Title: Pediatric otolaryngology divisional and institutional preparatory response at Seattle Children’s Hospital after COVID-19 regional exposure

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Keywords: pediatric otolaryngology; COVID-19; preparatory response; endoscopy

Conflicts of Interest: Dr. Randall Bly is co-founder and holds a financial interest of ownership equity with Edus Health, Inc and EigenHealth, Inc. He is Consultant and holds equity in Spiway, LLC. All other authors have no conflicts of interest.
Abstract

COVID-19 is a novel coronavirus resulting in high mortality in the adult population but low mortality in the pediatric population. The role children and adolescents play in COVID-19 transmission is unclear and it is possible that healthy pediatric patients serve as a reservoir for the virus. This article serves as a summary of a single pediatric institution’s response to COVID-19 with the goal of protecting both patients and healthcare providers while providing ongoing care to critically ill patients who require urgent interventions. A significant limitation of this commentary is that it reflects a single institution’s joint effort at a moment in time but does not take into consideration future
circumstances which could change practice patterns. We still hope dissemination of our overall response at this moment approximately 8 weeks after our region’s first adult case may benefit other pediatric institutions preparing for COVID-19.

Methods
Retrospective assessment of a quaternary children’s hospital surgical division’s response to COVID-19.

Setting
Established in 1908, Seattle Children’s Hospital is a 400 bed free standing academic teaching and research hospital located in Seattle, WA. It serves as a quaternary referral center to the states of Washington, Wyoming, Alaska, Montana, and Idaho, serving an estimated combined population of 11 million and pediatric population (<18 years) of 2.6 million. For this entire region, there are 16 fellowship trained pediatric otolaryngologists, 10 of which practice full-time at Seattle Children’s Hospital.

Coronavirus Disease 2019 Context and Exposures
Coronavirus disease 2019 (COVID-19) is an acute respiratory disease caused by the newly identified β-coronavirus SARS-CoV-2, or 2019 Novel Coronavirus. The COVID-19 pandemic has been recognized by the World Health Organization as an international public health emergency.\(^1\) COVID-19 spreads primarily through the respiratory tract by droplets, secretions, and direct contact.\(^2\) There is emerging evidence that procedures
and exams involving the upper aerodigestive tract are extremely high risk for
transmission, making otolaryngologists a particularly vulnerable population. 3

The first case of COVID-19 in the United States was announced on January 21st, 2020
in the State of Washington. The first death in the United States was in Washington
State on February 29th. The earliest infections and deaths affected residents and
workers in a senior living facility 12 miles east of Seattle. COVID-19 was declared a
pandemic by the World Health Organization on March 11, 2020. Washington is
currently the state with the second largest number of test-positive COVID-19 patients,
after New York. However, the limited availability of testing affects our ability to
determine the overall prevalence of COVID-19 infections. On March 4th, the first public
school system in the state was closed as a response strategy to mitigate exposures and
on March 11th, almost all school systems were closed. Currently, there are greater
than 2,000 regional positive cases but only 2% of these cases are in the pediatric
population (Table 1).

**Cumulative Response**

There were several factors considered in determining the response to this pandemic.
Initially, the response was directed at mitigating exposure to patients and their families.
As the infection spread, it became clear that children were less likely to become
severely ill from the infection. Hence, for pediatric caregivers, the focus shifted to
protection of the healthcare workforce. This is particularly important in otolaryngology
where many procedures involve the upper aerodigestive tract resulting in caregiver risk
for exposure. Conservation of personal protective equipment (PPE) was also a significant strategic factor in decision making.

Hospital traffic

All patients and providers are screened with COVID-related symptom questions and temperature assessment at all entry sites. Multiple sites of entry into the medical center were limited to permit screening at dedicated entrances. Our institution expanded its ICU criteria from 18 to 21 with the goal of level-loading care of younger adults from adult institutions to ours.

Triage of surgical cases

Elective surgical cases have been postponed. Only emergent and urgent cases are being performed. Examples of emergent otolaryngologic cases include management of severe airway obstruction, aerodigestive foreign body removal, soft tissue abscess drainage, complications of rhinosinusitis or otitis media, and post-tonsillectomy hemorrhage. Cases are deemed urgent when postponement of surgery could negatively impact a child’s overall health or developmental outcomes, and a delay of 6 weeks could result in those outcomes being measurably worse. Examples of urgent cases include malignancies and complicated cholesteatoma.

Triage of ambulatory visits

Patients are individually screened by providers and categorized into three tiers:

Tier 1: Must be seen in person, clinical issue is urgent, and physical exam essential
Tier 2: Appropriate for a telephone or telemedicine visit

Tier 3: Visit should be rescheduled

Telemedicine capabilities exist at our institution after being credentialed. We observed that in many instances, a phone call, coupled with photographs that the family sends in ahead of time were effective for making an assessment and to determine accurate timing of if/when that patient needs to be seen in-person. Multidisciplinary clinics such as Craniofacial, Hearing Loss, Thyroid, and Vascular Anomalies Clinic have continued to hold conference discussions (virtually) about patients previously seen. There is a wide variety of sub-specialization within our group and some diagnoses are more amenable to telephone call than others. Taking that into account, a review of clinic tier categorization data across all providers showed that of 314 planned clinic visits over 10 days, 24% were kept as in-person visits (Tier 1), 16% were converted to telephone (Tier 2), and 60% were postponed (Tier 3).

Provider deployment

Our standard inpatient team consists of one attending physician, two fellows, two residents, and one nurse practitioner. In an effort to mitigate the risk to trainees, they were placed on a partial deployment schedule such that each trainee could be in the hospital two to three days per week.

In response to the COVID-19 pandemic, our current inpatient team consists of one attending physician, one fellow, one resident, and two nurse practitioners. Given the
reduction in ambulatory clinic volume and surgical cases, we had the ability to identify a 
back-up attending who is available to support the inpatient team (available within 30 
minutes). All other teammates are available to be in hospital within 60 minutes. In 
addition, four attending physicians reside less than a mile from the hospital and could 
readily mobilize to assist with acute emergencies. Twice a day tele-conferenced 
huddles are carried out so teammates in hospital and home can review cases and 
provide input.

Trainees, nurse practitioners, or attending surgeons who develop any symptoms 
suggestive of viral infection are required to self-quarantine and obtain testing for 
COVID-19, following institutional policy.

Inpatient Operative and Endoscopy Procedures
Given the uncertainty of potential provider exposure to unknown carrier status of 
children with COVID-19, particularly in procedures associated with upper airway 
aerosolization, certain safety measures have been implemented. All OR cases are 
currently being screened for COVID-19 with a turn-around time of less than 24 hours, 
using a drive through testing process. In the event the urgency of a case does not allow 
for timely testing, the patient will be considered as COVID-19 positive and the 
procedure will be performed in a negative pressure room with strict isolation precautions 
that include N-95 masks or a Controlled Air Purifying Respirator (CAPR). Due to the 
potential high risk of viral transmission in certain procedures (e.g. Aerodigestive or 
rhinologic surgery) and to account for false negative results, these are being done in
negative pressure rooms with full PPE to minimize risk to care team, regardless of COVID-19 status. CAPR is preferred unless it is required for the surgeon to use loupes, a headlight or a microscope, in which case N-95 masks and eye protection are used. Preferential use of the CAPR system is based not only on the increased effectiveness (99% filtration vs. 95% rate with the N-95 masks), but also due to the ability to wipe down the face shields (each provider reuses their own) and re-use this system to preserve overall PPE supply.

During the COVID-19 pandemic we are only performing nasal and upper airway endoscopy procedures when the findings will have a significant impact on patient management decisions. For inpatient endoscopy, precautions are in effect similar to those for operative cases. This determination for urgent need is made via collaboration of the attending surgeon and the consulting primary team.

**Outpatient Endoscopy Procedures**

Similar to inpatient care, outpatient endoscopy is only being performed when a patient is deemed as having a critical clinical issue where information gathered on endoscopy will affect patient management decisions. In such a scenario, endoscopy will be performed in a negative pressure isolation room (clinic isolation room, ED isolation room, or operating room). We are not performing endoscopy at any of our ambulatory care facilities. Providers performing endoscopy wear full PPE.

**Impact on Otolaryngology Resident and Fellow Training**
While the above measures are designed to optimize patient care and mitigate the risk of exposure to COVID-19, they will have a negative impact on both resident and fellow training in Otolaryngology-Head and Neck Surgery. The reduction in ambulatory clinic and operative case volumes significantly limits trainee clinical educational opportunities. One strategy we have taken to address this issue is to involve our residents and fellows in discussions and planning sessions related to COVID-19 preparation and response. We feel this is a unique opportunity for them to gain knowledge in systems based care as it relates to crisis and disaster planning. In addition, we are working to develop additional learning opportunities that include simulation (with appropriate social distancing), video based instruction, didactic lectures, directed discussions on research projects and methodologies, as well as providing time to participate in national Otolaryngology educational opportunities.
Conclusion

Our divisional and institutional COVID-19 response is dynamic and rapidly changing. Our communication with all surgical specialties and our incident command center allows for rapid process improvement. This document represents our cumulative work at 8 weeks after initial regional exposure. The main interventions include (1) reduced staff presence at the hospital when not on call, (2) backup call system with redundancy, (3) postponement of all elective cases, clinic visits, and procedures, (4) conversion to telephone/telemedicine clinic visits when possible, (5) the use of COVID-19 testing and full PPE for all high risk procedures and (6) creating new educational content for trainees to supplement the loss of clinical activity.

References:


Table 1. Washington state COVID-19 exposures and deaths as of March 23rd, 2020, 3:07 pm. (Source: Washington State Department of Health)