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Consensus Statement No. 434: Simulation in Obstetrics and Gynaecology

(En français : Déclaration de consensus n^{o} 434 : Simulation en obstétrique et gynécologie)

The English document is the original version. In the event of any discrepancy between the English and French content, the English version prevails.

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KEY MESSAGES

1. Simulation is an evidence-based modality with multiple applications in obstetrics and gynaecology to achieve improved patient outcomes, enhanced safety, and efficiency.
2. Simulation is powerful when carefully planned using an interprofessional approach and when implemented as part of a local program.
3. All health care professionals in obstetrics and gynaecology can develop simulation activities.
4. Engagement of institutional support can facilitate training, assessment, and sustainability.

DEFINITIONS

Anticipatory or "just in time" events is an educational strategy where training occurs in close temporal proximity to a clinical encounter.
Crisis resource management is a set of principles that deal with cognitive and interpersonal behaviours that contribute to optimal team performance.
Debriefing is a formal, collaborative, reflective process within the simulation learning activity to promote participants' reflective thinking and provide feedback about their performance while various aspects of the completed simulation are discussed; and to explore with participants their emotions and to question, reflect, and provide feedback to one another (i.e., guided reflection).
Embedded participant refers to an individual who is trained or scripted to play a role in a simulation encounter in order to guide the scenario and who may be known or unknown to the participants; guidance may be positive, negative, or a distraction based on the objectives, levels of the participants, and needs of the scenario.
Experiential learning is an engaged learning process where students "learn by doing" and by reflecting on the experience.
Facilitator is an individual that helps to bring about an outcome (such as learning, productivity, or communication) by providing indirect or unobtrusive assistance, guidance, or supervision.
Fiction contract refers to the degree of engagement that health care trainees are willing to give the simulated event; also known as the "suspension of disbelief," it is a literary and theatrical concept that encourages participants to put aside their disbelief and accept the simulated exercise as being real for the duration of the scenario.
High-fidelity simulator in the context of this consensus statement refers to the broad range of full-body mannequins that can mimic, at a very high level, human body functions. This type of mannequin is also known as a high complexity simulator.
In situ simulation is a simulation that takes place in the actual patient care setting/environment in an effort to achieve a high level of fidelity and realism; this training is particularly suitable for work environments that are difficult due to space constraints or noise (e.g., an ambulance, a small aircraft, a dentist's chair, a catheterization lab, etc.).
Interdisciplinary education is an educational environment that integrates the perspectives of professionals from two or more professions by organizing the education around a specific discipline, where each discipline examines the basis of their knowledge.
Interprofessional education is an educational environment where students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes. In this document, this term refers to all members of the obstetrics and gynaecological team who interact no matter their position.
Realism is an educational technique that facilitates the learner's suspension of disbelief by creating an environment that mimics the learner's work environment; realism includes the environment, simulated patient, and activities of the educators, assessors, and/or facilitators.
Simulation is 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.

ABSTRACT

Objective: To provide a comprehensive and current overview of the evidence for the value of simulation for education, team training, patient safety, and quality improvement in obstetrics and gynaecology, to familiarize readers with principles to consider in developing a simulation program, and to provide tools and references for simulation advocates.

Target population: Providers working to improve health care for Canadian women and their families; patients and their families.

Outcomes: Simulation has been validated in the literature as contributing to positive outcomes in achieving learning objectives, maintaining individual and team competence, and enhancing patient safety. Simulation is a well-developed modality with established principles to maximize its utility and create a safe environment for simulation participants. Simulation is most effective when it involves interprofessional collaboration, institutional support, and regular repetition.

Benefits, Harms, and Costs: This modality improves teamwork skills, patient outcomes, and health care spending. Upholding prescribed principles of psychological safety when implementing a simulation program minimizes harm to participants. However, simulation can be an expensive tool requiring human resources, equipment, and time.

Evidence: Articles published between 2003 and 2022 were retrieved through searches of Medline and PubMed using the keywords "simulation" and "simulator." The search was limited to articles published in English and French. The articles were reviewed for their quality, relevance, and value by the SOGC Simulation Working Group. Expert opinion from relevant seminal books was also considered.

Validation Methods: The authors rated the quality of evidence and strength of recommendations using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach. See online Appendix A (Tables A1 for definitions and A2 for interpretations of strong and conditional [weak] recommendations).

Intended Audience: All health care professionals working to improve Canadian women's health, and relevant stakeholders, including granting agencies, physician/nursing/midwifery colleges, accreditation bodies, academic centres, hospitals, and training programs.

RECOMMENDATIONS

1. Health care professionals in obstetrics and gynaecology should understand the value of both in situ and off-site simulation as a tool

for education, patient safety, and quality improvement at both the team and individual levels (*strong, moderate*).
2. Health care professionals in obstetrics and gynaecology should be aware of the overall cost reduction associated with the use of simulation (*strong, moderate*).
3. Stakeholders at all levels must commit to an ongoing simulation program, including identifying, training, and supporting simulation advocates, as well as securing adequate funding. This approach leads not only to organizational readiness but also to quality improvement and positive culture change (*strong, moderate*).
4. Providers of obstetrical and gynaecological care should be familiar with key simulation modalities and principles of how to advance knowledge using simulation (*conditional, low*).
5. Purposeful simulation activities must be based on local needs assessments and knowledge gaps (*conditional, low*).
6. Interprofessional/interdisciplinary teams should participate in the design, implementation, and evaluation of team training and in situ simulation programs (*strong, high*).
7. Debriefing must be promoted as a fundamental component of the experiential learning process. Team debriefing/peer debriefing with a written guide can be as effective (as an alternative) as expert debriefing (*strong, high*).
8. Psychological safety must be established for all personnel within the simulation and the debriefing (*strong, moderate*).
9. Program evaluation, a system to measure the efficacy of a learning activity, must be included in the planning of simulation activities to assess whether the targeted outcomes of the program were achieved (*strong, moderate*).
10. Simulation-based activities should be designed in a culturally sensitive and socially responsible way, similar to all other aspects of health professionals' education (*strong, low*).

INTRODUCTION

Long a staple of training in high-acuity professions such as the military and aviation, simulation-based approaches to learning have also been adopted in the medical profession. Programs in anaesthesia, trauma, emergency, and critical care medicine have come to rely on simulation-based learning, with improved patient safety as the bottom line.

Simulation is an established educational modality for physician continuing professional development (CPD). More broadly, simulation is recommended by most international health and accreditation organizations throughout the education continuum, driving increasing demands for its utilization.[1,2]

Obstetric emergencies are intricate events, requiring multidisciplinary coordination. Standardizing the approach and management of obstetric emergencies is associated with improved clinical outcomes compared with non-standardized management.[3,4] In high-stakes, high-pressure critical events, preparedness minimizes human error and improves team performance.[5] Obstetrical simulation as a teaching modality was documented as early as the 18th century, using a model created by Angélique du Coudray.[6] (Figure 1) Since then, numerous studies involving multiple medical specialties have demonstrated the utility of simulation in CPD to improve decision-making and to evaluate processes and protocols. Physician participation in simulation has also been shown to have a positive impact on knowledge, skills, and behaviours, leading to significant improvements in patient outcomes.[7]

A systematic review of simulation-based CPD in obstetrics highlighted the positive impact of simulation-based education on physician learning and organizational performance, although there was significant heterogeneity among the included studies.[3] Despite the available data on positive outcomes and the introduction of advancing technology and high-fidelity mannequins, numerous barriers to simulation-based CPD implementation and physician participation have been identified.[8] For example, interprofessional training programs often struggle to be sustainable, owing to various logistical challenges and a lack of institutional support.[9]

Simulation is supported by history, data, and educational tools, but it has yet to be fully integrated into daily practice. Teaching and learning using simulation involve both time and money. Fully equipped state-of-the-art simulation centres, the latest high-fidelity mannequins, or highly trained simulation specialists may not always be necessary. PROMPT (Practical Obstetric Multi-Professional Training), moreOB (Managing Obstetrical Risk Efficiently), ALARM (Advances in Labour and Risk Management), and ALSO (Advanced Life Support in Obstetrics) are recognized obstetrical programs that use simulation at arguably reasonable costs. PROMPT was one of the first programs to demonstrate a significant improvement in outcomes.[7] However, despite their impact, many of these programs have encountered diminishing participant engagement and reduced departmental uptake. Programs specifically oriented to technical skills might have more sustainability, but PROTECT (Prevention and Repair Of perineal Trauma Episiotomy through Coordinated Training), for example, is not regularly offered to most providers.

The main goal of this consensus statement is to clarify the rationale and document the value of simulation in centres that provide obstetric and gynaecological care. It also aims to guide professionals in women's health care in the use and development of simulation as an interprofessional teaching modality by providing a framework to initiate a curriculum and a rationale for stakeholder engagement, along with simple tools and references. This consensus statement is intended to create a sense of urgency, with a guided coalition, and a vision for the future.

Role of Simulation in Education and Quality Improvement

Simulation-based training in its various forms has demonstrated benefits for individual learning, improving the functioning of teams, and auditing existing health care systems.

Simulation can be designed to teach a specific procedure or task, offer practice in managing clinical scenarios, or be

ABBREVIATIONS

ALARM	Advances in Labour and Risk Management
ALSO	Advanced Life Support in Obstetrics
CPD	continuing professional development
CBD	competency by design
CRM	crisis resource management
ISS	in situ simulation
moreOB	Managing Obstetrical Risk Efficiently
PROMPT	Practical Obstetric Multi-Professional Training
SET	Simulation Educator Training Course
QI/PS	quality improvement and patient safety (also known as QuIPS)
PROTECT	Prevention and Repair Of perineal Trauma Episiotomy through Coordinated Training

Figure 1. Madame du Coudray's simulator, The Machine.

"The Machine" is a simulator created by French midwife, Angélique Marguerite le Boursier du Coudray, in the 18th century. It is life-sized, built on a metal frame in lithotomy position, covered with burlap, and stuffed with cotton. The abdomen opens so the fetus can be positioned, and it contains orifices with an adjustable set of strings and straps to simulate vaginal descent and cervical dilation, in order to demonstrate the dynamics and movements of childbirth. Reproduced with permission from the *Musée Flaubert et d'histoire de la médecine, Rouen, France*.

systems- or environment-oriented. Simulation may be designed to take place in the daily clinical environment (in situ simulation [ISS]), or in a designated off-site location, such as a simulation centre. The objective of the simulation should serve as the basis for determining the most appropriate design and venue. The value of the simulation activity relies more on its alignment with the objective than on the cost of the simulation or mannequin.

Simulation has demonstrated benefits in improving individual performance at diverse assigned tasks in obstetrics and gynaecology, including sonographic fetal weight estimation, maneuvers used to relieve shoulder dystocia, laparoscopic management of ectopic pregnancy, and technical proficiency in hysteroscopy.[7,10–12] The value of task-oriented training has been reported to be greater for novice practitioners than experienced practitioners.[12] However, performance of particular tasks may be improved independent of clinical experience.[11] This improvement appears to be greatest in the short-term, with many experts advocating for regularly scheduled simulation training.

Simulation is increasingly incorporated into systems of assessment for learner competence, as demonstrated by the Canadian National Anesthesiology Simulation Curriculum program for anesthesiology residents in Canada and the Fundamentals of Laparoscopic Surgery course for surgical residents in Canada and in the United States.[13] With a similar goal for obstetrics and gynaecology residents, a Delphi study was undertaken in 2017, during which educators identified a set of specific clinical scenarios as being critical to demonstrate performance in prior to graduation.[14] From the results of this study, the SOGC Simulation Working Group developed 6 standardized, competency-by-design (CBD)-oriented clinical scenarios to serve as an adjunct to clinical exposure or to be used to assess entrustable professional activities (EPA).

Using a validated tool (the Pregnancy and Childbirth Questionnaire), one pilot study found an association between interdisciplinary simulation training and positive patient perceptions of the care they received.[15] Although more research is indicated, these early findings suggest the value of interprofessional simulation as it pertains to patient outcomes.

Simulation also provides an opportunity to train clinical teams toward team competence in managing a crisis. Crisis resource management (CRM) represents a non-technical skill set that requires practice. Team-based simulation training improves team competence, confidence, and patient outcomes during obstetrical emergencies, such as postpartum hemorrhage (PPH) and shoulder dystocia.[7,15,16] One study found that patient-reported quality of care also improved after the implementation of a CRM-focused team training course.[17]

ISS takes place in the native clinical context. For example, a simulated eclamptic seizure could take place in the birthing unit, on the postpartum ward, or in the emergency department, requiring the team to manage the scenario in their own hospital environment using available resources. Therefore, ISS can be used not only for team training, but also for auditing existing health care systems. These simulations consistently identify latent safety threats before they result in an adverse event with a real patient.[17] ISS programs can be tied to local quality improvement and patient safety (QI/PS) committees in order to communicate any latent safety threats. Conversely, QI/PS committees can use critical cases or policy changes to inform the development of simulation content for knowledge translation.

RECOMMENDATION 1

UNDERSTANDING THE COST-EFFECTIVENESS OF SIMULATION

Hospitals and health authorities providing maternity care should be concerned with the value of simulation in

obstetrics and gynaecology. Although there are costs associated with implementing simulation programs, ensuring regular multidisciplinary participation in simulation can reduce adverse maternal and neonatal outcomes,[18,19] reduce resultant costs to health care systems,[20] and improve provider knowledge, skill, and confidence.[21] As mentioned previously, simulation has also been positively associated with patient satisfaction.[15]

Van de Ven et al. investigated the cost-effectiveness of hospital-based simulation programs in obstetrics, comparing the effect of various frequency training models on neonatal trauma and associated care expenditures.[22] When simulations were conducted every 3 months for 1 year, there was a significant reduction in neonatal trauma, which offset the cost of initiating and maintaining a simulation program. This improvement was not seen with isolated simulations, or when simulations were completed less frequently than every 3 months. Cohen et al. found a reduction of catheter-related bloodstream infections following simulation-based training of medical residents in an intensive care unit. When evaluating costs, they demonstrated a 7-to-1 rate of return on the simulation training intervention.[23]

In 2016, Weiner et al. published an observational study following 7 years of PROMPT training. While acknowledging the results were observational, they found that simulation training through PROMPT led to better team communication, a 100% reduction in brachial plexus injury, improved umbilical cord blood gases, and a 30% reduction in cesarean deliveries. The projected savings, in terms of reduced litigation and costs, totalled US $38 million, excluding brachial palsy injuries.[24] Schaffer et al. examined malpractice claims among 292 obstetrician gynaecologists who attended 1 or more simulation training sessions between 2002 and 2019. In their retrospective analysis, they found a significant reduction in malpractice claims after simulation training, and attending more than 1 simulation session was associated with a greater reduction in claim rates.[25] A study by Geary et al. found that engagement in moreOB training lowered the frequency and costs of reportable events among maternity units in 34 Canadian hospitals. While moreOB showed little impact within its first 3 years of application, Geary et al. reported a significant reduction in the frequency of reportable events in the 3- and 6-year periods following the peer-led, interprofessional, team-based intervention (14% and 25% reduction, respectfully). Their results indicated that as culture change developed within maternity units through improved behaviours and processes, patient outcomes improved and there was a reduction in reportable events.[26]

RECOMMENDATION 2

INVOLVEMENT OF KEY STAKEHOLDERS

Given that simulation-based education has demonstrated benefits for teaching and assessment, patient outcomes and experience, auditing of processes, and system costs, there is a broad range of stakeholders who are served by the creation of a strong simulation program, including:

- Granting agencies
- Physician, nursing, and midwifery colleges
- Academic centres
- Hospitals
- Training programs at all levels
- Patients and families

The development of a simulation program, whether institutional, departmental, or hospital-based, requires interprofessional collaboration and planning as well as ongoing financial support. The content and goals of the simulation program are determined by the needs of the organization and its members or stakeholders, and may be identified through a quality improvement and patient safety pathway. They should also align with any existing educational and knowledge translation activities. Stakeholders include any educational and clinical groups using simulation activities. A simulation champion or advocate should be selected to develop, create, and implement a simulation program, in conjunction with an interprofessional team.[27]

An effective simulation program benefits from departmental and institutional support for financial decisions and ongoing assessments of program needs. A summary document reflecting the purpose, design, and implementation of simulation activities will facilitate ongoing support and engagement of organizational stakeholders. Guidance for writing this type of summary document was created by the Council for Patient Safety in Women's Health Care.[28]

Through the development of a simulation program, participating members or simulation advocates will become familiar with simulation and its scope, as well as the limitations of its use. Optimally, simulation advocates should have the time and opportunity to acquire and

understand the language, concepts, and knowledge that define simulation activities.[29]

Organizations should respond to program development needs by facilitating training through available resources, such as the Royal College of Physicians and Surgeons of Canada's Simulation Educator Training (SET) course, to advance the skills of faculty. Immersive workshops in simulation education provide faculty the opportunity to learn new skills and strategies when incorporating simulation into curricula and to network with individuals who share common goals.

The use of simulation is expected to expand throughout curricula and across health care providers not enrolled in ongoing training programs. Simulation is a powerful formative and summative tool for learners undergoing formal training, but it can be equally valuable in the CPD setting for independently practising health care providers. Simulation activities build and reinforce behaviours and skills in a safe environment. As such, it is likely that simulation activities and programs will eventually become mandatory components of maintenance of certification and accreditation standards.

RECOMMENDATION 3

CORE CONCEPTS OF SIMULATION DESIGN AND IMPLEMENTATION

Realism

Simulation is meant to mimic real clinical life in a safe educational setting. Establishing a sense of realism increases engagement in the learning activity. Careful consideration of different aspects of realism can dramatically reduce costs while ensuring appropriate alignment with the simulation goals.

The use of an expensive high-fidelity mannequin does not, on its own, translate into an effective learning activity. The concept of fidelity—being largely associated with expensive and physically realistic mannequins—has been heavily challenged over the last decade. Terms based on principles of effective training and transfer, such as *resemblance* and *functional task alignment*, may be more accurate than fidelity.[30]

Rudolph et al. suggested that 3 aspects of realism should be considered to achieve the aim and objectives of the simulation: physical, conceptual, and emotional.[31]

Physical realism

Physical realism describes the look and feel of the simulator. When teaching mastery in complex technical skills such as laparoscopic suturing, it is important to have a laparoscopic simulator that reproduces the laparoscopic view and to use materials that have a similar feel to real-life tissues.

Conceptual realism

Conceptual realism describes the ability of the simulator to portray concepts and relationships in a realistic way. For example, if a simulated patient is experiencing a PPH, then the patient's vital signs would be expected to change in a predictable way (hypotension and tachycardia). This can be displayed on a monitor, written on a whiteboard, or announced by the simulation instructor. The physical way that these vital sign changes are communicated is less important to the simulation than upholding the concept of appropriate vital sign changes. By upholding this aspect of realism, many simulations can retain their learning value at a lower cost.

Emotional realism

Emotional realism describes the affective experience of engaging in a simulation scenario. Participating in a simulation, independent of the content of the simulation scenario, can be stressful. Like the other aspects of realism, it is important to consider the learning objectives of the scenario and the level of the learners when setting the emotional intensity of the simulation. For example, when teaching the steps of a gynaecologic procedure to a junior learner, it may be counterproductive to layer on an anxious patient requiring complex counselling. Alternatively, if an interprofessional team is learning to manage a cardiac arrest in the birthing room, then having the team also attend to the patient's concerned support person may increase the sense of emotional realism for the scenario.

Considering the different aspects of realism is critical to the effective design of any simulated learning experience.

Modalities

The simulation modality must be carefully selected to target the identified goals of the planned simulation. There are a multitude of simulation modalities, activity locations, and degrees of realism to factor in. The simulation's identified objectives, which may be task-based, clinical, or environmental, will influence a number of factors.[32]

Task-based objectives

Task-based objectives must include modalities that allow for the assessment of a certain procedure and will vary

depending on the level of training. Examples include teaching a gynaecologic surgical procedure using a laparoscopic box trainer or teaching technical ultrasound skills using an ultrasound simulator.

Clinically-focused objectives

Clinically-focused objectives must include modalities that allow for the assessment of both procedural and medical reasoning.[32] For example, a simulation in which individual care providers practice the initial management of a PPH and insertion of a Bakri balloon device.

Environmentally-focused objectives

Environmentally-focused objectives are often overlooked in a simulation, but can help identify areas that need improvement in the clinical environment, including latent safety threats.[32] In an environmentally-focused PPH simulation, a multidisciplinary team of care providers would work together, ideally in their native environment, to manage a PPH.

Simulation activities can include partial task trainers for simple tasks such as insertion of an intravenous line or perineal tear suturing. Live tissue models can improve realism for certain tasks, but these have the disadvantages of cost, lack of comparability to human tissue, changing values and ethics, and changing technology.[33] Integrated simulator models include partial or whole body mannequins linked to a computer that controls outputs and feedback. These mannequins can provide instructor-driven or model-driven feedback in response to participant stimuli/input.[34] Virtual reality and augmented reality models that provide kinesthetic and haptic feedback are becoming increasingly available, and there is a growing body of evidence supporting virtual reality simulators or environments for specific scenarios. Furthermore, Haerling showed virtual simulation to be cost-effective.[35]

RECOMMENDATION 4

NEEDS ASSESSMENT AND SIMULATION SCENARIO DESIGN

Curriculum planning and development is critical to the implementation of a successful and sustainable simulation program.

Needs Assessment

Before initiating a simulation curriculum, a needs-based and updated development process should be undertaken to identify objectives and maximize the relevance and effectiveness of the program. The purpose of a needs assessment is to identify existing gaps that may be addressed. This is consistent with most curriculum design recommendations, such as Kern's 6-step framework.[36] Gaps can arise from numerous sources, including a change in unit protocols, quality improvement findings, team-based challenges, changes in guidelines, and so on. Although simulations can be guided by broader institutional or national data, unit-level simulations can be both feasible and valuable. Each hospital/unit should consider their own needs in designing a simulation program. For example:

- Simulating rare but critical high acuity, low opportunity events, such as an amniotic fluid embolism.
- Running a "just in time" simulation in anticipation of the management of a patient with placenta percreta who is currently admitted on ward.
- Running a simulation to facilitate knowledge translation in response to changing fetal health surveillance guidelines.

Maintaining a bank of simulations and ensuring they are up to date with current evidence and best practice is important for ongoing learning, continuing medical education, and improvement of processes.

Scenario Design

Multiple frameworks and guides exist for the design of simulation scenarios. Simulation advocates can gain experience through formalized simulation fellowships or through the Royal College SET course, as previously described. Using a standardized simulation framework and template creates consistency across and within programs.

One approach to scenario design is the "Five Ws" method, which addresses the following cardinal questions: who, what, where, when, and why.[37] Note that the order in which the questions are answered may vary.

Who

Who refers to the targeted individuals or teams participating in the simulation. It also refers to the facilitators, simulated patients, and all personnel involved in the simulation.

What

What refers to the goals of the simulation activity. Once the *who* has been identified, the *what* of the simulation activity may become clear. Alternatively, the *what* may

Figure 2. Simulation Event Table.

Simulation Event	**Objectives**	Case selection	-HALO event -"Just in time" -Institutional or national morbidity and mortality data
		Area of focus	-Task -Clinical -Environmental
		Timing	-Dedicated teaching time -Scheduled simulation time -Ad hoc drills
	Location	Tabletop/table reads	
		Simulation centre	
		In situ	
	Model	Realism	-Physical -Conceptual -Emotional
		Model type	-Partial task trainer -Computer based system -Live tissue models -Virtual reality -Integrated simulator models -Simulated patients

HALO: high acuity, low opportunity.

precede the *who*, as determination of the simulation topic can be guided by real-life challenging cases, institutional data, or national morbidity and mortality data.[38] Upon identifying the *who* and the *what*, clear objectives can be written to guide the development of the simulation.

Why

Why pertains to the needs assessment, the resulting objectives, and the broader aim of the simulation. The *why* must be shared among all participants to ensure engagement and increase the value of the simulation activity.

When

When pertains to timing and scheduling of the simulation event (see Figure 2). Argani et al. suggested that there is value to both scheduled and unscheduled events.[37] Scheduled events ensure that all members of the team are able to participate without competing for clinical duties, while unscheduled events allow practice of situations in the native setting.[39,40] Unit acuity, human resources, and staff schedules can influence the planning. Flexibility helps to maximize participation and engagement. Notifying relevant teams in advance may be important when running in situ simulations to ensure patient care is not compromised.

Where

Where is the location in which a simulation takes place. The *where* should be identified with the objectives of the simulation in mind. Types of locations can vary depending on the simulation:

- *Tabletop or table reads* are simple simulation activities that allow participants to talk through scenarios on their roles and work, given a hypothetical situation. They can take place anywhere, including virtually. Participants are given specific information needed to make real-time decisions. A tabletop or table read activity challenges individuals and may test other aspects of the response system, such as communications and availability of resources.[41]
- *Simulation centres* have dedicated staff and resources for facilitating simulation activities. Advantages of these locations include the presence of trained, dedicated simulation experts, simulation equipment, and video recording devices. However, not all centres are equipped with these facilities, but it does not preclude their ability to perform simulation activities.
- *ISS* takes place in an existing clinical or native environment and involves simulations that account for and are fully integrated into clinical operations, people, information, and technology.[17] It reflects how the clinical environment responds in its natural state.[42] Advantages of ISS activities include greater ease of access, reduced travel expense, and familiarity of environment.[34] Futhermore, ISS activities can help identify latent safety threats.[34,40]

Teams may be innovative in developing simulations and adapting their locations and tools. The COVID pandemic has yielded innovations that few imagined previously. For example, a lack of audiovisual recording in a particular setting can be surmounted by using

FaceTime and smartphones, or a virtual simulation may be delivered using a videoconferencing platform such as Zoom.

RECOMMENDATION 5

INTERPROFESSIONALISM

Health care is delivered by interdisciplinary teams that can include any health or social care professionals, such as physicians (at various levels of training and specialties), nurses, midwives, respiratory therapists, and others.[43] Interprofessional education brings together different professions to participate in a shared educational task in order to facilitate an understanding of each team member's professional practice and contribution to care. This understanding improves team competence.[44] Consequently, when the participants are members of an interdisciplinary team, a successful simulation program requires representatives of all team members at all stages, including design, implementation, and evaluation.[1,39] In obstetrics and gynaecology, simulation of obstetric emergencies can be used to improve patient safety, encourage teamwork, and raise morale.[32]

When simulation includes all health care professionals involved in intrapartum care, issues such as task distribution, patient management decisions, and communication between team members and with families can be addressed and practised.[40] Simulations and drills can be used to assess systems and identify flaws.[38] In addition to simulating emergencies, simulation of typical cases is also important. Research into legal and harm statistics suggests that it is rarely the emergency cases that result in adverse events.[26]

Simulation of day-to-day cases helps to test processes and identify latent threats to safe care before an adverse event can occur. Simulations can also be used as dress rehearsals to work out process issues for complex cases and new diseases (e.g., COVID-19).

In their study on an ISS program in anticipation of clinical encounters with the COVID-19 pandemic, Andreae et al. reported that simulations had an impact on organizational behaviour, which resulted in changes to scope of practice and resuscitation algorithms and raised awareness of the coming resource crisis. They concluded that simulation is a powerful tool for rapidly and safely testing protocols in preparation for a pandemic.[45]

Box. The Basic Assumption.

The Basic Assumption™. We believe that everyone participating in activities at [Insert Organization Name] is intelligent, capable, cares about doing their best, and wants to improve©
Reproduced from Centre for Medical Simulation, Boston, Massachusetts, U.S. Used with permission.

RECOMMENDATION 6

BRIEFING AND DEBRIEFING

A briefing before a simulation prepares and orients learners to the simulation experience. It has 4 main components. The first is to review the simulation's goals and objectives, which includes familiarizing learners with the simulation equipment and environment and explaining the roles of the facilitators. The second is to establish the fiction contract with the learners to ensure full engagement in the simulated scenario. The third is to review logistic details, such as length of the session, timing of breaks, and how to manage external communications throughout the session. The final component is to state the Basic Assumption (Box), which constitutes a pledge to respect all participants.[31]

Debriefing is a critical component of simulation. It offers the opportunity to identify areas for improvement, test processes, and learn as a team. It also allows learners to express their feelings and provides a platform for addressing questions and for reflection on each other's actions as part of a health care team. Debriefing helps to transform a simulation experience into learning through reflection. When running in situ simulations, process-oriented debriefing can help to identify latent safety threats, which, when paired with a system to close the identified gaps, can be used to improve outcomes and bolster staff engagement.[46,47]

Debriefing is a form of reflection-on-action in the process of continuous learning.[48] It aims to understand relationships among events, participants' thoughts, feelings, and actions, and performance outcomes of the simulation. It also explores the frame that guided the participants' actions, which can ultimately translate to learning across contexts and not just to the specific learning activity. Approaching the debrief with curiosity can add to the safety of the learning conversation.

Debriefing can be facilitator-guided or self-guided. While formal training in debriefing is of benefit, it is not essential to launching a simulation program. For example, an experienced facilitator from a different department or discipline may be invited to help guide the debrief. A novice facilitator using a framework as a guide can also be effective.[49]

Most published debriefing frameworks include at least 3 phases to guide conversation: reaction, analysis, and summary.[50,51] The reaction phase permits the sharing of emotions and aims to mitigate any distress that may be triggered. The analysis phase is dedicated to curiosity, actions, decisions, and the rationale behind them. Finally, the summary phase focuses on lessons learned and translation to clinical practice, including improved teamwork skills, process improvement, and culture change.

The following key elements are included in most debriefing frameworks:

- Maintaining (refreshing) psychological safety established during the simulation.[52]
- Sharing debriefing rules.
- Using open-ended questions and silence to help bring out things participants might be uncomfortable sharing.
- Encouraging the expression of emotions by participants to explore their reactions to the simulation.
- Discussing how or whether learning objectives were met.
- Analyzing why specific actions were chosen or certain attitudes were demonstrated.
- Sharing participants' mental models.
- Summarizing lessons learned and insights gained.

RECOMMENDATION 7

PSYCHOLOGICAL SAFETY

The importance of psychological safety in simulation training cannot be overstated. To be effective, simulations should include interprofessional perspectives during simulation facilitation and during the debriefing process. Including interprofessional members at each step of the simulation process may help encourage psychological safety. The most constructive way to encourage individual contribution and sharing of ideas is to create an environment that is non-hierarchical, without fear, and open to honest conversation no matter the role of the individual.[53] Ultimately, respect for each participant, as expressed by the Basic Assumption, is paramount to maintaining psychological safety.

The facilitators are responsible for establishing and maintaining psychological safety. This holds true during every simulation, including the debrief.[54]

Other considerations for enhancing psychological safety could include providing advanced and frequent notice of the timing of the simulation event. It may also help to share the subject of the simulation ahead of time. This allows participants to prepare, if they wish, and helps to ensure that the simulation is viewed by participants as a test of the team and processes rather than a test of individuals. This can be particularly important in a group with less experience in simulation-based learning.

RECOMMENDATION 8

PROGRAM EVALUATION

Incorporating simulation into an existing program can be both valuable and resource intensive. As with any other programmatic change, a system of evaluation is important to determine the outcomes of the intervention. This evaluation inevitably forms part of the needs assessment in the cyclical and iterative process of curriculum design and implementation. Program evaluation can be as simple as survey completed after each simulation session. Although outside the scope of this document, there are several theories and models for program evaluation, including complexity theory and the Kirkpatrick four-level model.[55] Each approach has its advantages. Regardless of the chosen model, it is important to examine both the intended outcomes, such as alignment with the predetermined objectives, and any unintended outcomes.[56]

RECOMMENDATION 9

SOCIAL RESPONSIBILITY IN SIMULATION

Engaging patients in simulation training can provide a unique point of view that is seldom identified or sought, but one that could be valuable in policy decisions and health care delivery.[57] Simulation scenario design often includes the creation of characters that are played by simulated patients. Collaborating with actual patients can lend an authentic voice to the writing of these characters

and the training of simulated patients. Moreover, it can protect against inherent bias or stereotyping, and increase the conceptual and emotional realism of the simulation content. Engaging content experts in equity, diversity, and inclusivity may be another way to approach this.

Spending in health care education and quality improvement must be carefully considered within the context of Canada's socialized health care system. Although simulation has been shown to reduce costs in certain contexts, it should be used responsibly, utilizing evidence-based practices and engaging in program evaluation to ensure the effective use of resources.

RECOMMENDATION 10

CONCLUSION

Simulation is a valuable tool for teaching specific clinical skills to individuals and for developing and improving team skills in CRM. Simulation is an important component of existing residency training programs. Despite recognized challenges, including fiscal and time constraints, simulation is expected to become increasingly integrated into CPD programs, not just in academic centres but also throughout the obstetrics and gynaecology specialty.

Simulation can identify latent threats in a clinical environment, improve patient safety, and contribute to high-reliability health care. It is essential that organizations and departments providing services in obstetrics and gynaecology have stakeholder support in developing and maintaining a simulation program. Doing so improves patient care and patient satisfaction, and reduces costs to organizations and to the health care system as a whole.

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APPENDIX A

Table 1. Key to Grading of Recommendations, Assessment, Development and Evaluation Quality of Evidence

Grade	Definition
Strength of recommendation	
Strong	High level of confidence that the desirable effects outweigh the undesirable effects (strong recommendation for) or the undesirable effects outweigh the desirable effects (strong recommendation against)
Conditional[a]	Desirable effects probably outweigh the undesirable effects (weak recommendation for) or the undesirable effects probably outweigh the desirable effects (weak recommendation against)
Quality of evidence	
High	High level of confidence that the true effect lies close to that of the estimate of the effect
Moderate	Moderate confidence in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low	Limited confidence in the effect estimate: The true effect may be substantially different from the estimate of the effect
Very low	Very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[a]Do not interpret conditional recommendations to mean weak evidence or uncertainty of the recommendation.

Adapted from GRADE GRADE Handbook, Table 5.1.

Table 2. Implications of Strong and Conditional recommendations, by guideline user

Perspective	Strong Recommendation • "We recommend that…" • "We recommend to not…"	Conditional (Weak) Recommendation • "We suggest…" • "We suggest to not…"
Authors	The net desirable effects of a course of action outweigh the effects of the alternative course of action.	It is less clear whether the net desirable consequences of a strategy outweigh the alternative strategy.
Patients	Most individuals in the situation would want the recommended course of action, while only a small proportion would not.	The majority of individuals in the situation would want the suggested course of action, but many would not.
Clinicians	Most individuals should receive the course of action. Adherence to this recommendation according to the guideline could be used as a quality criterion or performance indicator.	Recognize that patient choices will vary by individual and that clinicians must help patients arrive at a care decision consistent with the patient's values and preferences.
Policymakers	The recommendation can be adapted as policy in most settings.	The recommendation can serve as a starting point for debate with the involvement of many stakeholders.

Adapted from GRADE Handbook (2013), Table 6.1.