Title: National Trends in Otolaryngology Intern Curricula Following ACGME Changes
Short Title: Intern Curricula Following ACGME Changes

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ABSTRACT:

Objectives: In 2016, ACGME requirements for *Curriculum and Resident Experiences* were modified to require entering PGY-1 residents to spend six months of structured education on ORL-HNS rotations. We aim to determine how otolaryngology-head and neck surgery (ORL-HNS) training programs have adapted curricula in response to 2016 Accreditation Council for Graduate Medical Education (ACGME) curriculum requirement changes.

Methods: National survey of ACGME-accredited ORL-HNS programs was distributed via the Otolaryngology Program Directors Organization.

Results: Thirty-seven program directors responded (34.9%). Most common ORL-HNS rotations included general otolaryngology (80.6% of programs, up to 6 months) and head and neck oncology (67.7%, up to 4 months), though more months are also spent on other subspecialty rotations (laryngology, otology, rhinology, and pediatrics) than previously. All programs continue at least one month of anesthesiology, intensive care unit, and general surgery. Programs have preferentially eliminated rotations in emergency medicine (77% decrease) and additional months on general surgery (48% decrease). Curricula have incorporated supplemental teaching modalities including didactic lectures (96.3% of programs), simulation (66.7%), dissection courses (63.0%), and observed patient encounters (55.5%), to a greater degree following ACGME changes. More interns are involved in shared call responsibilities than in previous years (70.4% vs 51.8%). A stable minority of interns take the OTE examination (approximately 20%).

Conclusion: New ACGME requirements have challenged ORL-HNS training programs to develop effective 6-month rotation schedules for PGY-1 residents. Significant variation exists between programs, and evaluation of first year curricula and readiness for PGY-2 year is warranted.

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Key Words: ACGME, graduate medical education, curriculum, otolaryngology

Abbreviations:

ABOto	American Board of Otolaryngology
ABOS	American Board of Orthopaedic Surgery
ACGME	Accreditation Council for Graduate Medical Education
GRS	Global Rating Scale
ICU	Intensive Care Unit
OPDO	Otolaryngology Program Directors Organization
ORL-HNS	Otolaryngology-Head and Neck Surgery
OSCE	Objective Structured Clinical Examination
OTE	Otolaryngology Training Examination
PGY	Post-Graduate Year
RRC	Residency Review Committee
TSC	Task Specific Checklist

Level of Evidence: N/A

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INTRODUCTION

In 2016, the Accreditation Council for Graduate Medical Education (ACGME) requirements for Curriculum and Resident Experiences were modified to require entering PGY-1 residents to spend six months (previously three) of structured education on otolaryngology-head and neck surgery (ORL-HNS) rotations (Table 1).[1,2] The remaining 6 months (previously nine months) are spent on general surgery rotations, in a style more similar to the traditional surgical intern year. While the curriculum requirements for non-otolaryngology rotations are more well-defined, the curriculum for the remaining 6 months is left to the discretion of individual programs.

The stated goal of this change is to allow a greater focus on the development of proficiency in basic surgical skills, general care of otolaryngology patients both in the inpatient setting and in the outpatient clinics, management of otolaryngology patients in the emergency department, and cultivation of an otolaryngology knowledge base.[1] The retained six months on non-otolaryngology rotations are designed to enable proficiency in the peri-operative care of surgical patients, inter-disciplinary care coordination, and airway management skills.[1] The ACGME Residency Review Committee (RRC) posits that PGY-1 otolaryngology residents will learn both surgical and non-surgical skills from otolaryngology faculty, which may better prepare interns for more advanced otolaryngology education. This also addresses concerns that otolaryngology PGY-1 residents are not getting enough “hands-on” operative training while on general surgery rotations.

Other surgical subspecialties have previously undergone similar transformations, as the ACGME and American Board of Orthopaedic Surgery (ABOS) mandated major changes to PGY-1 curriculum in 2013.[3] Under these new requirements, PGY-1 residents in orthopaedic surgery spend a requisite 6 months on orthopaedic surgery rotations, 6 month of non-orthopaedic surgery rotations, and complete a mandatory skills curriculum.[4,5]

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The new 2016 curriculum requirements for ORL-HNS will similarly require infrastructural changes within individual departments, as programs face the challenge to develop an effective 6-month rotation schedule for their PGY-1 residents. Here, we describe the changes mandated by the ACGME for otolaryngology intern year and discuss implications of these changes moving forward. The purpose of this study is to describe how ACGME-accredited ORL-HNS programs are adapting to this curriculum change in its inaugural year and discuss the role of curriculum development, standardization of rotation structure, and evaluation moving forward.

MATERIALS AND METHODS

A national survey of 106 ACGME-accredited ORL-HNS programs was distributed to program directors via the Otolaryngology Program Directors Organization (OPDO) using Qualtrics survey software.[6] Question topics included program demographics (size, number of faculty and residents), intern rotation schedules (both otolaryngology and non-otolaryngology) for the current and previous academic years, call schedule format and on-call responsibilities, implementation and introduction of additional learning opportunities (dissection courses, surgical simulation, didactic lectures, grand rounds, tumor board, and observed patient encounters (faculty evaluation of resident in clinical setting)), Otolaryngology Training Examination (OTE, in-service), and open-ended commentary.

The survey was distributed via email to program director members of OPDO, and responses were collected over a time period of 3 months with interval email reminders at 1 and 2 months. The goals of the study were indicated at the start of the survey, and informed consent was indicated by voluntary participation. Data was collected at a time point halfway through the 2016-2017 academic year, and analysis was performed using a report of de-identified responses generated using Qualtrics software. Data reports were generated separately for questions regarding program demographics, otolaryngology

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curriculum, general surgery curriculum, and other educational opportunities. Reponses were considered complete if all questions in each block were completed.

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RESULTS

Thirty-seven program directors responded to the survey (34.9%, Figure 1). All program sizes including 1-5 residents per year were represented, with the majority of responding programs having 3 or more residents per year (67.6%). Responding program faculty sizes varied, with 10-20 clinical faculty members most prevalent (56.8%).

Otolaryngology Intern Curriculum

Thirty-one participants completed all questions pertaining to ORL-HNS specific curriculum (Table 2). In the 2016-2017 academic year, the most common ORL-HNS rotations included general otolaryngology (80.6% of programs, range 1 to 6 months) and head and neck oncology (67.7% of programs, range 1 to 4 months). Several programs reported dedicated rotations on pediatric otolaryngology (38.7%), rhinology (19.4%), otology/neurotology (12.9%), laryngology (9.7%), ORL-HNS dedicated emergency room (6.5%), and facial plastics (3.2%). Open ended responses indicated that some programs do not assign PGY-1 residents to particular services in a structured way, have PGY-1 residents participate with all services simultaneously, or have assignments dictated by service needs. Other ORL-HNS clinical experiences include allergy, audiology, sleep, radiology, pathology, research, or boot camp. Exposure to these additional subspecialties included between 1-4 weeks of experience, though timing was not reliably reported.

In the 2015-2016 academic year, programs included general otolaryngology and head and neck oncology rotations at lower though similar rates, 61.3% (up to 3 months) and 61.3% (up to 3 months), respectively. Full month rotations on laryngology, ORL-HNS emergency room, facial plastics, and

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rhinology services were not reported. Fewer responding programs included otology (1 program) and pediatric otolaryngology (7 programs) rotations.

General Surgery Curriculum

Twenty-seven participants completed all questions pertaining to general surgery curriculum. In the 2016-2017 academic year, nearly all responding programs reported at least one month of anesthesiology, intensive care unit (ICU), and general surgery. Notably, programs have preferentially eliminated rotations in emergency medicine (14.8% currently vs. 92.5% prior to ACGME changes) and additional months *beyond one required month* on general surgery (29.6% currently vs. 77.8% prior to ACGME changes). Additionally, many programs have retained exposure to neurosurgery (77.8%), plastic surgery (63.0%) and oral surgery (40.7%). Intensive care unit experience is further broken down into surgical ICU (77.8%), medical ICU (14.8%), trauma ICU (7.4%) and closely mirrors previous years' schedules (81.5%, 11.1%, and 7.4%, respectively). Additional retained rotations include pediatric surgery (22.2%), vascular surgery (22.2%), radiology (14.8%), and ophthalmology (7.4%).

Additional ORL-HNS Education

Twenty-seven participants completed all questions pertaining to additional educational experiences (Figure 2). New curricula have incorporated supplemental teaching modalities including didactic lectures (96.3% of programs, 7.4% increase from previous year), simulation (66.7%, 22.3% increase from previous year), dissection courses (63.0%, 18.5% increase from previous year), surgical skills "boot camp" (55.6%, 11.1% increase from previous year), and observed patient encounters (55.6%, 14.9% increase from previous year). Both before and after ACGME changes, a stable majority of PGY-1 residents participate in grand rounds and tumor board.

More interns are involved in shared call responsibilities than in previous years (70. 4% vs 51. 8%), most commonly in a "buddy call" format where the intern is paired with another resident assigned to call.

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PGY-1 residents are rarely involved in night float rotations (2 responding programs, 7.4%). A stable minority of interns take the OTE examination (approximately 20%).

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DISCUSSION

Our survey demonstrates that there is currently wide variability in curriculum changes amongst otolaryngology training programs in response to recent mandates by the ACGME. Ultimately, an effective curriculum should allow acquisition of skills and knowledge with a focus on our field, rather than training that will not be applicable to the developing otolaryngologist. However, in the absence of a standardized educational framework what constitutes an effective curriculum is largely up to interpretation by individual training programs. Ideally, the 2016 ACGME curriculum change will allow early integration to otolaryngology services, providing a strong foundation which allows residents to benefit more in subsequent years. Still, the degree of impact this change will have on readiness for PGY-2 year and beyond is unclear.

Otolaryngology Intern Curriculum

Our survey shows that it was most common to include additional months of general otolaryngology (up to 6 months) and head and neck oncology (up to 4 months) rotations. This may be due to perceived importance in early training, greater accessibility to educational opportunity, or greater service needs on these rotations. Many programs are not placing PGY-1 residents on structured rotation schedules, which again gives flexibility to place learners where educational opportunities exist or where service is needed. There is an increased incidence of structured, dedicated rotations on pediatric otolaryngology, rhinology, otology/neurotology, and facial plastics, services following ACGME changes. While the perceived importance of these rotations has likely not shifted as a result of the new changes, the newly allotted time and flexibility afforded by these changes allows their inclusion. Earlier exposure to

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subspecialty fields may be beneficial in helping residents choose research or career interests, whereas in previous years residents may not have had exposure to some subspecialties until later in training.

It is possible that case numbers, including key indicator cases, will increase simply due to more time logged on otolaryngology services. Feasibly, earlier exposure to basic and specialized otolaryngology procedures will allow resident assistant experience early, and thus earlier resident surgeon roles. Indeed, after 2003 duty hour restrictions, otolaryngology case volume did not decrease, and resident key indicators numbers have actually increased since the change.[7-9] Thus, continued monitoring of case volume and type will be an important metric following curriculum changes.

Exposure to supervising faculty earlier in training will likely also result in better understanding of resident skill level. Taken together, these changes have the potential to result in accelerated competency in otolaryngology trainees. Another potential result of the new changes will be to afford residents time for elective months later in training, allowing further pursuit and exploration of career interests.

General Surgery Curriculum

The implications of spending less time on general surgery rotations should be considered when designing new PGY-1 curricula. Certainly a goal of the curriculum requirement change is create a stronger focus on acquisition of skills and knowledge within our field, yet it is conceivable that interns spending half of PGY-1 year on otolaryngology services could be under-trained in general surgical principles and management of surgical patients relative to their predecessors. This is somewhat offset by the requirement that all interns continue to spend at least one month training in the intensive care unit, and must otherwise choose from a list of accepted general surgery rotations (Table 1).[1] While historically a full year or more was spent in general surgery training, the concurrent trends in general surgery, including further sub-specialization and specialized surgical techniques (e.g., laparoscopic

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surgery) may have lessened the educational value of traditional general surgery rotations for otolaryngology interns.

Our survey shows that the most commonly eliminated rotations include emergency medicine and "extra" months on general surgery. Thus, it was common to eliminate apparent redundancy in the non-otolaryngology rotation schedule. This is in contrast to otolaryngology months, where general and head and neck oncology rotations continued to see a high incidence despite being most common prior to ACGME changes. The survey did not differentiate general surgery service type; however, write-in answers suggest that endocrine surgery and trauma surgery are popular services. Other considerations for non-otolaryngology curriculum include weigh-in from the department of general surgery, which may have strong preferences regarding necessary skill/knowledge acquisition, desired intern experiences, or service needs. Indeed, a subset of otolaryngology training programs exist as divisions of general surgery rather than stand-alone departments. Our program and others have considered retaining rotations where a strong collegial relationship later in training is critically important (eg, anesthesiology, neurosurgery).

Removing emergency medicine, general surgery and ICU experiences could limit otolaryngology residents' ability to assess and care for critically ill patients. This highlights the importance of finding a balance between early specialized training in our subspecialty and maintaining core surgical experiences (some perhaps tangentially related to our field) to foster comprehensive assessment of the entire patient, rather than just ENT pathologies. Similarly, we consider that the decrease in emergency medicine rotations may be due to a feeling that many patient encounters in this setting are not applicable to future training in otolaryngology. Certainly, many junior residents are responsible for responding to otolaryngology-specific complaints when covering consults as early as the PGY-1 or PGY-2 year. Thus, a dedicated consult experience should be considered when designing new curricula.

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Additional Educational Experiences and Nontraditional Rotations

The accrediting bodies do not outline any requirements for educational activities outside of clinical rotations for PGY-1 residents specifically. Our survey suggests that additional educational experiences including didactics, educational conference (grand rounds and tumor board), observed patient encounters, simulation, dissection courses and boot camp curricula are becoming implemented to a greater degree following the 6 month otolaryngology requirement.

In this study, simulation demonstrated the greatest increase amongst the educational experiences listed above. Surgical simulation provides a safe environment for trainees to practice procedural skills and has taken a greater role in curriculum development in recent years.[10] Simulation experience that will further prepare PGY-1 residents for primary on-call duties is of particular interest in the context of curriculum change, and has been previously studied.[11] Our program has incorporated a full-month integrated anesthesia-otolaryngology "boot camp" rotation focusing on surgical simulation, otolaryngology emergencies, and airway management. While the ACGME mandate affords extra time to include this experience during the intern year, educational benefits compete with clinical service needs and feasibility of this or similar rotations should be evaluated at other institutions. While other surgical subspecialties have mandated completion of a surgical skills curriculum, a similar requirement for otolaryngology interns has not taken effect.[3]

On-call experience has increased greatly following ACGME changes. The majority of on-call experience for interns includes a "buddy call" format where the intern assists the on-call resident. This format is ideal, as ACGME requirements state PGY-1 residents should be supervised either directly or indirectly with direct supervision immediately available.[1] Starting July 1st, 2017, PGY-1 residents will again be permitted to take 24 hours shifts, though direct supervision will continue to be required.[12]

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This survey indicates that there was little change in the percentage of interns taking the OTE (in-service) examination. With early integration to otolaryngology services and subsequent early acquisition of otolaryngology-specific knowledge base, more programs may choose to have interns participate in coming years. OTE scores may be useful early in training to establish a baseline of specialty knowledge and monitor changes in individual performance as well as identifying strengths and weaknesses within a program overall. Furthermore, OTE scores in later years of residency can reliably identify trainees at higher risk of failing the American Board of Otolaryngology (ABOto) written qualifying examination.[13] There is currently no consensus on structured teaching, simulation, or OTE scores as metrics indicating high-quality training in otolaryngology programs.[14]

Further, the additional three ORL-HNS months afforded by the ACGME changes may allow added time and flexibility for curricula to address non-clinical elements outlined in the ACGME/ABOto defined "milestones", including medical knowledge, professionalism, interpersonal skills and communication skills.[15]

Further Study and Limitations

Response rate and response bias are limitations of many survey studies, though we feel these data provide valuable insight into the early curriculum changes individual programs are making in response to the 2016 ACGME requirement changes. We are unable to assess potential response bias as the survey data were collected anonymously. However, we have no a priori reason to suspect that program directors who have made changes with the trends identified would be more likely to respond to the survey request. These data are of particular importance to faculty responsible for any aspect of curriculum development, including program directors, who comprise the pool of respondents in this study. Notably, there were clear and common tends in rotation addition and elimination for a six-month rotation schedule despite a limited response rate. Likewise, the relative increases in "additional

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educational experiences" are relevant to those who are involved in curriculum design, as the most commonly included experiences are evident.

Further study of educational outcome measures over time is indicated to confirm the value or this change in residency training, as well as the relative values of individual program curricula, which have proven to be highly variable. The field of ORL-HNS has made significant contributions to the field of medical education and study of clinical competency. A recent study by Wagner et al reviews 31 studies of competency-based assessment tools in ORL-HNS, including case log evaluation, task specific checklists (TSC), global rating scales (GRS), knowledge-based questionnaires, and objective structured clinical examinations (OSCEs).[16] The authors identify that ORL-HNS programs consistently reported a need for new assessment tools that assess competency in both technical and non-technical skills. A similar ACGME change requiring 6 months on-service during intern year was instated for orthopedic surgery residencies in 2013, which also included participation and evaluation of a mandatory surgical skills curriculum comprised of 18 defined modules.[3] These types of interventions and evaluations would be feasible in otolaryngology given the additional 3 months on service, though would require deliberation regarding the appropriate modules to include for our specialty.

A logical follow-up question to these results is the rationale behind programs choosing the rotations schedules as reported. With absence of structured guidelines, reasons for variability between programs should be further explored. Important considerations include perceived educational gaps, metrics used to evaluate the value of rotations, and service/manpower needs. While different experiences are valued by different programs, the accrediting bodies strive to provide standard, unified training for all residents who are enrolled in any residency training program. As a specialty, we must consider what role the ACGME and/or ABOto have in providing more well-defined or standardized best practice curriculum guidelines.

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Conclusion

New ACGME requirements have challenged ORL-HNS training programs to develop effective 6-month rotation schedules for PGY-1 residents. Effectively doubled time on ORL-HNS service affords programs flexibility to trial new curricula, with a goal to ultimately accelerate competency and prepare interns for advanced otolaryngology training. In the absence of standardized guidelines, wide variability in rotation schedules and educational experiences across training programs exists. Overall increase in additional educational experiences is reported alongside a high and increased exposure to general otolaryngology and head and neck oncology. The impact of these changes and role for standardized guidelines have yet to be determined: These findings highlight the value of studying educational outcomes to determine effectiveness of first year curricula and readiness for PGY-2 year.

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Tables:

Table 1. Comparison of Otolaryngology Intern Year Rotation Changes [1,2]

	Before July 1, 2016	After July 1, 2016
Otolaryngology Rotations	3 months required	6 months required
General Surgery Rotations	9 months of structured education, including: Minimum of 5 months of structured education in at least 3 of the following: general surgery, pediatric surgery, plastic surgery, surgical oncology, thoracic surgery, transplantation surgery, and vascular surgery *Must include one month in each of the four clinical areas: anesthesiology, critical care/intensive care unit, emergency medicine, and neurological surgery.	6 months of structured education on non-otolaryngology rotation selected from the following: anesthesia, general surgery, neurological surgery, neuroradiology, ophthalmology, oral-maxillofacial surgery, pediatric surgery, plastic surgery, and radiation oncology. *Must include one month on an intensive care rotation.
Other		Total time on any one non-otolaryngology rotation must not exceed 2 months.

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Table 2. Breakdown of Reported Rotation Schedules by Academic Year

	2015-16 Academic Year	2016-17 Academic Year
General	61.3% (19) Overall 1 month – 35.5% (11) 2 months – 6.5% (2) 3 months – 19.4% (6)	80.6% (25) Overall 1 month – 19.4% (6) 2 months – 19.4% (6) 3 months – 19.4% (6) 4 months – 9.7% (3) 5 months – 3.2% (1) 6 months – 9.7% (3)
Head and Neck Oncology	61.3% (19) Overall 1 month – 35.5% (11) 2 months – 16.1% (5) 3 months – 9.7% (3)	67.7% (21) Overall 1 month – 12.9% (4) 2 months – 25.8% (8) 3 months – 22.6% (7) 4 months – 6.5% (2)
Laryngology	0% (0)	6.5% (2)
Otology/Neurotology	3.2% (1)	12.9% (4)
Pediatrics	22.6% (7)	38.7% (12)
Rhinology	0% (0)	19.4% (6)
Facial Plastics	0% (0)	3.2% (1)
ORL-HNS Emergency	0% (0)	6.5% (2)
Other/Unstructured (including all concurrently)	38.7 % (12)	32.3% (10)

Columns report % of responding programs (number of responding programs).

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Figure Legend:

Figure 1. **Responding Program Demographics.** All intern class sizes (1-5 trainees) and large range of departmental sizes are represented.

Figure 2. **Additional Educational Opportunities by Academic Year.** Greatest increases were seen in observed patient encounters, simulation, boot camp, and dissection courses for the 2016-17 academic year.

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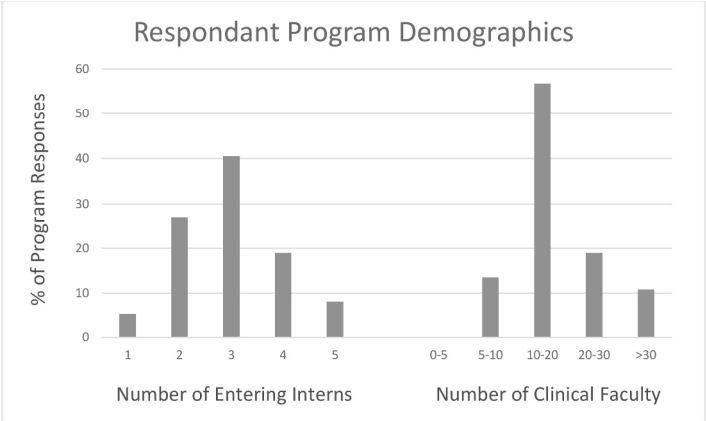


Figure 1. Responding Program Demographics. All intern class sizes (1-5 trainees) and large range of departmental sizes are represented.

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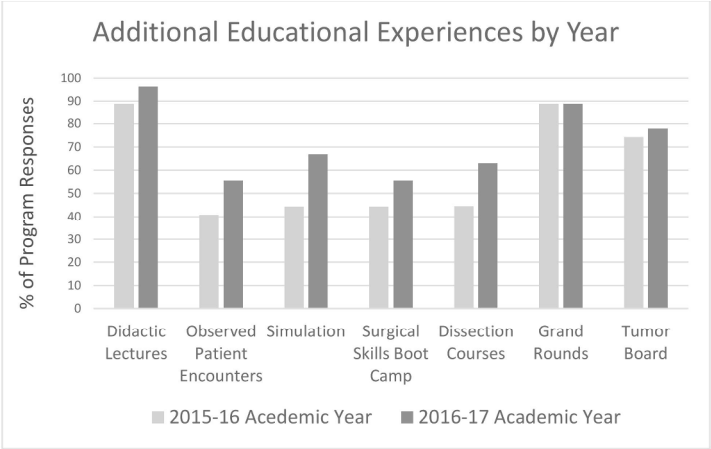


Figure 2. Additional Educational Opportunities by Academic Year. Greatest increases were seen in observed patient encounters, simulation, boot camp, and dissection courses for the 2016-17 academic year.

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