Otolaryngology Education in the Setting of COVID-19: Current and Future Implications

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Background:

The COVID-19 pandemic continues to garner extensive international attention. The pandemic has resulted in significant changes in clinical practice for otolaryngologists in the United States; many changes have been implemented to mitigate risks identified by otolaryngologists in other countries.\textsuperscript{1,2} COVID-induced limitations (CIL) include social distancing and triaging of patient acuity. Additionally, a recent publication by Stanford University has drawn particular attention to the risks otolaryngologists may face with regards to manipulation of the upper airway and mucosal disruption.\textsuperscript{3} As a result of COVID-19 recommendations, multiple institutions have overhauled resident clinical rotations. As examples, otolaryngology residents may no longer be involved in outpatient clinics or elective surgeries, and consults are triaged based on urgency. Additionally, residents have been grouped into companies or platoons in order to distribute a relatively limited number of trainees to clinical care. The goal of small separate resident groups is to limit potential resident exposure to COVID-19 positive inpatients, and to limit interaction with other residents in order to theoretically maintain personnel levels. Small resident groups may also be used to segregate susceptible head and neck cancer patients from the general patient population. One institution has created a consult service which is staffed by different residents and faculty than cover the cancer patients.

COVID’s impact on otolaryngology resident education has garnered relatively less attention nationally. Many programs have traditionally employed some degree of distance or online learning (e.g. remote lecturers from other academic institutions, web-based training, etc.). However, due to Centers for Disease Control (CDC) recommendations for group size of no more
than 10 people and keeping people 6 feet apart, many programs have been forced to move resident educational lectures to a remote-conferencing platform to maintain compliance with ACGME educational requirements.\textsuperscript{4}

If epidemiologic projections hold true, the duration of CILs will outlast many programs’ cache of educational materials. In other words, a two-year cycle of resident education could theoretically be exhausted in less than two months, thus resulting in significant repetition of learning material if only internal departmental lectures and lecturers are used. Not only could this create educational fatigue (e.g. “tuning out”) by the residents, but also teaching fatigue on the part of faculty within a single department.

In light of these aspects and given that a national otolaryngology resident curriculum has been proposed for years, we felt that a more structured educational format is critical to resident education both during CIL and beyond. Here we present the current consortium movement, future planning for a national otolaryngology curriculum, and implications for residency education and education in general.

**CIL Otolaryngology Resident Education Changes:**

Directed in part by Sonya Malekzadeh, MD, Chair of Otolaryngology Program Director’s Organization (OPDO), three consortia in otolaryngology resident education have developed nearly simultaneously with similar aims (Figure 1): John Oghalai, MD, started the Collaborative
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Multi-Institutional Otolaryngology Residency Education Program. Sarah Mowry, MD, started the Great Lakes Otolaryngology Consortium (GLOC). Brett Comer, MD, and Niki Gupta, MD, started the Consortium of Resident Otolaryngologic Knowledge Attainment (CORONA) initiative in otolaryngology. All three consortia offer a web based teleconferencing format for live lectures by faculty from numerous institutions nationwide. Lectures are recorded for later reference as well. Live lecture times have purposely been staggered for learning convenience based on time zones, for 8 total hours of lectures daily. Supplemental materials are listed as well for increased structure of learning based on the day’s lectures.

Other online learning resources have also been made available. The American Academy of Otolaryngology—Head & Neck Surgery (AAO-HNS) provided free access to AcademyU and Otosource for all residents through August 2020, and the process of integrating these resources into the consortia curriculum has begun.

It is important to preemptively plan for offering a unified national platform for education for residency programs to use pending the length of CIL on otolaryngology residency education in the United States, and perhaps beyond. As a specific example, if the CILs continue into the 2020-2021 academic year, otolaryngology subspecialty knowledge continues to be important. Additionally, topics such as critical care management, ventilator management, volume resuscitation, etc. become necessary topics as new interns enter post-graduate medical education. If CILs continue to reduce PGY-1 clinical exposure, a remote learning curriculum covering basic perioperative knowledge will also be required. Prior to COVID, the OPDO and
SUO had been working to create a specific otolaryngology PGY-1 curriculum, and the CILs may adjust this. Pending the severity of the COVID-19 impact on healthcare staff, it could also be that otolaryngologists and other physicians will be reassigned and will need rapid knowledge base expansion to run ventilators and perform critical care medicine. A national platform could facilitate this rapidly-needed education.

Additionally, unification of the consortia on some level becomes more important. For example, rotating curriculum foci amongst the consortia may become important in order to distribute live lecture topics among times most convenient for learners based on time zones. Even if CILs are lifted within a few months, the consortia may serve as a blueprint for the national unified curriculum and other education.

Progression Plan for Consortia and a Unified National Otolaryngology Education:

Figure 2 models a proposed development progression plan for the consortia. Traditional resident education in otolaryngology has consisted of hands-on or face-to-face learning with patients in the operating rooms, clinics, and inpatient floors. Didactic lectures supplemented this learning. In more recent years, simulation has become more prevalent in order to facilitate both comfort with procedures and learning. With CIL, the consortia were initiated, originally with the intent of simply providing lectures to fill the gap of less patient contact and limited internal educational supply of departments. Lecturers self-selected topics, date(s), and time(s) of lectures based on consortium schedule availability.
We propose that the consortia thoughtfully coordinate scheduling over time such that learning foci are distributed temporally among the consortia. This would allow volunteer lecturers to more easily identify in one setting where lecture topics are needed, and, conversely, where similar lecture topics may be already heavily grouped. Each consortium could initially still be managed locally due to time zone considerations for lectures, as background work such as splicing of videos and fielding technical problems as they occur.

In the maintenance phase, we foresee a few possible scenarios. First, the schedule could continue as already set by the consortia, with similar benefits. We foresee a potential issue with waning of interest as clinical schedules return to normalcy, precluding viewing of live lectures most of the day. Secondly, the spreadsheet could be used but with a fill-in-the-blank option by programs. For example, if Program X needs a lecturer on neck dissection on 11/17, then they list those characteristics to the spreadsheet, and this is essentially open-source filling of lecture slots on demand. One could easily envision an app for both scheduling and also for real-time notifications of open lecture slots. Thirdly, lecture topics could be listed, then lecturers with lecture(s) on those topics could be listed. Essentially, programs would then have the option of multiple lecturers from which to choose.

Limitations of Current Consortia and Needs Assessment:
The consortia are grassroots efforts on the part of a few otolaryngology departments. There have been some initial obstacles to development of the consortia, as well as some potential needs in the future. For example, the start of the consortia necessitated significant uncompensated time towards the creation and management of the consortia by departmental faculty, staff, and web designers, as well as costs associated with web-based viewing platforms. It may be that additional memory for recording cache has to be purchased in the future, in addition to website maintenance.

We foresee a waning of enthusiasm to some degree, similar to what happens with any new product. As clinical activities resume when CILs are lifted, we foresee a significant reduction in the number of volunteers for the consortia. Additionally, pending the length of the CILs, it may be that at-home simulation models need to be developed as an adjunct to the daily lectures and reading materials.

For the long-term survival of the consortia and perhaps integration into a national curriculum, analytics must be tracked to determine audience volume at different times of the day. There should be greater collaboration in identifying volunteer lecturers, with a unified announcement platform. There also would need to be decisions made regarding long-term management of the consortia. For example, should the management be turned over to a national stakeholder such as the AAO-HNS; should the content be kept open-source or with a monthly access fee; should there be a way to assess learning via period questions or testing?
Future Implications:

We see several potential fundamental changes to otolaryngology education and general education more broadly:

National Residency Curriculum

The first and most obvious byproduct of the consortia is a unified national residency curriculum. Currently, the consortia are simply an attempt to continue resident education as reasonably as possible given CIL causing significant disruptions of resident education on several levels. We realize that a comprehensive curriculum requires goals and objectives, educational strategies, and assessment tools, similar to what general surgery has implemented with the SESAP and ACS/APDS curriculum (would add the reference to the ACS curriculum). The OPDO Curriculum Task Force has begun work on a PGY-1 curriculum. That said, we feel that these consortia can serve as a blueprint for a portion of a national otolaryngology residency curriculum. A positive aspect of having three consortia initially is to be able to compare and contrast to find out what aspects are beneficial and what aspects need fine-tuning, and then continually honing to achieve an outstanding product. As mentioned above, several questions must be answered regarding the back-end issues once CIL ends, including who runs the curriculum once clinical volumes return to normal ranges, at what, if any cost, and how to guarantee intellectual property is preserved.
Medical Student, Resident, and/or Fellow Recruitment into Otolaryngology Education

Cardiology fellowships and emergency medicine residency programs have participated in remote interviews previously for either primary screening interviews or formal interviews, respectively. During the COVID-19 outbreak, facial plastic and reconstructive interviews were either cancelled or moved to an online interview platform. From a recruit’s perspective, the Zoom-based interviews have the advantages of decreased travel costs, travel time, absence from work, and flexibility in scheduling. Programs also have greater flexibility with interview times. Disadvantages include lack of face-to-face contact that, in some cases, may be beneficial to get the general gestalt of an applicant or program, as well as inability to observe in the clinic or OR which is considered an educational advantage to this style of interview. These factors are currently being investigated in depth.

Faculty Development

The CILs and resulting consortia are giving faculty, and junior faculty in particular, exposure to a wide variety of residents across institutions, as well as to potential employers. The consortia concept may completely change the idea of what it means to be an “invited professor,” particularly as it relates to costs associated with in-person lecturing.

Regional and National Conferences

Multiple conferences this spring have been canceled due to CILs, including the 2020 Combined Otolaryngology Spring Meetings (COSM). Interestingly, the opening of the resident educational
consortia occurred almost simultaneously. Long-term impacts of significant remote education remain to be seen, but it may be that conferences need to reformat meetings. For example, certain conferences currently are completely in-person, didactic-based, whereas others are a combination of presentation-format, experiential hands-on learning, and conference committees. It may be that some conferences could go to a completely remote-based format, whereas others could become a hybrid of remote-learning combined with hands-on learning.

There are financial implications to be considered from these changes. From conference participant perspective, there could be substantial cost savings and remote education could result in “cherry picking” conference attendance while still working part time during the conference. From an organizational perspective, format changes could result in substantial cash flow alterations due to loss of registration fees and the ancillary income that are beyond the scope of this discussion. Additionally, purely remote learning precludes the networking and hands-on activities that are a significant and enjoyable part of conferences.

**Continuing Medical Education (CME)**

The American Academy of Otolaryngology-Head & Neck Surgery (AAO-HNS) has long endorsed remote and online learning via its AcademyU platform and otherwise. Online CME and education have been used in hybrid with hands-on skills check off by the American Heart Association (AHA) for activities such as Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) training.
It may be that the AAO-HNS, American Board of Otolaryngology—Head & Neck Surgery (ABO-HNS), or other national stakeholders could harness live remote learning for CME or MOC credit as well. A tiered funding system could be developed such that residents or fellows-in-training could access for free, but practicing otolaryngologists pay either on a per lecture basis or a monthly fee.

General Education

The consortium concept could be expanded to other medical specialties, graduate education (medical and otherwise), undergraduate education, and high school. To some degree, online learning has been heavily adapted by undergraduate programs such as the University of Phoenix. The otolaryngology consortiums are already garnering interest in other specialties such as urology.9

There are significant financial implications from fundamental changes such as these, but to think that these concepts will not become more and more ingrained in learning through additional grassroots efforts is fallacious. Colleges and Universities could be quite resistant given the fact that faculty positions theoretically could be slashed substantially by essentially “crowd sourcing” teaching, it could become that a majority of room and board fees become obsolete. Similar to the economic ramifications for the taxi industry due to crowd-sourcing companies (Uber, Lyft), if higher education does not work proactively on the forefront of these changes, it may become obsolete. Finally, accountability and oversight on part of both the teachers and the learners becomes of utmost importance.
Conclusions:

COVID-induced limitations have impacted otolaryngology resident education, and directly led to the development of three national consortia in resident education. The consortia program may serve as an adjunct and/or blueprint for developing the long-discussed national otolaryngology curriculum. There are several potential direct and indirect long-term ramifications related to otolaryngology education and perhaps education as a whole. Our desire is for the remote learning consortia to serve as a major steppingstone in improving otolaryngology resident education.
References:


Figure Legends:

Figure 1: Aims of Consortia

Figure 2: Steps of Live Remote Learning Development Due to COVID-induced Limitations
- To continue otolaryngology resident education remotely in the setting of reduced clinical experience, limited educational resources, and limited in-person contact during the COVID-19 pandemic

- To build a collaborative network of educators in otolaryngology

- To expose residents to educators from other academic institutions, expanding diversity of viewpoints and teaching methods

- To serve as a starting point to include international colleagues whose departmental education platforms have been devastated by COVID-19.

- To serve as a platform for future national or international lecture formats and/or course material in otolaryngology

- To forecast potential fundamental changes to otolaryngology resident recruitment, in-training education, and continuing otolaryngology medical education
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<thead>
<tr>
<th><strong>Stage 1</strong>: Status Quo, pre-COVID</th>
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<tr>
<td>Traditional departmental educational schedule, including in-person didactics, operations, simulations</td>
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<tr>
<th><strong>Stage 2</strong>: COVID-Induced Limitations on Group Size</th>
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<tr>
<td>In-person didactics changed to a departmental remote-learning platform</td>
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<th><strong>Stage 3</strong>: Realization of Internal Departmental Limitations</th>
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<tr>
<td>Consortium schedules developed, recruiting external speakers</td>
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<td>Topics self-selected by volunteer lecturers for available dates/times</td>
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<th><strong>Stage 4</strong>: Realization of Educational Topics</th>
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<tr>
<td>General topic categories added to consortium schedules</td>
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<td>Supplemental materials from AcedemyU and other sources added</td>
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<th><strong>Stage 5</strong>: Consolidation of Consortium Resources</th>
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<tr>
<td>Specific topics added to general topics for consortia</td>
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<td>Coordination of rotating general topics such among consortia</td>
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<td>Coordination of consortium schedules onto one shared spreadsheet</td>
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<td>Continued management of respective lectures by each consortium leader</td>
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<th><strong>Stage 6</strong>: End of COVID-Induced Limitations</th>
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<td>Drawdown of departmental-run consortia and assumption of running curriculum by one of national otorhinolaryngology stakeholders or other service</td>
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<th><strong>Stage 7</strong>: Maintenance</th>
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<tr>
<td>Fine-tuning of lecture topics based on national stakeholder education committee decisions</td>
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<td>Running schedule for volunteers for daily live lectures</td>
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<tr>
<td>Individual departments can list lecture needs on common spreadsheet</td>
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<tr>
<td>Untimed live lecture times filled with recorded lectures, curated by national stakeholder</td>
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<tr>
<td>Running schedule for regional/national conference volunteers and/or “invited speakers”</td>
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