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Milestone assessment of minimally invasive surgery in Pediatric Urology fellowship programs

P.H. Smith III [a,c], M. Carpenter [a,b], K.W. Herbst [a,b], C. Kim [a,c]

[a]Division of Urology, Connecticut Children's Medical Center, Hartford, CT, USA

[b]Department of Research, Connecticut Children's Medical Center, Hartford, CT, USA

[c]University of Connecticut School of Medicine, Farmington, CT, USA

Correspondence to: P.H. Smith, Connecticut Children's Medical Center, Division of Urology, Suite 2E, 282 Washington St., Hartford, CT 06106, USA, Tel.: +1 (860) 545 9520; fax: +1 (860) 545 9036

trey.smith.83@gmail.com (P.H. Smith)

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Summary

Introduction
Minimally invasive surgery has become an important aspect of Pediatric Urology fellowship training. In 2014, the Accreditation Council for Graduate Medical Education published the Pediatric Urology Milestone Project as a metric of fellow proficiency in multiple facets of training, including laparoscopic/robotic procedures.

Objective
The present study assessed trends in minimally invasive surgery training and utilization of the Milestones among recent Pediatric Urology fellows.

Study design
Using an electronic survey instrument, Pediatric Urology fellowship program directors and fellows who completed their clinical year in 2015 were surveyed. Participants were queried regarding familiarity with the Milestone Project, utilization of the Milestones, robotic/laparoscopic case volume and training experience, and perceived competency with robotic/laparoscopic surgery at the start and end of the fellowship clinical year according to Milestone criteria. Responses were accepted between August and November 2015.

Results
Surveys were distributed via e-mail to 35 fellows and 30 program directors. Sixteen fellows (46%) and 14 (47%) program directors responded. All fellows reported some robotic experience prior to fellowship, and 69% performed >50 robotic/laparoscopic surgeries during residency. Fellow robotic/laparoscopic case volume varied: three had 1–10 cases (19%), four had 11–20 cases (25%), and nine had >20 cases (56%). Supplementary or robotic training modalities included simulation (9), animal models (6), surgical videos (7), and courses (2).

Comparison of beginning and end of fellowship robotic/laparoscopic Milestone assessment (Summary Fig.) revealed scores of <3 in (10) 62% of fellow self-assessments and 10 (75%) of program director assessments. End of training Milestone scores >4 were seen in 12 (75%) of fellow self-assessment and eight (57%) of program director assessments.

Discussion
An improvement in robotic/laparoscopic Milestone scores by both fellow self-assessment and program director assessment was observed during the course of training; however, 43% of program directors rated their fellow below the graduation target of a Milestone score of 4.

Conclusion
The best ways to teach minimally invasive surgery in fellowship training must be critically considered.

Start of fellowship Milestone score <3		End of fellowship Milestone score ≥4	
Program director score	Fellow score	Program director score	Fellow score
10 (62%)	10 (75%)	12 (75%)	8 (57%)

Figure Summary of Milestone scores at the beginning and end of fellowship by program director and fellow self-assessment.

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Introduction

The role of robotic surgery in Pediatric Urology has evolved rapidly over the past decade. The adoption of this technology in the field of Pediatric Urology continues to grow as long-term outcome data emerge. Growing literature demonstrates the safety and efficacy of many robotic-assisted laparoscopic pediatric urologic procedures with potential for improved postoperative recovery [1—4]. As such, it has become clear that robotic surgical training must be viewed as an essential component of Pediatric Urology fellowship training [5,6].

At the present time, a standardized approach to teaching robotic surgery within the context of a Pediatric Urology fellowship is lacking. Clearly, the fellows receive surgical training through direct operative experience. However, there is wide variability in the teaching approach at each fellowship program. Multiple training modalities are available to aid in robotic surgical training, such as robotic surgery simulation, skills courses, surgical videos, and animal labs. However, the optimal approach to teaching robotic skills in the fellowship setting and the role for supplementary training modalities is not well understood [7,8].

Until recently, standard objective measures of fellow proficiency and competency with robotic procedures have not been available. In 2014, the Accreditation Council for Graduate Medical Education (ACGME) published the Pediatric Urology Milestone Project as a framework to structure evaluation of fellows throughout training [9]. The Milestone Project provides an outline for assessing proficiency in multiple facets of training, including competency with robotic/laparoscopic procedures. Within this construct, fellow performance is assessed on a semiannual basis. Fellows are graded on a scale of five levels of performance, with Level 4 representing the graduation target (Fig. 1).

The goal of the present study was to summarize the robotic surgical experience in Pediatric Urology fellowship programs. Specifically, it assessed the surgical volume and perception of robotic skills. Recent clinical Pediatric Urology fellows were surveyed using the ACGME Robotic/Laparoscopic Pediatric Urology Milestones for skill assessment.

Methods

With permission from the Society for Pediatric Urology (SPU), Pediatric Urology fellowship program directors and fellows who completed their clinical fellowship year in 2015 were contacted. E-mails were sent requesting completion of an anonymous online survey. E-mail requests for participation were distributed directly by the SPU. The survey was circulated between August and November 2015 via an internet-based survey service (surveymonkey.com). Three requests were sent to encourage participation. No compensation was offered for participation.

Participants were queried regarding: (1) familiarity with the Pediatric Urology Milestone Project; (2) utilization of the Milestones as a metric of proficiency; and (3) fellow robotic/laparoscopic case volume and training experience. Program directors were asked to retrospectively score fellow competency with robotic/laparoscopic procedures according to the Milestones at the beginning and end of the fellow's clinical year. Similarly, fellows were asked to provide a self-assessment score of their competency with robotic/laparoscopic procedures at the beginning and end of the clinical year using the Milestone framework. Due to the anonymity of the surveys, scores at each program were not directly matched. The overall assessment amongst all responders was summarized. Surveys were excluded if incomplete or if the responder did not identify as a program director or as a fellow who completed his or her clinical fellowship year in 2015. Descriptive statistics were performed using SPSS 17.0 (IBM Corporation, Armonk, NY).

Results

Surveys were emailed to 35 fellows and 30 program directors. Sixteen fellow (46%) and 14 program director (47%)

Level 1	Level 2	Level 3	Level 4	Level 5
Accurately describes patient and equipment positioning for laparoscopic procedures Places additional trocars under direct supervision	Assists on all laparoscopic/robotic procedures Acquires laparoscopic/robotic access in children (e.g. Veress and Hassan techniques) Performs basic laparoscopic maneuvers, with attention to tissue handling and equipment selection/safety in a young child (e.g. mobilizes colon for pyeloplasty in a 2-year old)	Acquires laparoscopic/robotic access in complex situations (e.g. access in infants and obese children) Performs routine laparoscopic procedures, with attention to tissue handling and equipment selection/safety (e.g. orchiopexy, nephrectomy)	Performs moderately complex laparoscopic/robotic procedures with minimal supervision (e.g. pyeloplasty/ureteroureterostomy, heminephrectomy, ureteral reimplantation) Recognizes and manages unforeseen events during laparoscopic procedures (e.g. identifies and manages bowel or vascular injury) Capably directs bedside assistant on robotic-assisted cases	Performs the most complex laparoscopic/robotic procedures with mastery (e.g. retroperitoneal lymph node dissection, reconstruction for neurogenic bladder) Demonstrates capacity to perform moderately complex surgical procedures independently, and performs the most complex cases with supervision (e.g. redo pyeloplasty)

Figure 1 Accreditation council for graduate medical education robotic/laparoscopic milestones.