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SIR/RSNA/CIRSE Joint Medical Simulation Task Force Strategic Plan: Executive Summary

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Strategic Mission

The Executive Councils of the Society of Interventional Radiology (SIR), Radiological Society of North America (RSNA), and Cardiovascular and Interventional Radiological Society of Europe (CIRSE) have charged their Medical Simulation Task Forces and Work Groups to cooperate to achieve excellence and safety in interventional radiology patient care by jointly recommending and guiding implementation of a robust infrastructure and process to support Interventional Radiology (IR) simulation development, assessment, validation, application, and dissemination.

The goal of medical training is to create practitioners who demonstrate mastery of the professionalism (skills, knowledge, attitudes, and behavior) required for the successful delivery of medical therapy [1]. A well-designed and fully integrated curriculum is the essential mechanism...
by which this mastery is achieved. Since ancient times, mastery of the curriculum’s clinical, cognitive, psychomotor, and attitudinal skills have been acquired in the master-apprentice training model (MAM). After initially observing the instructor, the trainee is eventually allowed “hands-on” experience under supervision: in the past this has been supplemented with training on physical and animal models, cadavers, and, more recently, analogue, digital, and hybrid simulation [2].

The limitations of the traditional MAM for learning in patients include the need for expert supervision, the potential for suboptimal results or harm, time constraints, rising costs, stress, ethical considerations, and an adversarial medicolegal milieu. In addition, diagnostic imaging advances have all but eliminated the need for the straightforward invasive diagnostic procedures which had been used to train basic skills in interventional radiology (IR). These difficulties have led to a reappraisal of alternative training methods for the 21st century to augment and segmentally replace the traditional training methods.

Teaching models and tools must be cost effective, adaptable to change, and proven to develop skills that transfer to clinical circumstances. Where this gold standard validation proves elusive, these new medical simulators must be reconfigured to optimize the probability of validation. Medical simulation, using a combination of physical models and computer simulations, holds considerable promise for training, but to do this effectively requires accepted principles of educational methodology, including the need to obtain procedural skills within an overarching curriculum, with comprehension of the underlying condition and the risks and benefits of various therapies. Yet while standards exist for aviation, there are as yet none for the methodology and validity of medical simulations.

Validation

Public and professional acceptance of the use of simulation as a component of training high stakes IR skills requires proof (validation) of effectiveness. Validation of “testing” requires the ability to accurately assess knowledge and performance as they relate to learning objectives. The requirements for validating the use of a training device as a part of a curriculum depend on considerations such as the need

(1) to claim that participating in a particular training program is an accurate indicator of a level of competence or proficiency in the clinical environment;

(2) to claim that the use of a particular training device consistently provides particular results (proficiency, reduced training costs/errors over time), when used by different individuals in different training programs;

(3) to standardize a range of training programs to ensure that each predictably delivers a certain percentage of learners attaining predefined standards within a set period of time;

(4) for acceptance by users, experts, or other third parties (e.g., the public). This acceptance is generally more likely where training is performed with validated tools.

For these reasons, development of recommendations for validation and defined standards (including those specified within a curriculum) underpins the Joint Medical Simulation Task Force (JMST) strategic plan [3, 4].

A Strategy for Implementation

To safely implement simulator-based training in a curriculum requires evidence of clinical relevance, yet continued technology development might rapidly render well-conducted validation studies obsolete. It therefore seems prudent to adopt new technology for use within its areas of known efficacy [3] as determined by development history, metrics, validation studies, and the standards that are to be set in consequence of this strategy. Indeed clinically appropriate innovation, development, and instructional design should facilitate validation, opening up a new era in medical procedural training.

To increase the role of simulation in correctly teaching the cognitive and clinical knowledge necessary for the practice of IR requires thoughtful development and careful, yet expeditious, incorporation into official training curricula. This requirement has been identified by the Executive Councils of SIR and CIRSE and the Board of Directors of the RSNA [5]. The JSTF has been charged with recommending to their leadership a plan to integrate, throughout their divisional structures, the analysis, development, assessment, application, and dissemination of medical simulation in IR. This includes professional education, standards, research (principally direction, advice, and support), economics, practice building, and public information. The JSTF is not a credentialing body: its recommendations will include professional education, standards, research, economics, practice building, and public information. They will be derived from evidence-based and subject matter expert advice. The RSNA continues to work with SIR and CIRSE on the vision, mission, and goals for simulation in IR and beyond, as well as an implementation plan.

The 2010 Vision of the Societies

By 2010 a growing number of validated IR simulation training modules will (1) have been shown to transfer skills and reduce procedural error, (2) be delivering clinical
benefit to patients, and (3) have been integrated into a
standardized IR training curriculum and certifying exam-
inations—the newly formed American Board of Radiology
(ABR) Foundation is planning on a major role for simu-
lation in its early initiatives.

Specific Goals to Attain the Mission of the Joint
Simulation Task Force

1. To foster international relationships between societies
   and physicians in recognition of an increasingly global
   radiology community
2. To help the IR profession meet the anticipated growth
   in demand for interventional radiologists by conduct-
   ing activities which, through introducing simulation
   into curricula, will help
   a. To continuously improve education and training to
      reflect the current and evolving specialty of IR
   b. To encourage and educate students at the under-
      graduate level
   c. To meet the educational and continuing professional
      development needs of the societies’ members
3. To become stronger and more inclusive societies by
   demonstrating leadership in key clinical and technol-
   ogy areas affecting the future of IR
4. To advocate successfully on behalf of patients
   a. To ensure that they have access to optimal care
   b. To provide excellence in that care by
      i. Recommending standards in education
      ii. Using medical simulation optimally to improve
         patient safety
5. To support and disseminate high-quality research in
   radiological sciences relevant to simulation and pursue
   excellence in publications and communications of this
   research

Strategy Outline [3, 4]

This two-stage strategy aims to achieve the stated goals for
medical simulation with specific reference to financial
implications and expected timeframes. While not intended
to be prescriptive, the societies recognize the pressing need
for such an initiative in the field of IR simulation, recog-
nizing that periodic updates and modifications will be nee-
ded to address evolving technology and political issues. The
JSTF will work to develop the strategy objectives and dis-
seminate findings collaborating with others as required to
meet the societies’ mission of excellence in IR patient care.

Stage I

Stage 1 comprises two parallel strands, curriculum devel-
opment and organizational objectives.

A. Curriculum development

This defines the role of simulation within a structured,
training program including how, where, and when simu-
lator training takes place. It will also review assessment
methodologies for establishing competence including tra-
ditional techniques, novel automatic assessment based on
simulator-derived performance data, and observer-based
methods. Finally, it outlines the role of credentialing
organizations to oversee accreditation and revalidation

B. Organizational objectives

These consider how utilizing simulator models could im-
prove the performance of IR training and of health care
institutions. Human factors for the adoption of medical
simulation standards will be determined, including identi-
fication of metrics and agreement on standards for the
validity and efficacy of simulator models. Criteria for
evaluating simulators will be developed with respect to
learning, training, and the nature of performance feedback.
Support for the task force will be enlisted from the
industry, funding organizations, and the government. A
program will be formulated for implementation of simu-
lator-based training in IR curricula. Finally, recommenda-
tions will be made regarding the use of simulation by
simulator and medical device companies for education,
when operating outside curricula [6].

Stage II

It is intended that this strategy will provide guidance.
Research methodology (i.e., milestones, Gantt charts,
specifications, costings, personnel, etc.) is expected to be
generated and implemented by various other groups. The
core objectives of this stage are summarized below.

A. Training standards

B. Professional education

C. Practice building

D. Research

This part of the strategy aims to provide direction, advice,
and support to researchers from within and outside the col-
laborative, academic, and industrial partners of the JSTF.
E. Economics

F. Public education

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