Targeting Simulation-Based Assessment for the Pediatric Milestones: A Survey of Simulation Experts and Program Directors

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ABSTRACT

OBJECTIVE: To determine which of the 21 general pediatrics milestone subcompetencies are most difficult to assess using traditional methodologies and which are best suited to simulation-based assessment.

METHODS: We surveyed 2 samples: pediatric simulation experts and pediatric program directors. Respondents were asked about current use of simulation for assessment and to select 5 of the 21 pediatric subcompetencies most difficult to assess using traditional methods and the 5 best suited to simulation-based assessment. Spearman rank correlation was used to determine a correlation between how the 2 samples ranked the subcompetencies.

RESULTS: Forty-eight percent (29 of 60) simulation experts and 20% (115 of 571) program directors completed the survey. Few respondents reported using simulation for summative assessment. There are clear differences across the pediatric subcompetencies in perceived difficulty of assessment and suitability to simulation-based assessment. The 3 most difficult to assess subcompetencies were "recognize ambiguity," "demonstrate emotional insight," and "identify one's own strengths and deficiencies." The subcompetencies most suitable to assessment using simulation were "interprofessional teamwork," "clinical decision making," and "effective communication." Program directors and simulation experts had high agreement for both questions: difficult to assess (rho = 0.76, $P < .001$) and suitable to simulation-based assessment (rho = 0.94, $P < .001$).

CONCLUSIONS: Several general pediatrics milestone subcompetencies were identified by pediatric simulation experts and pediatric program directors as difficult to assess using current methodologies and as amenable to simulation-based assessment. The pediatric simulation community should target development of simulation-based assessment tools to these areas.

KEYWORDS: competency-based assessment; pediatrics milestones; residency training; simulation

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WHAT'S NEW

This study describes pediatric simulation experts' and pediatric program directors' opinions of which pediatric milestones subcompetencies are most difficult to assess and which are best suited to simulation-based assessment. This information can target the development of simulation-based assessment tools.

THE ACCREDITATION COUNCIL for Graduate Medical Education's (ACGME) Milestone Project is a major step in the deliberate transition toward competency-based education and assessment of residents. The Milestone Project has driven each specialty to identify unique subcompetency skills that are essential for achieving competence in that discipline. These subcompetency skills are contained within the 6 core competency domains common to all specialties.[1–3] For each subcompetency, 4 to 5 performance levels have been defined, consisting of milestones, measurable attributes, or behaviors, marking a learner's progression toward mastery of each skill.[4,5] In May 2014, pediatrics was 1 of 7 specialties to begin reporting individual resident's level of milestone

achieved to the ACGME on a semiannual basis for 21 of the 48 pediatric milestones subcompetencies.

Within these competency-based levels of milestones, there is a need for objective and reproducible tools to assess learners in a variety of settings.[2,6,7] Simulation, defined as the imitation or representation of one act or system by another, is increasingly used in health care for the purposes of education, assessment, research, and health system integration to facilitate patient safety.[8] In residency training, simulation education can incorporate computer modeling, standardized patients, skills or task trainers, and high-fidelity mannequins.[9] Observed standardized clinical encounters using standardized patients have been used in high-stakes assessment of medical students as part of the United States Medical Licensing Examination Step 2 for almost a decade, and several studies suggest they can be used to assess levels of milestones as well.[10–13] Residency programs increasingly look to task trainers to assess learner competency to perform procedural skills.[14,15] Simulation, including structured mannequin-based high-fidelity and mixed-modality scenarios, similarly offers an opportunity to develop and disseminate assessment tools designed for the specialty specific subcompetencies, reflecting different performance levels of milestones.[16] The reproducibility and control inherent in a simulated environment make it an appealing assessment modality. Simulation scenarios can also be carefully scripted, including prompts to trigger behavioral responses to specific situations difficult to observe in real life. However, technological requirements and high educator-to-learner ratios mean that simulation is resource intensive and should be appropriately targeted to areas where other assessment modalities fall short.[17]

With this study, we sought input from 2 groups of experts, pediatric simulation educators and pediatric program directors, to identify which of the 21 general pediatric subcompetencies are most difficult to assess using traditional methodologies and which might be best suited to simulation-based assessment.

METHODS

SURVEY DEVELOPMENT

The survey was initially drafted beginning January 2014 using face-to-face and telephone meetings. Simulation experts, including the author group and executive committee members within the International Network for Simulation-Based Pediatric Innovation, Research, and Education (INSPIRE), informed the initial 2 rounds of survey revision. The Simulation Pediatric Education Group of the Association of Pediatric Program Directors (APPD) assisted in the third and fourth revisions. Finally, response process testing was performed using nonpediatric simulation experts and members of a pediatric resident evaluation committee familiar with the Pediatric Milestone Project but not necessarily with simulation. The final survey contained 13 items and was designed to take 20 minutes to complete. Two versions were created, one for simulation experts and the other for residency program directors in pediatrics. Survey introductions varied between the 2 groups. Questions were identical with 2 exceptions: different specialty training selections for each survey, and an additional question to simulation experts regarding the number of years they had been involved in simulation. The institutional review board at Maine Medical Center approved the study as exempt.

SURVEY CONTENT

The first 5 survey questions collected demographic information including the following: role within simulation or residency training program; subspecialty training; and size, type, and location of the associated residency program. Four questions asked about simulation capabilities and the current use of simulation for resident assessment. The next 2 questions asked respondents to choose 5 of 21 subcompetencies that are most difficult to assess using traditional methodologies and best assessed using simulation, respectively. An additional question offered an open response area for suggestions of any other unaddressed simulation-based assessment needs.

SURVEY ADMINISTRATION

The survey was distributed electronically using Qualtrics (Provo, UT) to a purposeful sample of 60 US pediatric simulation experts selected by members of the INSPIRE[18] executive committee from its membership. INSPIRE is a rapidly growing international collaborative of pediatric simulation researchers, educators, and clinicians. Respondents were selected by virtue of involvement in postgraduate medical education but not serving in the roles of pediatric residency program director or associate program director. The survey was distributed to residency program directors electronically through the APPD in accordance with their survey policy. The APPD membership was estimated to be 571 at the time of survey distribution, representing 199 unique US pediatrics and medicine–pediatric programs. Simulation experts received survey invitations from September through October 2014; program directors and associate program directors received them from October through November 2014. Nonresponders in each group received weekly reminder e-mails (3 in total).

DATA ANALYSIS

Descriptive statistics were used to analyze the data for demographic data as well as the total number of votes for each of the 21 pediatric milestones subcompetencies for each question. The outcome variables for each subcompetency included the number of votes for "most difficult to assess using traditional methodologies" and "best assessed using simulation." These were counted from both simulation experts and program directors, for a total of 4 outcome variables per subcompetency. A rank list was determined for the 4 outcome variables, and Spearman rank correlations were conducted between program directors and simulation experts on their rankings of the subcompetencies. Three subcompetencies were