

Characteristics and Core Curricular Elements of Medical Simulation Fellowships in North America

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ABSTRACT

Background In the past few years, there has been rapid growth in the number of simulation fellowships for physicians in the United States and Canada, with the objective of producing faculty with expertise and leadership training in medical simulation. Relatively little is known about the collective content and structure of these new fellowship opportunities.

Objective We sought to identify a common set of core curricular elements among existing simulation fellowships and to obtain demographic background information on participants and leadership.

Methods We designed a web-based survey and circulated it to simulation fellowship directors in the United States and Canada. The questions explored aspects of the fellowship curriculum. A grounded theory approach was used to qualitatively analyze fellowship goals and objectives.

Results Of the 29 program directors surveyed, 23 responded (79%). The most commonly listed goals and objectives were to increase skills in simulation curriculum development, simulation operations and training environment setup, research, educational theory, administration, and debriefing. The majority of the responding fellowship directors (17 of 22, 77%) indicated that a set of consensus national guidelines would benefit their fellowship program.

Conclusions Simulation fellowships are experiencing a period of rapid growth. Development of a common set of program guidelines is a widely shared objective among fellowship directors.

Introduction

Medical simulation has grown rapidly as an educational method due to increased patient safety awareness, increased acceptance of simulation as a teaching tool, the need for objective demonstration of competencies, the popularity of this technique among students, and the decreasing cost of equipment.¹⁻³ Simulation expertise for the training of health professionals is in high demand worldwide,⁴⁻⁶ yet there is little consensus on how to train medical simulation experts.

High-quality simulation instruction is dependent on well-informed, trained educators.^{7,8} Running an effective and efficient simulation center requires administrative skills, knowledge of medical education principles, curriculum development, research methodology, and the ability to use task trainers and simulators.¹ In 2005, there were 5 nationally listed simulation fellowships in the United States and Canada. When this study was initiated in 2013, there were 31 fellowships, and by 2015, there were more

than 50 programs worldwide. With this rapid growth, there is a paucity of guidance for these fellowships, whose graduates will go on to lead simulation centers.

Simulation fellowships are not accredited, and there are no certifying boards, guidelines, or educational milestones. This results in significant training variability. With the exception of simulation fellowships in general surgery,⁹ little is known about the content or structure of these programs. The goal of this study is to obtain program and demographic information on simulation fellowship programs and to seek to identify common curricular elements among existing fellowships.

Methods

Participants and Data Collection

We sent a web-based survey (SurveyMonkey) to simulation fellowship directors in the United States and Canada. Participants were identified by performing online searches using terms including “simulation fellowship” (“medical” and “surgical”), “medical simulation education,” “medical simulation faculty education,” and “medical simulation faculty development.”

Programs were included if they (1) have had a simulation fellow within the previous 2 years, and (2)

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Editor's Note: The online version of this article contains the survey questions used in the study and the strategies and resources used for fellowship training.

TABLE 1

Goals and Objectives for Simulation Fellowships

Goals and Objectives (N = 12)	n	%
Simulation curriculum development	12	100
Simulation training/setup/operations	12	100
Research	11	92
Education course/theory	10	83
Administration	10	83
Debriefing/course	8	67
Assessment	5	42
Patient safety	3	25
High-risk communication	2	17
Product development	2	17

were planning to recruit fellows in the next academic year. The survey invitation was e-mailed to fellowship program directors with up to 4 reminders during the spring of 2014. Responses, including incomplete surveys, were incorporated into the analysis.

Survey Design

The survey consisted of questions aimed at identifying structural and curricular aspects of the fellowship curriculum. Kern's conceptual framework of curriculum development was used for questions regarding the curriculum,¹⁰ and the framework by McGaghie et al,⁸ describing the 12 features and best practices of simulation-based medical education and research, was used for programmatic questions. The survey was pilot tested by 2 simulation directors. The survey questions are available as online supplemental material.

The University of Illinois at Chicago Institutional Review Board granted exemption status to this study.

Data Analysis

Survey results were analyzed using Microsoft Excel (Microsoft Corp, Redmond, WA) and Stata version 11 (StataCorp LP, College Station, TX). Frequencies, means, and ranges were calculated. The open-ended qualitative responses regarding curriculum were categorized utilizing a grounded theory approach.^{11,12} An index of themes was generated, and discrepancies were resolved by reviewing submitted curricula in the context of these themes until a consensus decision was made.

Results

A total of 31 simulation fellowships were identified. Responses from 23 programs (74%) were received, and 2 programs did not meet inclusion criteria.

Program Administration and Structure

A total of 86% (19 of 22) of program directors responding to this question had not completed a simulation fellowship themselves, and 76% (16 of 21) had not completed a formal nonmedical advanced degree (eg, MPH, MEd, etc). The simulation facilities used for training ranged from 1000 to 27 000 ft², averaging 8400 ft². Seventy percent (14 of 20) of programs funded their simulation fellowships by clinical service (part-time clinical load at the attending salary rate). Most programs have existed for 5 years or less (83%, 19 of 23), have graduated 1 to 2 fellows to date (52%, 12 of 23), and typically accept 1 fellow per year (74%, 17 of 23).

Fellow Characteristics

The majority of individuals who completed simulation fellowships have also completed prior training in emergency medicine (78%, 18 of 23), surgery (22%, 5 of 23), or anesthesiology (17%, 4 of 23). Most fellows spend 21 to 30 hours a week on simulation fellowship responsibilities and 11 to 20 hours per week on clinical responsibilities.

Curricular Goals and Objectives

The majority of respondents (77%, 17 of 22) indicated that consensus national guidelines would benefit their fellowship program. A total of 86% (19 of 22) of simulation fellowship directors reported having formal goals and objectives. Only 55% (12 of 22) of programs enumerated those goals and objectives, which the research team assigned to 10 categories (TABLE 1). Participants also identified curricular objectives that were most difficult to master, that needed frequent updating, and that they would like to add or enhance (TABLE 2).

Instructional Strategies

A total of 64% (14 of 22) of programs provided no formal training regarding the use of standardized patients, and 41% (9 of 22) of programs had no formal reading requirement. A variety of strategies and resources are being employed by simulation fellowships (provided as online supplemental material).

Advanced Degrees and Scholarship

Most fellowships (82%, 18 of 22) did not require the pursuit of a formal advanced degree. The minimum scholarly requirement varied, with the majority (77%, 17 of 22) requiring some combination of a national presentation and abstract and/or a manu-

TABLE 2

Challenges in Curricular Objectives

Challenges	Most Difficult for Fellows to Master, n (%) (N = 21)	Needs Updating Most Frequently, n (%) (N = 20)	Would Like to Add or Enhance in Current Curriculum, n (%) (N = 17)
Debriefing principles/practice/feedback	11 (52)	2 (10)	1 (6)
Simulation curriculum integration	4 (19)	6 (30)	0 (0)
Outcomes/assessment methods	14 (67)	8 (40)	2 (12)
Instructional design (includes simulation case development)	2 (10)	1 (5)	0 (0)
Management of simulation technology and equipment	2 (10)	6 (30)	1 (6)
Team training	1 (5)	5 (25)	3 (18)
Scholarly writing	14 (67)	6 (30)	6 (35)
Program evaluation	4 (19)	2 (10)	3 (18)
High-stakes testing	11 (52)	6 (30)	7 (41)
Deliberate practice/mastery learning; training environment setup and execution	4 (19)	2 (10)	1 (6)
Skill acquisition and maintenance (setup and execution of procedural, professional, cognitive, and group skills sessions)	2 (10)	3 (15)	0 (0)
Other	1 (5)	0 (0)	1 (6)
None	N/A	N/A	2 (12)

Abbreviation: N/A, not applicable.

script, and 22% (5 of 23) requiring 2 national presentations, abstracts, and/or manuscripts.

Assessment of Fellows

The majority of programs used a formative training approach without a summative evaluation to assess their fellows. Few programs endorsed any form of summative testing, but most have a formal evaluation process administered by the program director.

Discussion

Our survey provided a snapshot of the structure and content of simulation fellowships in North America during a period of rapid growth. As in many developing fields, most fellowship directors did not complete formal training to prepare them for their current roles. A majority of fellowship directors indicated that consensus national guidelines would benefit their programs. Two-thirds of all programs endorse a shared core set of goals and objectives, including simulated curriculum development, simulated operations and technology, educational theory, research, administration, and debriefing. This skill set is similar to previously published studies on medical education fellowships.^{13,14} However, two-thirds of all programs offer no formal training in the use of standardized patients.

Development guidelines for simulation fellowships would create a standardized curriculum to support well-established programs, enhance development of new programs, and provide a baseline standard skill set for graduates. Other groups have recently established guidelines for educational fellowship programs in other domains of medical education.^{9,15–17} Once a consensus skill set is established, the development of nationally recognized certificate and master's programs tailored to medical simulation may also expand.

This study has several limitations. Although attempts were made to identify all fellowships, some may have been missed. The survey was anonymous, and the demographics of those who did not complete it could not be compared to participants. Further research should investigate the perceptions of simulation fellowship trainees and graduates as it pertains to their education experience.

Conclusion

Simulation fellowships are experiencing rapid growth, and directors agree that a common set of programmatic guidelines is needed. Information on current training practice and patterns can help develop a shared curricular framework for advanced simulation education.

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