Accreditation Council for Graduate Medical Education (ACGME) Case Requirements for General Surgeons in Pediatric Surgery: Evaluation of Current Operative Volume on Resident Completion of Index Cases

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Introduction

The ACGME sets case requirements for general surgery trainees.[1]. For pediatric surgery, 20 "index" cases are required, however the type of required cases has not changed in more than 30 years. Many cases that were performed in an open manner are now done in a minimally invasive (MIS) fashion, but do not count as "index" cases. This affects the general surgery resident's ability to obtain certification during their pediatric surgery rotation.

Operations Research is the science of using mathematical models to create solutions. These models are used in various sectors such as healthcare and airtravel industries to find solutions to scheduling, personnel and logistical solutions[2].

Based on previous research from thoracic surgery, we wondered whether we could combine case volume and resident numbers to simulate the likelihood of a resident index case volume both with and without addition of MIS cases.

Hypothesis

We hypothesize that mathematical models can help us understand exposure to index case volume for general surgery residents.

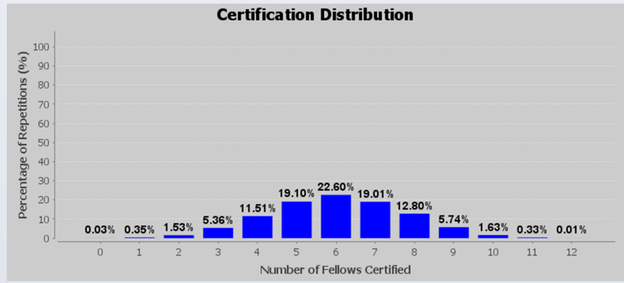
We further hypothesize that the simulation with and without MIS cases will impact the number of residents we can properly train in a year during their allotted rotation time.

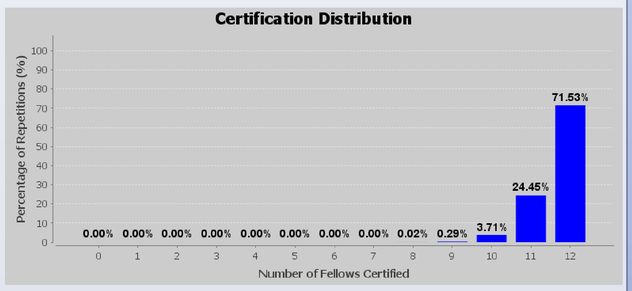
Methods

We reviewed pediatric surgery cases in our institution over the last 5 years (2009-2013), specifically evaluating the type and number of cases being done by the general surgery trainee.

Our institution supports 12 general surgery residents that rotate through the pediatric surgery department over their residency training timeline. We also support two pediatric surgery fellows at any given time.

Using a computer model which has been published previously, we "simulated" the likelihood of residents meeting their ACGME requirements based on annual case volume, number of trainees, and rotation length and call schedule[3].





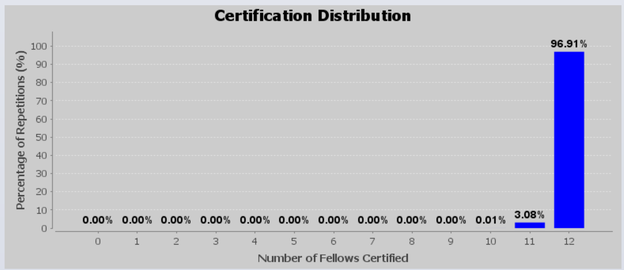
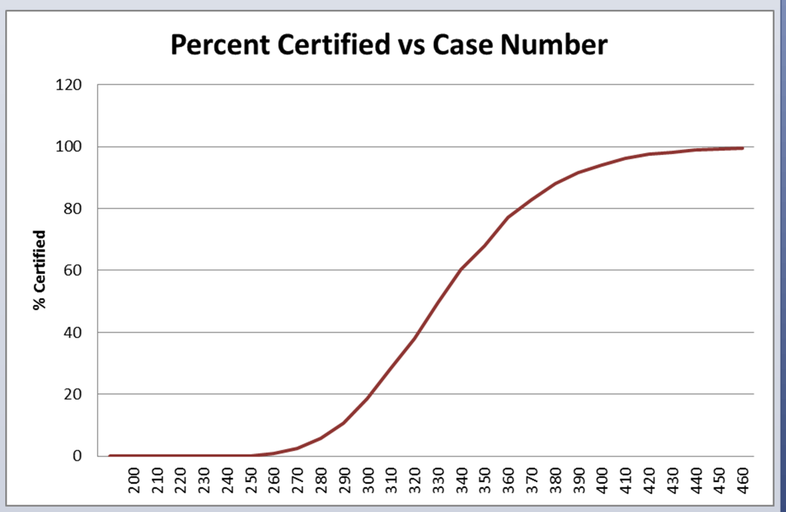


Table 1, 2, 3 (Clockwise from Left)
Table 1. Percentage of residents certified with current cases
Table 2. Percentage of residents certified with addition of Laparoscopic appendectomy
Table 3. Percentage of residents certified with addition of Laparoscopic Gastrostomy Tube placement

In this graph, X Axis depicts the number of "index" cases per year; Y Axis depicts the number of certified residents per year. As the number of credited cases increases, the percentage of certified residents approaches 100%



Results

In our institution, total case volumes averaged approximately 2100 cases/year. The most common "index" cases logged in by residents (pyloromyotomy, inguinal hernia, and umbilical hernia) were 236 ± 11 cases per year.

Using the simulator to model 10,000 years, the likelihood that the trainees would attain their required number of cases (20) in their training period was approximately 1.6% of the time.

By adding laparoscopic cases, the annual average number of "index" cases increased to 416 ± 30 cases. With the increased number of "index" cases, the likelihood that 12 residents obtaining their pediatric surgery case numbers increased to 99% of the time.

Conclusions

Mathematical models simulation provides unique insight into surgical resident training.. Additon of MIS index cases will increase the likelihood of resident exposure to index cases during their rotation.

Inclusion of laparoscopic cases also better represents the variety of cases a general surgeon will be exposed to post training.

References

1. Institutional Operative Data Form https://www.acgme.org/acgmeweb/tabid/377/ProgramandInstitutionalAccreditation/SurgicalSpecialties/Surgery/CaseLoginformation.aspx
2. Bennett TR, Duckett SJ. Operations Research and Nurse Staffing. International Journal of Bio-medical Computing. 1981; 12:433-38
3. Ballard TNS, Grenda TR, Cohn AM, Daskin MS, Seagull FJ, Reddy R et al. Innovative Scheduling of Graduate Medical Education. Journal of Graduate Medical Education. 2015; 7(2); 169-170.