studies have identified manikin-based simulation as a means producing higher learning outcomes for new graduates and veteran practitioners when technology based interactive learning is preferred (Lammers, Byrwa, Fales & Hale, 2009, and Sweet & McDougall, 2008).

In conclusion a review of the literature in regard to the effectiveness of clinical simulation remains inconclusive but reached the following common conclusions:

1) Simulation training by high-fidelity manikins resulted in high learner satisfaction in learning clinical skills. (Laschinger et al. 2008)
2) Simulation training should be used as an adjunct for real time clinical practice and not a replacement. (Laschinger et al. 2008)
3) Study results regarding the effectiveness of simulation in facilitating clinical learning are for the most part favorable but not conclusive (Hayden et al. 2010)

Simulation has been demonstrated to lead to improvements in medical knowledge, comfort in procedures, and improvements in performance during retesting in simulated scenarios. Simulation has also been shown to be a reliable tool for assessing learners and for teaching topics such as teamwork and communication

The Variety of Simulation:

There four major categories of simulation that either use standardized patients or technologies to replicate a clinical scenario:

1. Task training simulation which provides the ability to practice a unique skill such as arterial blood gas puncture, intubation, and suturing and line placement.
2. Manikin-based simulation which utilizes manikins of varying degrees of technological ability from static to high fidelity to model human behavior.
3. Standardized Patient Simulation which utilizes real people trained to act as patients.
4. Virtual reality simulation that uses computerized, 3D technology to simulate real patient scenarios. (Chakravarthy et al. 2011)
Please refer to Addendum A for a review of information related to the levels of technological simulation, a comparison of simulation to problem based learning, a typology of the fidelity elements in simulation and a comparison of standard versus portable simulation.

A major advantage of clinical simulation is the ability to custom design a scenario to approximate unique clinical experiences at varying levels of complexity. This diversity lends itself to accomplishing a broad range of educational goals at any level of participant expertise. Gaba (2004) identified eleven attributes of simulation that can be manipulated to make its application multidimensional.

Gaba’s 11 Dimensions of Simulation

1. Purpose and aim of the simulation:
   a. To assess performance
   b. Training
   c. Rehearsals
   d. Pt care protocols
   e. Application and operations of medical equipment
2. The unit of participation in the simulation
   a. Individual training
   b. Team training
   c. Multidisciplinary training
3. The experience level of the simulation participants
   a. Students (apprenticeship)
   b. Interns and residents
   c. Experienced clinical practitioners
4. Health care domain in which the simulation is applied:
   a. Primary Care
   b. In hospital
   c. Home care
   d. ICU
5. Healthcare discipline:
   a. Allied health
   b. Nursing
   c. Physicians
6. Type of knowledge, skill, attitudes or behavior to be addressed:
   a. Conceptual
   b. Technical skills
   c. Decision making skills
   d. Attitudes and behaviors
7. Age of the patient being simulated:
   a. Neonates
b. Pediatrics  
c. Adults  
d. Elderly  
8. Technology applicable or required  
a. Verbal role playing  
b. Actor as patient  
c. Computer patient  
d. Mannequin  
9. Site of simulation participation  
a. Multimedia computer based  
b. Simulation lab  
c. Actual work site  
10. The extent of direct participation in the simulation  
a. Remote viewing only  
b. Direct on site hands on  
11. The feedback method accompanying the simulation  
a. Instructor critique  
b. Video based play back  


Standards of Best Practice for Medical Simulation

In 2009 the International Nursing Association for Clinical Simulation and Learning (INACSL), was charged with establishing performance standards for simulation in healthcare education. Over 3 years, seven standards were identified to reflect the best practices in health care and health science education.

Standard I: Terminology

Consistent terminology enables clear communication, reflects shared values, and permits the sharing of knowledge and ideas through research and publications. A compendium of the common terminology utilized in the planning, participation and conducting of clinical simulations is to be found in the following reference:

Standard II: Professional Integrity of Participant(s)

For simulation based instruction or evaluation to be of value participants must maintain professional integrity related to the simulation. There must be mutual respect and professionalism demonstrated between all participants. Information related to the simulation process should be kept confidential.

Guidelines:

1. Keep confidential all phases of the simulation process to protect the content of the scenario from bias that could alter future learning experiences.
2. Participants are expected to exhibit professional behavior. It is the role of the facilitator to recognize and put an end to any behavior that is unprofessional and inappropriate.
3. During debriefing feedback should be constructive and delivered with mutual respect.


Standard III: Participant Objectives

The foundation for all simulation based learning experiences should be well developed, clearly stated objectives.

Guidelines:

1. Participant objectives should speak to all learning domains to include knowledge, cognitive and affective domains.
2. Participant objectives should be appropriate to the knowledge level of the participant (ie novice, beginner, advanced) and achievable.
3. Participant objectives should align with overall educational goals.
4. Participant objectives should incorporate evidence-based practice.
5. Participant objectives should promote holistic client care (ie: physical assessment, communication, mental health assessment, spiritual/cultural sensitivity).
6. Participant objectives should be achievable within the designated time frame.


Standard IV: Facilitation

It is important to use a method of facilitation the meets the learning needs of the participant(s) and achieves the expected outcomes.

Guidelines:
1. Use facilitation methods that align with the simulation objectives guiding: preparation before the simulation, facilitating activity during the simulation, as well as, determining feedback/debriefing post simulation.

2. Facilitation methods should be in line with participants achieving expected outcomes.


**Standard V: Facilitator**

The simulation facilitator guides and supports the participant through the simulation process. The facilitator has been trained to be proficient in the management of all aspects of the simulation.

Guidelines:

1. The facilitator should prepare the participant by communicating expected objectives and outcomes to the simulation participant.

2. The facilitator ensures a safe learning environment that encourages active learning and reflection.

3. The facilitator should demonstrate up to date knowledge related to simulation pedagogy, and design, technology and scenario content.

4. Facilitator assures the simulation based learning experience is at a level appropriate for the participant.

5. The facilitator assesses and evaluates acquisition of knowledge and skills.

6. The Facilitator models professionalism and integrity.


**Standard VI: Debriefing**

A planned debriefing is a key component of any simulation experience. It should be aimed at promoting reflective thinking which includes the meaning and implications of actions, assimilation of knowledge and correlation with previously learned information.

Guidelines:

1. Debriefing should be facilitated by someone competent in the process.

2. The environment for debriefing should be safe promoting: confidentiality, trust, open communication, self-analysis and reflection.

3. The role of the facilitator during the debriefing process is to guide participants as they reflect on their actions in comparison to stated objectives.
4. Debriefing should have structure and include optimal time to achieve the objective.
5. Debriefing should focus on the participant objectives and outcomes.


Standard VII: Participant Assessment and Evaluation

Formative or summative evaluation of the simulation participant is a key element of the simulation based experience.

Guidelines:

1. Formative assessment should be given to participants providing information for the purpose of improving performance and behaviors associated with cognitive, affective and psychomotor learning domains.
2. Summative evaluation should be provided to inform participants on the achievement of stated goals.
3. Evaluation of participants should be based upon standards of interrater objectivity and reliability to avoid observer bias and to decrease subjectivity.


References:


Chakravarthy, B. Haar, E. Bhat, S. McCoy, C. Denmark T. Lotfipour, S. Simulation in Medical School Education: Review for Emergency Medicine, Western Journal of Emergency Medicine Volume 466 XII, NO. 4: November 2011


Addendum A
<table>
<thead>
<tr>
<th>Technological simulation levels</th>
<th>Level 0</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulation Technique</td>
<td>Written simulations includes pen and paper simulations or “Patient Management Problems” and latent images</td>
<td>3-D models which can be a basic mannequin, low fidelity simulation models, or part-task simulators</td>
<td>Screen-based simulators. Computer simulation, simulation software, videos, DVDs, or Virtual Reality (VR) and surgical simulators.</td>
<td>Standardized patients. Real or simulated patients (trained actors), role play.</td>
<td>Intermediate fidelity patient simulators. Computer controlled programmable full body size patient simulators not fully interactive.</td>
<td>Interactive patient simulators or computer controlled model driven patient simulators, also known as high fidelity simulation problems.</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td>Usually student led</td>
<td>Student or trainer led</td>
<td>Student or trainer led</td>
<td>Student or trainer led</td>
<td>Preferably trainer led</td>
<td>Preferably student led</td>
</tr>
<tr>
<td>Type Skills addressed</td>
<td>Passive Cognitive</td>
<td>Psychomotor</td>
<td>Interactive Cognitive</td>
<td>Psychomotor, cognitive, and interpersonal</td>
<td>Partly interactive psychomotor, cognitive, and interpersonal</td>
<td>Interactive psychomotor, cognitive, and interpersonal</td>
</tr>
<tr>
<td>Typical use</td>
<td>Patient management problems. Diagnosis mainly for assessment</td>
<td>Demonstration and practice of skills</td>
<td>Cognitive skills Clinical management. Sometimes interpersonal skills (software allowing for a team to interact over networked computers)</td>
<td>Same as Level 2 plus patient physical assessment, diagnostic, or management problems. Interpersonal skills</td>
<td>Same as Level 3 plus procedural skills. Full-scale simulation training sometimes used for demonstrations</td>
<td>Same as Level 4</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>Unrealistic feedback cannot be given instantaneously after the exercise</td>
<td>Limited range of training functions. No or little interactivity</td>
<td>Unrealistic setting. Students and trainers have to be familiar with the software/equipment. Software has to be kept up to date with the relevant medical regulations/procedures VR sometimes requires very high computational power</td>
<td>For small groups of students only. Patients have to be trained and briefed. Inconvenient if the exercise has to be repeated many times. Not valid for any invasive practice unless used in conjunction with a part-task trainer</td>
<td>May require programming of scenarios. Several trainers required for a relatively small group of students. Trainers have to be familiar with the equipment. Requires an emulated patient monitor for most parameters.</td>
<td>Cost (mannequin and facility). Several trainers required for a relatively small group of students. Trainers have to be familiar with the equipment. Not very portable.</td>
</tr>
<tr>
<td>Advantages</td>
<td>Low cost (no special equipment required in most cases). One academic may be sufficient for a large number of students</td>
<td>Equipment relatively mobile and always available. One academic may be sufficient for a class of students working on the same skill. Spares patient discomfort</td>
<td>Relatively low cost, except for VR. One academic may be sufficient for a large number of students. Students can use it on their own (self-learning). Software often provides feedback on performance</td>
<td>Can be very realistic. A must for communication skills and patient history taking. Allows for truly multi-professional training</td>
<td>Provides a fairly realistic experience. Can be used to apply a broad range of skills. Students’ performance sometimes recorded. Allows for truly multi-professional training. Usually portable</td>
<td>Realistic experience. Can apply a broad range of skills. Students' performance recorded for debriefing. Allows multi-professional training. Can be used with real clinical monitoring equipment</td>
</tr>
</tbody>
</table>

**Technological Simulation Levels Explained**

**Simulation Technique**

- **Level 0**: Written simulations include pen and paper simulations or “Patient Management Problems” and latent images.
- **Level 1**: 3-D models which can be a basic mannequin, low fidelity simulation models, or part-task simulators.
- **Level 2**: Screen-based simulators. Computer simulation, simulation software, videos, DVDs, or Virtual Reality (VR) and surgical simulators.
- **Level 3**: Standardized patients. Real or simulated patients (trained actors), role play.
- **Level 4**: Intermediate fidelity patient simulators. Computer controlled programmable full body size patient simulators not fully interactive.
- **Level 5**: Interactive patient simulators or computer controlled model driven patient simulators, also known as high fidelity simulation problems.

**Mode of Delivery**

- **Usually student led**
- **Student or trainer led**
- **Preferably trainer led**
- **Preferably student led**

**Type Skills Addressed**

- **Passive Cognitive**
- **Psychomotor**
- **Interactive Cognitive**
- **Psychomotor, cognitive, and interpersonal**
- **Partly interactive psychomotor, cognitive, and interpersonal**
- **Interactive psychomotor, cognitive, and interpersonal**

**Typical Use**

- **Patient management problems. Diagnosis mainly for assessment**
- **Demonstration and practice of skills**
- **Cognitive skills Clinical management. Sometimes interpersonal skills (software allowing for a team to interact over networked computers)**
- **Same as Level 2 plus patient physical assessment, diagnostic, or management problems. Interpersonal skills**
- **Same as Level 3 plus procedural skills. Full-scale simulation training sometimes used for demonstrations**
- **Same as Level 4**

**Disadvantages**

- **Unrealistic feedback cannot be given instantaneously after the exercise**
- **Limited range of training functions. No or little interactivity**
- **Unrealistic setting. Students and trainers have to be familiar with the software/equipment. Software has to be kept up to date with the relevant medical regulations/procedures VR sometimes requires very high computational power**
- **For small groups of students only. Patients have to be trained and briefed. Inconvenient if the exercise has to be repeated many times. Not valid for any invasive practice unless used in conjunction with a part-task trainer**
- **May require programming of scenarios. Several trainers required for a relatively small group of students. Trainers have to be familiar with the equipment. Requires an emulated patient monitor for most parameters.**
- **Cost (mannequin and facility). Several trainers required for a relatively small group of students. Trainers have to be familiar with the equipment. Not very portable.**

**Advantages**

- **Low cost (no special equipment required in most cases). One academic may be sufficient for a large number of students**
- **Equipment relatively mobile and always available. One academic may be sufficient for a class of students working on the same skill. Spares patient discomfort**
- **Relatively low cost, except for VR. One academic may be sufficient for a large number of students. Students can use it on their own (self-learning). Software often provides feedback on performance**
- **Can be very realistic. A must for communication skills and patient history taking. Allows for truly multi-professional training**
- **Provides a fairly realistic experience. Can be used to apply a broad range of skills. Students’ performance sometimes recorded. Allows for truly multi-professional training. Usually portable**
- **Realistic experience. Can apply a broad range of skills. Students' performance recorded for debriefing. Allows multi-professional training. Can be used with real clinical monitoring equipment**
A Typology of Educationally Focused Medical Simulation Tools: Gillaume Aliner, Medical Teacher, 2007, 29: e243- e250
<table>
<thead>
<tr>
<th>How merging problem-based learning and simulation matches learning outcomes.</th>
<th>PBL</th>
<th>Simulation</th>
<th>Achievable Learning Outcomes</th>
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Merging Problem Based Learning and Simulation as an Innovative Pedagogy, Clinical Simulation in Nursing, ppe141 – e148, Vol 7, Issue 4
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<tr>
<th><strong>Fidelity Elements in Simulation: A Typology</strong></th>
<th><strong>Definition</strong></th>
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<tbody>
<tr>
<td><strong>Description</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td>Partial taster trainers (simulators – low tech)</td>
<td>Basic models or manikins used for the development of simple techniques and procedures e.g. a birthing pelvis.</td>
</tr>
<tr>
<td>Peer to peer learning</td>
<td>Collaboration between peers for the development of skills e.g. abdominal assessment</td>
</tr>
<tr>
<td>Screen-based computer simulators</td>
<td>Computer based programs for the development of knowledge and critical thinking skills e.g. advanced life support.</td>
</tr>
<tr>
<td>Virtual reality</td>
<td>A combination of computer-generated images with auditory, tactile and visual trainers e.g. surgical skills.</td>
</tr>
<tr>
<td>Haptic systems</td>
<td>A combination of real-world and virtual reality exercises which enables the device or procedure to be 'touched' and 'felt' and for practitioners performance to be tracked.</td>
</tr>
<tr>
<td>Standardized patients</td>
<td>Role-playing of a case study using students or actresses in a realistic and consistent approach.</td>
</tr>
<tr>
<td>Full-scale simulation (medium to high fidelity)</td>
<td>Full body computerized manikins programmed to provide physiologic responses to practitioner actions e.g. full body obstetric birthing simulators.</td>
</tr>
</tbody>
</table>

*Simulation Based on Learning in Midwifery Education: A Systematic Review, S Cooper et al.*
<table>
<thead>
<tr>
<th>Comparison of Select Features of Standard And Portable Acute Care Simulation</th>
<th>Standard Simulation</th>
<th>Off-site</th>
<th>On-site (In Situ)</th>
<th>Mobile (Including Progressive)</th>
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<tbody>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
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<tr>
<td>Location</td>
<td>Simulation Center</td>
<td>Nonclinical setting (e.g., conference space)</td>
<td>Live clinical environment</td>
<td>Transitive settings (e.g., medical clinic to ambulance to ED</td>
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<tr>
<td>Accessibility for learners</td>
<td>Scheduled events</td>
<td>Scheduled events</td>
<td>Impromptu or scheduled</td>
<td>Impromptu or scheduled</td>
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<tr>
<td>Interdisciplinary training</td>
<td>Limited (scheduling)</td>
<td>Session-dependent</td>
<td>Session-dependent</td>
<td>Integral</td>
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<tr>
<td>Continuity of care</td>
<td></td>
<td></td>
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<tr>
<td>Multi-department/multi-facility learning</td>
<td>Facility-dependent</td>
<td>Possible</td>
<td>Possible</td>
<td>Integral</td>
</tr>
<tr>
<td>Prolonged scenario</td>
<td>Possible</td>
<td>Possible</td>
<td>Possible (often limited)</td>
<td>Possible (often limited)</td>
</tr>
<tr>
<td>Opportunity for didactic/ debrief component</td>
<td>Session-dependent</td>
<td>Session-dependent</td>
<td>Limited (time, AV, equipment)</td>
<td>Limited (time, AV, equipment)</td>
</tr>
<tr>
<td>AV support</td>
<td>Facility-dependent</td>
<td>Location-dependent</td>
<td>Limited</td>
<td>Limited</td>
</tr>
<tr>
<td>Session finding source</td>
<td>Direct (learner/departmen t)</td>
<td>Direct (learner/departmen t)</td>
<td>Indirect (department/institutio n)</td>
<td>Indirect (department/institutio n)</td>
</tr>
<tr>
<td>Costs (including infrastructure)</td>
<td>Center-dependent</td>
<td>Session-dependent</td>
<td>Session-dependent</td>
<td>Session-dependent</td>
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<tr>
<td>Staff clinical release</td>
<td>Required</td>
<td>Required</td>
<td>Institution-dependent</td>
<td>Institution-dependent</td>
</tr>
<tr>
<td>Supplies + equipment</td>
<td>Provided by center</td>
<td>Provided for session</td>
<td>Existing on-site materials</td>
<td>Existing on-site materials</td>
</tr>
<tr>
<td><strong>Research</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Primary methodological benefit</td>
<td>Improved control over SIM/environment</td>
<td>Improved access to specific subject cohorts</td>
<td>Live clinical environment</td>
<td>Live clinical environment</td>
</tr>
<tr>
<td>Potential challenges</td>
<td>Subject scheduling</td>
<td>Subject scheduling</td>
<td>Obtaining consent for impromptu simulation</td>
<td>Subject scheduling</td>
</tr>
<tr>
<td>Example</td>
<td>Pre- and post-training assessment of ACLS skills and teamwork behavior retention via detailed observational study of resident physician trainees</td>
<td>Difficult airway simulation scenario performance comparison across large cohort of physicians with similar backgrounds at a national conference</td>
<td>Quality management study to assess resuscitation team response to simulation patient cardiac arrest on medical floor</td>
<td>Assessment of CPR care delivery during unstable out-of-hospital patient transport simulation</td>
</tr>
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Portable Acute Care Simulation: Kobyashi et al