

*This manuscript was accepted for publication in Otolaryngology-Head and Neck Surgery.*

1 Insights on otolaryngology residency training during the COVID-19 pandemic

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6 Funding: None

7 COI: None

8 Authorship Contributions:

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11

12 Word count: 897 (excluding abstract, tables, and figure)

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22 Abstract

23 Otolaryngology residency training programs are facing a novel challenge due to severe acute  
24 respiratory syndrome coronavirus 2. The wide spread impact and chronicity of this pandemic  
25 makes it unique from any crisis faced by our training programs to date. This international  
26 medical crisis has the potential to significantly alter the course of training for our current resident  
27 cohort. The decrease in clinical opportunities due to the limitations on elective surgical cases and  
28 office visits as well as potential resident redeployment could lead to a decline in overall  
29 experience as well as key indicator cases. It is important that we closely monitor the impact of  
30 this pandemic on resident education and ensure the implementation of alternative learning  
31 strategies, while maintaining an emphasis on safety and well-being.

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45 Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome  
46 coronavirus 2 (SARS-CoV-2), has been designated as a pandemic by the World Health  
47 Organization.<sup>1</sup> As with any international medical crisis, there are ripple effects throughout the  
48 health care system, including our training programs. Although residency training has previously  
49 been impacted by regional natural disasters (e.g. Hurricane Katrina), acts of terrorism and war  
50 (e.g. the terrorist attacks on 9/11/2001), and medical outbreaks (e.g. SARS epidemic in 2002-  
51 2003), the anticipated duration and widespread impact of the COVID-19 pandemic is  
52 unprecedented. For those reasons, the implications of the COVID-19 pandemic on  
53 otolaryngology residency education deserves close attention, along with strategies to mitigate  
54 adverse effects on our residents and their training.

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56 Based on recommendations from multiple national organizations and guidelines,<sup>2</sup> hospitals and  
57 academic medical centers are postponing elective surgical procedures. Although some  
58 procedures performed by otolaryngologists are urgent or emergent (e.g. airway procedures,  
59 oncologic resection, trauma), many procedures, including most Accreditation Council for  
60 Graduate Medical Education (ACGME)-designated Key Indicators (KIs), are not time sensitive.  
61 Furthermore, concerns about SARS-CoV-2 transmission during transnasal surgeries,<sup>3</sup> and  
62 potentially any surgery involving the mucosa of the head and neck, are likely contributing to a  
63 further decrease in operative opportunities for otolaryngology residents. We anticipate that the  
64 effect on operative experience will be most noticeable for residents who are in the final two years  
65 of training.

66

67 Based on published data on cases performed as resident surgeon or resident supervisor (from  
68 2009-2017)<sup>4</sup> and ACGME minimum KI requirements,<sup>5</sup> the ratio of mean cases to minimum  
69 required cases was determined for each KI (see Table 1). The three KIs with the lowest  
70 mean/minimum ratio were stapedectomy/ossiculoplasty, parotidectomy, and congenital neck  
71 masses. Since all of three of these are generally elective procedures, they are likely to be the  
72 most impacted. Although case numbers are helpful as they provide quantitative data, it is  
73 important to assess resident confidence in KIs as well. O'Brien and colleagues reported that  
74 stapedectomy and rhinoplasty were the KIs with the lowest levels of independent practice among  
75 PGY5 residents.<sup>6</sup> For those reasons, program directors should pay particular attention to these  
76 KIs in graduating residents. During the current pandemic, alternative modalities (such as  
77 additional didactic sessions, online training modules, skills labs, etc.) may be required to  
78 augment training in these KIs to ensure that residents graduate with appropriate surgical skills.

79

80 Due to the nature of the COVID-19 pandemic, many states have implemented shelter in place  
81 orders to minimize spread and facilitate control of the disease. These regulations have rendered  
82 in person education impossible. In response, programs are implementing virtual substitutes for  
83 these educational experiences. The current state of technology has allowed for the integration of  
84 a variety of video conferencing platforms in order to achieve this goal. A national didactic  
85 curriculum has developed in order to enhance and supplement residency curricula while standard  
86 opportunities are limited. This innovative project began in California with the goal of widely  
87 disseminating an accessible and consistent set of lectures by working collectively. The end  
88 product of this endeavor is a daily lecture series that has been made available to residents across  
89 the nation. After the introduction of the West Coast consortium, the Otolaryngology Program

90 Directors Organization (OPDO) introduced Midwest and East Coast consortiums in order to  
91 accommodate all time zones (see Figure 1).

92

93 Many residency programs have created teams in which a portion of the residents are assigned to  
94 clinical activities while others are to abstain. At our institution, a research curriculum has been  
95 implemented. The nonclinical residents video conference with their research mentor weekly to  
96 develop a plan. At the end of each week, a virtual research meeting is held for all residents. One  
97 resident provides an in-depth update on their project. The research techniques and statistical  
98 analyses specific to that project are reviewed in detail.

99

100 Although it is important to ensure continuity of resident education during this time, it is critical  
101 for leaders to be mindful of the impact that an event such as a pandemic can have on mental  
102 health. Faculty, program directors, and chairs must allow time and space for learners to acclimate  
103 to this new environment. Many residents are experiencing the added mental tax of worrying  
104 about not only their own safety, but also for the safety of family, friends, colleagues, and  
105 patients. Open discussions of fears, concerns, and frustrations should be encouraged. Finding a  
106 balance between setting productivity goals and allowing time for processing is essential for well-  
107 being.

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109 We require flexibility from not only our learners, educators, and administrators, but also our  
110 overseeing bodies, such as the ACGME,<sup>7</sup> Residency Review Committee (RRC),<sup>8</sup> and the  
111 American Board of Otolaryngology – Head and Neck Surgery (ABOto) (see Table 2).<sup>9</sup> It is  
112 encouraging to see the early communications from these bodies that have shown understanding

113 and reassurance in this time of uncertainty. Redeployment of otolaryngology residents is a new  
114 reality for many otolaryngology residents.<sup>8</sup> As our residents are being called to the front lines, it  
115 is important to ensure their safety, with appropriate personal protective equipment (PPE),  
116 supervision, and adherence to duty hour requirements.

117

118 In less than one month, otolaryngologists have implemented technology for the delivery of  
119 education, a nationwide didactic curriculum, virtual sessions for social connectedness, and new  
120 research curricula. Continued focus on innovation in education while maintaining a safe working  
121 environment for our residents is paramount. Lessons learned during this crisis will inevitably  
122 shape the future of resident education.

123

124 Table 1

125 Ratios of Otolaryngology Key Indicator Mean Cases and Required Minimums

126

Key Indicator	National Mean Cases per Resident (2009-2017) <sup>1</sup>	ACGME Minimum Requirement	Mean/Minimum Ratio
<b>Parotidectomy</b>	<b>25.23</b>	<b>15</b>	<b>1.68</b>
Neck Dissection	60.39	27	2.24
Oral Cavity Resection <sup>2</sup>	N/A	10	N/A
Thyroid/Parathyroidectomy	63.96	22	2.91
Tympanoplasty	43.54	17	2.56
Mastoidectomy	38.28	15	2.55
<b>Stapedectomy/Ossiculoplasty</b>	<b>16.45</b>	<b>10</b>	<b>1.65</b>
Rhinoplasty	20.63	8	2.58
Mandible/Midface Fractures	36.46	12	3.04
Flaps and Grafts	52.76	20	2.64
Airway – Pediatric and Adult	68.35	20	3.42
<b>Congenital Neck Masses</b>	<b>13.11</b>	<b>7</b>	<b>1.87</b>
Ethmoidectomy	90.56	40	2.26
Bronchoscopy	70.7	22	3.21

127 Key Indicators with Mean/Minimum Ratios of <2 are shown in bold.

128

129 1. National mean cases per resident (as either resident surgeon or resident supervisor) from 2009-  
130 2017 were calculated based on data presented by Gurgel et al.

131 2. A mean/minimum ratio for Oral Cavity Resection could not be calculated since mean case  
132 numbers were not available for this Key Indicator in the data presented by Gurgel et al.

133

134 Abbreviations: ACGME: Accreditation Council for Graduate Medical Education; N/A: Not  
135 available

136 Table 2

137 Summary of ABOto Temporary Changes in Requirements during COVID-19 Pandemic

	Standard ABOto requirements	ABOto temporary changes
PGY1	6 months otolaryngology rotations	3 months otolaryngology rotations
	6 months non-otolaryngology rotations	3 months non-otolaryngology rotations
		6 months flexible rotations at PD discretion
PGY2-PGY5	All time spent in otolaryngology rotations	Clinical time caring for COVID-19 patients counts toward Board Eligibility
		PD to determine if resident is able to advance
PGY1-PGY5	6 weeks leave time in one calendar year	Additional 2 weeks of leave time for quarantine time if engaged in educational activity not counted toward 6 weeks
		Absences >2 weeks considered on case by case basis

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139 Abbreviations: ABOto: American Board of Otolaryngology – Head and Neck Surgery; COVID-

140 19: Coronavirus disease 2019; PD: program director

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143 Figure 1

144 Daily Timeline of Consortia Didactic Sessions

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147 Abbreviations: CMIOREP: Collaborative Multi-Institutional Otolaryngology Residency

148 Education Program; CORONA: Consortium Of Resident Otolaryngologic kNowledge

149 Attainment; EDT: Eastern Daylight Time; GLOC: Great Lakes Otolaryngology Consortium;

150 PDT: Pacific Daylight Time

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EDT	PDT	
4 <sup>AM</sup>	1 <sup>AM</sup>	
5	2	
6	3	
7	4	
8	5	<b>Midwest Consortium (CORONA) Didactics</b>
9	6	
10	7	
11	8	
12 <sup>PM</sup>	9	
1	10	
2	11	
3	12 <sup>PM</sup>	<b>East Coast Consortium (GLOC) Didactics</b>
4	1	
5	2	
6	3	
7	4	<b>West Coast Consortium (CMIOREP) Didactics</b>
8	5	
9	6	
10	7	
11	8	
12 <sup>AM</sup>	9	

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